DREENACREENIG WEST WIND FARM LIMITED

Dreenacreenig West Wind Farm, Drimoleague, County Cork.

CONSTUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

March 2017

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DOCUMENT APPROVAL

PROJECT	Dreenacreenig West Wind Farm	
CLIENT / JOB NO	Dreenacreenig West Wind Farm Limited	4636
DOCUMENT TITLE	Constuction Environmental Management Plan (CEMP)	

		Prepared by	**Approved by**
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Date			

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Document	Name	Name	Name
Date			

DREENACREENIG WIND FARM, DRUMOLEAGUE, CO CORK

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

CONTENTS

TABLES

LIST OF FIGURES

APPENDICES

TECHNICAL SCHEDULES

1.0 INTRODUCTION

1.1 BACKGROUND TO REPORT

Jennings O'Donovan & Partners Limited (JOD) has prepared this Construction Environmental Management Plan (CEMP) for the proposed development a wind farm located in the townlands of Dreenacreenig West, Drimoleague, Co. Cork. This document has been prepared on a preliminary (outline) basis and will be further developed and expanded following the appointment of the Contractor for the main construction works. Some items of this CEMP can only be finalised with appropriate input from the Contractor who will actually carry out the main construction works. This CEMP identifies for the incoming Contractor, the key planning, EIA and Contract Document constraints that must be adhered to in order to deliver optimum environmental reassurance for the site.

This document should be read in conjunction with the Environmental Impact Statement, Further Information and Planning Drawings for the various elements of the proposed development.

1.2 PLANNING HISTORY

A decision to grant Planning Permission for the wind farm was issued by Cork County Council on the 3rd October 2011, (Planning Ref: 10/857).

The decision was subsequently appealed to An Bord Pleanála (ABP) (Reference Number: PL 88.239767) where it was granted permission on the 5th December 2012, subject to 16 No. conditions. In the ABP decision they considered that the environment impacts of the proposed development were acceptable and, subject to compliance with the mitigation measures set out in the environmental impact statement and as conditioned by the Board, the proposed development would not have unacceptable adverse effects on the environment.

During the turbine selection and procurement process the particular wind turbine model proposed at that time, the Vestas V52, was now no longer available. It was decided to install 5 no. Enercon E48 turbines and 2 no. Enercon E44 turbines which have similar design specifications to the original design.

A Section 5 Request for Declaration on development and exempted development relating to turbine model was requested on the 8th June, 2016 and the Planning Authority declared that the proposed modification to the dimensions of permitted turbines at Dreenacreenig West, Drimoleague, Co. Cork

is development and is exempted development under the provisions of Section 4, subsections (1) — (3) of the Planning & Development Act 2000, as amended (Ref D/19/16).

The development is located approximately 12 km west of Dunmanway. The site can be located on Discovery Series Map No. 85 at approximate grid reference W113 521 and the site is irregular in outline, approximately 1.7 kilometres in width and 1.6 kilometres in length.

The appended Site Layout Plan – Drg. No. 4636 / PC/ 01, shows the extent of the development required for this wind farm. The main construction access to the wind farm site will be the Local Road L-4614. A total of 7 No Wind Turbine Generators are consented, to which access needs to be provided. The grant of planning allows for a total of approximately 3,050m of new wind farm road to provide the required access to the turbines. In addition approximately 1,260m of existing forest roads will need to be upgraded from approximately 3.5m wide to 5m in width. These new site access roads will be a minimum width of 5m, developed similar to the existing forest roads, which will generally be made up of approximately 500mm deep rock fill sub-base with approximately 150mm deep graded capping layer. In addition, it will be necessary to construct hardstands at each of the 7 turbines and each hardstand will be approximately 650m^2 constructed in a similar method as the site roads. The windfarm will have 1 site entrance onto the Local Road L-4614 and in order to allow entry of construction plant and abnormal loads both existing access points will require modification and up-grade.

