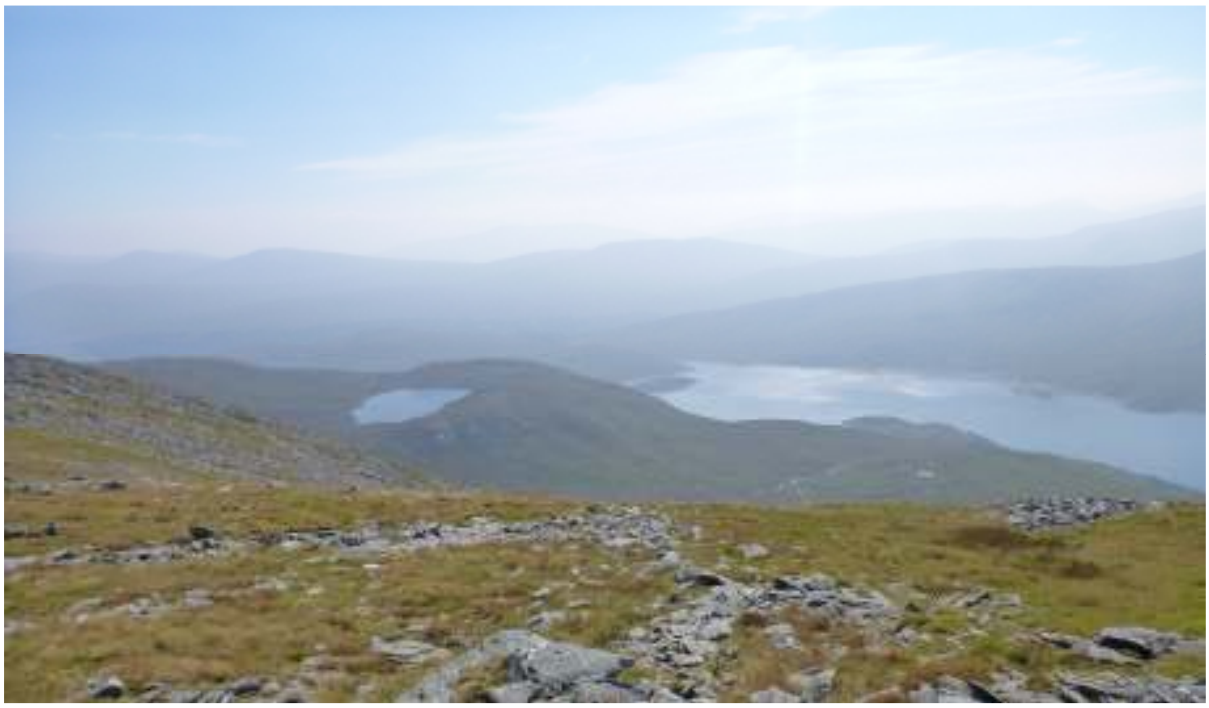
FEARNA STORAGE

Fearna Pumped Storage Hydro Scheme

CAR Licence Report

Non-technical Summary

September 2025



Quality Information

Prepared by	Checked by	Approved by
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Revision History

Revision	Revision Date	Details	Authorised
01	September 2025	Issue to SEPA	[redacted]

1 Introduction

1.1.1 The function of the Fearna Pumped Storage Hydro (PSH) project would be to create a large-scale long duration electricity storage (LDES) scheme with up to 1,800MW generation capacity to store and release energy from or to the electricity transmission system.

1.1.2 The Proposed Development / Controlled Activities would help to balance supply and demand for grid power at a national scale. The electricity storage capacity of the Proposed Development will be up to 36 gigawatt hours (GWhr), which equates to 20 hours of generation at 1,800 MW.

1.1.3 This would make it amongst the largest energy storage facilities in the UK, providing a very significant contribution towards meeting the Scottish Government's commitment to pumped storage hydro, as set out in the Scottish Energy Strategy.

1.1.4 The Proposed Development / Controlled Activities would reuse existing hydropower and other infrastructure during the construction and operational phases, to minimise impacts on the water and wider environment.

