FEARNA STORAGE

Fearna Pumped Storage Hydro Scheme
EIA Report

Appendix 2.3 – Mass Balance Strategy

February 2025

Quality Information

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Revision History

Revision	Revision Date	Details	Authorised
01	February 2025	Issue to ECU	Fraser Allison

Contents

Executive Summary

This document provides information on the volumes of earthworks materials generated by construction of all of the elements of the Proposed Development including the Southern Access Route [SAR], excavations, borrow pits and the subsequent management and use of all materials within the site to avoid the need for disposal off-site.

The Proposed Development would operate by transferring water between a lower reservoir, (Loch Quoich) and an upper reservoir (Loch Fearna). Loch Quoich is an existing hydropower reservoir and no modifications to its dams or other existing structures would be required to accommodate the Proposed Development. The maximum water level of the upper reservoir would be raised by constructing two dams to create the required storage capacity. The reservoirs would be connected by an underground waterway system including up to three headrace tunnels.

The gravity dams and underground works would involve large volumes of earthworks and so this Earthworks Mass Balance and Borrow Pit Plan has been designed for the Proposed Development which would maximise the use of materials generated from within the site for use in the construction of the permanent works, and put any surplus materials to beneficial use within the site in the form of reinstatement and restoration of habitat areas.

This would minimise the environmental impact of the Proposed Development by avoiding the need to transport bulk materials to the site wherever possible and by minimising the generation of any waste material that would need to be taken off site for disposal.

Further, this Plan has been developed to minimise the haulage of bulk materials across the site, to minimise environmental impact and maximise efficiency. To achieve this, the Proposed Development has been split into three discrete sections; i) the SAR, ii) the lower end of the main PSH site works and iii) the upper end of the main PSH works. The aim would be to achieve a material balance for each section, however with infrastructure provided to allow the movement of material between the sections where required. At this stage a surplus of rock would be generated at the lower works, which would be transported to the upper works for the construction of the dams. This is subject to further refinement of the design.

1. Scoping Responses

1.1.1 The following Scoping Responses were received from SEPA and NatureScot, and are addressed by the contents of this document.

SEPA	6.1 - The following information should also be submitted for each borrow pit: a) A map showing the location, size, depths and dimensions b) A map showing any stocks of rock, overburden, soils and temporary and permanent infrastructure including tracks, buildings, oil storage, pipes and drainage, overlain with all lochs and watercourses to a distance of 250m. You need to demonstrate that a site specific proportionate buffer can be achieved. On this map, a site-specific buffer must be drawn around each loch or watercourse proportionate to the depth of excavations and at least 10m from access tracks; c) Sections and plans detailing how restoration will be progressed including the phasing, profiles, depths and types of material to be used.
NatureScot	We know from other schemes of this nature that the grid connection and spoil from tunnel operations can have the potential to raise further impacts. Therefore, we advise that detail of the grid connection and spoil management is fully detailed in any application going forward.

2. Introduction

2.1.1 This outline Mass Balance Strategy and Borrow Pit Plan has been designed for the Proposed Development, which would maximise the use of earthworks materials generated from within the site for use in the construction of the permanent works to avoid the need for disposal of earthworks materials off-site. There is a net requirement to excavate material from within the site to construct the Proposed Development and therefore only sufficient quantities required will be excavated.

2.1.2 The layout of the Proposed Development, including the infrastructure and proposed borrow pits, site compounds and working areas is shown in **Figure 2.1 – Location Plan** and **Figure 2.2 – Scheme Layout**. Within this document borrow pits are referred to as BP1, BP2, BP3 etc. and site compounds as SC1, SC2, SC3 etc.

2.1.3 The general Mass Balance Strategy includes that material excavation should be minimised and that excavated material be transported over as short a distance as possible, thereby maximising the efficiency of construction, reducing emissions and minimising the project programme. Accordingly, it is proposed to aim to achieve a localised mass balance as far as possible at each of the three main works areas; i) the Southern Access Route [SAR], ii) the lower end of the main PSH works and iii) the upper end of the main PSH works.

2.1.4 The works associated with the Southern Access Route [SAR] would include the upgrade of existing forest roads, the construction of new sections of access track, construction of three bridges and associated civil works. The C1144 public road would also be widened for approximately 2.5km between the SAR and the main PSH works site. The material for these works is proposed to be won from existing and proposed borrow pits along the route. Borrow pits would be worked to provide the required volumes of processed rock for the initial works and ongoing maintenance, and then reinstated. The location of borrow pits along the route would minimise the distance that material requires to be transported.

