

EARBA STORAGE

A GILKES ENERGY COMPANY

Earba Pumped Storage Hydro Scheme EIA Report

Appendix 2.3: Outline Construction Environmental Management Document

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Quality Information

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1 Introduction

1. This Outline Construction Environmental Management Document (CEMD) has been drafted to support the Section 36 application for the Earba Pumped Storage Hydro Scheme (the Proposed Development).
2. The Proposed Development is a large-scale long duration electricity storage scheme with up to 1800MW of generation capacity and 40 GWh of electrical energy storage. The Proposed Development would operate by transferring water between a lower reservoir, Lochan na h-Earba (Loch Earba) and an upper reservoir, Loch a' Bhealaich Leamhain (Loch Leamhain). The maximum water level of these existing lochs would be raised by constructing dams to increase their natural storage capacity. The reservoirs would be connected by an underground waterway system including up to three headrace tunnels.
3. This document is referred to as the Outline CEMD which means that it provides a framework from which a Final Construction Environmental Management Document (CEMD) would be developed with the aim of avoiding, minimising or mitigating any construction effects on the environment.
4. The delivery of all of the mitigation identified in the Chapter 20 of the EIA Report would be controlled and delivered through the final construction stage CEMD. The final version (or construction version) of the CEMD would be drafted and owned by the Principal Contractor. It is anticipated that the final version of the CEMD would be submitted to the planning authority as a pre-commencement condition.
5. Whilst the CEMD would be finalised and submitted as a final version as part of a pre-commencement condition it is acknowledged that the CEMD would be a 'live' document and as such would be refined during the construction period. This aspect of the document is discussed further below.
6. In this outline CEMD the likely structure of the final document has been set out, along with highlighting key parts of the works that require early discussion and consideration.
7. In the final construction stage CEMD, all relevant published guidance by SEPA, Nature Scot and other competent authorities would be followed in the drafting and implementation of the CEMD.

2 Key activities of the Proposed Development

8. The key stages in the construction process are set out below. The list below includes some high-level detail on the construction activities that would be undertaken and highlights key environmental considerations associated with these parts of the works. It is expected that the final CEMD would expand upon these points in some detail. Furthermore, the list below is not exhaustive and significant further information would be provided in the final CEMD document.

Mobilisation Stage:

9. One of the first activities for the Principal Contractor would be to set up the construction compounds. These compounds would include offices, the temporary accommodation camps, concrete mixing plants and large storage areas.
10. Each compound area would require a detailed plan which would include (but not be limited to) the location of cabins, welfare, associated water treatment areas, drainage and areas for spoil storage.

Enabling works

11. Early enabling works would be underway at the same time as the site set up and would include construction of initial haul roads, construction of the new junction at the A86(T) and the new bridge at the Moy Channel.
12. The works associated with preparing the lower reservoir for dam construction would also be considered as enabling works. This includes the Pitridh diversion channel, the Shuas aqueduct and moving the Ardverikie hydro intake.
13. There are considerable interfaces with existing water courses in the above works and the measures that would be taken to minimise any impact of the works on the water bodies would form a key part of the CEMD methodology associated with these enabling works.
14. The new access track works would pass close to key ornithological receptors and the management of the works in these areas must be appropriate. The finalised CEMD would clearly set out the management of this potential habitat interface.
15. Borrow Pits would require bespoke Borrow Pit Management Plans and Spoil Management Plans which would include detailing drainage and EMPs along with any processing areas.
16. It is planned that Borrow Pits BP1, BP3 and BP4 along with SC3 in the lower Earba area and BP5A and BP5B and SC8 in the upper Leamhain Area would be used for stone processing and stockpiling as well as other construction activities. Please refer to **Appendix 2.4 – Mass Balance Strategy and Borrow Pit Plan** for further details of the proposed site borrow pits and site compounds which would be used to manage the earthworks process.

Powerhouse platform

17. A large platform for the powerhouse would be constructed in a cutting at the south side of Loch Earba. Significant earthworks would be required to form this platform and so management of run off and drainage during the excavation process would be crucial and would require to be planned in detail with layout plans and drainage management methodology included within the Pollution Prevention Plan (PPP) which forms part of the CEMD.

