# Oweninny Wind Farm

## Oweninny Power Ltd.

## Environmental Impact Statement

## Chapter 3

## Project Implementation

June 2013

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# 3. PROJECT IMPLEMENTATION

## 3. 1 INTRODUCTION

This chapter sets out the likely project implementation schedule, construction equipment and approach to construction that will be followed. Work Method statement for access track construction, foundation construction and piling operations are provided in Appendix 5.

## 3. 2 PROJECT PHASING

### 3.2.1 Indicative Phasing

The project will be developed in 3 phases which are influenced by grid access availability and construction scheduling and also by the nature of any planning permission granted for the development. The following are indicative of the phase developments likely to take place, (see Figure 2.13 in Chapter 2).

Phase 1 will comprise the construction of 70 - 90 MW of wind farm capacity including the Visitor Centre and Operation and Maintenance Building. This phase will connect to the existing 110 kV substation at Bellacorick and the construction is expected to commence in 2015 with completion of Phase 1 by 2017.

Phase 2 will comprise the construction of 70 - 90 MW of wind farm capacity. This phase will also connect to the existing 110 kV substation at Bellacorick and the construction is expected to commence in 2016 with completion of Phase 2 by 2018.

Phase 3 will comprise the construction of the 190 – 230 MW of wind farm capacity. Although a grid offer has been received this construction phase is dependent on the implementation of Grid West by EirGrid which will provide a new 400 kV substation and transmission system in the Mayo general area. Construction of Phase 3 is therefore expected to commence in 2018 with completion in 2022.

The indicative project phasing is shown in Table 3-1.

***Table 3-1: Indicative Project Phasing***

| Phase | Rated Output (MW) | Approximate construction period |
|---|---|---|
| Phase 1 | 70 – 90 | 2015 - 2017 |
| Phase 2 | 70 - 90 | 2016 - 2018 |
| Phase 3 | 190 - 230 | Post 2018 * |

* the timing of this phase of the development is dependent on the timing of the Grid West development.

## 3. 3 PROJECT CONSTRUCTION

### 3.3.1 Scope

Construction will principally involve the following:

- Upgrading of three existing site entrances and upgrading and construction of 85 km of access tracks from the N59 throughout the site
- Establishing temporary site facilities including site offices, construction lay down areas, storage and concrete batching facilities
- Earthworks for the provision of access trackways, crane hard standings and turbine foundations, for the four Electrical Substations, eight permanent meteorological masts, Operation and Maintenance Building, Visitor Interpretative Centre and temporary batching plant
- Piling of on average 30 foundation piles for each turbine base where required
- Stripping of overburden and development of Borrow pit
- Fixing of formwork and steel reinforcement for the turbine foundations.
- Construction of reinforced concrete bases with cast-in steel foundation section for the tower and backfilling around foundations.
- Reinstatement of areas around turbine bases and track edges.
- The erection by crane of the pre-fabricated turbine towers and the installation of turbines and rotor blades.
- Construction of the four Electrical Substations containing the control buildings and substations.
- Construction of the eight permanent meteorological masts
- Installation of underground ducts and cabling from each turbine to the respective Electrical Substation.
- Construction of the 110 kV overhead lines from the Electrical Substations to the Bellacorick substation area via cable interface towers and underground cables.
- Installation of drainage sediment control system
- Tree felling to provide a 50 m wide corridor for approximately 4.25 km of access tracks in forest plantation areas, keyhole tree felling at 10 turbine foundation and hard stand work areas and an area of up to 100 m x 100 m for temporary rotor storage and assembly prior to turbine erection.
- Decommissioning of all temporary facilities

### 3.3.2 Schedule

The wind farm construction will be undertaken in phases over the period 2014 to beyond 2020, depending on grid upgrading works and implementation of Grid West by EirGrid. Phase 1 and Phase 2 will each require approximately 24 months respectively to complete provided that weather conditions are not unfavourable and the existing 110 kV overhead lines are upgraded by EirGrid. A further construction period is likely to be required for

Phase 3 of approximately 48 months. The commencement of this final phase will be dependent on the implementation schedule of Grid West.

An indicative construction schedule is presented in Table 3-2.

***Table 3-2: Construction Schedule and Nominal Time Scales***

| Activity | Phase 1 | Phase 2 | Phase 3 |
|---|---|---|---|
| Likely time period | 2014 - 2016 | 2016-2018 | Post 2020 |
| Rated MW output | 70 – 90 MW | 70 -90 MW | 190 – 230 MW |
| Number of turbines | 30 | 30 | 51 |
| Establish temporary facilities | 6 weeks | 6 weeks | 6 weeks |
| Site Entrance upgrading | 1 month | 1 month | 1 month |
| Tree felling operation | | | 3 months |
| Drainage control (settlement ponds, drainage channels) | 9 months | 9 months | 18 months |
| Borrow pit excavation | 5 months | 3 months | 12 months |
| Earthworks and access road construction | 9 months | 9 months | 18 months |
| Earthworks for turbine access, foundation and crane hard stand | 6 months | 6 months | 12 months |
| Steel formwork for turbine construction | 6 months | 6 months | 12 months |
| Concrete base formation for turbines | 9 months | 9 months | 18 months |
| Turbine assembly and erection | 5 months | 5 months | 6 months |
| Electrical Substation access and earthworks | 4 weeks | 4 weeks | 8 weeks |
| Installation of transformer station | 12 months | 12 months | 12 months |
| Construction of meteorological masts | 3 months | 3 months | 6 months |
| Construction of Operation and Maintenance building | 6 months | - | - |
| Construction of Visitor Interpretative Centre | 8 months | - | - |
| Construction of 110 kV Overhead line | 3 months | 3 months | |
| Installation of underground cables to Bellacorick | 2 months | 2 months | 3 months |

For Phase 1 and Phase 2 the main construction elements include:

- Site entrance upgrading and access track construction
- Civil engineering works will take approximately 24 months for each phase.
- Electrical works will take approximately 12 months for each phase and will be carried out in conjunction with the civil works as far as possible.
- Turbine erection will take between 3 and 6 months for each phase depending on weather conditions, and will commence when the bulk of the civil works are complete.
- Reinstatement and landscaping for each phase will be conducted in parallel with turbine commissioning.

For Phase 3 the main construction elements include:

- Civil engineering tasks will take approximately 18 months.
- Tree felling will take approximately 3 months
- Electrical works will take approximately 12 months and will be carried out in conjunction with the civil works as far as possible.
- Turbine erection will take 6 - 8 months depending on weather conditions, and will commence when the bulk of the civil works are complete.
- Reinstatement and landscaping will be conducted in parallel with turbine commissioning.

The final construction programme will be developed in consultation with the turbine manufacturer, based on availability of turbines and projected delivery dates.

### 3.3.3 Construction Plant and Machinery

The estimated type and number of items of construction plant and machinery that will be used during the course of construction are provided in Table 3-3.