2.1.5 The main PSH site is characterised by rock exposures across the site, overlain in some areas with superficial deposits and peat. The exposed rock features and ground investigations carried out to date (ground probing) provide a reasonable indication of the ground conditions that may be expected at the key elements and to inform the Mass Balance Strategy.

2.1.6 The lower end of the main works would require surface excavations to create a terrace adjacent to Loch Quoich for the powerhouse. Further excavations in rock would be required to excavate the shafts which would house the pump-turbine units. Additionally, the access tunnel adit to the underground works would be located within the disused quarry adjacent to the powerhouse site. Excavated tunnel material would be brought to surface at this point. It is proposed that all tunnel material would be used locally i) to create the temporary working area SC2 and permanent switchyard area at the disused quarry, ii) to construct the powerhouse and main site access tracks iii) for the production of concrete and structural fill material iv) for powerhouse facades and v) to supplement the construction of the dams at the upper reservoir if there is an excess of material at the lower end. Space to allow the temporary stockpiling and processing of material prior to its re-use on site has been allocated within the design.

2.1.7 The upper reservoir works would be constructed as far as possible with material excavated from the proposed borrow pits within the upper reservoir i.e. borrow pits BP1, BP2 & BP3. These borrow pits would be located immediately adjacent to the proposed dams and upper control structures and would have sufficient volume to construct the dams. Any surplus material from the lower works could also be transported to the upper reservoir, however this is not envisaged to be required. The material would be moved either by vehicle and potentially also by conveyor if appropriate.

2.1.8 Any surplus fine-grained materials generated from construction of the permanent works which may be unsuitable as engineered fill would be put to beneficial use within the site and used to create landforms for visual mitigation, borrow pit profiling, other non-structural elements and reinstatement.

2.1.9 Following development of the scheme sizing and initial engineering design calculations, the sizing and volumes of the main elements of the scheme have been defined in order to estimate the bulk material requirements.

2.1.10 Using the currently available data from the site and civil engineering modelling software, a preliminary mass balance of bulk earthworks materials including unsuitable spoil materials has then been calculated.

2.1.11 For the excavated rock from the underground works using drill and blast methods, useable rock material has been assessed as 90%, with 10% spoil. Similar proportions have been used for the rock in borrow pits below the weathered zones.

2.1.12 A typical bulking factor of 1.6 has been taken for the excavated rock and a re-compaction factor of 1/1.2 for roller compacted fill material, giving an overall bulking and re-compaction factor of 1.33 for re-used rockfills. This will vary in practice, with sufficient available space in the rock borrow pits BP1, BP2 & BP3 in the upper reservoir to allow adjustment of the depth and the volume excavated to suit the final requirements.

2.1.13 Approximately 20,300 peat probes have been carried out across the site, giving an average depth of 0.4m to glacial material or rock below. For the purposes of Mass Balance, peat is considered to be material which is a minimum of 0.5m deep.

2.1.14 Material which is less than 0.5m in depth is considered not as peat but as carbon-rich material, with the upper 200-300mm of this material comprising turf. This material is capable of being transported to other areas of the site and would be carefully stockpiled and re-used for landscaping and finishing of the tracks, the construction compounds, around the dams, powerhouse area and SAR.

2.1.15 Where peat deposits over 0.5m exist within the works footprint, the peat would be excavated and where possible put to immediate re-use, for example to dress access road verges, visual mitigation or for nearby peatland restoration where appropriate. Peat would be placed first, with the available turfed carbon-rich soil placed over to encourage immediate regrowth. Where required, peat would be stored locally and in line with best practice to allow it then to be re-used. This is discussed further in **Appendix 12.2 - Peat Management Plan**.

3. Overall Balance of Material on the SAR

3.1 Summary of proposed earthworks on the SAR

The proposed SAR would require the following works and associated earthworks to provide the construction access and facilities to deliver the Proposed Development.

3.1.1 Construction of the proposed A87 junction and river Garry Bridge (if not already constructed by others prior to commencement of the Proposed Development) – refer to **Figure 2.21 – A87 Junction** and **Figure 2.22 – Bridge Over River Garry at White Bridge.**

3.1.2 Upgrade of the existing forest roads between the proposed Garry Bridge and the River Kingie (approximately 23km) comprising mainly: i) upgrades to existing layby and provision of new laybys; ii) curve widening on some bends to allow abnormal load access; iii) improvement of the existing running surface where required; iv) dualling of some sections of the existing forest route to allow two-way access; and v) drainage works associated with the above. Refer to **Figure 2.14 – Southern Access Route Upgrades**

