336-006-RP02

Drainage Impact Assessment

Corriemoillie BESS

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1 Introduction

Haydn Evans Consulting Ltd (HEC) has been commissioned by Field Corriemoillie Ltd (hereafter referred to as the Client) to carry out a Drainage Impact Assessment (DIA) to support a planning application for the construction and operation of a battery Energy Storage System (BESS) of up to 200 MW with associated infrastructure (including cable route to substation), access and ancillary works (including landscaping and biodiversity enhancement).

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1.1 Site Proposal

The proposed development has a total development footprint of approximately 3.014 hectares (ha) across the 18.3 ha site.

The Proposed Development principally comprises a BESS that will charge and discharge electricity from the adjacent, existing Corriemoillie Substation.

It includes one battery compound comprising battery storage units arranged into rows, medium-voltage (MV) skids and associated ancillary equipment, a substation compound which accommodates high-voltage grid transformers, switchgear and a control building, as well as site-wide supporting infrastructure including underground cabling, access tracks, security and noise attenuation fencing, attenuation basins, and landscaping measures. Whilst the exact specifications are subject to detailed design, the principal components described form the basis of the Section 36 application to allow environmental assessments and mitigation to be appropriately scoped.

2 Location and Existing Conditions

2.1 Site Location

The site is located approximately 620 metres (m) to the northwest of Corriemoillie, Highlands, centred on approximate Ordnance Survey (OS) grid reference 234862,864215 (see red line on Figure 1).

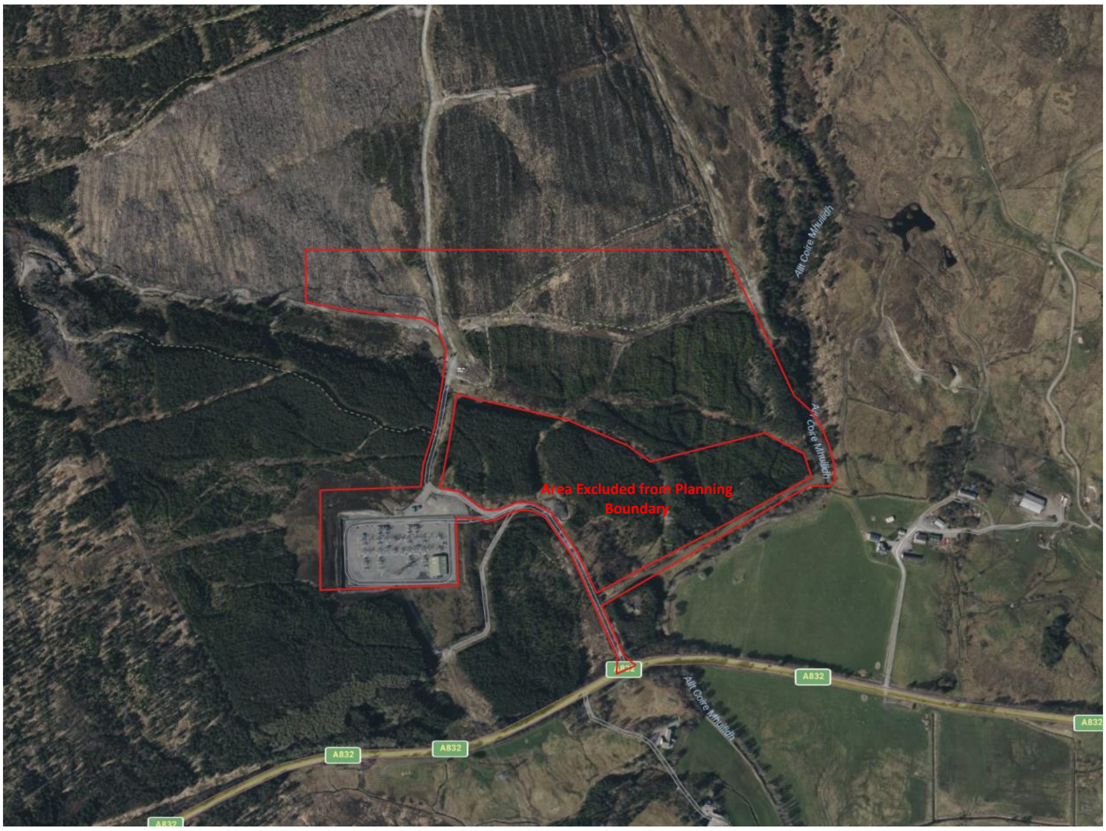

Figure 1: Site location map

The site is generally surrounded by greenfield land.