Access Tunnels

18. The tunnel adits for the access tunnel would require a heading which would need to be stabilised and appropriate drainage put in place.
19. The access tunnels would be constructed to reach key points in the waterway tunnel system. They would most likely be constructed using the drill and blast methods.

Significant water would be required as part of the drilling process, this water will either be pumped or flow by gravity to the tunnel adit. This run off would be removed from the tunnel system and would then require treatment. The process for the treatment of water being removed from the tunnels would be fully detailed in the finalised PPP and CEMD.

Powerhouse Shaft Construction

20. Six deep shafts are required at the powerhouse and these would be sunk once the powerhouse platform is complete. The shaft construction would be a top-down drill and blast process which would include temporary lining with permanent lining following. The removal of water from these works and the treatment process would be a key aspect of the finalised PPP and CEMD.

Headrace tunnels

21. Up to three tunnels would be required from the lower reservoir to the upper reservoir. These tunnels would be constructed using the drill and blast techniques. Following mucking out of the tunnel a temporary lining would be formed with shotcrete which would then be supplemented with a permanent concrete lining and in the highest-pressure section the permanent lining would be steel. There could be up to six tunnel faces being progressed at one time and this could produce a substantial volume of run off from the tunnels, all of which would require to be treated. This treatment process would be detailed in the PPP and CEMD including plans showing the location and size of treatment works.
22. The Surge shafts, which are vertical tunnels linked to the main headrace tunnels, provide a free water surface that can move up and down. These vertical tunnels would likely be constructed by the raised bore tunnelling technique. This would mean that run off and muck is removed via the headrace tunnel below. Space at the top of the surge shafts is limited and careful management of the works areas at ground level, which is over 700m above sea level would be required and detailed in the CEMD.

Dam Construction

23. The Dam construction on the lower reservoir requires a dam to the north (Shios) and a dam to the south (Shuas).
24. The Shios dam would require a suitably designed temporary diversion channel or culvert to pass water from the Earba catchment safely through or around the dam works.
25. Both the Shuas and Shios dams would interface with Loch Earba and this would likely mean further temporary works such as cofferdams to dewater the excavations to form the dam cut offs may be required.
26. The Leamhain dam is a constrained area with the Ben Alder & Aonach Beag SAC a downstream receptor and as such additional detail has been provided at this stage as to the likely methodology for lowering the loch level to allow a proper dry working area for construction. Please refer to **Appendix 2.1 - Leamhain Dam Construction – Draft Pollution Prevention Plan**.
27. All three dams are significant in size and would have large footprints. Design of the temporary drainage around the dam footprints would be crucial to avoid local flooding

of excavations, which can cause delay and abortive work, as well as the subsequent treatment of the water that would require to be pumped out of the excavation(s). Drawings of the finalised drainage around the dam works would form part of the final PPP and CEMD document and would be similar in principle to the proposals in **Appendix 2.1 - Leamhain Dam Construction – Draft Pollution Prevention Plan**, such that accumulation of run off within the works areas would be controlled.

Construction of the Control works

28. The Lower Control Works would provide the link from Loch Earba to the tailrace tunnel. It would be built both within and adjacent to Loch Earba and the works includes gate structures to isolate the tailrace tunnels from the powerhouse. These works present a large interface with an existing water body. Proposals are currently planned to allow for these works to be set back from the existing loch edge sufficiently to allow a temporary cofferdam arrangement in order to construct the works in the dry. The finalised temporary works would be carefully designed and managed to minimise any discharge into Loch Earba during excavation or concreting works. Continuous monitoring of loch levels would also be required.
29. The upper control works provide the link from Loch Leamhain to the main pressure tunnel. These upper works also include a shaft to allow for isolation of the pressure tunnel from the upper reservoir. As discussed above the lowering of Loch Leamhain is required to facilitate construction of the dam and this would also greatly assist with the construction of the upper control works with only a modest temporary cofferdam.