***Table 3-3: Estimated Typical Construction Plant and Equipment****

| Phase 1 Plant | Phase 2 Plant | Phase 3 Plant |
|---|---|---|
| 15 - 20 No. hydraulic excavators<br>2 Rubber tired excavators | 15 – 20 No. hydraulic excavators<br>2 Rubber tired excavators | 15 - 20 No. hydraulic excavators<br>2 Rubber tired excavators |
| 5 - 10 No. 25 – 40 ton dump trucks<br>30 No 8 wheeler truck – stone delivery | 5 - 10 No. 25 – 40 ton dump trucks<br>30 No 8 wheeler truck – stone delivery | 5 - 10 No. 25 – 40 ton dump trucks<br>30 No 8 wheeler truck – stone delivery |
| 2 x Piling Rig<br>Pile transport – 4 x 40 ft trailers and 3 x Concrete lorries. | 2 x Piling Rig<br>Pile transport – 4 x 40 ft trailers and 3 x Concrete lorries. | 2 x Piling Rig<br>Pile transport – 4 x 40 ft trailers and 3 x Concrete lorries. |
| 1,200t capacity crane (x1) | 1,200t capacity crane (x2) | 1,200t capacity crane (x2) |

| Phase 1 Plant | Phase 2 Plant | Phase 3 Plant |
|---|---|---|
| 300 - 500t capacity crane (x2)<br>100t capacity crane x1<br>MEWP x 2 | 300 – 500t capacity crane (x2)<br>100t capacity crane x1<br>MEWP x 2 | 300 - 500t capacity crane (x2)<br>100t capacity crane x1<br>MEWP x 2 |
| Concrete Batching Plant | Concrete Batching Plant | Concrete Batching Plant |
| Concrete pump (truck mounted)<br>10 x concrete trucks | Concrete pump (truck mounted)<br>10 x concrete trucks | Concrete pump (truck mounted)<br>10 x concrete trucks |
| 10 No. 8 t dumpers, 2 x teleporters. | 10 No. 8 t dumpers, 2 x teleporters. | 10 No. 8 t dumpers, 2 x teleporters. |
| 150 mm Dewatering pumps | 150 mm Dewatering pumps | 150 mm Dewatering pumps |
| Site generators and fuel bowsers | Site generators and fuel bowsers | Site generators and fuel bowsers |
| 15 -20 No. Four-wheel drive vehicles | 15 -20 No. Four-wheel drive vehicles | 15 -20 No. Four-wheel drive vehicles |
| Miscellaneous power tools | Miscellaneous power tools | Miscellaneous power tools |
| Deliveries to site – rebar and other materials.2 x low loaders | Deliveries to site – rebar and other materials. 2 x low loaders | Deliveries to site – rebar and other materials.2 x low loaders |
| Deliveries to batching plant – 10 No 8 wheeler or Artic trucks. Water tanker delivery. Bulk cement delivery. | Deliveries to batching plant – 10 No 8 wheeler or Artic trucks. Water tanker delivery. Bulk cement delivery. | Deliveries to batching plant – 10 No 8 wheeler or Artic trucks. Water tanker delivery. Bulk cement delivery. |
| | | 2 No. Forest Harvester |
| | | 2 No. Tree Felling Forwarder |
| | | 6 No. Timber lorries |

** Note: The estimated plant is indicative and will be dependent on the contractor(s) appointed to undertake construction*

### 3.3.4 Construction and Environmental Management Plan

All site activities will be provided for in a Construction and Environmental Management Plan (CEMP) prepared prior to commencement of on-site operations. The Plan will outline the work practises, environmental management procedures and management responsibilities in relation to construction of Oweninny Wind Farm.

The Plan will set out all measures necessary to ensure the works are carried out in accordance with the specified contractual, regulatory and statutory requirements, as well as the mitigation measures set out herein. Amongst the items to be addressed will be the following:

- Control of fuels and oils
- Control of concrete
- Management of spoil storage areas
- Waste management
- Construction monitoring
- Traffic management
- Pollution contingency plan
- Forest harvesting operations
- Drainage control measures

All site personnel will be required to be familiar with the CEMP's requirements as related to their role on site. The CEMP will be a controlled document, which will be reviewed and revised as necessary.

### 3.3.5 Site Management

A full construction management team will be deployed on site in accordance with routine site construction procedures. This team will consist of a Resident Site Manager and Assistant Engineers as appropriate.

Forest felling operations will be carried out in accordance with Forest Service Guidelines.

All construction works will be carried out under appropriate supervision. Works will be carried out by experienced contractors using appropriate and established safe methods of construction. All requirements arising from statutory obligations including the Safety, Health and Welfare at Work Act and associated regulations will be met in full.

## 3. 4 TEMPORARY SITE FACILITIES

### 3.4.1 Contractor's Compound

A number of suitably surfaced contractor's compounds, which will be approximately 70 m x 40 m in plan, will be provided for offices, equipment storage and construction staff welfare facilities at the location identified in Figure 2.1 for the duration of the site works. It is anticipated that up to four separate contractors will be involved. In addition a number of potentially suitable locations for temporary site compounds have been identified adjacent to substation 2 and substation 4, close to entrance on the western side and in close proximity to the existing Bord na Móna maintenance workshops. The use of these areas and the main compound area will be a decision for the construction contractor.

Portable cabin structures will be used to provide temporary site offices and self-contained chemical-type toilets will be installed. These will be managed and serviced on a weekly basis or more frequently if required, and will be removed from the site on completion of the construction phase.

Container storage units will be provided for holding tools and materials and lay down areas will be provided for major components.

Each compound will be fenced with chain link fencing and will have a lockable gate.

Potable water supply will be provided via the local group water scheme connection point which has been taken over by Mayo County Council and to which both ESB and Bord na Móna have connections or alternatively by water tanker or bored well.

Temporary direction notices will be erected for construction traffic.

All temporary facilities will be fully removed upon project completion and the respective areas will be reinstated or modified for use in the operation of the development if appropriate.

### 3.4.2 Temporary Concrete Batching Plant

A temporary concrete batching plant will be established for the duration of the construction phase, (see Planning Drawing QR320201-P-000-053). This will comprise aggregate and binding materials storage, water storage, batching plant, concrete silos, water recycling area and temporary administration structures. The concrete batching plant including material storage will be established for the duration of the works adjacent to Electrical Transformer Substation No.1. The proposed location is situated on thin peat overlying sandy subsoil.

The site will be cleared and leveled and a concrete platform and hard core areas constructed. The concrete apron will be sloped towards a three bay water recycler. This will provide settlement of suspended solids from surface water flow. The three bay water recycler will be cleaned periodically and the fines stored upslope. The fine material recovered will be reused in the concrete production.

Water will be extracted from nearby existing water sources ($10m^3$ per hour required) on site and will be stored in a designated water storage area (approximately $500m^3$).

Aggregate material will be brought to the material storage areas within the concrete batching plant compound from external quarry sources. Each of the four material storage areas will be capable of holding up to 5,000 tons of aggregate material, i.e. a total of 20,000 tons. Stockpiling of aggregate will take place over a prolonged period to minimize cumulative impacts on traffic on the N59 and other roads in the area.