As noted above the planning grant issued by An Bord Pleanala is subject to 16 conditions and reference to Condition 5 in particular will note that the developer must complete a detailed construction method statement and environmental management plan.

Condition 5 states:
"Prior to commencement of development, a detailed construction method statement and environmental management plan, including the following details, shall be submitted to and agreed in writing with the planning authority.

(a) Details of the proposed water monitoring protocol and drainage inspection regime.

(b) A detailed method statement for the construction of the borrow pit.

(c) A detailed method statement for geotechnical investigation, design and monitoring, including all aspects of the proposed borrow pit, and all aspects of management of excess spoil, such that slope stability measures and prevention of water pollution are fully implemented.

Reason: In the interest of environmental protection and orderly development.

For clarity our office have completed a separate Borrow Pit Construction Management Plan to address items 5(a) & 5(b) and this report will refer to item 5(a)

1.3 AIMS AND OBJECTIVES OF CEMP

This Construction Environmental Management Plan (CEMP) has been developed in accordance with the Institute of Environmental Management and Assessment (IEMA) Practitioner "*Environmental Management Plans*", Best Practice Series, Volume 12, December 2008 and has been designed to cover the proposed environmental construction strategies that are to be carried out, before and during the proposed development works. It is intended that this preliminary CEMP will be finalised by the contractor in the form of a detailed CEMP should the works progress to construction stage.

This CEMP aims to define good practice as well as specific actions required to implement mitigation requirements as identified in the Natura Impact Statement (NIS) and Environmental Impact Statement (EIS), the planning process and/or other licensing or consenting processes.

The CEMP is considered to be a live document which will be developed further and / or amended where necessary subsequent to planning consent to take account of planning condition requirements and any information which may be made available from additional consultations, site surveys etc.

The CEMP will form part of the main Civil Construction works Contract. The Civil Contractor will take account of the structure, content, methods and requirements contained within the various sections of this CEMP when further developing this document (to include environmental plans and other related Construction Management Plans) as required by the Contract.

A summary of the CEMP development process and the required input from the main parties involved in the post planning and construction of the wind farm is indicated in Figure 1.1.

