

# Appendix 3.2 Borrow Pit Search Areas

## Contents

Introduction	1
Geological Baseline	1
Identification of Borrow Pit Search Areas	1
Design of Borrow Pits	2
Borrow Pit Operation	2
Borrow Pit Restoration	5
Conclusions	5
References	6

This page is intentionally blank.

# Appendix 3.2 Borrow Pit Search Areas

## ***Introduction***

As part of the Proposed Development, aggregates will be required for the construction of access tracks, crane hardstanding areas, the substation and for the construction compounds. The Applicant has identified potential borrow pit search areas within the site boundary where borrow pits may be located to provide the required aggregate. This Appendix provides a description of the identification of these locations and the guiding principles regarding the design, operation and restoration of the borrow pits within the borrow pit search areas of the Proposed Development.

## ***Geological Baseline***

Published British Geological Survey (BGS) data<sup>1</sup> (1:50,000 scale) show the site to be underlain by metamorphic bedrock of the Moine Supergroup formed approximately 541 to 1,000 million years ago. The majority of the site, like Yell as a whole, is part of the Yell Sound 'division', which is dominantly comprised of banded and laminated psammities (a metamorphic rock formed from sandy sediments), interspersed with quartzites, schists and gneisses. This was originally sedimentary rocks which were altered by high grade regional metamorphism. This is detailed in data mapping BGS historic rock samples across the site<sup>2</sup>.

Superficial geology shows the majority of the site to be covered with peat which is described in detail in Chapter 10.

Hydrogeology across Yell is linked to the Moine Supergroup rock unit, it being impermeable rock generally without groundwater except at shallow depths. Therefore, the site is classified as a low productivity aquifer. Detailed site investigations prior to construction will be carried out to further confirm the suitability of the rock and the potential volumes to be extracted from the search areas.

There are a number of small abandoned quarries/pits present on Yell, which have been used as sources of rock or gravel for minor construction purposes (including Garth Wind Farm) indicating that the bedrock within the Proposed Development site boundary is likely to be suitable for construction purposes.

## ***Identification of Borrow Pit Search Areas***

The study area for identification of borrow pit search areas was within the Proposed Development site boundary to minimise transport impacts. Borrow pit search areas were then identified across to site in areas where environmental effects would be minimised and aggregate extraction could be maximised.

The identification of borrow pit search areas first identified areas where environmental effects would be minimised considering:

- landscape;
- ecology;
- cultural heritage; and
- hydrology.

The identification process also considered impacts on residential receptors, considering the potential impacts of:

---

<sup>1</sup> <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

<sup>2</sup> <http://mapapps2.bgs.ac.uk/geoindex/home.html>

- noise;
- dust; and
- visibility.

Following review of potential sites from an environmental perspective, the construction requirements of the Proposed Development were considered to identify borrow pit search areas that were in suitable areas to enable construction. This process identified nine suitable borrow pit search areas, A-I, which form part of the Proposed Development (refer to Figures 1.2a-e). The size of the borrow pit search areas is presented in Table 1.

**Table 1 – Size of Borrow Pit Search Areas**

Borrow Pit	Search Area (m <sup>2</sup> )	Borrow Pit	Search Area (m <sup>2</sup> )
A	24,926	F	28,831
B	14,618	G	4,251
C	13,184	H	24,650
D	6,734	I	36,252
E	37,971		

## ***Design of Borrow Pits***

At this time no ground investigations have been undertaken across the Proposed Development site. As is standard practice, the Applicant will undertake the ground investigations following consent of the Proposed Development.

The results of the ground investigations will allow for detailed design of the borrow pits to be undertaken. This will include the number, depth, orientation and design of the borrow pits within the search areas. The borrow pits' design will consider the topography of the surrounding slopes to provide an effective integration with the immediate landscape upon restoration. Consideration will also be given to the overall gradient of the borrow pits floor to ensure that runoff is not too rapid, and limit therefore erosion.

The Applicant will submit detailed drawings and method statements of the design, excavation, management and restoration of the borrow pits to Shetland Islands Council for their approval, in consultation with the appropriate consultees, and proposes that this is placed as a condition of the consent.

## ***Borrow Pit Operation***

Although, as discussed above, detailed design of the borrow pits will not be completed until after consent following the ground investigations, the operation of the borrow pits will follow the principles outlined below.

### **Legislation and Best Practice**

The following legislation and guidance will be abided by and implemented during the design and operation of the borrow pits.

#### Quarries Regulations 1999

The principles of the Quarries Regulations 1999 shall be followed by the contractor appointed by the Applicant, to provide a safe working environment during the development of the borrow pits.

The excavation designs for the borrow pits will provide safe and stable slopes, which encompass the principle of “design for closure”. Haul and access roads will be of adequate width for the plant utilised and allow for the provision of edge protection.