Coarse and fine aggregates will be stored in separate bins. Aggregates will be transported from the bins to an aggregate hopper by conveyor belts. A weigh hopper is situated directly beneath the overhead storage hopper, where aggregate is weighed and transferred to the mixer house.

Cement and fly ash will be stored in separate overhead silos. These components are fed into the mixer house. The correct proportion of water is added, along with any required admixtures and the concrete is mixed, ready for final slumping, inspection and transportation to the construction site.

The batching plant will be capable of producing 50 $m^3$ of concrete per hour with an hourly requirement of 10 $m^3$ of water and 20 tons of aggregate and 5 tons of cement.

Concrete will be batched on site on a demand basis mainly for turbine foundation construction. During the operation of the concrete batching plant external concrete suppliers will be on stand by to deliver the required concrete.

Drainage control including sediment control and settlement and pH neutralization will be provided at this location.

The batching plant compound will be fenced with a 2.4m high chain link fence.

For the wind turbines, the concrete pouring operation is critical to the structural integrity of the turbine base as once the pour commences it must be completed in one operation to ensure correct formation of the base. The presence of the batching plant on site with adequate store of materials will provide an alternative to delivery of concrete by vehicles providing security of concrete pouring operation.

Conversely, an external concrete batching plant will be on standby during turbine foundation pour to provide concrete in the eventuality that the batching plant suffers an unexpected breakdown. Concrete deliveries would be called in to complete a turbine base pour if necessary.

The proposed concrete batching plant will be constructed for two main purposes

- to partially meet the concrete demand on site.
- to provide a back up concrete production facility in the event of an external plant being unable to meet the required concrete demand flow. This would be critical to the pouring of concrete foundations which must be completed in continuous fashion to ensure foundation integrity.

The provision of the batching plant will have major operational and some environmental benefits. It will allow for redundancy in concrete production essential to wind farm construction. It will also reduce the peak volume of traffic on the N59 for instance as concrete will be batched on site and not transported in. The materials required can be imported to the site over a prolonged period. This will have knock on effects on peak emissions of air pollutants such as $SO_2$, $NO_x$ and dust associated with transport.

The location of the concrete batching plant within the Oweninny site, has been carefully selected to minimise potential impacts on the environment. The proposed location is adjacent to Substation number 1, (see Figure 2-1) and is considered the best site in terms of operational aspects and in terms of environmental and visual impacts. It is located more than 1.28 kilometres from the nearest occupied dwelling, which is situated along the central road passing northwards through the site and adjacent to the Oweninny/Owenmore river. The batching plant is also located a distance of approximately 550 metres from the nearest stream, a first order tributary of the Oweninny/Owenmore river and about 117 metres distance from a small lake (Lough Nagappul) adjacent to the stream.

Within the batching plant site area the main concrete batching, wash out and truck loading facilities will be constructed on top of a concrete base slab which separates the plant from existing ground. The internal roadway to the batching plant area will also be concreted.

Site offices, control building and staff parking will be located on hard core areas.

### 3.4.3 Other temporary facilities

The contractor may provide temporary storage and sanitary facilities at turbine hardstands and other construction areas during the construction period.

Portable generators will also be provided to facilitate commissioning of the site.

### 3.4.4 Emissions and emission control

Batching plants can give rise to potential emissions including dust, wastewater and waste materials. Given the distance to the nearest occupied dwelling and surface water the potential impact of any such emissions are likely to be insignificant. Major construction works associated with the setting up of the temporary batching plant include formation of foundation, erection of carbon steel supports and metal works including welding and assembly of fabricated metal sheets. Atmospheric dust would be the principal air contaminant generated during construction. The excavation requirements are very small and the amounts of dust and other emissions that will be generated will be relatively minor. Bare areas of soil will be quickly covered with hardcore and hard surfaces during construction minimising potential for dust and silt runoff from the site. The main potential for emissions from the batching plant site will occur during the operational phase and will be intermittent in nature. For example for turbine foundation pour the batching plant would produce concrete on 30 days, 31 days and 51 days during each of the development phases. Similarly foundation pours for the visitor centre and O&M building would be on a campaign basis over a number of weeks.

**Dust emissions.**

Dust emissions can arise from materials delivery and fugitive emissions from silos, conveyor belt system and batching plant operation. The most effective means of reducing dust emissions at batching plants is to hard-surface roadways and any other areas where there is a regular movement of vehicles. The batching plant area itself within the site will consist of a concrete apron which will be cleaned on a regular basis to remove any spilled materials.

Suppression of dust emissions from unsealed yards and roadways, will be achieved by hard coring the stockpile areas and access tracks to these and regular light watering when required

Dust emissions due to vehicles will be minimised by provision of a hard surfaced access road within the batching plant site to the batching plant area. Wheelwash facilities will be provided at the Oweninny site main exits.

The batching plant site will be operated in accordance with best practice with good maintenance practices, including regular sweeping to prevent dust build-up. To ensure that dust emissions are minimised the following additional actions will be implemented:

- Aggregate material will be delivered in a damp condition, and water sprays will be applied to reduce dust emissions. Given the distance of the batching plant site to the nearest occupied dwelling it is proposed to store aggregate on hard core rather than in contained areas.
- Aggregate will be stored on site in stockpiles
- The Conveyor will be designed and constructed to prevent fugitive dust emissions. This may include covering the conveyor with a roof, installing side protection barriers and equipping the conveyor with spill trays, which direct material to a collection point. Belt cleaning devices at the conveyor head may also be used to reduce spillage.
- Before loading into a concrete truck, materials will either be premixed in a totally enclosed concrete mixer or if the batching plant is the dry mixer type loaded into trucks for subsequent mixing.

- The mixer loading area will be enclosed and water sprays and a robust curtain of suitable design, or an effective air extraction and filtration system will be installed to suppress dust generated during mixer truck loading.
- Concrete trucks will be loaded in a way that minimises airborne dust emissions
- Weigh bins and hoppers will be enclosed.
- Any raw material spills will be removed promptly by dry sweeping. Water will not be used in the process of cleaning up spills except where the area drains to a wastewater collection point where washing down would be preferable to generating dust by sweeping. Where dry materials are recovered they will be recycled into the concrete batching process.
- Cement storage silos will have an approved fabric filter incorporating a fabric-cleaning device installed on each cement storage silo. The fabric filters will be serviced and maintained in accordance with the manufacturer's recommendations. Regular inspection and maintenance will be undertaken.
- To prevent overfill and subsequent filter damage, storage silos should be fitted with high-level audible and visual alarms in addition to an automatic delivery shut-down.
- If visible emissions are observed their source will be identified and corrective action taken immediately
- All filter systems will be inspected on a daily basis to identify when cleaning/replacement is necessary. The inspection will include for checks for tears or leaks in fabric/cartridge filter systems.

**Water**

Water quality impact can occur both during the construction and operational phases of the proposed concrete batching plant. Construction impacts can include

- construction run-off and drainage;
- sewage effluent produced by the on-site workforce.