Powerhouse Superstructure

30. The installation of the powerhouse superstructure followed by the installation of the powerhouse overhead crane would mean drainage of the permanent works (roof) would need to be in place and the transition from temporary drainage to permanent needs to be done in such a way as to ensure that there are no pollution incidents.

Concreting works across the site

31. Concreting works would be undertaken across the site. The process to batch concrete, store associated materials, move concrete around site and safely transfer it to the formworks where it is required would be done in a manner that avoids environmental incident.
32. Concreting would be required throughout the construction programme from the bridge abutments at Moy on initial mobilisation right until the final casting in of the last piece of turbine equipment. The dams would have a foundation plinth and may have an upstream concrete face, there would be concrete lining within the tunnels, there would be concrete bridge abutments and control works structures to form. However, by far the largest volume of concrete would be required at the powerhouse.
33. The planned proposals are that the main lower area concrete plant serving Shuas dam, the Powerhouse and the underground tunnel system, would be located close to the powerhouse in either site compound SC2 or SC3, with further concrete plants located within SC6 at Shios dam, SC7 at the surge shaft area, and SC8, serving Leamhain dam and the upper control works. In all areas, suitable bunding and drainage management would be employed to avoid potential impacts on nearby waterbodies. Further detail of this process would be provided in the PPP and CEMD.

E&M Installation

34. Installation of the powerhouse mechanical and electrical equipment and associated commissioning of turbines would be undertaken towards the end of the construction programme. The start of commissioning would mean watering up tunnels for the first time. The methodology that would be undertaken to avoid any contamination of the lower and upper reservoir bodies would need to be set out in the final CEMD.

Reinstatement

35. Reinstatement of the site would be a significant process in order to enhance natural habitats and encourage re-growth of the natural environment and the methodology which is detailed in the CEMD would be referenced to best practice guidance, A specific Reinstatement Plan would form a section to the CEMD.

3 Structure of the Final CEMD

36. The Principal Contractor would draft the Final CEMD document and as a minimum the document would be expected to include a structure that encompasses the key chapters as set out below.
37. It is noted that chapters (or sub documents) such as a bespoke Peat Management Plan would sit within the CEMD. These sub documents would focus on both individual aspects of the works along with a holistic approach to the site on the specific section or subtopic.
38. In some cases, it may be necessary for multiple sub documents on the same topic to be contained within the CEMD. For example, the powerhouse would have a stand-alone pollution prevention plan, as would the Leamhain and Earba dams.
39. The structure and approach to the CEMD as detailed below would be refined but fundamentally the Contractor would be encouraged to create each chapter of the CEMD to be as succinct as possible with the use of drawings encouraged. This would make the document site specific and easier follow, which in turn would be useful when the Contractor is developing individual RAMS for site activities.

Introduction and description

40. The final CEMD would have an introduction and a full detailed description of the works. This would also be supported by key drawings showing the detailed design of the works.

Environmental Management Team

41. The Principal Contractor's Project Environmental Management Team would be set out, which would include the role of each team member, relevant experience and an organogram. This section would also outline the applicants environmental support staff such as the project ECoW and any other assisting clerk of works that would be involved in site monitoring.

Policies, Training and Communication

- 42. There are a number of Environmental Policies, such as those drafted by SEPA, that would be applicable to the project. These would require to be summarised in the CEMD.
- 43. The hierarchy of communications must be set out. This would include how comments from the applicant's side are communicated across the site and also the chain of command for dealing with environmental matters.
- 44. There would be a large workforce on site and environmental training along with toolbox talks focusing on environmental lessons learned would need to be undertaken, there should be a clear section in the CEMD setting out the training and toolbox talk process.
- 45. The transfer of information from the CEMD to the works RAMs and daily site briefings etc would be outlined.

