

Environmental Effects – Potential significant impacts.

1.1. Characteristics of the Proposed Development.

The proposed site consists covers a portion of terrain just over 4 kilometres north-south and just over 5 kilometres east-west, and the development will include construction of a windfarm comprising 16 turbines, and all ancillary site works.

Access to the subject site will be provided along a network of third-class roads to be constructed as part of the proposed development. It is proposed to carry out upgrade works on some of the existing surrounding third class roads, where this is necessary, to better cope with traffic approaching and leaving the site.

1.2. Potential Impact of the Proposed Development.

Implementation of the proposed development will result in the **removal of soils and subsoils, as well as a significant volume of bedrock**, from parts of the subject site to install turbines and create level platforms for roads.

This is a direct, permanent impact but is not considered to be a significant negative impact as it has a negligible influence on the overall landform morphology.

In order to minimise any potential impact on the environment, including the soil and geological environment, 'Avoidance of Impact' was incorporated into the design of the development. During the refinement of the overall site design and owing to the depth of excavation, specific engineering measures were incorporated in the form of:

- The construction layout of roadways was situated along pre-existing laneways or trackways, where present.
- Turbines were situated where peat does not occur and solid bedrock is as close to the surface as possible, meaning more coherent foundations are in place for individual turbines.
- Mitigation measures will be incorporated into the construction phase to minimise impact on bedrock, subsoils, soils and water.
- Where excavations into subsoil and bedrock take place, while pouring concrete care will be taken to ensure no seepage of liquid or water into the bedrock fissures.
- At the proposed location of turbine number 3, culvert trenches will be constructed to divert water from the seeps around the turbines locality both during and after construction.
- Silt traps will be employed at these, and other surface water drainage points.
- Piling of areas of subsoil/bedrock that are not sufficiently consolidated will be achieved to provide *in situ* foundation for the turbines.

1.3.1. Predicted Impact of Construction.

Activities during construction will include the excavation of and pouring of foundations for turbines and cranepads, reinforcing of foundations, upgrades of public roads and installation of access roads, laying of cable ducts and hanging gates and constructing fences. Final sizing of foundations and founding depths will be determined during the detailed design stage of the windfarm.

As a result of site preparation, the proposed development will involve the removal of materials to facilitate road building, turbine installation and cable laying.

Owing to the proportion of the area under construction that will have bedrock close to the surface, it is not envisaged that the opening of an on-site quarry to supply stone for roads and foundations will be necessary. However, during the construction phase, a short term generation of high suspended sediment loads in streams adjacent to turbine bases is possible.

Soils on the site may become unnecessarily compacted by machinery during construction.

Soils, subsoils and bedrock may be at risk of becoming contaminated through site activity, in particular the risk of fuel spillages and leakage.

In general, the materials generated during the construction of the facility would be classified as Inert Construction and Demolition Waste, as per the European Waste Catalogue (EWC). It is not envisaged that any significant volumes of such material will be required to be exported from the site during the construction stage.

4.3.2. Mitigation Measures for these impacts during construction.

By limiting the depth of cut and fill ground preparation excavations the impact on the geological environment has been reduced and minimised. This will result in a moderate impact on the soil, subsoil and bedrock environment.

In order to protect against unnecessary compaction of soil by machinery, construction limits, accesses, and haulage roads will be clearly defined.

Strict supervision of contractors will be adhered to, to ensure that all plant and equipment utilised on-site is in good working condition. Any equipment not meeting the required standard will not be permitted for use within the site. This will minimise the risk of soils, subsoils and bedrock becoming contaminated through site activity.

All vehicles will either be serviced and fuelled offsite or in appropriate designated areas onsite with appropriate measures, such as spill kits, available. A wheel wash system for trucks leaving the site will be employed.

All potentially polluting materials, including hydraulic fluid, engine oil and fuel, will be stored in specified areas, which will be bunded to ensure total containment in the unlikely event of total failure of the storage tank. This will reduce the risk of soil contamination due to activity of plant and equipment.

The developer shall ensure that the excavation of soils, subsoils and bedrock is undertaken in an appropriate manner, to allow a safe working environment in accordance with standard construction methods and all current Health and Safety Regulations. It is proposed to build culvert trenches to divert water from the seeps around the locality of proposed turbine 3 both during and after construction, and to employ silt traps at surface water drainage points.

The site investigation indicates that the rock material will be removed by conventional mechanical rock breaking and excavation methods owing to its' moderate rock strength. Blasting is not proposed.

Measures will be taken to eradicate the need for transfer any material for disposal off-site. Topsoil and other mineral soils that can be used for amenity purposes will be stockpiled on the site for use in the final landscaping of the development.

During the construction of turbine number 3, water control measures will be employed to reduce the risk of sediment impacting to the surrounding environment. Water run-off from exposed soil surfaces have the potential to flow through this site. Temporary water control measures, comprising temporary sediment settlement ponds should be employed for the duration of excavation, with all waters diverted through these structures prior to outfall to the seeps downslope. This will control the quality of any water discharged from site.

The emplacement of the turbines in general does not constitute a risk to groundwater quality or quantity in the area as long as the required precautionary measures are taken when constructing the turbines. In effect, each turbine base is no more than a large 'boulder' of concrete which rests in the soil/subsoil/bedrock and water table. The aquifers under the site range from poor to locally important, with no regionally important aquifers present, and no major public water sources in the immediate vicinity of the site.

Exposed soil surfaces will be vegetated following the construction phase to anchor the soil and prevent any soil erosion and mobilisation to water channels. In particular this is required around the proposed location of turbine number 3. The planting of poplars and willow will be carried out immediately surrounding and down-gradient of turbine 3 in order to stabilise the slopes and take up much of the water seeping around the turbine as is practicable.

4.3.3. Predicted Impact of Operation.

When the development is operational, there will only be limited exposure of the soil, subsoil and bedrock environment. **No foul water emissions will occur to the soil environment following the construction of the development. Some surface water will percolate to ground around the turbines, but the amount of water infiltrating will adhere to recommended loading rates for discharge to ground.**

The design of the turbine foundations will ensure no seepage of soiled water or other liquids into the fissures in the bedrock or into the water table. The development will result in a permanent covering of a small proportion of the geological environment with roadways, paths and other impervious surfaces. The amount of increase of runoff from the site from these surfaces is insignificant. It should be noted that there will be no discharges to soil, subsoil, groundwater or surface water arising from the proposed development.

4.3.4. Reinstatement and monitoring when operational.

The construction of a windfarm comprising 16 turbines, with associated access roadways within the site, will result in permanent alteration of the lands, due to the placement of impermeable structures on the site. There is no scope for reinstatement of the initial land surface further to construction of these structures proceeding. On a macro-scale, there is little impact with the hills and flanking channels/valley holding their landscape form.

In between the turbines, the geological environment will however be reinstated wherever possible by deposition of topsoil in open spaces.

As the proposed development will have no impact on the surrounding geological environment, therefore there will be no short to long-term impacts outside the site boundary. From this, there is no requirement for monitoring of the soil and geology environment post construction.