The site has been designed and will be constructed such that clean surface water, including roof runoff, is diverted away from contaminated areas and directed to a surface water discharge system. Any liquids stored on site, including admixtures, fuels and lubricants, will be stored in accordance with EPA Guideline, Bunding and Spill Management (2007). The drainage control system will be constructed in advance of any ground clearance works or site preparation and will control potential discharges to surface waters.

Temporary welfare facilities will be provided at the concrete batching plant site for both the construction and operational phases. A holding tank will be used to collect wastewater from sanitary facilities. Wastewater will be removed from site by a licensed waste contractor.

During the operational phase wastewater including cement, sand, aggregates, chemical admixtures, fuels and lubricants could gain access to surface and ground waters from the site. Turbid and highly alkaline wastewaters are the key potential aquatic impacts associated with concrete batching plants.

To control potential impacts on the environment good construction practices and site

management measures will be observed to ensure that solid waste, fuels and solvents do not enter the nearby waters. These practices will include the following:

- All runoff from the concrete batching area, washout area and concrete truck loading facilities will be directed to a three stage water recycler.
- Water from this recycler will be recycled back into the concrete batching plant process or used for washout facilities.
- Fines and solids from the water recycler will be removed and reused in the concrete batching plant process.
- Any excess surface water from the concrete slab and water recycler area will be directed towards the drainage control system and will pass through a sediment control pond before being directed to overland flow across the site. There will be no direct discharge to any receiving water.
- Wastewater from the water recycler will only be discharged to the settlement ponds between the pH limits of pH 6 to pH 9.
- All fuel and chemical stores will be bunded in accordance with the requirements of EPA Guideline, Bunding and Spill Management (2007)
- Routine inspections of the water recycler and bunds will be undertaken.
- Areas where spills of oils and chemicals may occur will be equipped with easily accessible spill control kits to assist in prompt and effective spill control, according to the EPA Guidelines, Bunding and Spill Management. Staff should be familiar with spill response and notification procedure.

**Waste Materials**

The main solid waste generated by batching plants is waste concrete. Waste minimisation is the preferred approach to dealing with this material.

- Where possible, waste concrete will be used for construction purposes at the batching plant or project site (eg bunker blocks or paving unsealed areas). Alternatively, waste concrete will be directed to a suitable washout area where it becomes gravel, sand and sludge, which can subsequently be collected and reused.
- Any dust arising on site and from the filter system will be recycled into future concrete batches

**Noise**

No specific noise controls are expected to be required for the concrete batching plant as the site is located at a distance of grater than one kilometre from any residence and will operate intermittently.

### 3.4.5 Decommissioning

The temporary batching plant is likely to remain in situ during the construction of Phases 1 and 2. However, given that construction of Phase 3 will not commence until Grid West is at the construction stage it is possible that the batching plant equipment would be decommissioned for a period between Phase 2 and Phase 3. Should this occur the concrete paved areas would be left in situ and full decommissioning of the site would occur post the Phase 3 construction.

With the implementation of environmental controls as indicated above and given the batching plant location with respect to occupied dwellings and the public road no significant environmental impacts are foreseen during its construction, operation and decommissioning.

### 3.4.6 Control of Oils & Fuel

Oils and fuels will be used during the construction phase and the following procedures will be implemented for on-site storage of fuels, lubricants and hydraulic fluids for equipment used on the construction site:

- Storage of fuels, lubricants and hydraulic fluids will occur mainly at the contractors' compound(s), which will be fenced with chain-link fencing and will have a lockable gate, thereby ensuring that the area in which fuels, lubricants and hydraulic fluids are stored will be properly secured against unauthorised access or vandalism.
- Outside the contractors compound there will be short term storage of fuels for diesel generators use don site.
- An area within the compound will contain a small bund lined with an impermeable membrane in order to prevent any contamination of the surrounding soils and vegetation and of groundwater.
- Selection of the location for storage of fuels, lubricants and hydraulic fluids will be based on the following:
  - It will be remote from surface drains and watercourses.
  - It will be readily visible for supervision and inspection.
  - It will be readily accessible for filling and maintenance.
  - It will be protected against accidental impact.
- Bunds will have capacity of at least 110% of the largest tank accommodated or 25% of the total maximum capacities of all tanks, whichever is the greater, where more than one tank is installed and will be constructed and managed in accordance with the EPA Guideline, Bunding and Spill Management (2007).

The following procedures will be implemented during construction operations:

- Fuels and oils will be carefully handled to avoid spillages.
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the site and disposed of appropriately.
- Any waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling.
- As a minimum, simple spill protection equipment that will be held locally will include specialist absorbent mats/pillows and granules for containment/cleanup of oil. Adequate quantities should be held in stock and be available for immediate use.
- Appropriate spill control equipment, such as oil soakage pads, will be available on site to deal with any accidental spillage and emergency response procedures will be put in place.
- Designated contractors' personnel will be trained and certified in oil spill control and

clean up procedures and in the proper and safe disposal of any waste generated through such an event.

## 3. 5 PUBLIC ROADS

It is recognised that the N59 used in delivery of construction materials and turbine components may require upgrading to facilitate the project. Any road improvements that are undertaken will ultimately be of long-term benefit to the local community.

It is proposed that a condition survey of public roads be carried out by Oweninny Power Ltd. in agreement with the Local Authority prior to commencement of the project to identify any improvement works, such as road widening at bends, provision of passing bays, etc, that may be required and for agreement with the Local Authority.

While the surface of the public roads will be maintained for the duration of the works, the above survey will also form a basis for agreeing any remedial works that may be necessary following completion of the construction.

Additionally it is noted that a Road and Bridge survey was conducted along the N59 as part of the Corrib Gas discharge conditions. The adequacy of this existing Road and Bridge survey in terms of assessing existing infrastructure and the potential impact of the Oweninny wind farm construction activities on it will be discussed with the Local Authority at an early stage. If required an updated Road and Bridge survey will be conducted by Oweninny Power Ltd for agreement with the Local Authority prior to commencement to identify any improvement works that maybe required.

## 3. 6 TURBINE ACCESS AND CRANEPADS

### 3.6.1 Access tracks

An access track network is required through the site to facilitate construction of the turbine bases and erection of the turbines. Access already exists to the Bellacorick Wind Farm within the site but parts of these tracks will require upgrading in Phase 3 of the project. Approximately 85 km of access tracks will be required in total. It is anticipated that upgrading of existing tracks will provide approximately 6 km of the overall required length.

In addition a network of now disused internal railway beds exists on the site. These formed part of the original peat harvesting operations and the decommissioned trackways are used for general vehicular access to the overall site. In some cases the railway network may be surface upgraded to allow continued use by light vehicles to the overall site.

The network of access tracks will utilise up to 5 km of trackways provided for the existing windfarm.

In forest plantation areas a clear fell corridor of about 50 m width will be established through Coillte plantation on the site to access turbine locations. Keyhole felling around the turbines will also be undertaken. Trees will be harvested using traditional harvester and forwarder equipment and stockpiled on site prior to removal by truck to appropriate commercial operations. Felling will be carried out in accordance with the Forest Service Guidance documents and under a felling licence. Silt ponds will be installed for roadside drainage following tree clearance.