The site is accessed off the A832 to the south of the site. The track travels north, passing the Corriemoillie Substation before reaching the site.

East of the site, the Allt Coire Mhuilidh flows in a southerly direction.

2.2 Existing Topography

A topographical survey has been produced for the site (see Appendix A). The survey shows ground levels to generally fall from north-west to south-east. Ground levels in the north-west are circa 189 metres Above Ordnance Datum (mAOD), falling to circa 121 metres (mAOD) in the south-east. Ground levels undulate across the site.

The survey shows vegetation around the perimeter of the site.

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2.3 Existing Sewer/Water Assets

Scottish Water (SW) sewer records for the site have been obtained (see Appendix B). The records show no foul or surface water sewers in the vicinity of the site.

No sewer records have been obtained.

2.4 Existing Drainage Regime

There is no formal drainage regime for this site, surface water is likely to flow overland following the ground topography. Various ditches/depressions are shown on the topographical survey, which intercept overland flow and direct it towards the south-east.

2.5 Ground Conditions

British Geological Survey (BGS) mapping confirms the site to have a bedrock geology of Crom Psammite Formation (Psammite) (see Figure 2).

Superficial deposits across the site vary. Glacial Deposits (Diamiction, gravel, sand, and silt) are shown to be present across the most-part of the site, with areas of Alluvium (clay, silt, and gravel) and Peat (see Figure 3).

