Case Study

Coulags (Fionn Abhainn) hydro-electric scheme (HES) – Good practice track development and reinstatement

Summary

SIMEC GHR (the developers) first approached SNH for pre-application engagement in 2014. The proposal was for a 1500kW run-of-river hydro on the Fionn Abhainn, a tributary of the River Carron in Wester Ross. Components of the scheme would be sited within the Wester Ross National Scenic Area (NSA) and Coulin & Ledgowan Forest Wild Land Area. There are no ecological or geological protected areas in the locale.

The development and construction of the Coulags HES is considered by SNH to be an exemplar of good practice.

There are a number of factors that contributed to this, but of particular importance were

- Early engagement
- Partnership approach to solving issues
- Willingness to adapt design and construction techniques to suit the local environment
- Appointment of a highly experienced contractor (Wyvis Plant and Power Ltd) by GHR, and involving them in the evolution of the design and Construction Method Statement.
- Ongoing dialogue and review throughout the construction phase

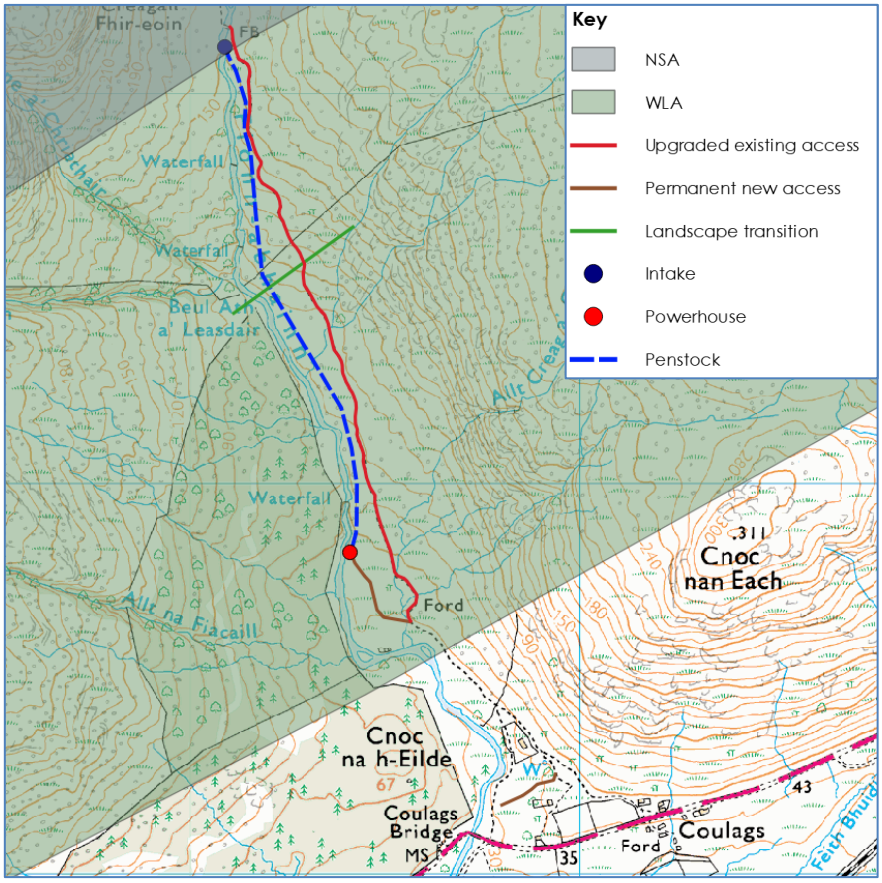

Figure 1 – Scheme layout relative to NSA and WLA

Early engagement (see appendix 1)

Early engagement was extremely important as it allowed SNH to directly advise on the character and the associated sensitivities of the area, as reflected in its designation as both an NSA and an area of wild land, and for GHR to outline technical and design constraints. There were a number of information exchanges and sharing of good practice ways of working and further site visits were undertaken to establish how the different drivers could be accommodated on the ground. This level of SNH input would only be forthcoming for proposals in particularly sensitive locations.

Of particular importance to accommodating the scheme in this sensitive area was early recognition and understanding of the landscape character by the developer and their consultants. It proved beneficial that all parties showed **willingness to respond to the site sensitivities in the design process and not to see components of the scheme as fixed until the point of approval by The Highland Council**.