Improvements to existing tracks within the site will comprise the following:

- Widening: Excavate an approximate 1.5 m strip next to one side of the track, into glacial till / weathered rock. Place approved stone along the strip, tying into existing track structure, to leave a 6 m wide completed track.
- Strengthening: Excavate weak / sub-standard sections of the existing wind farm access trackway and replace with approved stone.
- Bend improvements: Excavate strip / area to the side of the existing track, into cohesive soil or weathered rock, to create a bend which complies with the turbine supplier's delivery specification. Place approved stone along the strip / area tying into existing track structure.

Access tracks will be to standards that meet the criteria for load carrying capacity of the ground over which the tracks will pass, for the axle loads of the vehicles and the total number of vehicles during the construction period.

The site is characterised by the presence in places of areas of relatively deep peat. However, the proposed layout has been developed by avoiding such areas wherever possible and it is anticipated that the required formation strength will be achieved in the majority of areas (70%) without deep excavation.

The tracks will generally be formed by excavating the existing overburden and placing a layer of coarse granular fill followed by a 100 mm layer of fine gravel. An overall minimum thickness of 800 mm is envisaged.

The use of floating access tracks will be considered as an alternative to deep excavation in areas where this construction type may be appropriate

To facilitate internal access to turbines for maintenance purposes within the site short sections of floating road are proposed which would effectively close off potential loops in the trackway structure. This will allow small and light maintenance vehicles to traverse short distances between adjacent turbines which would not otherwise be linked by construction tracks reducing journey time within the site.

If localised pockets of deeper peat are found that do not warrant adopting floating road construction and excavations are necessarily deeper, a layer of quarry rock will be placed to raise levels and aid drainage.

Crossings of drains and minor watercourses will be by culverts. These will be suitably designed for base flows and peak flows, with a minimum size to avoid occurrence of blockages and build-up of discharges and to avoid increased flow velocities with the potential to cause erosion. They will also be designed in accordance with the requirements of Inland Fisheries Ireland "*Requirements for the Protection of Fisheries Habitats during Construction and Development works at River Sites*".

### 3.6.2 Cranepads

Cranepads, which comprise level hard-standings, are required adjacent to each turbine base for the operation of a heavy lifting capacity crane and a smaller service crane used for assembly of the turbine components. These areas will be to the same general specification as the turbine access tracks that they adjoin, but a slightly greater depth of construction is envisaged. Trackside drainage will be provided within the excavated width and will discharge into stilling ponds at regular intervals. The resulting discharge will be directed to overland flow to existing wetted areas of the bog to ensure appropriate water quality for release into the general drainage of the site. Details of the site hydrology and

drainage management are provided in Chapter 19 of this EIS.

## 3. 7 WIND TURBINES

### 3.7.1 Turbine Bases

Foundations for wind turbines may be of the gravity, rock anchored or piled type. Pile based foundations are more likely to be proposed at Oweninny and depths of piling will depend on site conditions that are established by detailed geotechnical investigations. Exploratory boreholes have been undertaken and this indicates that piles averaging 17m in length will be required. Piles will be of the reinforced concrete type and the average number of piles per turbine base will be 30. Additional geotechnical investigations will be undertaken as necessary at each turbine location with associated sampling and laboratory testing to confirm piling requirements.

While sizes will depend on site conditions, it is envisaged that turbine bases will consist of reinforced hexagonal, (or similar equivalent shape) concrete pad footings measuring 22 m across x 3 m deep, similar to those shown in Planning Drawing number QR320201-P-000-042. Foundations will be either excavated or founded on the piles about 0.5m below existing ground level and will incorporate an upstand / plinth into which a tower insert or fixing bolts will be embedded. At each turbine base the completed foundation will be covered with soil leaving only the concrete upstand / plinth outstanding. The upstand / plinth will be approximately 4-5 m in diameter, depending on the final choice of turbine model.

The exact dimensions of foundations will be determined by pre-construction structural design calculations incorporating appropriate factors of safety. These will be based on detailed geotechnical investigations, which will include trial pit excavation and exploratory boreholes as necessary at each proposed turbine location with associated sampling and laboratory testing. The depth of individual foundations will vary according to the depth to rockhead or other competent subgrade.

Design of foundations will be undertaken by qualified structural engineers who have successfully designed foundations in similar environments for similar structures.

In design terms the substrata encountered at Oweninny are neither unusual nor problematic. In design terms, neither the ground conditions at the site nor the structural loads arising from wind turbines are particularly unique. Wind farm developments have been successfully designed for environments where bases are founded on strata that are similar to those at Oweninny.

The general method of construction of the turbines will be as follows:

- Marking out of the location of the foundation established from the construction drawing
- Construction of the crane hardstand and piling platform area
- Piling of up to 30 concrete piles where required to an average depth of 17m. Piles will most likely be constructed by coring and inserting a steel sleeve which will be filled with reinforced concrete prior to sleeve removal. Piling at each turbine foundation location will take approximately 1 week.
- Where piling is carried out excavating soil to a depth of up to 1m with provision of a surrounding working area to allow placing of shuttering, etc. Excavators will be

conventional and long reach machines, which will initially sit on the cranestand and / or bogmats or the adjoining access track. Depending on the depth and type of peat encountered the peat will be benched until formation level is reached or large boulders will be punched through the peat to retain the sides of the excavation

- Placing of concrete will generally be in two phases, namely the base pour which will be a single continuous phase and the pedestal pour, using pumps and compaction using vibrating pokers to the levels and profile indicated on the drawings. Upon completion of the concreting works the foundation base will be covered and allowed to cure. The steel reinforcement framework will be prepared in advance of the concrete pour. The base pour, comprising the base of the foundation will be poured continuously over a one day period. An estimated 550m$^3$ of concrete will be required for the first pour requiring approximately 50 concrete deliveries. The concrete base will be allowed to cure for a period of between 30 – 45 days. The first pour will only take place at one turbine base at a time. The pedestal pour will take place after the curing period comprising 100 m$^3$ of concrete approximately.
- Where concrete piles are not required the turbine foundations will be excavated to a depth of c. 3.0 m and the excavated material will be side cast adjacent to the work area to a depth of no more than1.0m. Steel and formwork will be as described above and the concrete will be poured in two operations as described above.
- The concrete will be protected from rainfall during curing and all surface water runoff from the curing concrete will be prevented from directly entering surface water drainage.
- Fixing of high tensile steel reinforcement will be in accordance with the designer's drawings and schedules. The foundation anchorage system will be installed, levelled and secured to the blinding using steel box section stools.
- Installation of ductwork as required and erection of formwork around the steel cage and propping as required.
- Checking of the foundation anchorage system both for level and line will be conducted prior to the concrete being installed in the base. These checks will be passed to the turbine manufacturer for their approval.
- Following a curing period, where the foundation base will be covered to assist curing, formwork will be stripped off and stored for re-use.
- Backfilling the foundation with a cohesive material, where possible using the material arising during the excavation and landscaped using the vegetated soil set-aside during the excavation.