#### The Water Environment (Controlled Activities) (Scotland) Regulations 2011

The Water Environment (Controlled Activities) (Scotland) Regulations 2011, sets out good practice to prevent pollution of surface and groundwater resources. This will be implemented during the operation and restoration of the borrow pits. Where authorisations are required for process plant operation or consents to discharge (also under The Water Environment (Controlled Activities) (Scotland) Regulations 2011), these will be obtained from the Scottish Environment Protection Agency (SEPA).

#### Planning Advice Note 50: Controlling the Environmental Effects of Surface Mineral Workings

Pan 50 provides advice on the potential significant environmental effects arising from surface mineral workings and the recommended mitigation measure to remove and reduce these effects.

#### Pollution Prevention Guidance and Guidance for Pollution Prevention

The Pollution Prevention Guidance (PPGs) and the Guidance for Pollution Prevention (GPPs) which are replacing the PPGs provide best practice guidance for construction sites.

#### **Construction Environmental Management Plan**

Prior to construction commencing the Applicant will submit a Construction Environmental Management Plan (CEMP) to Shetland Islands Council for their approval (in consultation with appropriate consultees). The Applicant proposes that this is placed as a condition of the consent.

The CEMP will detail the methods and techniques to be employed across the whole of the Proposed Development, including the borrow pits, to ensure compliance with legislation, construction best practice and the mitigation measures outlined within Chapter 16 of this EIA Report.

The CEMP will be prepared in consultation with Shetland Islands Council, SEPA, SNH, Historic Environment Scotland and Scottish Water. It will be a ‘live’ document which will be monitored and updated as required throughout the construction period.

#### **Borrow Pit Methods of Working**

A proposed methodology for the borrow pits is outlined below, however this is generalised for all locations and is subject to change following detailed site investigations and is given here for indicative purposes only. Individual, detailed method statements will be authored for each borrow pit following the completion of the detailed design. The Applicant proposes that the method statements are placed as a condition of the consent.

#### Soil and Drift Stripping and Storage

The borrow pits shall be worked in strips, to ensure that only enough aggregate for the project is obtained, and to limit the impacts of the borrow pits to as confined an area as possible. Heather turves and peat shall be removed in strips from the initial excavation area and initially stored in a temporary storage area. This storage area will be kept as low as possible to minimise compression and hence damage to the heather or peat and should be kept moist throughout the duration of the storage period. Glacial till (if present) will also be removed in strips and will be placed in a peripheral bund next to the excavation area of the borrow pit(s). This storage mound shall be a maximum of 1.5 m high, and the side slopes of the mound shall not exceed a gradient of 1 in 2. As the borrow pit(s) excavation develops, the heather turves and glacial till shall be removed in advance of the active excavation and shall be progressively restored over the worked out areas where possible, to minimised storage durations.

### Extraction of Rock

Rock shall be obtained by the use of plant to both win and crush the resulting rock to the required grading. It is anticipated that rock will be extracted by breakers and other relevant methods that may be required. Noise associated with stone extraction is discussed in Chapter 8.

Currently no blasting is proposed at the borrow pits, however if detailed ground investigations suggest that blasting should be required for rock extraction, then a blasting assessment including a vibration assessment will be undertaken and submitted to Shetland Island Council prior to construction commencing. The Applicant proposes that the requirement for a blasting assessment is placed as a condition of the consent.

### **Drainage and Pollution Prevention**

Natural hillside runoff shall be diverted around the active excavation area as required by the placement of temporary bunds around the outer periphery of the active excavation area, to ensure that runoff is prevented from flowing into and out of the active excavation.

Cut-off ditches shall be constructed where required to prevent transmission of particulates and to minimise the transmission of surface water runoff to and from surrounding land. As the borrow pit sites occupy small areas, the overall hydrological regime of the area will not be significantly altered.

Regarding groundwater issues, the low permeability of the bedrock across the Proposed Development allow very limited transmission of groundwater. Some minor and very localised drawdown of groundwater is anticipated resulting from the excavations, if shallow groundwater is present in the weathered zone close to the surface. It is considered that influx of groundwater shall be restricted to near surface seepages. Impacts from the excavations are therefore negligible on the groundwater table position.

There is the potential for the localised contamination of groundwater by fuels and oils from machinery. This will be minimised by following of the good practice guidance set out in the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR), PPGs and GPPs which will be detailed in the previously mentioned CEMP. This will include but not be limited to the following measures:

- management procedures and physical measures shall be put in place to deal with spillages;
- site spillage and emergency procedures shall be prominently displayed at the site and staff shall be trained in its application;
- maintenance procedures and checks shall ensure minimisation of leakage of fuels or oils from plant;
- refuelling and servicing shall be undertaken on designated impermeable areas where any spillages can be contained and treated;
- all plant shall be maintained in good operational order and any fuel/oil leaks recorded for attention;
- sumps and bunded areas shall be emptied periodically, the waste being removed from site by a registered waste carrier and taken to an appropriate licensed facility;
- an oil interceptor shall be installed at the sump overflow; and
- there shall be no fuel storage at the excavation sites.