Monitoring Plan

- 46. Details of the site Monitoring Plan that would assess the performance of the construction process against key environmental criteria would be documented in the CEMD. This would include items such as the performance of Environmental Protection Measures (EPMs). It would be a contractual responsibility of the Principal Contractor to ensure that the measures set out in the CEMD are implemented. Fully executing a well thought out monitoring plan would greatly reduce the risk of environmental incident.
- 47. In addition to this the Applicant would set up a site team to oversee the Principal Contractor's performance at implementing the CEMD.
- 48. During construction there may observations made over the suitability and effectiveness of implemented measures from the CEMD. Any need for improvement or alteration of an approach would be communicated to the Site team. Should improvement or modifications be made to the CEMD then these would be issued to the relevant stakeholders for comment as required.

Incident Response Plan

- 49. The Contractor's planned responses to, and measures for dealing with environmental emergencies would be clearly set out in an incident response plan, which would include any incidents occurring out of hours and who would be notified. The applicant would be expected to be informed along with SEPA (via the hotline) if there was such an incident.

Pollution Prevention Plan (PPP)

- 50. A Pollution Prevention Plan (PPP) would form part of the CEMD. The Principal Contractor would have obtained a construction licence from SEPA as required under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 and the PPP would be drafted to set out how the Principal Contractor would comply with the Construction licence.
- 51. As mentioned above separate PPPs (or separate chapters of the PPP) would likely be required for each part of the works. The Leamhain Dam outline PPP would be developed further by the Contractor as part of the final CEMD. Please refer to

Appendix 2.1 - Leamhain Dam Construction – Draft Pollution Prevention Plan
for more details of the proposals for this part of the works.

Final Water Crossings Schedule

52. Each interface with a water crossing must also be managed and **Appendix 12.3 – Schedule of Watercourse Crossings** provides initial detail of these; this would be further developed at detailed design stage and a final water crossings schedule would form part of the CEMD.

Drainage Impact Assessment (DIA)

53. A Drainage Impact Assessment (DIA) will form part of the final CEMD. The DIA would include details relating to any existing field drains and the management of surface water drainage, which would be designed in line with general Sustainable Drainage Systems (SuDS) principles. Mitigation measures to manage the risk of overland flow are included in **Chapter 12 Geology, Soils and Water** of the EIAR this would be linked to **Appendix 12.3 – Schedule of Watercourse Crossings**.

Ecological Management Plan (EMP)

54. This plan would include how the ecology interface with the works across the site would be managed.
55. The final EMP would provide detail on the working practices that would be implemented to minimise the impact of the works on site ecology.
56. Furthermore, at the start of the project, prior to mobilisation, a number of Ecological Pre-commencement Surveys would be required and the timetable for these surveys shall be clearly set out.
57. There may be Ornithological or other constraints that impact the works at different times of the year. Any resulting restrictions on working hours would be clearly set out along with a plan showing the location of the constraints. Where possible these would be designed out for example aligning access tracks to avoid areas of concern.
58. The EMP would provide plans and detail on any required habitat protection, such as isolating GWDTEs, so the works are properly managed adjacent to these areas.
59. The EMP would also make reference to the proposed mitigations contained each chapter of the EIAR and would use information contained in the following Appendices in the EIAR:
- **Appendix 8.2: Extended Phase 1 Habitat Survey (2022)**
 - **Appendix 8.3: Habitat Survey Report (2023)**
 - **Appendix 8.4: Protected Mammal Survey Report (2023)**
 - **Appendix 12.4 – GWDTE Assessment**
 - **Appendix 10.2 – Ornithology – Field Survey Methodology**
 - **Appendix 11.1 - Aquatic Surveys**

Waste Management Plan

60. The Waste Management Plan would detail how waste material arising from the works would be managed during construction.

61. It is expected that a waste avoidance process would be set up by the Principal Contractor to minimise the need to dispose of waste. This would then be followed by trying to recycle or reuse as much of the unavoidable waste that is produced on the site. Waste to landfill would, at all times, be minimised. The process to achieve these key aims would be challenging given the scale and complexity of the Proposed Development and would therefore require considerable forward planning. The WMP would provide the detail to achieve these objectives for the site.
62. The WMP would also outline the methods by which waste would be classified, sorted and stored on site. Storage of waste has impacts on the environment so this needs to be done in accordance with best practice and this would be set out in the WMP.