Key aspects of the scheme that were subsequently agreed were;

- Keeping the proposal a simple run of the river scheme focused only on the main glen with no additional intakes.
- Recognising the point at which the wild land character increased and moving the intake downstream from this point.
- Separating permanent access to the intake from the temporary construction route, enabling the disturbed ground to be fully restored to pre-construction conditions.
- Recognising the character and landscape value of the stalkers path and the need to retain this.
- Recognising the point along the pipe line route at which landscape character and topography changed and agreeing different construction approaches for these separate sections. A highly bespoke approach was developed by GHR and Wyvis for the upper section (north of the landscape transition shown on Fig. 1), with this being presented to and agreed with SNH prior to the submission of the application for planning permission.
- Keeping the footprint as small as possible particularly within the upper section.
- Retaining particular landscape features that added to the character of the area
- Recreating landscape features and the general lie of the land that were affected by the works
- Improving the stalkers path, whilst retaining its characteristic footpath features, to make it suitable for subsequent ATV access to the intake for maintenance

The rationale for all these points was agreed and **reflected in the detailed design of the scheme and the construction method statement which was submitted with the application for planning (therefore becoming a condition of consent), and importantly formed the basis of the tendering procedure**. As a result the contractors who bid for the contract were in no doubt what was expected of them and why and this is also true of the appointed Environmental Clerk of Works.

Construction process (see appendix 2)
On appointing contractors a site visit was undertaken between developer, contractor and SNH to ensure everyone was clear about the timescale and approach to be taken to the works. This provided an opportunity to reiterate that there was an expectation to deliver exactly what had been set out in the pre-planning documents, and importantly to explain first-hand the reasons for what otherwise might be seen as constraints to be overcome.

As work progressed, regular site visits took place (where appropriate and feasible with SNH staff time) to review progress at critical points in the work schedule, and ensure the desired good practice was being undertaken and reinstatement outcomes were being achieved. **Of particular significance to the success of the scheme was the willingness and ability of the contractor to rise to the challenge of doing things differently, and bringing their own innovative good practice techniques to addressing issues.** The subsequent use of 'peeled back' drainage ditches was a particularly helpful and innovative approach to reducing the impact of traditionally dug drainage ditches which in other schemes can have a surprisingly high landscape and visual impact and hinder subsequent good reinstatement.

Overall, the agreed works, particularly in the upper section, required very careful planning by the contractor and a not unsubstantial number of additional vehicle movements as dug material and site equipment could not be stored in the upper sections. The made track was only single width with no passing places, due to a tight planning corridor and habitat/landscape sensitivities. This did result in a slightly longer construction period and therefore a slightly higher cost to the developer but was not considered significant in the overall development. Estimated construction period was 18 months. As demonstrated on this scheme, the importance of selecting the right contractor for the job cannot be underestimated.

Despite a very dry summer that threatened to impact on vegetation recovery and initiate turf shrinkage, reinstatement has begun following some wet weather on site.

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SNH
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Appendix 1
Pre-application (access) and Scoping Engagement

Pre-application engagement was undertaken throughout autumn 2014 between the developer, SIMEC GHR, and SNH with input from The Highland Council's Access Officer, regarding access provision during and post-construction.

The developer provided information on the access track, stating;
"we have taken the access and penstock route alongside an existing path. At this location it would be our intention to reinstate the intake access to 1.5m wide to permit quad bike access for maintenance. If we put the penstock and access on the existing path, the net impact of one linear feature post-construction may be preferable to having two linear features on the landscape. However, during construction walkers would not be able to use the path and would be required to be 10-15m on the uphill side of the path. Depending on footfall this will create a temporary additional linear feature. However this is likely to recover more quickly than the construction route".

The response to the developer, and subsequently to planning, regarding the above points, came about from ongoing liaison between the Highland Council Access Officer and SNH.