Depending on the choice of turbine manufacturer, the turbine transformer be contained within the tower base or installed externally. In the event of a requirement to install the transformer outdoors, its foundation base will be about 2.5 m x 2.5 m x 0.3 m deep and will be constructed of lightly reinforced concrete and situated adjacent to the turbine on backfill material.

An earthing mat or electrode will be installed at each turbine base. It will comprise earthing rods and up to three concentric rings of bare stranded copper conductor. The extent of the earthing will be determined by testing of electrical resistivity.

### 3.7.2 Turbine Installation

Construction contractor's may adopt a "Just in Time" system of delivery to site with a number of turbines delivered in advance of erection or an early delivery system with storage of wind turbine components on site. Equipment will be shipped to Ireland either to an intermediate location, such as a shipyard, where it will be stored until required or for direct delivery to site. For just in time type delivery equipment will arrive on site the week it is required and turbine components will be delivered to the site on specialised long transporter vehicles.

Each turbine will be constructed by in-situ assembly of components carried out with the aid of a heavy lifting capacity main crane and a smaller capacity crane working in tandem.

Use of cranes will generally be as follows:

- A regular or crawler type crane of approximately 100 - 300 t capacity will be used for rotor builds, unloading hubs and parts stacking and single blade lifts .
- A 300 - 500 t capacity crane will be used for rotor builds when extra boom length required due to terrain / location problems. It will be used as a tail crane for tower sections and rotor lifts.
- A main lift crane of approximately 1,200 t capacity will be used for nacelle, bottom and top tower sections and rotor lift.

Each turbine will be erected over a 2-3 day period.

### 3.7.3 Commissioning

All individual wind turbine components and all electrical equipment will be the subject of factory testing prior to delivery to site. Following assembly of turbines and installation of all equipment, a period of commissioning and testing will follow.

The full duration of commissioning will vary with the development phase and is expected to be approximately 10 weeks for each phase, subject to suitable weather conditions, and this will be followed by fine tuning during the first three months of operation.

## 3. 8 ELECTRICAL SUBSTATION

Each Electrical Substation in which Control Buildings and substations will be located will occupy a hard-standing area of approximately 8,432m². Each will include plinths to support electrical equipment including transformer and end-pylon cable ducts and other ancillary equipment. Each compound will be enclosed by a security fence, on which warning, project description and interpretation signage will be attached.

The Control Buildings will be single storey and will consist of a pitched roof supported on blockwork cavity walls on reinforced concrete strip footings. Hard finishes will be provided for the majority of floor areas throughout the buildings. These will provide durable surfaces that enhance the building environment and are easy to clean. Protective floor finishing will also be provided. External doors and escape doors will generally comprise metal flush doors and mild steel frames.

The Grid Transformer will be delivered to the Electrical Substation on a multi-axle special purpose tractor and trailer transport that will distribute this load over eight or more axles, which results in acceptable loads.

Drainage arising from paved surfaces within the Electrical Substation and from transformer bunds will be discharged through an appropriate oil interceptor before entering the site drainage management system. Drainage from the station will pass through a settlement pond before discharge to overland flow.

Electrical Substation 1 will be constructed in Phase 1, Electrical Substation 2 in Phase 2 and Electrical Substations 3 and 4 in Phase 3 of the development.

## 3. 9 OPERATION AND MAINTENANCE (O&M) BUILDING

The operational and maintenance building will be constructed in Phase 1 of the project and will comprise a portal frame steel building on a concrete foundation approximately 31.2 m x 21.3 m with an external concrete storage area. Walls will consist of a 100mm block work outer leaf rendered to a smooth finish, cavity and 215mm internal block work leaf. External cladding will comprise Kingspan insulated panels or similar material. Windows will comprise powder coated double glazed aluminium. The O&M building will be located within a compound measuring 50.1m x 35.3 m surrounded by a 2.5m high palisade fence. Its construction is expected to take approximately six months. The construction will require:

- Excavation of foundation to a depth of 1.0m or suitable bearing stratum and pouring of concrete foundations
- The concrete will be protected from rainfall during curing and all surface water runoff from the curing concrete will be prevented from directly entering surface water drainage.
- Fixing of high tensile steel reinforcement will be in accordance with the designer's drawings and schedules. The foundation will be installed, levelled and secured to the blinding using steel box section stools.
- Installation of ductwork as required and erection of formwork around the steel cage and propping as required.
- Checking of the foundation both for level and line will be conducted prior to the concrete being installed in the base.
- Following a curing period, where the foundation base will be covered to assist curing, formwork will be stripped off and stored for re-use.
- Erection of the steel framework and construction of external and internal walls
- Backfilling the foundation with a cohesive material, where possible using the material arising during the excavation and landscaped using the vegetated soil set-aside during the excavation.
- As indicated in Chapter 2 (Section 2.5.13) a septic tank followed by a proprietary wastewater treatment system discharging to a raised percolation bed will be provided to treat foul effluent from sanitary facilities provided within the O&M building.

## 3. 10 VISITOR CENTRE

The Visitor Centre will also be constructed during Phase 1 of the development. It has been designed to cater for groups of up to 50 people with other occasional users of up to an additional 100 people. The building itself will reflect the shape of a wind turbine blade

in its roof structure linking the centre to the site. It will consist of a building 76.5m in length and 10.5 metres in width along its main axis and will occupy a space of 762m$^2$. The height of the building will vary between 7.65m and 8.75 m along its length. The outer walls will be clad with gabions of locally sourced rock with internal plaster rendered block walls.

It will provide exhibition areas, administration and sanitary facilities and a coffee shop and elevated coffee dock which will provide extensive views of the wind farm site. The coffee shop area will allow views ranging from the northeast to northwest through double glazed aluminium folding glass partitions allowing access to an external hardwood decked area. Above the coffee shop, the coffee deck on the roof will provide similar views and will be accessible both internally and externally. Parking for the visitor centre will be located to the southwest of the visitor centre and will provide bus, car and disabled parking facilities.

Construction of the visitor centre will entail the following:

- Excavation of foundation to a depth of 1.0 m and pouring of concrete
- The concrete will be protected from rainfall during curing and all surface water runoff from the curing concrete will be prevented from directly entering surface water drainage.
- Fixing of high tensile steel reinforcement will be in accordance with the designer's drawings and schedules. The foundation will be installed, levelled and secured to the blinding using steel box section stools.
- Installation of ductwork as required and erection of formwork around the steel cage and propping as required.
- Checking of the foundation both for level and line will be conducted prior to the concrete being installed in the base.
- Following a curing period, where the foundation base will be covered to assist curing, formwork will be stripped off and stored for re-use.
- Erection of the steel framework and construction of external and internal walls
- Backfilling the foundation with a cohesive material, where possible using the material arising during the excavation and landscaped using the vegetated soil set-aside during the excavation.
- Car parking area development using hardcore and or gravel
- As indicated in Chapter 2 (Section 2.5.13) a septic tank followed by a proprietary wastewater treatment system discharging to a raised percolation bed will be provided to treat foul effluent from sanitary facilities provided within the Visitor Centre
- A rainwater harvesting system will be constructed to provide general usage water for the visitor centre

Construction of the visitor centre is expected to take approximately 12 months to complete.