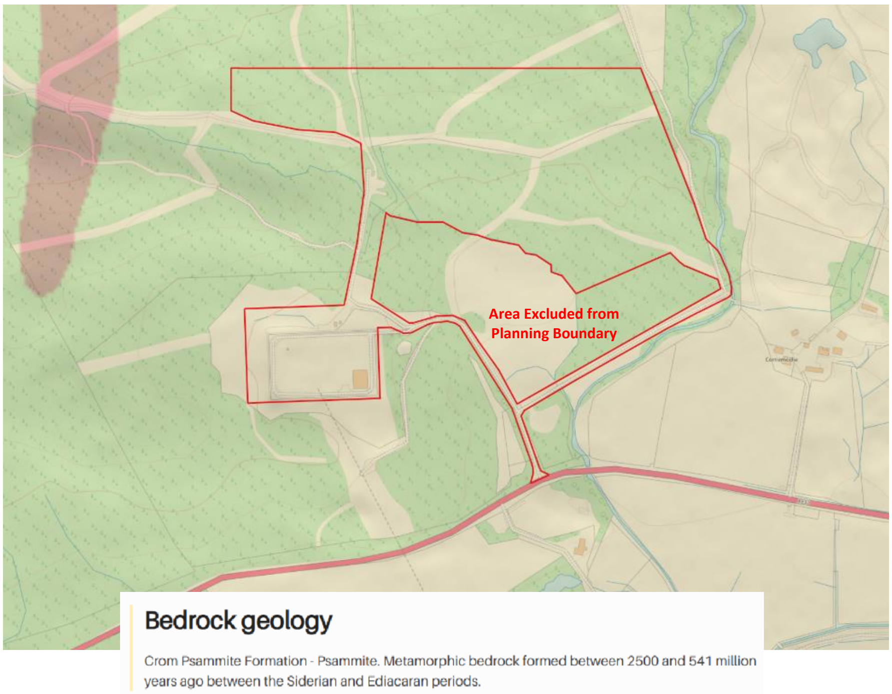

Figure 2: BGS Geology Map of Bedrock geology

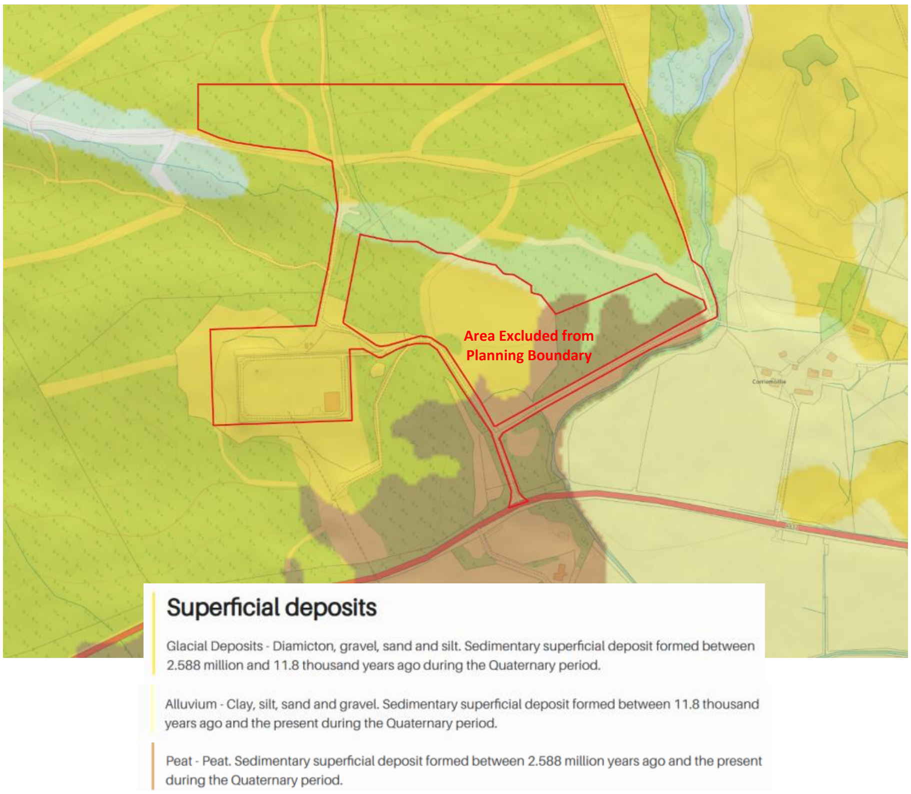

Figure 3: BGS Geology Map of Superficial Deposits

The Geoenvironmental and Geotechnical Desk Study undertaken by GDG which forms part of the overall submission for this project, states:

‘The Hydrogeological Map of Scotland from the BGS indicates that there is not expected to be a superficial aquifer underlying the Site. The bedrock aquifer beneath the entire Site is the Morar Group unit, which is a low-productivity aquifer. Groundwater flow in this aquifer occurs almost entirely through fractures and other discontinuities, with small amounts present in the near-surface weathered zone and secondary fractures.

It is noted that a historical ground investigation at the Corriemoillie Substation, located 200m southeast of the Site, encountered shallow groundwater strikes between 0.40 and 0.80m below ground level (bgl).’

3 Planning Policy Context

3.1 National Planning Framework 4 (NPF4 Adopted 2023)

The National Planning Framework 4 (NPF4, 2023) includes government policy for developments and meeting the challenges of climate change and flood risk. Policy 22 states that development proposals should:

- Not increase the risk of surface water flooding to others, or itself be at risk;
- Manage all rain and surface water through sustainable urban drainage systems (SUDS), which should form part of and integrate with proposed and existing blue-green infrastructure. All proposals should presume no surface water connection to the combined sewer; and
- Seek to minimise the area of impermeable surface.

3.2 Highland-wide Local Development Plan (HwLDP, Adopted 2012)

On 5 April 2012 the Highland-wide Local Development Plan was adopted by the Council and was constituted as the local development plan in law. The Plan sets out a vision statement and spatial strategy for the area, taking on board the outcomes of consultation undertaken during preparation of the plan. Policy 66 is relevant to this assessment and reads as follows:

Policy 66 Surface Water Drainage
All proposed development must be drained by Sustainable Drainage Systems (SuDS) designed in accordance with The SuDS Manual (CIRIA C697) and, where appropriate, the Sewers for Scotland Manual 2nd Edition. Planning applications should be submitted with information in accordance with Planning Advice Note 69: Planning and Building Standards Advice on Flooding paragraphs 23 and 24. Each drainage scheme design must be accompanied by particulars of proposals for ensuring long-term maintenance of the scheme.

4 Surface Water Drainage

The surface water drainage strategy has been designed based on the requirements of CIRIA 753 (C753) dated March 2015 and the Water Assessment and Drainage Assessment Guide produced by the Sustainable Urban Drainage Scottish Working Party (SUDSWP).

