TA2.3 Temporary Mineral Working Management Plan

Glenshero Wind Farm

Technical Appendix 2.3:
Temporary Mineral Working Management Plan

Author: Craig Smith Date: 13 September 2018 Ref: 03144-002048

REVISION HISTORY

Issue	Date	Author	Nature And Location Of Change
01	27/08/18	Craig Smith	First Issue
02	13/09/18	Craig Smith	Second Issue

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1 INTRODUCTION

The following assessment has been carried out by RES Ltd on behalf of SIMEC Wind One Ltd.

The work has been carried out by Senior Project Engineer Craig Smith BEng Hons with over 7 years' experience in carrying out the design and assessment of mineral workings and a total of 12 years' experience as in the civil engineering and construction industry. A copy of his CV is included in EIAR Volume 4: Technical Appendix 1.2.

It is proposed that stone required for the construction of the Glenshero Wind Farm (the proposed development) would be won on site from one or more Temporary Mineral Workings (TMWs). Materials won from the TMWs would be used primarily in tracks and hardstand areas and if suitable in the construction of foundations across the wind farm.

Outline estimates place the demand for site won stone to be approximately 195,000 m^3 and it is proposed that this demand would be supplied from between 1 and 6 TMWs located in the seven identified areas of Search shown on the Infrastructure Layout Fig. 2.1 (EIAR Volume 3) whilst typical layouts for each proposed TMW are shown in Fig. 2.10 (EIAR Volume 3).

The exact volumes of materials required and the finalised number, layout and reinstatement proposals for TMWs would be developed by the selected construction contractor and agreed with The Highland Council (THC) prior to work commencing. The principles set out below would be adhered to within those detailed plans.

2 METHODS OF WORKING

2.1 Location of Temporary Mineral Workings

Temporary Mineral Workings would be located within up to seven Areas of Search (AoS) as shown in Figures 2.1 and 2.10 (EIAR Volume 3). The exact number of TMWs would be finalised prior to construction but for the purposes of this assessment, it is assumed that the required volume of stone would be distributed across the seven sites as shown in Figures. 2.1 and 2.10 (EIAR Volume 3).

Table 1. Surrounding Features

Area of Search	Outline Extraction Volume (m^3)	Approximate Centre: Easting, Northing
1	Approximately 2,800	248851, 799048
2	Approximately 2,800	249027, 799480
3	Approximately 2,800	249686, 800168
4	Approximately 2,800	253613, 800284
5	Approximately 2,800	253969, 799857
6	Approximately 2,800	254933, 800809
7	Approximately 2,800	252596, 802820

The locations of the TMWs have been considered in relation to the features listed in Table 2 below.

Table 2. Surrounding Features

Feature	Further Details
Industrial units	Not applicable
Residential properties	Closest Residential Property is approx. 5 km from AoS 5
Educational establishment	Not applicable
Public buildings	Not applicable
Woodland	Closest forestry is a small mixed plantation 2.9 km from AoS 5
Water course	All AoS are located more than 100 m from a mapped watercourse.
Utilities	AoS 7 is located adjacent to the Stronelairg Wind Farm substation and export cable However it is understood that this area would be backfilled with material previously used in a temporary track and as such no blasting would be required.
Rural / farm land	The site area is used for shooting of game
Public Rights of Way	Not applicable
Crops	Not applicable
Livestock	Not applicable
Derelict Land	Not applicable
Parks / recreation areas	Not applicable
Protected Sites	Not applicable
Conservation Areas	Not applicable
Cultural Heritage	Not applicable

2.2 Programme of Implementation

An approximate sequence of works is outlined below:

Table 3. Outline Programme of Implementation

Stage of Construction	Considerations
Set out the TMW phases with the use of suitable survey equipment i.e. GPS (Real-time kinematic (RTK)) equipment.	The contractor would ensure that markers which are to be used for setting out purposes are not harmful to the environment i.e. untreated wooden pegs or similar. Where possible, paints or other manmade materials would be limited.
Prior to commencement of extraction works, fence off area with stock proof fencing.	Access and egress points would be provided for pedestrian access.