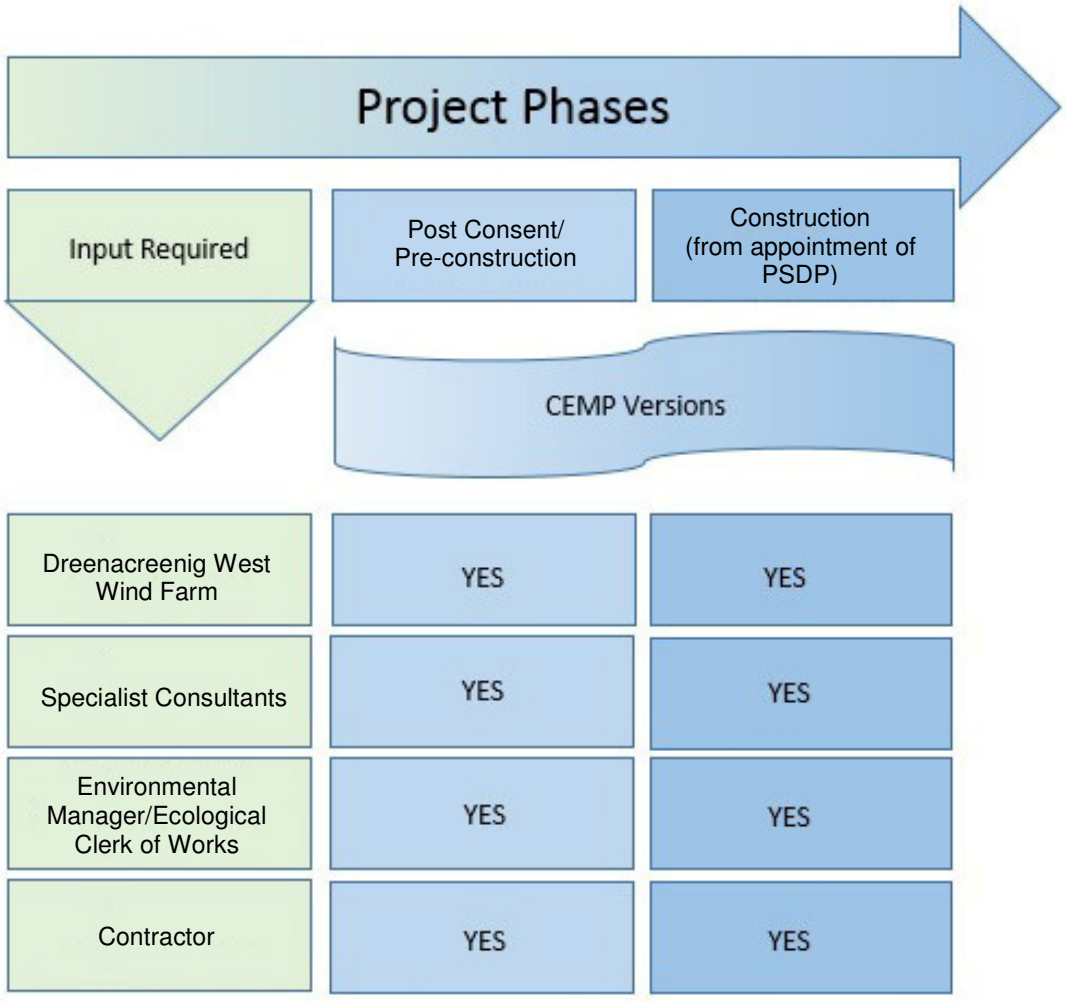

Figure 1.1 Summary of CEMP development process

1.4 CEMP ROLES AND RESPONSIBLITIES

Prior to commencement of construction works, the Contractor will identify a core Environmental Management Group, comprising of specific project personnel and including the Ecological Clerk of Works (ECoW). The Environmental Management Group will meet monthly to discuss the monthly environmental report and will advise site personnel on areas where improvements may be made on site. The group will draw on technical expertise from relevant specialists where required and will liaise with other relevant external bodies as required.

The Contractor will appoint an Environmental Manager who will be responsible for coordination and development of the CEMP and any other surveys, reports or construction management plans required for discharge of relevant pre-commencement planning conditions. In conjunction with the ECoW, the

Environmental Manager will also review the Contractors construction management plans and environmental plans as required by the CEMP, carry out compliance auditing during the construction phase and coordinate the Environmental Management Group and required liaisons between Dreenacreenig West Wind Farm, the Contractor, the planning case officer and other statutory authorities.

The Contractor will appoint an independent Ecological Clerk of Works (ECoW). The main roles and responsibilities of the ECoW relate to compliance monitoring with the CEMP and planning conditions and advice provision in relation to ecological matters. The ECoW will also assist the Environmental Manager.

1.5 REPORTING PROCEDURES

Figure 1.2 provides a diagrammatic outline of the general tasks and communication lines, based on the roles described in Tables 3.2 and 3.3 in Section 3, and tasks detailed in the Technical Schedules. The Contractor will update this information as part of the detailed CEMP.

Technical Schedule TS1, Environmental Incident and Emergency Response Plan, includes a figure illustrating the communications plan for reporting procedures for all potential environmental risks, hazards or incidents which may relate to ecology, water quality, dust, noise or archaeology.