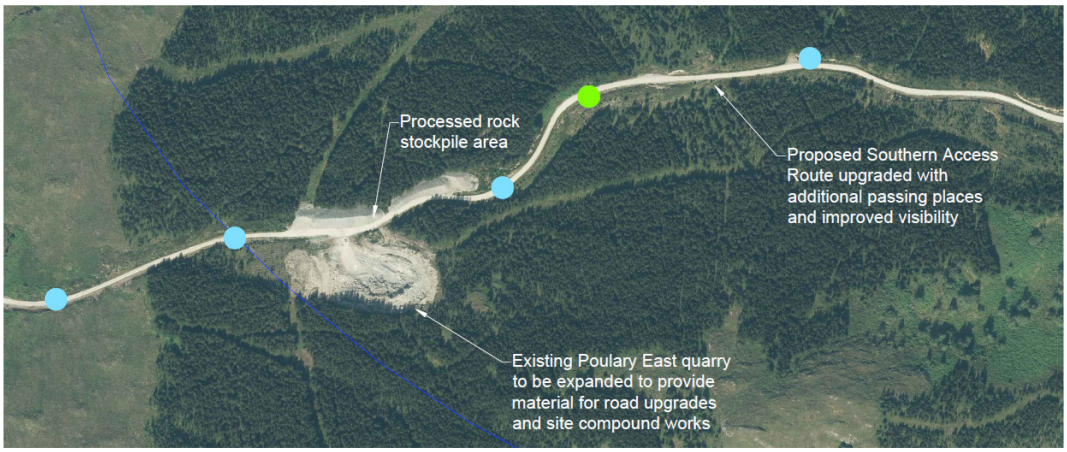

Figure 3.1 –Sample of additional passing places and yhe existing Poulary East borrow pit on existing forest road along SAR

3.1.3 Construction of a new section of access track between the River Kingie and the C1144. Refer to **Figure 2.15 – River Kingie to C1144.**

3.1.4 Construction of new bridges over i) River Kingie and ii) Gearr Garry to allow the SAR to connect to the C1144. Refer to **Figure 2.17 River Kingie Bridge GA** and **Gearr Garry Bridge GA.**

3.1.5 Widening of the existing C1144 public road for approximately 1.5km to the east of Quoich Dam and 1.5km to the west of Quoich Dam, to allow public and construction access to be maintained. This would comprise creating an additional lane and associated drainage and service diversion works by excavating generally on the north side of the existing carriageway, but in some localised areas there would be excavation and / or fill on the southern side. For clarity, the existing HV overhead line pylons would not be affected. The C1144 widening works and construction methodology would avoid diversion or alteration of this infrastructure. Refer to **Figure 2.19 C1144 Road Widening Plan and Long Section**

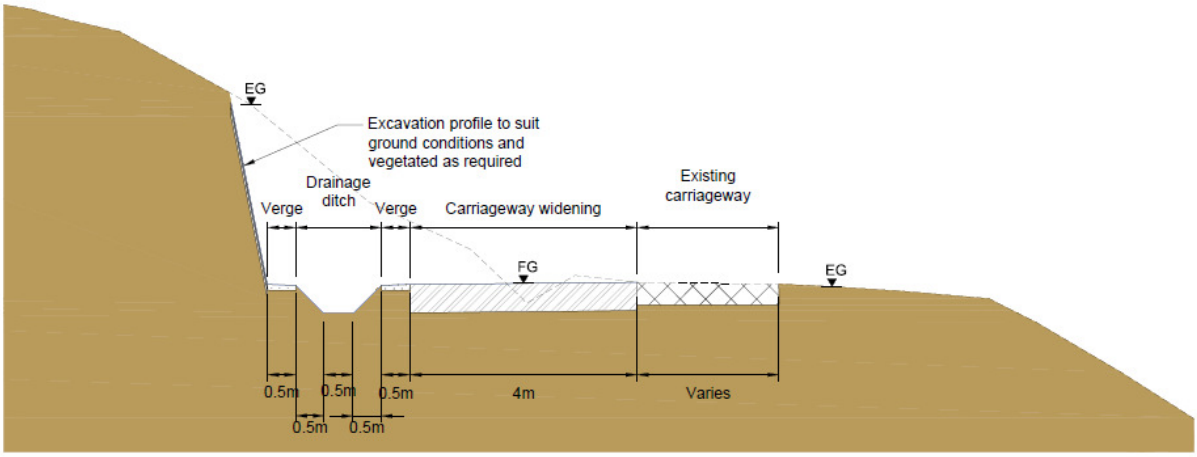

Figure 3.2 – Typical C1144 section through proposed C1144 widening.