We advised that;

- the existing path was a popular route to Munros & Corbetts and a Right of Way across to Torridon, into a 'wilderness area' used all year round, although more so April-Oct.
- Consideration should be given to sufficient depth of peat/soil to bury the pipe under the path and the alternative options that could lead to additional scarring. If the penstock could be buried then perhaps it may be best for the developer to use the path route and re-instate afterwards to get a good quality path, rather than having further damage and scarring running alongside the path. However, having the pipe exposed along the path, should the peat depth not be adequate, will not be welcome and would be better to be hidden as much as possible away from the path.
- The Right of Way must remain open during construction and even a temporary path must be suitable for use in terms of surface, drainage and gradient. In regard of public access works are best done out-with holiday periods (Easter, Jul-Aug and early Oct) and preferably Oct-April.

In October 2014, SNH submitted a scoping response. The main thrust of our advice focussed on minimising impacts on the Wild Land area and NSA, and assessment requirements. We raised issue with the absence of information regarding any detail on how the intake would be accessed for operational purposes. Our understanding was that operational access to the intake would be via the existing Right of Way, albeit slightly widened.

In January 2015 further scoping stage engagement took place between SNH and the developer. The developer outlined that Right of Way access would be retained throughout construction and upgraded / reinstated to as good or a better standard post-construction with use of appropriate path-building contractors. The developer also requested further advice on minimising landscape and visual impact, including our position on moving the intake downstream. This request was again linked to access requirements. The developer was concerned about the visual impact of taking permanent access to the intake up the steep section of the walker's path. They noted that a quad bike or 'argocat' used for intake access may not be safe on the steep stone path and/or deviate to the sides creating unsightly erosion. Two alternatives were being considered: i) deviating to the penstock route for a short distance where the gradient and surface can be managed to accommodate a less

steep and/or a stone 1.2m wide path for intake maintenance or ii) overlaying a zig-zag route bisecting but maintaining the existing walkers path which would ease the gradient for maintenance access and other recreational users.

Following further discussion with the developer, in which we added advice about the inclusion of LVIA for the special quality of stark geology and rock, a satisfactory solution was found, culminating in our response to the planning application in June 2015. Essentially, with detail included in submitted Construction Environment Management Plans (CEMP) and agreed by SNH and The Highland Council, a temporary construction track would provide access to the intake from the powerhouse, which would later be fully reinstated; and using footpath construction techniques, the existing stalkers path running alongside the temporary path would be widened to provide operation and maintenance access for a quad bike / argocat. Details of the construction of the temporary track and Rights of Way upgrade are below.

SNH and SEPA advised on the discharge of the Planning condition covering CEMPs in May 2016.

Appendix 2
Technical aspects of scheme siting and design

Habitat baseline and construction mitigation
Within the planning boundary, a total of 89.69 hectares was surveyed, with eight different Phase 1 habitat types identified. The predominant habitat type was Wet dwarf shrub heath (74%). Wet modified bog and bracken made up a further 3% combined.
The peat depth survey recorded depths from 137 points within the site boundary, and an additional extent upstream. The average peat depth recorded was 25.63cm. Depths greater than 50cm were also recorded.

The report went on to outline proposed mitigation specific to habitats.
The ecological report can be found here.

Temporary construction track (as per CEMP)
The following general practices were to be employed by the principal contractor (**Wyvis Plant Ltd**):

- The tracks/working widths are split into 4 sections:
    - Section A – the section from the existing track off the A890 to NGR NG 95574 45665.
    - Section B – the new section of track from NGR NG 95574 45665 to the powerhouse.
    - Section C – the lower section of new track from the powerhouse to where the gradient of the slope changes and the topsoil becomes much thinner. A working width of 25m is permitted in this section.
    - Section D – the upper section of track through the steeper sections to the intake location. The working width must be a maximum of 10m in this section, including penstock.

- The hydrological pathway for all the flushes across the penstock will be maintained through appropriate cross drainage. Any sensitive plant species that can be relocated prior to works to outside of the working width will be done so by the ECoW.
- Excavated soils/peat will be placed so as to minimise the potential for erosion or wash out. Soils/peat excavated from section D must be stored according to best practice in the storage areas at the north edge of section C. Soils/peat excavated from section C must be stored adjacent to where they were excavated. The soil and peat handling methods described in Appendix D (Construction Method Statements) must be followed.
- Vegetation, ground and water disturbance is to be kept to a minimum. Excavated vegetation, with its root layer, will be retained for re-instatement in piles 2 turfs high and turf side up. Sub-soil and rock will be stored separately from the topsoil and vegetation. The ECoW will monitor the status of the stored vegetation and if it is found to be drying out then it will be watered as appropriate.
- As much ground vegetation as possible will be retained and stored suitably to allow plants (ground flora and seedlings) to survive. This material should be stored for the minimum time necessary before it is used for re-instatement.