Stage of Construction	Considerations
Set out and install SuDS features, initially the surrounding cut-off drains and associated SuDS works as appropriate within the proposed TMW area.	SuDS would ensure that any suspended solids generated during construction are effectively mitigated and that down-catchment areas are not deprived of water supply
Remove the top layer of vegetated material. Store the minimal topsoil deposits for later restoration of the area.	This material would be removed and re-used to cover and promote natural re-vegetation of the reinstated TMW.
Excavate to rockhead level and utilise overburden to form a surface water diversion bund adjacent to the cut-off drain. Additional overburden would be stockpiled within the proposed TMW area.	If suitable, this material would be re-used as for partial backfill of the TMWs.
Ripping could occur in the weathered zone of bedrock. Where rock becomes more competent, establish a first line blast to form a productive face. Utilise pattern blasting to loosen rock where required to extend the TMW in the desired formation.	Typically, face height would not exceed 15m or 70° slope angle and would generally follow HSE The Quarry Regulations.1999 guidance where appropriate. The peak of the existing land formation would not be removed.
Crushing/screening/grading of extracted rock prior to temporary stockpiling for removal and utilisation	Control of noise and dust emissions
Stockpiles of aggregate or overburden, where present, would remain below 5m in elevation beyond existing topography and would rest at their natural angle of repose.	Suspended sediment in surface run-off would be diverted to either the sump at the back of the area or the rock filled drain at the entrance.
Extraction of stone and formation of steeply graded 1.5m high faces and 0.5 m wide benches to sloping base of pit. Additionally, formation of 'roll-over' slopes along the more elevated parts of each pit.	In order to mitigate potential effects of the extraction on visual amenity a 'roll-over' slope would be formed along the more elevated parts of each working. This slope would be in keeping with existing topography in the vicinity and would be restored to dry heath and acid grassland to ensure its assimilation into the adjoining landscape.

Stage of Construction	Considerations
Restoration would take place, initially using overburden materials but also peat where appropriate, to backfill local depressions to near ground level.	Reinstatement to compliment adjacent land forms, geology and hydrogeology as far as practicable. Topography designed to maximise potential for revegetation.
Vegetated material would be placed in areas where excavation faces are exposed.	It is important that this is undertaken promptly after extraction is complete to speed up the re-vegetation process.

2.3 Operational (Extraction) Activities

The work at the TMW identified comprises the extraction of rock material for use as aggregate for access tracks, hardstand areas and foundations on Glenshero Wind Farm.

Key extraction activities at the TMW include rock breaking/blasting, crushing, screening/grading, stockpiling and haulage away from the TMW.

The estimated duration of extraction from the TMWs is approximately 18 months. The daily operation and management of the TMW would be the responsibility of the contractor, however, in general the methodology set out below for careful management of the TMW would be adhered to in order to minimise potential environmental impact.

In order to make the above possible, it would be necessary to implement a working method which ensures that provisions are in place to manage topsoil or peaty topsoil removal and re-use for restoration and overburden removal and storage. Provisions for the control of surface run-off during and post construction and the re-vegetating of working faces post construction are also included. Further details on these issues are provided in the following sections.

The exact extent of blasting required is unknown at this stage; however this scale would be limited to the upper envelopes which have been used to inform EIAR Volume 2: Chapter 9 – Noise.

It is anticipated that blasting could occur up to 2-3 times a week for the first six months, then tapering off to every other week and then more infrequently.

Once operations are sufficiently underway, restoration would take place progressively behind the working area to encourage re-vegetation. This would minimise any impact to the surrounding environment by minimising the working area at any point.

General site best practice would be applied through operation activities including:

- Use of fuel would be controlled to the minimum practicable by adequate management systems;
- Vehicle engines would be switched off when not in use;
- All vehicles would be properly maintained;
- Staff would be briefed on fire risk from cigarettes etc in dry conditions. Designated safe smoking areas would be located away from the TMW, with the finalised locations to be confirmed prior to site works commencing; and
- No fires to be lit on site.

2.4 Soil & Peat Material Handling

The TMW has been positioned where rock is most expected to be close to the surface and away from any areas with deep peat or areas with significant risk of peat slide.