3.1.6 Construction of temporary site compound SC1, which would act as the primary accommodation and administrative compound for the project. This compound would be formed by an earthworks cut/fill exercise to create three terraces to suit the local topography and minimise earthworks. Topsoil would be stripped and glacial materials would be used to for landscape mitigation and the topsoil then placed over. This compound area is currently within a commercial timber plantation and would be returned to commercial forestry on completion of the Proposed Development, therefore the glacial material and topsoils will be placed back over the area. Refer to **Figure 2.30 Site Compound SC1 Plan** and **Figure 2.31 Site Compound SC1 Sections.**

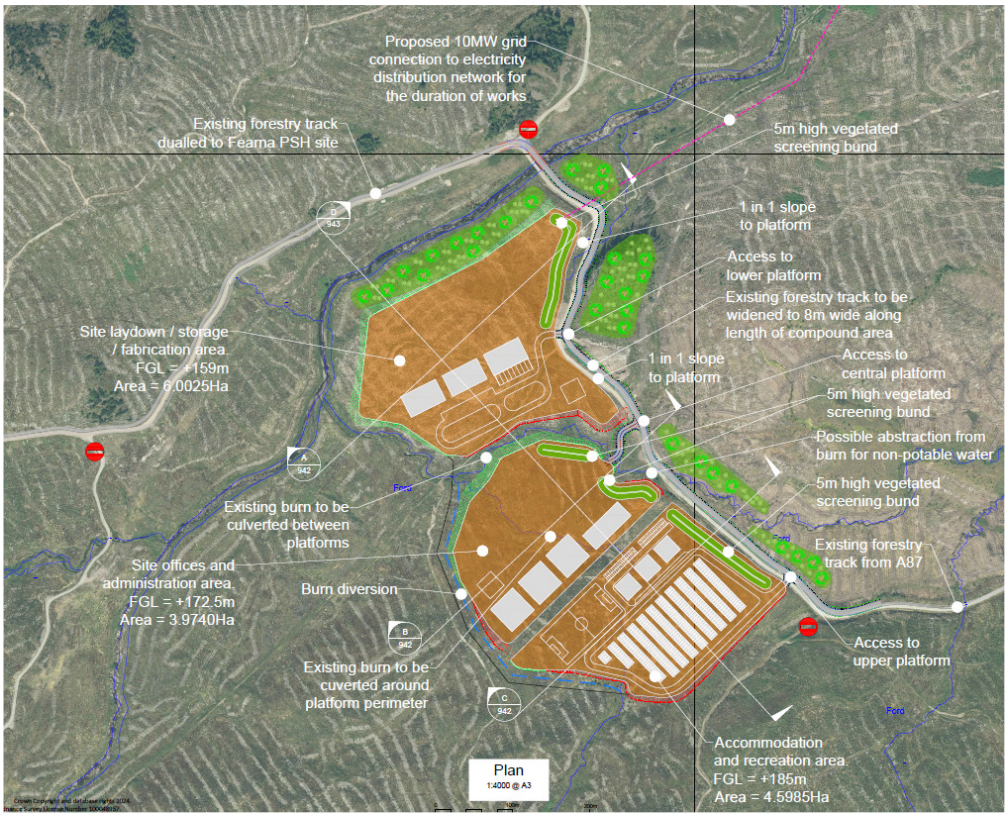

Figure 3.3 – Site Compound SC1 plan

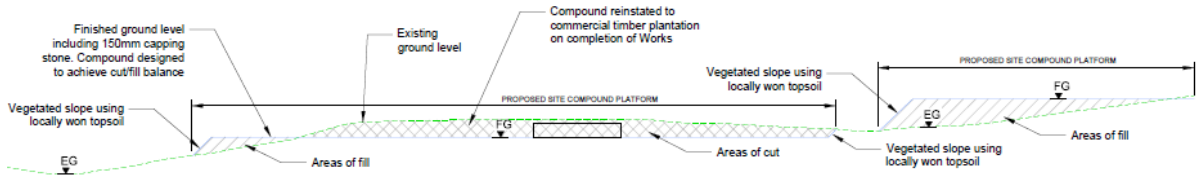

Figure 3.4 - Typical section through site compound SC1

3.2 Material Requirements of the SAR works

3.2.1 The SAR works would generate the quantities of material shown in Table 3.1.

Table 3.1 – Material Requirements on the SAR

SAR works - material required	Cut Volume ROCK (m^3)	Cut Volume SUPERFICIALS (m^3)	Cut Volume PEAT/CARBON-RICH SOILS (m^3)	Fill volume ROCK (m3)	Fill volume SUPERFICIALS (m3)	Reinstatement Volume PEAT/CARBON-RICH SOILS (m3)
SAR - FLS forest road upgrades	3540	3540	7043	35401	3540	13500
SAR - Kingie to C1144	0	2395	11275	43000	15370	34168
Site Compound SC1	34559	269189	41838	29000	309893	202050
C1144 road widening	3184	8946	2978	11665	0	6762
Total Material Quantities	**41282**	**284069**	**63134**	**119066**	**328803**	**256480**

3.2.2 Table 3.1 shows 41,282m^3 of rock excavation, which would be reused as part of the SAR works. This creates a rock requirement of 119,066 – 41282 = 77,784m^3 to be excavated from borrow pits along the route.