## 3. 11 METEOROLOGICAL MASTS

A total of eight permanent meteorological masts will be erected on site. These will comprise a concrete foundation base 4m x 4m dimension and 2m deep. Lattice steel masts to a height of up to 120m to correspond with the hub height of the selected turbines for the project, will be erected on the foundation base. The works will include:

- Excavation of foundation to a depth to a depth of 3m and construction of a blinding layer.
- Fixing of high tensile steel reinforcement will be in accordance with the designer's drawings and schedules. The foundation will be installed, levelled and secured to the blinding using steel box section stools.
- Concrete pouring ($32m^3$) and levelling. The concrete will be protected from rainfall during curing and all surface water runoff from the curing concrete will be prevented from directly entering surface water drainage.
- Following a curing period, where the foundation base will be covered to assist curing, formwork will be stripped off and stored for re-use.
- Erection of the steel lattice framework tower and installation of the meteorological equipment.
- Backfilling the foundation with a cohesive material, where possible using the material arising during the excavation and landscaped using the vegetated soil set-aside during the excavation.
- Commissioning of the meteorological mast equipment.

Three meteorological masts will be erected during Phase 1 of the development, two in Phase 2 and the remaining three in Phase 3. Construction of each individual meteorological mast will take approximately two weeks.

## 3. 12 SITE DRAINAGE

A comprehensive drainage and sediment control plan has been prepared for the development. The development will have a minimal impact on the hydrological regime of the catchment in which it is located. This is discussed in greater detail in Chapter 19.

The design principle on which drainage from the site will be managed is on the basis of flow separation, whereby separate surface water discharge from other areas on site outside the wind farm construction and construction / operational related drainage systems will be employed. The clean system will capture and manage runoff from areas of the site unaffected by the works and the construction / operational (C/O) system will accommodate runoff from the working areas of the site.

The key purpose of the drainage network will be to minimise the risk of the ingress of silt laden runoff from the construction and operational areas of the wind farm from entering the local streams. Drainage from construction and operational areas will be directed to settlement ponds before discharging to surface water flow. Interceptor drains will be put in place to divert surface water from areas where no construction activity is occurring away from the construction locations.

To maximise the effectiveness of the separation of clean and C/O flows, the clean drainage works, including diverter drains, drainage off the construction sites and settlement ponds will be installed immediately prior to the main earthworks activities related to the construction of site tracks, turbine foundations, crane hard stands, substations, operation and maintenance building, temporary concrete batching plant and visitor centre.

The design of the trackway construction is such as to minimise the impact on the natural drainage patterns by allowing surface drainage to pass under the new track at closely placed intervals, corresponding with existing natural drainage lines where possible.

To intercept the clean surface water run-off before it reaches the construction and operational parts of the site, cut-off drains will be installed on the up-gradient side of the access tracks and hard-standings. These will generally follow the natural contour of the ground at relatively low gradients and convey drainage to nearby low points where it will be culverted beneath the site tracks or area of hard-standing. The size of the cut-off drainage channel and associated culverts will reflect the respective catchments and rates of run-off to be found on the Oweninny site.

The Construction / Operational surface water system will incorporate the following features as appropriate:

- Vegetation filter strips
- Swales
- Settlement ponds
- Check dams
- Surface cross drains

The planned drainage design is presented in Planning Drawing Numbers QR32-0201-P-000-059 to QR320201-P-000-064.

## 3. 13 ASSOCIATED WORKS

### 3.13.1 Tree Felling

Tree felling will take place in Coillte forest plantation, on lands leased from Bord na Móna, near Lough Dahybaun and near Corvoderry. This is required to facilitate access to wind turbine sites located in the plantation areas and the areas immediately adjacent to the turbines which will be permanently cleared of trees. A total of 7.3 hectares of forest plantation will be clear felled at Furnaught Hill and a further 28 ha of forest plantation will be clearfelled in the area north of the existing Bord na Móna maintenance workshops in the Muing river catchment.

The tree felling will be the subject of an application for a Felling licence (LFL) to the Forest Service, whose policy requires that planning permission for the development be submitted in support of the application.

All tree felling will be undertaken by experienced operators using modern harvesting and forwarding machinery. Each tree will be cut at its base, as close to the ground as possible. It will then be debranched and processed into optimal lengths of log dependent on tree diameter and overall length to minimise wastage. Logs will be formed into piles

based on size and will subsequently be removed to the existing forest road network prior to onward transport off site. Tree stumps will be removed as part of the excavation of e foundations and access track construction.

Recognised work practices as outlined in the following will be adopted:

- Forestry Harvesting and Environment Guidelines (Forest Service, 2000)
- Forestry and Water Quality Guidelines (Forest Service, 2000, updated 2009)

### 3.13.2 Borrow Pit

One borrow pit will be developed. Its location is shown on Figure 2.1. The borrow pit comprises an area of approximately 17 hectares and will be excavated to an approximate depth of 2m with an approximate volume of 340,000$m^3$ of material for access track and crane hard stand construction. The soils on site are mostly cutover and cutaway peats broadly ranging in depth from 0 mm to 3 m. The borrow pit area is covered by a thin veneer of peat, ranging from 0mm to less than 100mm. This material will be scraped away and stockpiled adjacent to the borrow pit during material excavation. It will subsequently be disposed of within the borrow post excavation.

The proposed method of extraction will be wet excavation, and the water table in the borrow pit will not be pumped down to minimise the potential for impact on the overall site water table.

Excavated material will be stockpiled for dewatering to the southwest near the borrow pit as shown on Figure 2.1. Truck loading will occur immediately adjacent to the borrow pit area for transport to the stockpile area where they will subsequently be reloaded for construction requirements. Drainage control will be put in place around the stockpile area to minimise the impact of suspended materials entering water courses.

Use of the borrow pit will be strictly limited to meeting project needs. There is no intention that it be used on a commercial basis for other purposes during the project or afterwards. The use of the borrow pit is considered to be advantageous compared to drawing aggregate from an operational quarry in the local area since it reduces potential impacts on the local road network.

It is recognised that it is not possible to meet the project requirements from this borrow pit alone and it will be necessary to source additional materials externally and stone will be imported from suitable quarries.

The borrow pit will be dealt with as follows:

- Remove any existing vegetation, soil / peat and subsoil and stockpile separately beside the borrow pit, taking care that living vegetation is preserved by careful placement and that the various materials are not mixed.
- Following extraction of the material required for track construction, the borrow pit will be left as a pond in the area to naturalise.
- Appropriate works such as grading of the borrow pit sides will be carried out to form a natural low sloping edge which will allow natural revegetation to occur. This will also reduce the potential health and safety risk associated with water features of this nature.
- Warning signs will be erected with regard to the water depth and hazard posed by the

pond.