Overburden would be temporarily stockpiled within a suitable area of the proposed Area of Search until the restoration phase commences. Where relevant, overburden would remain separate from peat deposits and would sit at an angle no greater than its natural angle of repose, not protrude beyond 5 m in height above the existing topography and would be laid in layers of not more than 1 m thick. Where possible, stockpiles would be placed to the side and on the flattest accessible areas and would avoid any placement on deep peat deposits.

Other overburden glacial till, of which only a small quantity is anticipated, would be utilised for the construction of a surface water diversion bund up topographic gradient, where practical. Any remaining overburden would be temporarily stored in an agreed area within the planning envelope away from construction traffic movements, for use as a moisture retentive layer at the base of the TMW.

2.5 Aggregate Material Handling

Where appropriate, stockpiles of aggregate would be temporarily stored in proximity to the crusher. To minimise environmental impact, the TMW is to be worked in discrete cells. As such, the location of the processed material stockpiles would be transient according to the working phases, however, all of these locations would be at least 100 m from the nearest watercourse.

Aggregate stockpiles would be formed to a maximum height of 5 m above surrounding topography. They would be shaped as it is being built to shed water and sit at an angle no greater than its natural angle of repose.

2.6 Welfare Provision

Welfare facilities for the TMW would be located at the temporary construction compound (within Glenshero Wind Farm) (EIAR Volume 3: Figure 2.1).

2.7 Security

Security arrangements for the TMW areas would be considered under the measures implemented more widely across the proposed development.

2.8 Safety

Training/induction would be undertaken for all site staff prior to working on site. Method statements would be communicated to all relevant personnel through activity plans including:

- Provision of ongoing training and review of relevant procedures with site staff throughout the contract, including through the use of tool box talks;
- Provision of ongoing monitoring of the effectiveness of mitigation and procedures and update as required;
- Provision of ongoing monitoring, review and update of environmental control measures in method statements.

2.9 Environmental Inspections and Geotechnical Assessments

During the construction phase of the proposed development, an on-going system of formalised assessment would be completed by a suitably qualified Geotechnical Engineer. They would be responsible for monitoring site workings and responding to changing ground conditions accordingly.

Environmental inspections would be carried out by personnel based at the TMW and by the project's Environmental Clerk of Works (ECoW).

The inspections would consider the environmental aspects listed below in Section 3.

2.10 Working Hours

Construction traffic would adhere to programmed activities and agreed working hours specified for Glenshero Wind Farm as set out in EIAR Volume2: Chapter 2: Development Description.

3 ENVIRONMENTAL AND HYDROLOGICAL ASPECTS

3.1 Access and Traffic Management

All materials extracted would be distributed via the on-site track network, therefore avoiding the public road network.

3.2 Ecology

3.2.1 General

The TMW location and extents have been selected so as to minimise impacts on any ecologically sensitive areas. To discourage site staff from potentially impacting upon the surrounding environment, the working areas, associated access tracks and storage areas would be marked by a fence or marker posts at all times during the operation of the TMWs. No excursion beyond the delineated boundary would be permitted without authorisation. An ECoW would undertake pre-construction surveys and would monitor the construction works.

3.2.2 Ornithology

Ornithological commitments apply to the Glenshero Wind Farm as a whole and are relevant but not specific to the TMW area. Opportunities for bird species to nest on the TMWs location are extremely limited due to the short sward and lack of cover for ground-nesting species. Notwithstanding the above, should any evidence of nesting be discovered, a buffer (would be established and clearly delineated around the nest and works in that area stopped until the birds either fledge or the nesting attempt ends, e.g. as the result of nest predation.

All contractors would be required to comply with all relevant ornithological commitments set out above.

3.2.3 Flora and Fauna

Protected species commitments apply to the Glenshero Wind Farm as a whole and are relevant but not specific to the TMW area. Notwithstanding the above, should any evidence of a protected species having colonised the location since the walkover be discovered, an appropriate buffer would be established and clearly delineated around the identified feature and works in that area stopped and the ECoW contacted to organise how to proceed.

No particular floral recommendations apply to the locations. Floral mitigation is focussed on ensuring no impacts on surrounding habitats, as set out above.

All contractors would be required to comply with all relevant flora and fauna commitments set out above.