Upon restoration of the excavations, the residual gentle downslope gradient of the restored floors will ensure future drainage and prevent pooling.

### **Management of Noise, Vibration and Dust**

All the borrow pit search areas, with the exception of borrow pit search area A, are situated too far from any residential receptors to give rise to significant disturbance from noise, vibration or dust in terms of the guidelines

set out in PAN 50. However, for all borrow pits good practice techniques will be employed during the borrow pit operation including, but not limited to:

- any compressors brought on to site to be silenced or sound reduced models fitted with acoustic enclosures;
- all pneumatic tools to be fitted with silencers or mufflers;
- the majority of deliveries to be programmed to arrive during normal working hours only;
- care to be taken when unloading vehicles to minimised noise. Delivery vehicles to be routed so as to minimise disturbance to local residents;
- delivery vehicles to be prohibited from waiting within or in the vicinity of the site with their engines running;
- all plant items to be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive noise;
- all plant to be sited so that the noise impact at nearby noise-sensitive receptors is minimised;
- local hoarding, screens or barriers to be erected as necessary to shield particularly noisy activities;
- normal working hours will be between 07:00 and 19:00 Monday – Friday, and 08:00 – 18:00 Saturday and Sunday; and
- use of dust suppression using a water bowser during dry periods where dust generation is significant.

### **Cultural Heritage**

The borrow pit search areas have been sited away from any currently known sites of archaeological interest however there is potential for unknown buried archaeological features within the borrow pit search areas. If any archaeological features are discovered during the borrow pit operations, all ground workings at this location will cease, and will be subject to an archaeological watching brief.

### ***Borrow Pit Restoration***

Restoration of the borrow pits will differ between borrow pit depending on the shape and manner of the excavation. Individual, detailed restoration plans and method statements will be submitted to Shetland Island Council for approval, in consultation with the appropriate consultees, prior to the commencement of construction. The Applicant proposes that this is placed as a condition of the consent.

It is anticipated that the restoration of the borrow pits will consist of the following:

- softening of excavation edges on the hillside surrounding the borrow pit;
- replacement of peat within the borrow pits to an agreed level to provide continuity with peat at entrance level;
- replacement of stored heather turves on the peat;
- re-seeding with native species as required.

Refer to Appendix 7.7 (Outline Habitat Management Plan) for further details.

### ***Conclusions***

This appendix sets out the guiding principles regarding the design, operation and restoration of the borrow pits within the borrow pit search areas of the Proposed Development.

Following consent of the Proposed Development and the completion of the ground investigations the Applicant will submit detailed drawings and method statements for the location, design, operation and restoration of the borrow pits to the Shetland Island Council for approval (in consultation with appropriate consultees). The Applicant proposes that this is placed as a condition of the consent.

The implementation of best practice and abidance by the CEMP will minimise and mitigate adverse environmental effects and ensure the compliance of the Proposed Development to ensure compliance with legislation.

## **References**

British Geological Survey (2012). *Geological Survey of Scotland, 1:50,000 geological map series. Sheet 130 and 131 (Parts) Yell*. Available at: <https://www.bgs.ac.uk/data/maps/maps.cfc?method=viewRecord&mapId=11019> and viewed at <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

Natural Resources Wales, the Northern Ireland Environment Agency and the Scottish Environment Protection Agency (2018). *GPP 5: Works and Maintenance in or near Water*. Available at: [https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm\\_source=website&utm\\_medium=social&utm\\_campaign=GPP5%2027112017](https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm_source=website&utm_medium=social&utm_campaign=GPP5%2027112017)

Natural Resources Wales, the Northern Ireland, Environment Agency, the Scottish Environment Protection Agency, the Energy Institute and the Oil Care Campaign. (2018). *PPG 2: Above Ground Oil Storage*. Available at: <https://www.netregs.org.uk/media/1475/gpp-2-pdf-jan-2018.pdf>

Scottish Executive (1996). *Planning Advice Note 50: Controlling the Environmental Effects of Surface Mineral Workings*. Available at: <https://www.gov.scot/publications/planning-advice-note-pan-50-controlling-environmental-effects-surface-mineral/>

Scottish Executive (1999). *The Quarries Regulations*. Available at: <http://www.legislation.gov.uk/uksi/1999/2024/made>

Sottish Government (2011). *The Water Environment (Controlled Activities) (Scotland) Regulations*. Available at: <http://www.legislation.gov.uk/ssi/2011/209/made>