A Clerk of Works was employed on site (Highland Ecology and Development Ltd). Although referred to as an Ecological CoWs in the CEMP, their remit extended to observing works and liaise with the contractor and the client regarding ecological, landscape and environmental issues. It was also acknowledged in the CEMP that their remit would extend to the role of Landscape Supervisor, specifically:

- Participate in the pre-construction walkover to microsite the route of the working corridor, acknowledging the change in width from 25m in the lower section to 10m in the upper section.
- Mark out the working corridor with flags, including the soil storage areas in the lower section. Different habitat/soil types are to be identified through the use of a coloured flag system, with the corresponding areas marked at the storage locations to identify where each habitat/soil type should be stored.
- Create catalogue of location and orientation of significant boulders, including capturing the pre-construction landforms using photos and GPS. These will be used by the principal contractor when undertaking reinstatement/restoration works.
- Supervise the stripping and storage of the turf/vegetated layer.
- Supervise the reinstatement, ensuring the landscape returns as close to its pre-construction state as possible.

For Material Laydown, Construction Compound, and Soil Storage locations, Access Track Construction, Soil Handling and Management and Peat Handling and Management working practices, please refer to CEMP Appendix D: MS02, MS03, MS08 and MS09 respectively.

A 'Construction Site Restoration and Monitoring Plan' (Appendix F) was also submitted as part of the CEMP. It stated 'In the Environmental Statement (ES) submitted in support of the planning application GHR committed to removing the track that will run adjacent to the penstock route once construction has been completed'. The Report went on to describe the restoration of track sections, processes for track type, the restoration of peatland and monitoring. The Appendix contains fix point photography and maps along the temporary construction route.
In **February 2016** pre-construction GWDTE habitat mapping was carried out. These were already identified during the pre-application surveys, and the penstock route designed to avoid the sensitive habitats where possible.

Turf storage and Lichen covered boulders
The area of 'wild land' along the penstock route is characterized by the presence of flushes and areas of wet ground with widely and randomly scattered boulders, some very large. It is the intention to restore the character of the landscape along the penstock to as close to the original as possible. This will be done by ensuring as much of the GWDTE are returned to their original location as possible and ensuring the lichen communities present on the boulders are protected. This will require close collaboration between machine operators and site ECoW. Separate storage areas for different vegetation types will be clearly marked out on site.
All significant boulders between 40cm and 1.5m will be marked with a paint dot (blue) on the north side for future reinstatement. This is to maintain the correct aspect when the boulders are replaced following construction. A pre-construction record has been undertaken on key sections of the penstock and a record of the landform created.

In September 2016, we were forwarded images of workings within the 10m wide working width that leads to the intake through the designated Wild Land – see below. These can be compared to the fixed point photography in CEMP Appendix F, and further site reinstatement images taken in **September 2017**

Rights of Way upgrade
The original stalkers path / Right of Way was assessed and a proposal written for the upgrade and widening by Highland Conservation Ltd. early in 2015. The route is primarily a stalker/recreational path. The most sensitive stretch of upgrade was from the junction of the new spur (separating tracks to the powerhouse and the Rights of Way) at NG955457 to the existing footbridge at NG951471. A distance of 1614 metres. This would provide vehicle access to the powerhouse and ATV access to the intake. The proposal for the section was to have an ATV track not wider than 1.8m that maintains the character of the existing hill path. This section of the track will provide ATV access to the intake for maintenance.

Developing Mountain Biking in Scotland were informally consulted early in 2016, and raised interesting points regarding the tracks design. Specifically, they noted that it was their hope that the new path construction doesn't equate to an overly smoothly graded path surface which takes away from the area's historical character, or one that encourages recreational or novice riders to embark on overly challenging and potentially dangerous excursions into this area that they wouldn't have on the original path.

A four wheel quad bike with optional tracks for snow or bog conditions is in use for maintenance requirements.