3.3 Archaeology

The proposed extraction of aggregate from the TMW would not affect any known archaeological or cultural heritage sites. Furthermore, given the small scale and temporary nature of the proposed works, it is considered that the proposed development would not give rise to any significant indirect impacts upon

archaeological or cultural heritage receptors in the vicinity of the site, e.g. the setting of or views to and from former cairns etc. Although considered unlikely, the potential for unidentified remains being present is a possibility. Therefore, site staff would be briefed on the nature of common archaeological finds including:

- Brick or tile fragments;
- Coins or pottery;
- Bone fragments or skeletons;
- Timber joists or post holes;
- Brick or stone foundations;
- In-filled ditches.

If any other suspected archaeological features are uncovered during excavation of spoil, excavation activities would cease and the Construction Site Manager would be informed immediately.

3.4 Drainage and Surface Water Management

The TMW locations have been sited away from watercourses and beyond a 100 m buffer area defined for site selection.

Cut-off drainage and or face crest bunding would divert surface flow around the operational area and leave only incident rainfall to collect in the TMW. All cut-off drains would be constructed in advance of any operations occurring within the TMW site.

TMW floor levels would slope gently down to the rear of the area forming a natural pool to retain any surface water and enable suspended sediments to settle out. Water collected in a sump in the low point of the TMW would then be pumped to a SuDS settlement lagoon (located within the proposed TMW area, out of the rock extraction area) sequence prior to natural drainage. Diverted surface flow would also be retained and treated through a SuDS settlement lagoon sequence. No water from excavations and dewatering activities would be allowed to enter surface waters directly.

Staff would be briefed on the location of these features and importance of preventing water run-off from exiting the TMW and would be given regular tool box talks about the risks of working near water and the potential to cause pollution.

Stockpiles (of superficial deposits and aggregate) would be located in suitable locations to ensure that there is no risk of material washing out and contaminating watercourses.

No refuse or debris would be stored at the TMW, however, it would be gathered daily and stored in secure skips located at the temporary construction compound (within Glenshero Wind Farm), prior to regular removal to avoid risk of polluting watercourses.

The source of any water used to suppress dust would be in accordance with legal requirements and if doubt exists about what is permissible consultation with SEPA would occur.

All plant and equipment would be maintained appropriately including checking for leaks and cleaning/removing visible oil.

Any contaminated soil would be disposed of to a licensed waste disposal site in accordance with legal requirements.

There would be no effluent discharges from the TMW.

Following completion of the interim site restoration, the sites would be inspected by suitably qualified personnel, to ensure that any drainage features retained within the sites are functioning properly and that the sites are in good condition.

3.5 Waste Management

There is no waste developed by works at the TMWs anticipated, natural soils would be reused for restoration.

No facilities would be present within TMWs, no hydrocarbon storage would take place. A diesel powered pump would be situated on a drip tray. Regular inspections would take place to check for leaks and drips. The drip tray would have the capacity to safely store at least 110% of total fuel capacity of the pump.

3.6 Noise and Vibration

Impacts from noise and vibration from the TMWs have been considered in EIAR Volume 2: Chapter 9: Noise.

For all activities, measures would be taken to reduce noise levels with due regard to practicality and cost as per the concept of 'best practicable means' as defined in Section 72 of the Control of Pollution Act 1974

3.7 Dust and Air Pollution Management

The main activities on site that may cause dust emissions include the following:

- HGV movement on haul roads;
- Excavation and movement of site won material;
- Crushing of site won material;
- Stockpiles.

The potential issue of dust creation during the works would be weather and season dependant, therefore detailed dust management methods would be subject to the works programme and contractor working methods.

Dust management would be carried out at all times in accordance with industry best practice measures to ensure that any local sensitive receptors are not affected by nuisance levels of dust from the works.

The Construction Site Manager would be responsible for undertaking and recording the following daily checks to manage dust emissions:

The following methods of dust suppression would be implemented during the construction phase of the TMW:

- Site tracks to be damped down using bowser or other suitable system;
- Speed limits to be put in place to ensure low vehicle speeds;
- Damping of dry excavations and cutting/crushing activities which generate dust; and
- Programming of works to minimise the time that materials are exposed.