2 Need for the Project and Policy Context

2.1 Why It's Needed

2.1.1 UK is moving from fossil fuels to intermittent renewables leading to a growing need for backup and balancing capacity.

2.1.2 Short-duration batteries cannot meet multi-hour or multi-day needs. PSH is the only proven, scalable long-duration storage technology.

2.1.3 The Proposed Development would:

- Displace gas generation and cut ~930,000 tonnes of CO_2 annually.
- Support grid stability (Black Start, inertia).
- Contribute significantly to Scotland's net zero by 2045 target.

2.2 Policy Alignment

2.2.1 The Proposed Development aligns with the following key policies, amongst others:

- UK: Net zero by 2050 (Climate Change Act 2008, amended 2019);
- Scotland: Net zero by 2045 (Climate Change (Scotland) Act) and
- Government strategies (Clean Power 2030, Draft Scottish Energy & Just Transition Plan, COP29 commitments) all highlight pumped storage hydro as critical infrastructure.

2.3 Why Fearna?

2.3.1 Fearna was chosen after a nationwide site screening exercise based on:

- Excellent topography and geology for large reservoirs;
- Proximity to grid infrastructure;
- Outside sensitive environmental designations;
- Compact footprint compared to energy delivered; and
- The facility to Include habitat restoration and biodiversity enhancements.

2.4 Wider Benefits

2.4.1 The Proposed Development would provide the following key benefits:

- Energy security: reliable backup for renewables.
- Climate action: significant emissions savings.
- Economic value: jobs, investment, and clean energy leadership for Scotland.
- Environmental care: efficient use of construction materials, peatland restoration, habitat compensation.

3 Water Management

3.1 Water Use

3.1.1 The Proposed Development would utilise the existing Loch Quoich as the lower storage reservoir and Loch Fearna as the upper storage reservoir. Flows would be abstracted and returned to the reservoirs at the rates provided in this chapter.

3.1.2 The maximum energy storage of the Proposed Development would be up to 36 GWh, which corresponds to a useable water storage volume of 41Mm^3 (million cubic metres) in the reservoir system.

3.1.3 On commencement of operations, the upper reservoir would be pumped full using the available stored water in the lower reservoir.

3.1.4 The Proposed Development would only operate between agreed minimum and maximum levels of the proposed upper and lower reservoirs. There would be no impact on the current downstream flow regime from Loch Quoich.

3.1.5 All existing CAR Licences, namely CAR/L/1011471 covering the Ness catchment and CAR/L/1090786 covering the Allt a' Mheil hydro scheme would be unaffected by the Proposed Development.

3.1.6 Compensation flows would be passed through the two dams forming the upper reservoir, namely the Fearna Dam and Coire Dubh dam.

3.2 Geomorphology

3.2.1 There would be no significant geomorphological effect from the proposed controlled activities, however sediment augmentation to the River Garry in the downstream catchment is proposed as a biodiversity enhancement.

3.3 Water Temperatures

3.3.1 A number of surveys and studies have been carried out to investigate the existing temperature regime of Loch Quoich and the Gearr Garry and other waterbodies downstream of it, as well as the potential effects on these temperatures from the operation of the controlled activities. These are as follows:

- A baseline survey of temperatures in Loch Quoich and the Gearr Garry;
- A calculation of the temperature effect per cycle of the PSH; and
- An assessment of temperature variance in Loch Quoich using Tuflow FV 3D Modelling.

3.3.2 The effect of the proposed controlled activities on the temperature regime of Lochs Quoich and Fearna has been analysed, together with any potential effect on downstream waterbodies. Detailed modelling of Loch Quoich has shown that the seasonal thermocline regime within the loch would continue during the controlled activities, with a predicted increase on water temperature over 12 and 48 month simulation periods at the discharge point of the Quoich reservoir through the dam and tunnel of 0.2°C and a peak temperature increase in the month of September of 1.0°C and average of 0.4°C.