3.2.3 The cut/fill volumes of superficial material approximately balance. Any surplus material would be stored and re-used in the reinstatement of the temporary site compound SC1.

3.2.4 Table 3.1 shows a net deficit in peat / carbon-rich soils. This is primarily due to stripped material being used to vegetate the earthworks slopes and landform screening bunds around the site compound SC1. In order to reinstate SC1 and return it to a plantable condition to support woodland planting, peat / carbon-rich material from the upper reservoir site will be placed here. Refer to **Chapter 12 – Geology, Soils and Water** for further details.

3.3 Material Sources on Southern Access Route [SAR]

3.3.1 Material for the proposed SAR works would be won from three proposed borrow pits along the route at i) Poulary East (existing), ii) Glen Kingie (existing) and on Kingie Estate (new).

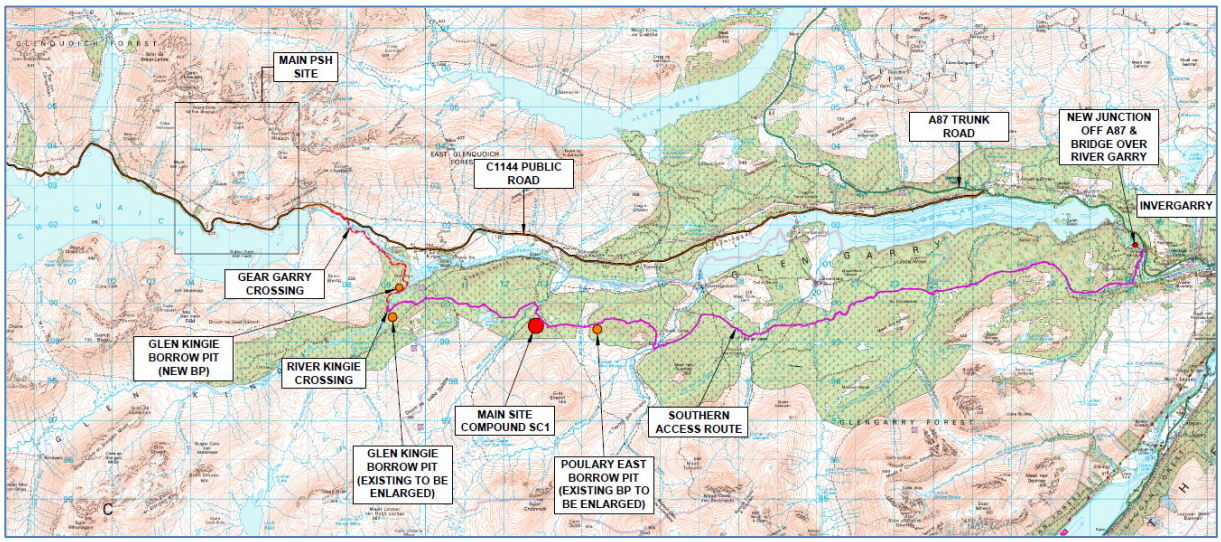

Figure 3.5 – Proposed SAR Borrow Pits

3.3.2 Existing borrow pits would be enlarged by removing overburden which would be stored for the purposes of reprofiling and reinstatement or if suitable used for construction. Following the extraction and processing of rock, the borrow pits would be left compliant with Quarry Regulations and available to be used in future for track maintenance.