FIGURE 3.1 GENERAL COMMUNICATION PLAN

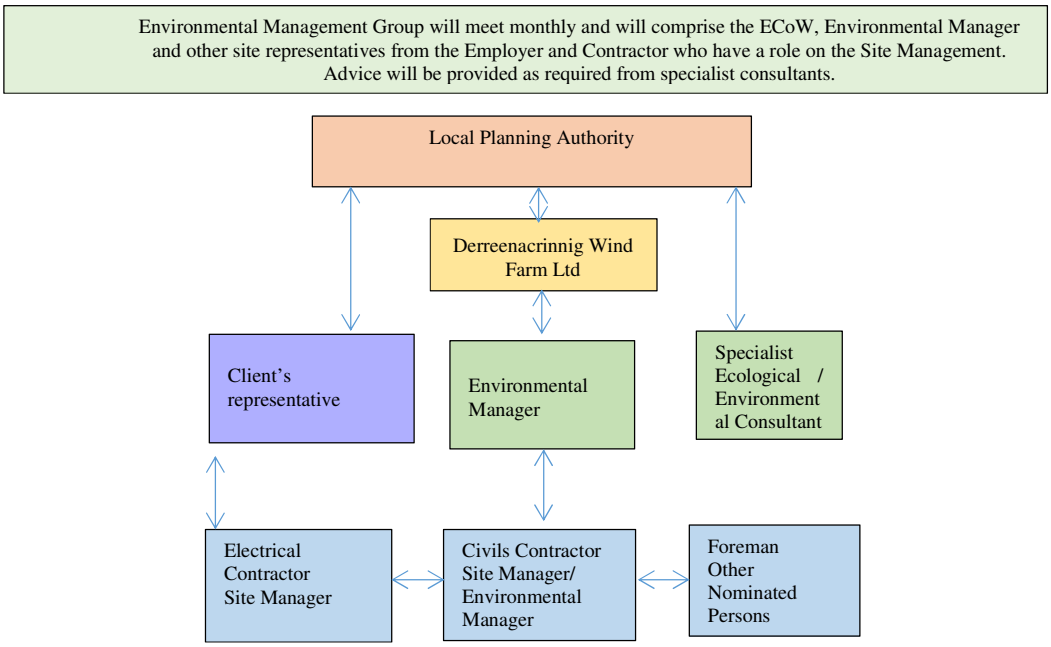

Figure 1.2 General Communication Plan

1.6 CEMP STRUCTURE

The CEMP is divided into discreet Sections which are designed to be filed as separate documents / folders if required. A copy of the CEMP documents / folder(s) will be kept in the site offices for the duration of the site works and will be made available for review at any time. The Contractor's Environmental Manager will be responsible for the CEMP and will keep all sections updated throughout the construction phase.

Where the Contractor has standard documents within his own company / corporate Environmental Management Plans which cover a particular requirement of this CEMP, these will either be inserted or cross referenced within the relevant Section of this CEMP.

TABLE 1.1: CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP): Document Structure		
Section	**Title & Brief Description**	**Contractor Development Required**
1	Introduction	No (Information purposes only)
2	Project Information Provides details on site location, scheme description and a summary of the environmental sensitivities at the site in Table 2.1 (as derived from the Environmental Impact Statement, Further Information, Planning Reports and Appropriate Assessment Screenings and other information where available). Provides details on relevant Planning Conditions. Any documents prepared by Dreenacreenig West Wind Farm in response to Planning Conditions will be recorded in Table 2.6. Contains a record of all Scheme Amendments and a Register of Variations.	Yes Any documents prepared by the Contractor in response to Consent Conditions will be recorded by the Contractor in Table 2.6 and inserted in the CEMP where necessary. Any Scheme Amendments and / or Variations to the CEMP required during the works will be recorded by the Contractor in Tables 2.6 and 2.7.
3	Environmental Communications Plan Contains details on specific requirements relating to: • Contact details for Dreenacreenig West Wind Farm personnel, technical specialists, Contractor personnel, regulators, landowners, other stakeholders etc; • Meetings, reports and consultations; • Roles and responsibilities; and • General reporting procedures and tasks.	Yes The Contractor will: i) Insert contact information for regulatory authorities and other stakeholders (where not already provided) into Table 3.1 ii) Refer to Table 3.2 for details on requirements for meetings, reports and consultations iii) Insert information on Contractor appointments and responsibilities relating to environmental management and implementation of this CEMP into Table 3.3. iv) Refer to Figure 1.2 for a summary of the main communication lines.
4	Correspondence, Records, Reports This Section relates to document control and retention of records. The information at the start of Section 4 provides: • A list of all documents to be retained / filed within the CEMP. Table 4.1 provides a record of all Environmental Consents, Licenses and Permits issued for the project.	Yes The Contractor will complete Table 4.1. Throughout the duration of the Contract, the Contractor will insert / file all communication records, data, field records and reports associated with Environmental Management and implementation of this CEMP into this Section 4. This Section may be sub-divided into sub-folders for specific information relating to discrete areas of Environmental Management (such as waste management, pollution prevention, water quality monitoring, ecology etc). Alternatively, this information may be filed within the individual Technical Schedules in Section 5. The filing method selected by the Contractor will be made explicit at the start of Section 4.
5	Appendices	No.