3.3.3 It is predicted that these changes will not have a material effect on the temperature regime of the Gearr Garry, to which the Quoich reservoir discharges, which has a baseline seasonal temperature variation of approximately 15°C that is largely driven by ambient temperatures rather than the temperature of the water feeding it from Loch Quoich.

4 Effect on Biodiversity – Aquatic

4.1.1 The CAR Report considers the likely effects of the Fearna Pumped Storage Hydro scheme on the water environment for the purposes of Controlled Activity Regulations. The scope includes the impact on the water environment only, encompassing waterbodies, watercourses, fish fauna, fish habitat, macroinvertebrates and macrophytes where a direct impact is likely to occur during the operation of the Proposed Development because of the controlled activity.

4.1.2 The chapter was prepared by Gavia Environmental Ltd, with specialist input from Professor Colin Adams of Glasgow University.

4.1.3 A total of 16 likely effects were identified. Three of these were scoped out due to predicted negligible impacts and included ingress & entrainment, impingement and noise & vibration.

4.1.4 Assessment of magnitude, importance and significance of 12 remaining factors concluded:

4.1.5 Negative effects (13 in total) ranged in significance from:

- Very Low (impact on riverine spawning habitat, fish attraction to intake, fragmentation of habitat, Reduction in macrophyte cover, reduction in

macroinvertebrate abundance (Loch Fearna), Water temperature changes from water transfer);

- Low (reduction in egg viability & hatch success, fish stranding and water quality reduction);
- Moderate (reduction in food availability for fish and Reduction in macroinvertebrate abundance (Loch Quoich)); and
- High (fluctuations in water level).

4.1.6 Mitigation would be provided in the form of high quality artificial spawning habitat areas created below the minimum Loch Quoich drawdown level. These habitats would feature optimal spawning substrates for Arctic charr and would be regularly maintained to prevent siltation from fine sediment. Current spawning opportunity on loch margins is often affected by existing drawdown thus presenting an opportunity for ecological enhancement.

4.1.7 In addition to simply mitigating the effect of the pump storage it is highly likely that a well-conceived mitigation plan would result in an environmental net gain, compared with the current position for Arctic charr.

5 Effect on Terrestrial Ecology

5.1.1 An Ecological Impact Assessment (EcIA) has been completed which evaluates the potential ecological impacts associated with the proposed Fearna Pumped Storage Hydro (PSH) development, focusing on designated sites, habitats and protected species. The EcIA provides a comprehensive assessment of the ecological implications during both construction and operational phases, detailing predicted impacts, mitigation measures, biodiversity enhancements, and anticipated residual effects.

5.1.2 The proposed development site comprises a variety of ecologically sensitive areas, including Annex 1 habitats and Scottish Biodiversity List Priority Habitats, some of which qualify as Priority Peatland, Ancient Woodland, and Caledonian Pinewood. The project area also supports protected and notable species, including otter, pine marten, red squirrel, amphibians, reptiles, dragonflies, and other protected Scottish Biodiversity List (SBL) invertebrates. The main potential impacts identified include:

5.1.3 The construction of dams, access tracks, and reservoirs would result in the permanent loss of certain habitat areas and temporary loss/modification/degradation of others:

- Peat and carbon-rich soils would be lost and disturbed, affecting soil integrity and carbon storage. Construction activities may also alter water flow and quality, potentially impacting adjacent peatland, wetland, and aquatic habitats.
- Risks to protected and notable species include habitat degradation, fragmentation of foraging and commuting habitats, disruption of rest and breeding sites, pollution incidents, and potential for vehicle collisions.

5.1.4 To address these impacts, a Biodiversity Enhancement and Management Plan (BEMP) would be produced, with specific, measurable goals for habitat restoration,

enhancement, and biodiversity net gain. An outline of this BEMP is included with the EIAR chapter at Appendix 8.7: OBEMP. Key mitigation and biodiversity net gain strategies include:

- Woodland, peatland, and montane scrub habitats would be restored or created in the Glen Garry Forest to compensate for habitat loss, including significant areas of riparian restoration / planting.
- A Peat and Soil Management Plan and water quality protocols (aligned with SEPA guidelines) would reduce the risk of contamination and protect water and soil resources.
- Measures such as timed enabling works and vegetation clearance, speed restrictions, translocation of vulnerable species would be implemented to reduce disturbance to wildlife and minimise ecological impacts during construction activities.