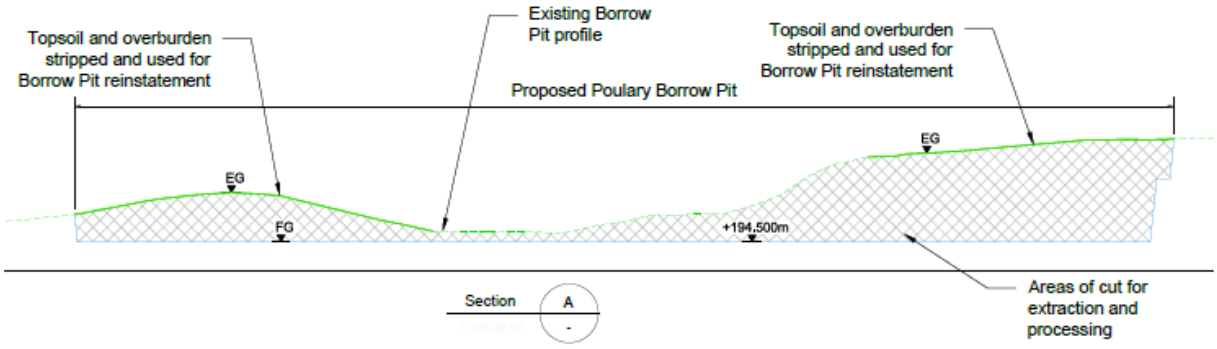

Figure 3.6 – Poulary East Borrow Pit – proposed section

3.3.3 New borrow pits would be stripped of topsoil and overburden material which would be put to beneficial use either at the borrow pit or for the construction, profiling or landscaping of new sections of track. Rock would be extracted and processed and used for the construction of upgrade works.

3.3.4 It is proposed that borrow pits would remain operational throughout the project construction period to allow ongoing maintenance of the SAR.

3.3.5 Where rock material is generated as part of the works, for example during the cut/fill excavations to construct the site compound SC1 or in road cuttings, this material will be re-used locally to source.

3.3.6 Refer to table 3.2 for a breakdown of the proposed material sources for the SAR works.

Table 3.2 – Material sources for the SAR works

SAR works - material sources	Rock Volume (m3)	Superficials (re-placed in BP) (m3)	Carbon-rich soils Volume (m3)	Carbon-rich soils reinstatement volume
Poulary East Borrow Pit	126,887	6745	1026	21,500
Glen Kingie Forest Borrow Pit	37,100	2000	900	9000
Kingie Estate Borrow Pit	65,839	3505	756	7560
Total material available	**229,826**	**12,250**	**2924**	**38,060**

3.3.7 Para 3.2.2 shows a net requirement of 77,784m^3 of rock for the proposed SAR works. Table 3.2 shows an available volume of 229,826m^3, therefore sufficient rock is available with a degree of contingency to complete the SAR works and carry out ongoing maintenance through the construction and operational phases as required.

3.3.8 Only the required rock volumes would be extracted, after which the borrow pit operations would cease and the borrow pits could be reinstated using the stored superficial material and carbon-rich soils and peat from borrow pits and other areas of the site

4. Overall Balance of Material - Lower Works

4.1 Summary of the Proposed Lower Works

The lower works which require earthworks would comprise the following:

4.1.1 Powerhouse access track to the powerhouse, access tunnel adits, switchyard and temporary site compound SC2 area which would be located within the disused quarry on the shores of Loch Quoich. This area would then become the permanent HV switchyard area. The existing slipway to provide boat access would be also be accessed via this route.

4.1.2 Excavation of the powerhouse area to create a level working platform for the construction of the powerhouse.

4.1.3 Construction of the six powerhouse shafts which would be approximately 90m deep. These excavations would be in rock and then the shafts would be lined in concrete.

4.1.4 Construction of the powerhouse superstructure, with facades created using site-won rock.

4.1.5 Construction of six tailrace tunnels which would create the waterway from each of the powerhouse shafts to Loch Quoich.

4.1.6 Lower inlet/out structures on the shore of Loch Quoich, which provide fish screening and isolation gates.

4.1.7 The underground works comprising i) access tunnels, ii) high pressure tunnels, iii) vertical shafts and iv) associated temporary working areas. The material from the underground works would be extracted via the access tunnel adit which would be located within the disused quarry. Additional adits may be provided from the back face of the quarry during the detailed design phase.

4.1.8 Visual mitigation measures, which would primarily comprise the re-use of excavated material to create landforms around the lower works to minimise the visual impact.

4.1.9 Access track to the Upper Works, which would comprise 3.5km of new access track between the western end of the widened section of the C1144 and the base of Coire Dubh Dam. The capping material for this track would be won from the powerhouse surface excavations. The access track beyond this is classed as part of the Upper Works.

4.2 Material Sources for the Lower Works

4.2.1 The Lower Works area is heavily modified due to: i) the operational Quoich Hydro scheme and associated drawdown; ii) the disused quarry which was used to construct Quoich Dam and which has been partly infilled with material from the nearby landslide in 2018; iii) use of the area for storage and laydown; and iv) for boat access to Loch Quoich.