3.8 Responding to Environmental Incidents

Environmental controls would be implemented as set out in the Outline CEMP included within EIAR Volume 4: Technical Appendix 2.1.

3.9 Daily Check Management

A daily management check would be implemented and would generally follow the example in Table 4 below.

Table 4. Daily Checks

Daily Check	Description
Weather forecast	Check the local weather forecast at start of working day to identify likely daily weather conditions.
Sensitive receptor	Identify which sensitive receptors may be affected by dust pollution from the site.
Dry weather	Apply water bowsers to excavations, haul roads and soil storage areas regularly throughout the day.
	Undertake regular visual checks throughout the day to ensure dust at the above locations is being suppressed.
Wind	Cover open skips and stock piles containing loose fines.
	In the event that dust is being blown off-site, cease dust generating activities until wind conditions improve or dust is suitably managed
On-site activities	Undertake regular visual checks throughout the day of dust management during excavation, crushing and regular movement of HGVs on haul roads.
	Focus water bowsers on areas where dust is being generated.
Neighbour notification	In the event that there is a risk of dust being transported off-site despite the above management measures being put in place, inform neighbours in advance of risk and what management measures have been put in place.
	Actively monitor dust management and where dust pollution is likely to affect neighbours, cease all activities until suitable management procedures can be implemented.
Complaints	A record would be kept on site of all dust related complaints and remedial actions taken.
	If required, staff would be briefed on changes required to working practices to ensure the incident is not repeated.

In addition to the above daily checks, the following dust management would be followed on site:

- All staff would be trained in the importance of dust management procedures;
- Activities on site would be planned to ensure risk of pollution from wind blown dust is reduced to minimum;
- Stockpiles (of fines and aggregate) would be no greater than 5 m above surrounding topography. The material would be tipped so as to ensure that the sides of the stockpiles are stable;
- Only appropriate plant would be used and all equipment would be regularly maintained;
- No unauthorised burning of materials would be permitted on site;
- Regularly monitor the performance of dust management procedures at the site.

4 RESTORATION AND AFTERCARE PLANS

All restoration works would be undertaken following consultation with the Applicant, THC, SEPA, SNH and landowners.

4.1 Restoration Concept

The outline restoration proposals for the proposed TMWs are illustrated Fig 2.10. The TMW would provide for the replication of approximately 6.5 Ha of natural upland habitat.

4.2 Restoration Landform

The excavation of TMW could result in anomalous steep sided voids and rectilinear exposed extraction faces. This could result in loss of visual amenity and ecological interest. In order to avoid this TMWs would incorporate a gently graded 'roll-over' slopes consistent with those of the existing landscape and would remove the most elevated and potentially visible faces in each pit. The 'roll-over' slopes would also provide a suitable landform for the replication of previous habitats. Lower faces would be covered by restoration materials placed in the excavation void. However, any exposed face to be retained in a working would be subject to restoration blasting and/or mechanical amendment to achieve a more natural and irregular finish which provides for ecological niches.

4.3 Restoration Materials

In line with the principles set out in section 4.4 of EIAR Volume 4: Technical Appendix 2.5: Draft Peat Management Plan, the excavation void would be partially filled by selected moisture retentive overburden released from both the TMW excavation and if necessary from construction works elsewhere from the Glenshero Wind Farm. This material would then be topped by a combination of acrotelmic and catotelmic peat where such deposits were initially removed as overburden. The peat material used in the restoration of the TMW would reflect the quantities of peat material extracted, all in accordance with SEPA guidance. Catotelmic peat would be placed above the selected moisture retentive overburden material and then surfaced with translocated acrotelmic peat turfs from the TMW excavation, again in accordance with SEPA guidance.

Restoration of the roll-over slope would be undertaken by direct translocation of 'in-situ' turf and substrate

Peat would only be reused adjacent to existing peatland habitats outwith the TMW area to create a suitable tie-in with the surrounding area and in order to hydrologically connect them both. This would be achieved by means of the breaking out of any impermeable barrier between existing peatland habitats and those restored within the TMW. The location of these hydrological connections would be determined through detailed design but would be located and engineered in a way that would ensure that water flows equally between the restored TMW and to the surrounding peatland habitats. This approach would maximise the potential to establish active peatland in the restored TMW.