5.1.5 An Invasive Non-Native Species (INNS) Management Plan would be implemented to prevent the spread of invasive species, including biosecurity protocols for construction activities.

5.1.6 After the application of mitigation measures, the residual effects on most ecological receptors are expected to be non-significant, with a moderate to high confidence level in the effectiveness of the mitigation strategies. Long-term habitat restoration efforts are anticipated to promote recovery and provide biodiversity net gain, reducing long-term impacts on local populations and sensitive habitats.

6 Effect on Biodiversity - Ornithology

6.1.1 Three protected species, Common Scoter (Melanitta nigra), Black-throated Diver (Gavia Arctica) and Red-throated Diver (Gavia stellata) would be affected by the proposed controlled activities' effects on waterbodies and watercourses.

6.1.2 The potential effects during construction and operation of the Proposed Development on designated sites (selected for avian ecology features) have been assessed. A detailed assessment of effects on West Inverness-shire Lochs Special Protected Area (SPA), which is functionally linked to the Site, is provided in a separate shadow Habitats Regulations Appraisal (sHRA) report.

6.1.3 After mitigation / compensation, it is assessed that there would be no residual negative effect from the construction or operational activity of the Proposed Development on any ornithological receptors within the area.

7 Effect on Economy

7.1.1 The economic effect of the Proposed Development has been assessed in accordance with the SEPA Guidance Note WAT-SG-67.

7.1.2 The assessment has determined that the significance of the effect on the economy as a consequence of the Proposed Development is **Positive High to Very High**.

8 Effect on Health & Safety

8.1.1 The likely effects of the Proposed Development on the population in terms of human health and human safety has been assessed under the following categories:

- the risk of ill-health or disease;
- the risk of injury; or
- human well-being more generally.

8.1.2 The assessment concludes that the following effects would give rise to effects with the significances tabulated below.

Effect	Type of Effect	Magnitude of Effect	Importance of Effect	Significance of Effect
Ill Health or Disease				
Private water supplies	Negative	Small	Medium	Low
Hydrocarbon pollution	Negative	Small	Medium	Low
Risk of Injury				
Public / Construction interface	Negative	Small	Very High	Moderate - High
Water Hazards	Negative	Very Small	Very High	Low
Road Traffic Accidents	Negative	Very Small - Small	Very High	Low - Moderate
Human Well Being				
Disturbance to recreational access	Negative	Very Small	Medium	Low

9 Effects on Recreation

9.1.1 The assessment addresses only direct impacts on recreation and access, with those associated with visual amenity assessed in Chapter 11 - Visual Amenity and Landscapes.

9.1.2 The forms of public recreation known to take place within and around the site of the Proposed Development, and which have been assessed in this Chapter are as follows:

- Canoeing;
- Swimming;
- Angling; and
- Hillwalking on the Munro Spidean Mialach.

9.1.3 The Proposed Development has the potential to impact upon recreational use and access within the proposed site and surrounding area. Some effects relate to construction disturbance and modifications to water discharges. Construction and

operational disturbance would be managed by provision of the measures outlined in the Section 36 planning application EIAR Appendix 14.1 – Draft Access Management Plan.

9.1.4 All impacts on recreation and access within the water environment during both construction and operation have been assessed as Negligible. The impact on hillwalking on the Munro Spidean Mialach from the construction and operation of the Fearna Reservoir has been assessed as Very Low.

10 Effect on Well Being – Visual Amenity and Landscapes

10.1.1 The LVIA has identified that there would be localised significant landscape and visual effects occurring during the construction of the Proposed Development within an area extending up to around 5 km and affecting the landscape character and special qualities of localised parts of the Moidart Morar and Glen Shiel SLA, and WLA 18. Significant effects are also predicted to the visual amenity of those using the minor road to Kinloch Hourn and walking routes to the mountains of Gleouraich and Spidean Mialach, and Gairich.