- Health and Safety equipment will be provided to at the ponds

### 3.13.3 Material import

**Fill and aggregate**

In addition to the material available from the on-site borrow pit crushed stone and other aggregates will be required for the access track construction, hardstands, concrete batching plant operation and the other major elements of the project. Approximately 740,000 $m^3$ of stone in total will be required to complete construction of the wind farm. The excess requirement not met by the borrow pit will be imported to the site spread over the three project phases and is likely to be provided by local quarries in the area.

**Concrete**

It is unlikely that the proposed temporary batching plant would meet all of the construction needs and import of concrete from external sources is likely to be a construction requirement. In the event of breakdown of the proposed concrete batching plant concrete will be imported from local suppliers to the site along the N59. In the worst case scenario all of the concrete would need to be imported to site.

**Steel**

Steel reinforcing bar will be imported to site for concrete piles, turbine and building foundations from external suppliers.

**Miscellaneous**

Blocks, bricks, glass sand and general construction materials will be imported to site for construction of substations, O&M building and Visitors Centre

## 3. 14 CONSTRUCTION WASTE

On a project of this scale it is not unusual to generate waste materials which must be disposed off in a proper and safe manner. Construction waste will arise during each construction phase of the project and can arise from activities associated with project construction such as concrete use to temporary material use such as contractors site compounds. Wastes can arise during construction, operation and decommissioning also. The main items of construction waste and their sources are set out in Table 3-4.

***Table 3-4: Construction Waste and their Sources***

| Waste | Source |
|---|---|
| Canteen and office waste | Staff welfare facilities and site offices including foul water storage facilities |
| Excess fill material | Temporary surfaces to facilitate construction such as contractors temporary compounds and the temporary batching plant hardcore areas |
| Concrete | Remaining from turbine or pile construction |

| Waste | Source |
|---|---|
| | or arising from the batching plant operations and building construction |
| Concrete blocks and miscellaneous building materials | Remaining from construction of the Visitor Centre, O&M building, control buildings and temporary office accommodation |
| Timber | Temporary supports, shuttering and product deliveries. Remaining from building construction and temporary works. |
| Steel | Steel that is unused in reinforced concrete structures |
| Fuel, Oils Greases and Hydraulic Fluids | Unused quantities at end of construction period or arising from clean up of spill incidents |
| Electrical waste such as waste cables, excess conductor and electrical fittings | Excess materials from overhead line and underground cable construction and other building construction on site. |

All wastes will be managed in accordance with applicable legislation and recognised best practice within the construction industry. Where possible, waste materials will be recycled on site into alternate construction areas. Where this is not possible waste materials will be dealt with as follows:

- Non-hazardous Office & Canteen Waste: A licensed waste disposal contractor will transport this waste to a licensed landfill.
- Construction Waste: This waste will be stockpiled on site and will be transported to a licensed landfill for final disposal.
- Steel: All waste steel reinforcing bars will be stockpiled. Unused material may be gathered for reuse elsewhere and scrap items will be collected for recycling by a scrap metal merchant.
- Timber: Timber waste will be minimised through reuse of shuttering, etc. throughout the project. At completion it is expected that the majority of timber will be gathered for re-use elsewhere at a different site.
- Fuel, Oils Greases and Hydraulic Fluids: Waste will be stored on site in labelled containers and will be collected by a licensed oil recycling contractor as necessary.
- Electrical waste: All electrical waste will be stored on site in labelled containers and will be collected by a licensed recycling contractor as necessary.

Records will be maintained of the quantity of waste generated.

## 3.15 REINSTATEMENT

The process of backfilling the excavated soil and restoring surface vegetation along access track margins, over the margins of hard-standing areas, adjacent to turbine

foundations and for landscaping purposes around the Visitor Centre, O&M building and electrical transformer compounds, will commence as soon as the imperative tasks in the construction process are complete.

Soil will be backfilled outside the drainage channels along track-sides and vegetated sods replaced over the surface, bedded-in, re-graded, etc., to re-constitute a stable and settled ground surface on which the natural vegetation can recover and will be resistant to erosion.

## 3. 16 MITIGATION OF IMPACTS

Incorporation of measures to mitigate environmental impacts is inherent in the planning and design of wind farms such as at Oweninny. This extends to all phases of the wind farm project from site selection and the concept phase, including consideration of alternatives, through development, pre-planning and design phases to construction, operation and decommissioning.

The hierarchy in mitigating environmental impacts in the Oweninny Wind Farm project has been avoidance, reduction and remedy. The objective of the development has been to maximise the sustainable wind energy capture of what is a very suitable site for wind energy development without causing significant adverse environmental impacts. The design of Oweninny Wind Farm meets the primary objective of avoidance of impacts on environmental resources.

A consideration in all projects is to manage the scope of project activity necessary to achieve the project objectives in a manner that is environmentally responsible. At Oweninny impacts on all aspects of the environment have been minimised by selection of the proposed scheme over the multiplicity of possible alternatives.

Key mitigating actions during design, construction and operation of the wind farm include the following:

- Siting and design of construction of turbines to avoid potential impact on the designated areas of the Bellacorick Iron Flush and Lough Dahybaun.
- Siting of turbines, access tracks, substations and other buildings to avoid intact bog remnants and minimise impact on bog remnants previously drained as part of the peat harvesting operations.
- Siting of turbines outside communication corridors between telecommunication and other transmission masts to ensure no interference with these signals.
- Siting of turbines at least one kilometre from the nearest occupied dwelling
- Integration of the development into the existing bog rehabilitation works already completed on the site
- Design of foundations for the wind turbines will be undertaken by qualified structural engineers who have successfully designed foundations for wind farm developments in similar environments.
- A full construction management team will be deployed on site in accordance with routine site construction procedures. This team will consist of a Resident Site Manager and Assistant Engineers as appropriate.
- All construction works will be carried out under appropriate supervision. Works will be

carried out by experienced contractors using appropriate and established safe methods of construction. All requirements arising from statutory obligations, including the Safety, Health and Welfare at Work Act and associated regulations, will be met in full.

- All forest felling will be carried out in accordance with the Forest Service Guidelines.
- Bord na Móna has a long history of peat management in Ireland and of its contribution to the energy needs of the country. It is mindful of its obligations to protect the environment and the well being of the local people within its operational area.
- ESB has had a long history of responsible operation of power plants throughout Ireland and is mindful of its obligations in regard to environmental protection also.

## 3. 17 EMERGENCY RESPONSE PLAN

Due care and precautions will be taken as prescribed in the EIS in the construction, operation and decommissioning of the wind farm. However, in addition to this an emergency response element is being included.

The emergency response process makes clear how and who will be alerted in the event of clear and immediate risk, or serious incidents, and will ensure that appropriate mitigation can take place quickly. An emergency point of contact is provided and it is intended that this will be manned by appropriately qualified personnel during all times of the site's construction, operation and decommissioning.

An Emergency Response Plan has been prepared and is included in Appendix 6. A copy of this Plan will be provided to the construction contractors, site supervision personnel and operational personnel. It will be updated on annual basis to allow for changes in personnel in relevant organisations.