Material would be sourced as follows:

4.2.2 The surface excavations from the powerhouse footprint and surrounding works area. It is proposed that these excavations commence early in the programme to allow development of the main site establishment. This excavation would generate rock to create the temporary site compound SC2 area, which would ultimately house the HV switchyard. The base of the disused quarry currently sits below the maximum operating level of Loch Quoich and could be inundated, so would require to be raised above maximum flood level plus a freeboard allowance. The processed rock would also be used to construct the access road to the Upper Works. The powerhouse area is overlain with thin soils and possibly some glacial material, however rockhead is evident across the footprint and on the

adjacent shore of Loch Quoich. Topsoil and glacial material would be used in the landscape mitigation measures around the powerhouse.

4.2.3 The powerhouse shaft excavations, which would be solely in rock and created primarily using the drill and blast technique. The rock arisings from these works would be brought to the site compound SC2 area for processing and re-use, where possible. This material would be used: i) to supplement the surface excavation material to raise the floor of the disused quarry if required; ii) for concrete aggregate; iii) for possible temporary marine works to construct the lower control works; and iv) for track maintenance.

4.2.4 The underground works, which would solely be rock arisings from drill and blast operations. All excavated tunnelling material is proposed to be brought to the compound area SC1 via the access tunnel adit, where it would be processed for re-use where possible, and thereafter used for the same proposed purposes as the powerhouse shaft arisings.

4.2.5 Lower inlet / outlet structures within Loch Quoich. These six structures would require to be situated at the correct level to allow the operation of the pump-turbine units across the proposed operational range. The levels would be such that excavation into the rock along the shoreline and within the existing drawdown zone of Loch Quoich would be required. This material would be brought to the adjacent site compound SC2 for processing and re-use, where possible.

4.3 Materials Balance for the Lower Works

4.3.1 The Lower Works as described above would generate rock that would be re-used to provide a mass balance for this area of the site, with the contingency that any surplus rock material may be moved to/from the Upper Works if required.

4.3.2 No specific borrow pits are therefore proposed in the Lower Works area, as the rock material generated by the construction of the works is sufficient.

The heavily modified nature of the Lower Works area and the indicative ground conditions would generate relatively low volumes of topsoil and glacial material. This material would be put to re-use in the landscape mitigation measures around the lower works, which would comprise creating landforms to replicate the existing landscape.

The material balance calculations are summarised in Table 4.1 below:

Table 4.1 - Lower Works Material Balance

Lower end PSH works	Cut Volume ROCK (m^3)	Cut Volume SUPERFICIALS (m^3)	Cut Volume PEAT/CARBON-RICH SOILS (m3)	Fill Volume ROCK (m^3)	Fill Volume SUPERFICIALS (m^3)	Fill Volume PEAT/CARBON-RICH SOILS(m3)
Powerhouse surface excavation	243,959	18,864	0	15,000	-	-
Pressure tunnels	242,320	-	-	-	-	-
Access tunnels	152,907	-	-	-	-	-
Powerhouse shafts	348,641	-	-	-	-	-
Lower Control Works	108,034	-	-	1,875	-	-
Disused Quarry infill	-	-	-	459,200	8,013	-
C1144 to upper reservoir track	10,006	69,880	20,173	35,500	26,780	45,760
Vegetated rock embankment	-	-	-	32,000	16,000	25,650
Powerhouse lanscape mitigations	-	-	-	10,575	31,725	16,500
Concrete aggregate	-	-	-	197,800	-	-
Powerhouse facades	-	-	-	20,000	-	420
Total Material Quantities	**1,105,867**	**88,744**	**20,173**	**771,950**	**82,518**	**88,330**
Surplus material				**333,917**	**6,226**	**-68,157**

4.3.3 The surplus rock material shown in Table 4.1 would be moved to the upper works and used in the construction of the dams. It is also anticipated that refinements in the design and geotechnical parameters will reduce the volume of rock that requires to be excavated, thereby reducing this local excess.

4.3.4 The deficit in carbon-rich soils would be met by the reuse of material from the upper works. Refer to **Appendix 12.2 - Peat Management Plan** for further details.