TABLE 1.1: CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP): Document Structure		
Section	**Title & Brief Description**	**Contractor Development Required**
	Appendix A - Planning Conditions Appendix B - Site Investigation Report Appendix C - Employer's Project Programme Appendix D - Landscape Scheme Appendix E - Mitigation Management Summary Appendix F - Drawings	The Contractor is not required to develop the Appendices to this document. The Appendices are reference documents provided for information purposes.
6	Technical Schedules & Available Information Technical Schedules include the following: TS1 Environmental (Incident and Emergency) Response Plan (ERP) TS2 Emergency Communications Plan (in event of a spillage). TS3 Waste Management Plan (WMP) TS4 Watercourse Crossing Plan (WCP) TS5 Induction Schedule TS6 Water Quality Monitoring Plan (WQMP)	Yes The Contractor is required to develop the Technical Schedules and/or include additional information or construction management plans as appropriate and where required by the Contract. The development of the Technical Schedules will generate more site specific documents which address particular environmental management procedures applicable for works in specified areas of the site. These Technical Schedules form the Contractor's Environmental Plans (for example, Waste Management Plan). Table 5.1 lists all Technical Schedules and provides information on Contractor responsibilities.

Table 1.1. Document Structure for Construction Environmental Management Plan

2.0 PROJECT INFORMATION

2.1 Site Location and Scheme Description

The proposed wind farm site is located in the townland of Dreenacreenig West and is situated in West Cork, approximately 5km north-west of Drimoleague.

A total of 7 No Wind Turbine Generators are consented, to which access needs to be provided. The grant of planning allows for a total of approximately 3050m of new wind farm road to provide the required access to the turbines. In addition approximately 1,260m of existing forest roads will need to be upgraded from approximately 3.5m wide to 5m in width.

These new site access roads will be a minimum width of 4m, developed similar to the existing forest roads, which will generally be made up of approximately 500mm deep rock fill sub-base with approximately 150mm deep graded capping layer. In addition it will be necessary to construct hardstands at each of the 7 turbines and each hardstand will be approximately 650 sq. m. constructed in a similar method as the site roads. Construction of the substation and car parking area will have an approximate footprint of 600m^2. The windfarm will have 2 site entrances onto the Local Road L-4614 and in order to allow entry of construction plant and abnormal loads both existing access points will require modification and up-grade.