10.1.2 Significant effects to landscape areas would reduce after 15 years to an area affected by the upper reservoir and dams within around 4 km. Significant visual effects would be limited to those accessing the Gleouraich / Spidean Mialach walking route. An additional cumulative significant effect is predicted for those accessing the Gairich walking route within a scenario where the Beinn Bheag wind farm is also operational.

10.1.3 Whilst some longer term significant effects within this localised area are predicted to qualities of the SLA and WLA 18, within which the Proposed Development would be situated, the wider effect on these areas as a whole would not be significant.

11 Economic Opportunities for Disadvantaged Groups

11.1.1 The effect of the Proposed Development on economic opportunities for disadvantaged groups has been assessed in accordance with the SEPA Guidance Note WAT-SG-67.

11.1.2 The Construction stage of the project will provide around 500 employment opportunities for semi-skilled and skilled workers. The approximately 7-year construction period is the focus of the assessment on opportunities for disadvantaged groups.

11.1.3 The Operational stage of the project will require around 29 skilled workers. The Authorised Person continues to explore training and educational opportunities for these skilled workers such that there would be a benefit to disadvantaged groups, but this is ongoing and as such has been omitted from this assessment.

11.1.4 The assessment has determined that the Proposed Development has a Positive effect of very low Significance relating to economic opportunities to disadvantaged groups. It should however be noted that as part of a sensitivity analysis it was considered that if a significant proportion of the workforce was to come from the 5% most deprived areas of Scotland, then the significance of effect becomes Medium to High.

12 Effects on Climate Change

12.1.1 The effect of the Proposed Development on climate change has been assessed in accordance with the SEPA Guidance Note WAT-SG-67.

12.1.2 The assessment set out below has determined that the Proposed Development has a Positive effect of Very High Significance on Climate Change.

13 Invasive Non-Native Species (INNS)

13.1.1 The risk of the introduction, transfer or spread of INNS to or within the area of the Proposed Development by the controlled activities and their construction and operation has been considered, and the following risks identified:

- The risk of transfer of fishes from Loch Quoich to Loch Fearna
- The risk of introduction of INNS from outside the development area through the transport and deployment of personnel, equipment and materials.

13.1.2 Based on practical considerations, it is not proposed to try to prevent the potential transfer of fishes from Loch Quoich to Loch Fearna.

13.1.3 The risk of introduction of INNS to the development area through the transport and deployment of personnel, equipment and materials would be controlled by the implementation of biosecurity controls included in the project's Construction Environmental Management Document (CEMD), which would be drafted in compliance with the latest version of the SEPA guidance "Biosecurity Management of INNS for Construction Sites and Controlled Activities" and the Ness Catchment Biosecurity Plan 2021 – 2030.

13.1.4 The mitigation outlined above is considered a robust approach to minimise the INNS risk to the catchments potentially affected by the construction and operation of the Proposed Development and associated controlled activities. It is considered that the mitigation proposed means that the risk of INNS transfer is low.

14 Draft Balancing Test

14.1.1 The Applicant has undertaken a draft balancing test and considers that the Proposed Development has positive benefits that outweigh those that are negative.

14.1.2 Further assessment was then done using a sensitivity analysis which involved assessing the implications of applying a best case and worst-case assumptions in relation to aspects of those effects about which you are uncertain. The effects that are classed as Moderate-High or greater are listed in the table below along with the results of the sensitivity analysis.

Effect	Type of Effect	Significance of Effect	sensitivity analysis
Fluctuations in water level in Loch Fearna	Negative	High	sensitive to uncertainties
Public / Construction interface	Negative	Moderate - High	sensitive to uncertainties
Economy	Positive	High to Very High	insensitive to uncertainties
Climate Change	Positive	Very High	insensitive to uncertainties

The Very High positive effect on Climate Change was very robust when scrutinised in the sensitivity analysis and remained at Very High positive effect even with adjustment of associated factors used to determine the overall significance. This supports the conclusion that the very high positive effect on Climate Change is of a magnitude that concludes that the project has resulting greater positive benefits than negative.