4.1 SuDS Hierarchy

Surface water drainage should be managed in a way that replicates the natural drainage processes for the Site as closely as possible. The proposals should follow the hierarchy outlined in C753 and should be disposed of to a receptor in the order of preference described below:

1. Into the ground;
2. To a surface water body e.g. watercourse;
3. To a surface water, highway drain, or another drainage system;
4. To a combined sewer.

4.1.1 SuDS Selection

Into the ground

On-site infiltration testing is not available, however; given the presence of the ditch network, the steep topography of site and the proximity of the watercourse, it is assumed that infiltration is unlikely to be feasible.

To a surface water body

It is proposed to discharge surface water run-off from the site to the adjacent watercourse, which ultimately discharges to Allt Coire Mhuilidh (see drawing in Appendix B). This mimics the existing drainage regime for the Site.

4.2 Greenfield run-off rates

The greenfield run-off discharge rates have been calculated using the HR Wallingford IH124 method and are based on the area of the proposed compound (3.014 ha). The greenfield rates for the site are summarised in Table 1 below (see Greenfield Calculations in Appendix B).

Rainfall event	Greenfield discharge rate (l/s)
1:1 year	32.41
Qbar	38.12
1:30 year	74.34
1:200 year	108.27

Table 1: Greenfield run-off calculations

4.3 Overland flow prevention

The existing surface water flow route across the site is being intercepted by a ditch adjacent to the northern boundary of the site. This ditch will convey the surface water generated by the catchment upstream of the site, around the site boundary to the east, and discharge into the existing watercourse to the south of the site as per the existing regime. The proposed interception ditch has been designed with intermittent pond areas to further enhance the ecological benefits around the site. To capture the run-off from the area between the interception ditch and the site boundary, a filter drain has been incorporated into the drainage strategy at the bottom of the cut slope along the sites northern and western boundaries. This filter drain conveys the surface water to the interception ditch along the eastern boundary of the site.

4.4 Surface water drainage strategy

The surface water generated by the Proposed Development is intercepted by filter drains positioned periodically across each area. The filter drains direct the surface water through a network of drains, pipes and a swale, towards the basin which conveys the flow towards the outfall.

The surface water will be discharged at a restricted rate to the diverted ditch which connects into the watercourse on the southern boundary. The watercourse flows downstream towards Allt Coire Mhuilidh. The surface water drainage drawing and supporting calculations are provided in Appendix B.

<u>Discharge rate</u>

The discharge of surface water run-off from the Proposed Development will be restricted to the Qbar greenfield rate (38.1 l/s) in line with the guidance provided by SUDSWP. Discharge from the basin is restricted by a flow control device.

<u>Attenuation</u>

Attenuation has been sized using FEH data and Causeway Flow software to accommodate the temporary run-off for rainfall events up to and including the 1:200 year event, in line with Highland Council guidance. The basin has been designed to have a 300 mm of freeboard in the 200 year event and 1:3 side slopes. The volume of storage required for the basin in the 200 year event is 1530m^3. This is generally equivalent to the attenuation required for the 1 in 100 year plus 40% climate change event.

A stilling basin is proposed at the basin’s inlet to dissipate the energy of the surface water flows and prevent erosion of the basin.

4.5 Pollution Mitigation

The above proposal ensures that surface water is managed 'at source'. All surface water from the Proposed Development area will pass through a filter drain and the attenuation basin. This type of development has 'Low' pollution hazard level, as shown in table 26.2 of C753. The relevant land use is tabled below, with the SuDS pollution indices tabled (as per table 26.3 of C753).

Pollution Hazard indices for different land use classifications				
Land Use	**Pollution Hazard Level**	**Total suspended solids pollution index**	**Metals**	**Hydrocarbons (HC)**
Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, home zones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e. 300 traffic movements/day	Low	0.5	0.4	0.4
Indicative SuDS mitigation indices for discharges to surface waters				
Filter Drain		0.4	0.4	0.4
Detention Basin (secondary indices halved)		0.5 (0.25)	0.5 (0.25)	0.6 (0.3)
Total		**0.65**	**0.65**	**0.7**

Table 2: SuDS Pollution Assessment

The use of a filter drain and attenuation basin exceeds the mitigation indices required for pollution likely from this type of development. Surface water from part of the site also passes through a swale, further enhancing the pollution mitigation.

4.6 Management and Maintenance

The surface water drainage system should be maintained to ensure the system operates at its maximum capacity for the 35 year lifetime of development. A management and maintenance plan are provided in Appendix B.