Peat Management Plan (& Soil Management Plan) (PMP & SMP)

63. Large quantities of peat excavation are required in the construction of the Proposed Development. These quantities are set out in **Appendix 12.2 – Initial Peat Management Plan (PMP)**. The approach to any excavation of peat is that it would be put to beneficial use and Appendix 2.2 also sets out how this peat would be used on site. It should be noted that as part of the Section 36 application a significant number of peat probes have been undertaken to inform the outline Peat Management Plan.
64. Following detailed design, the final footprint of the works would be known and there would be further ground investigation data to assess peat depths. With this information the peat management plan would be finalised and it would also include further information added from the Principal Contractor on their approach to stripping, storing and reinstating the excavated peat.
65. The final PMP would be a significant document with peat quantities from each part of the works documented, along with location for storage and the final area for the peat to be used in reinstatement works. The final PMP would underline one the Proposed Developments key objectives that excavated peat shall not be disposed of and must be put to beneficial use.
66. The PMP would also consider the stability of the Peat. Please refer **Appendix 12.1 – Peat Landslide Hazard Risk Assessment (PLHRA)**
67. Given that the Proposed Development is in an upland site in the Highlands peat would be the main organic material that is stripped from excavations prior to removal of superficial or rock deposits. Following the final GI an assessment would be made on whether a separate Soil Management Plan (SMP) would be required. This SMP would detail how soil (not peat) would be stripped, stored and reinstated if required.

Reinstatement Plan

68. Following on from the PMP the Reinstatement Plan would detail how the site would be restored. Where possible reinstatement would be undertaken as soon as is practical so as to best utilise stripped vegetation and give it the best possible chance of establishing.
69. It is expected that the ECoW would be closely involved in this process.

Construction Noise and Vibration Management Plan (CNVMP)

70. This section of the CEMD would detail how construction noise is to be controlled in line with best practice and guidance. This may be through a combination of types of

construction plant, certain working methods or a control of working hours for some construction activities.

71. At this stage of the project a draft Construction Noise & Vibration Management Plan (CNVMP) has been drafted and this is included in Appendix 18.3 of the EIAR.

Cultural Heritage

72. The Proposed Development would have only minimal interaction with Cultural Heritage interests but a short section of the CEMD would be dedicated to providing a Cultural Heritage Management Plan.

4 Finalising of the CEMD

73. The Principal Contractor would finalise the CEMD as they work towards mobilising to site. This document would then be submitted to the appropriate stakeholders including THC and SEPA allowing sufficient time for their review and feedback.
74. As set out in the narrative above it is expected that the CEMD would be an extensive document with site specific works areas discussed in detail.
75. Any comments from stakeholders would be reviewed and implemented into a revised final version. Site visits and workshops with stakeholders to review the Contractors proposals may also be beneficial.

5 Implementation & Purpose of the CEMD

76. The CEMD document would form the basis for environmental protection measures required across the site at the various works areas. The CEMD provides the site team with a go to document when drafting individual RAMS for site tasks so that the environmental aspects can be considered and understood. These RAMS would then be expected to reflect the environmental interface with inclusion of appropriate methodology.
77. The Principal Contractor would likely require the assistance of Subcontractors. It is expected that the CEMD would be fully signed up to and implemented by all subcontractors. The contractual obligations put on the Principal Contractor by the applicant to adhere to and implement the CEMD would be imposed by the Principal Contractor onto any subcontractors in a 'back to back' arrangement.
78. The CEMD would be Live document and it is expected there would be a number of revisions throughout the duration of the works. Updates to the CEMD may be required due to the following:
- Working methods may change such that the CEMD would also require updating,
 - The Principal Contractor may be required to deal with unforeseen events or conditions that could impact environmental management,
 - Additional environmental issues or interfaces may be picked up by ecologists during the works period,

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- The Proposed development has a long programme and Construction best practices may be altered during the works which would require revision to parts of the CEMD, and
 - Comments or advice from the ECoW or stakeholders following site visits may mean a change of working methods is required, to be reflected in a revised CEMD.

The above list is by no means exhaustive.