5. Overall Balance of Material - Upper Works

5.1 Summary of the Upper Works

5.1.1 The Upper Works which require earthworks would comprise the following:

- Construction of the Coire Dubh and Fearna Dams. These dams are proposed to be constructed from rock fill which is generated from borrow pits BP1, BP2 and BP3 within the upper reservoir, with a waterproof concrete upstream face. This is the same form of dam as the existing Quoich Dam but larger and would require a total volume of approximately 8.5Mm^3 of excavated rock.
- Dam spillway channels. These channels would be excavated primarily in rock and would transfer spill flows from the upper reservoir into the downstream watercourses. Where ground conditions allow, the spillway channels would remain as exposed rock, but in some areas may be concrete lined. This is similar to the existing Quoich Dam spillway.
- The upper inlet/outlet structures. These would be located within the footprint of borrow pit 3 however would require excavation to the formation level to deliver the required hydraulic transfer to the underground waterways and provide sufficient screen area. The structures would be of reinforced concrete construction.
- Access roads around the Upper Works. These will be required both for the construction and operation of the works. Where possible, temporary access tracks would be located within the upper reservoir inundation area. The permanent access track would connect the Upper Works site to the Lower Works and run across the downstream face of Coire Dubh dam, between Coire Dubh and Fearna dam and along both dam crests. A small access track would be constructed along the toe of each dam to allow temporary public access via the diverted walking route and also for ongoing maintenance and inspection.
- Temporary site compound SC3. This compound would be located within the footprint of the proposed borrow pits and would therefore not be envisaged to require specific earthworks other than capping stone.
- Temporary works during the construction. Work such as river diversions, temporary working platforms or access to specific areas may require earthworks.

5.2 Material Sources for the Upper Works

5.2.1 The primary source of materials for the Upper Works will be borrow pits BP1, BP2 and BP3. These would be large-scale borrow pits due to the scale of the dams and other structures and would require to be stripped of overlying turf / carbon-rich soil or peat and glacial material (where present) prior to rock excavation and processing for the construction of the upper works. The stripping of the overlying material would be undertaken incrementally as the borrow pits were increased in size. Glacial material would be placed in the base of the previously worked section of borrow pit. Refer to **Appendix 12.2 - Peat Management Plan** for further details of how peat would be re-used.

5.2.2 The excavated rock from the borrow pits would be used primarily for the rock fill for the Coire Dubh and Fearna Dams but also for a number of other uses, namely: i) concrete aggregate for the upstream dam faces, inlet outlet structures, spillways and dewatering structures; ii) access road construction; and iii) temporary site compound and working areas.

5.2.3 Rock material which is unsuitable for use would be returned to bases of the borrow pits for permanent storage below the reservoir minimum inundation level.

5.2.4 The construction of the spillway channels would generate rock which would be used for the construction of other structures. There is extensive rock exposure at surface across the footprint of the proposed spillway channels.

5.2.5 The construction of the upper inlet/outlet structures would require the base level of borrow pit BP3 to be dropped further as described above. Rock generated from this excavation would be used within the Upper Works.

5.3 Material Balance in the Upper Works

5.3.1 There would be a requirement to excavate only the required volumes of rock to complete the construction of the upper works.

5.3.2 Surplus material from the Lower Works can be accommodated and in this case the volume of material excavated from the Upper Works area would reduce accordingly.

5.3.3 Refer to Table 5.1 for details of the proposed material balance at the upper works:

Table 5.1 – Upper Works Material Balance

Upper works - material balance	Cut Volume ROCK (m^3)	Cut Volume SUPERFICIALS (m^3)	Cut Volume PEAT/CARBON-RICH SOILS (m3)	Fill volume ROCK (m3)	Fill volume SUPERFICIALS (m3)	Fill volume PEAT/CARBON-RICH SOILS (m3)
Fearna Dam	9800	286376	94766	3452198	-	-
Coire Dubh Dam	9000	140000	50011	5135799	-	-
Coire Dubh spillway channel	121233		1057	-	-	-
Fearna spillway channel	61338		1116	-	-	-
Concrete aggregate	-	-	-	69109	30000	-
Temporary access roads	-	-	-	78500	32250	-
Site compound SC3				8000	8000	
Landscaping / reinstatement	-		-	-	76100	35250
Borrow Pit 1	735950	18113	250481		18113	
Borrow Pit 2	4917835	286174			426174	
Borrow Pit 3	3030595	159339			299339	
Surplus from Lower Works				333917		
Upper control works excavation	195393			11250		
Total Material Quantities	**9081144**	**890002**	**397431**	**9088773**	**889976**	**35250**
Cut/Fill balance (+ve shows surplus)				**-7629**	**26**	**362181**

5.3.4 Table 5.1 shows a balance of rock material, with the excavated volumes from Borrow Pits BP1, BP2 and BP3 tailored accordingly. The combined volume of excavated rock from these borrow pits is shown as 8.7Mm^3 however the theoretical maximum volume according to the current design is in the region of 10.20Mm^3, therefore providing approximately 1.5Mm^3 contingency on the above figures.

5.3.5 It is proposed that the surplus superficial material be placed within the base of the borrow pits below the reservoir minimum water level.

5.3.6 The average carbon-rich soil / peat depth is 0.54m across the footprint of the works in Table 5.1.

5.3.7 Surplus carbon-rich soils and peat would be moved to other areas of the site for re-use. Refer to **Appendix 12.2 - Peat Management Plan** for further details.