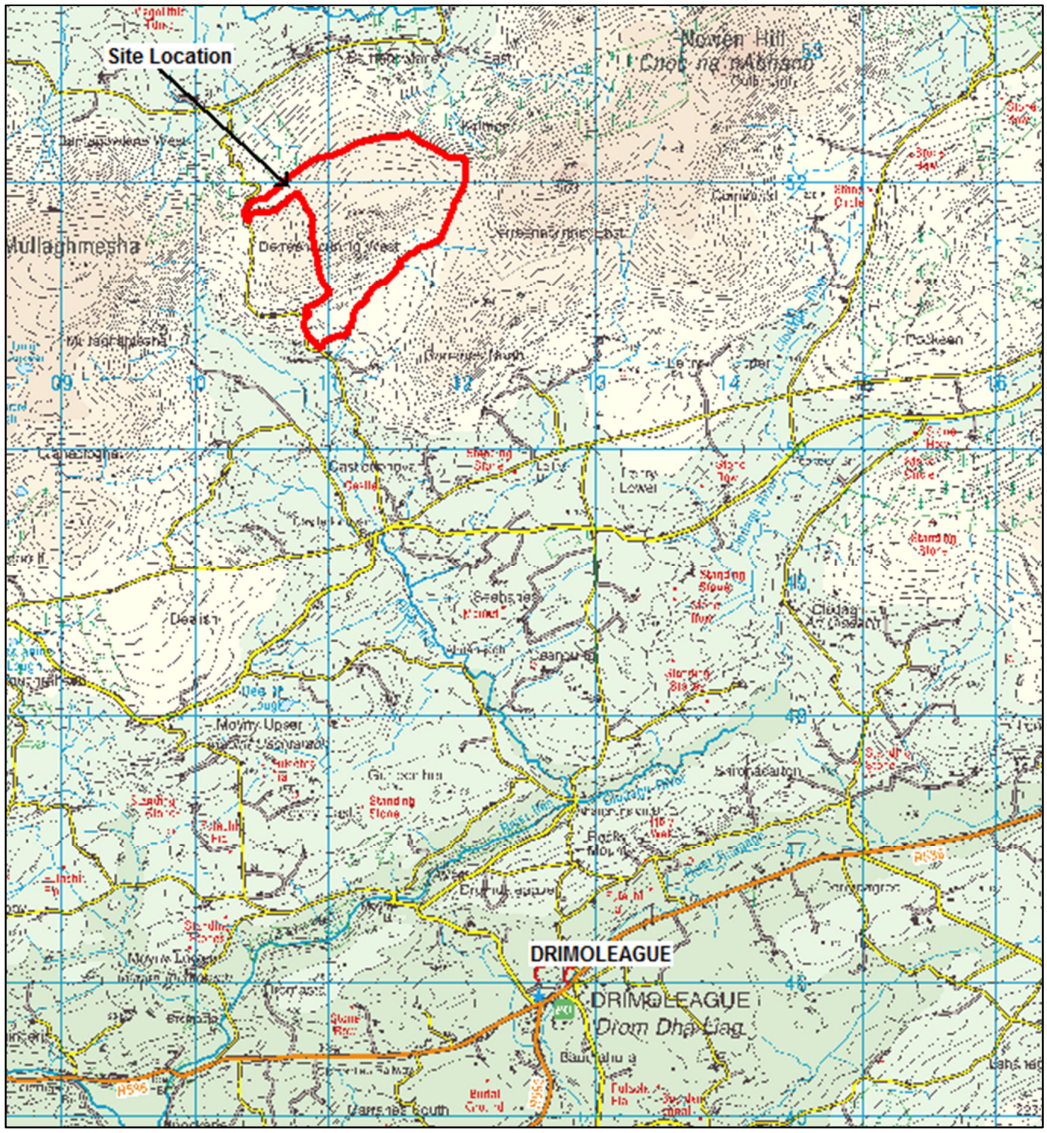

Figure 2.1 Site Location Map

2.2 Existing Site Description

The total area of the site is 121 ha and is characterised by elevations varying from 200mOD to 400mOD. The site consists predominantly of exposed or thinly covered bedrock and upland blanket peat bog/heath. The majority of the study area is underlain by the Gun Point Formation of the Old Red Sandstone Magnafacies. Much of the site is grazed by sheep. Peat depth across the majority of the site is >0.5m deep in particular on the southern slope. Deep peat generally occurs only in pockets with the deepest measuring approx. 3m deep (Minerex 2010).

The northern part of the site drains via a tributary into the Mealagh River, which flows into the sea at Bantry. The southern part of the site is drained by a tributary of the Ilen River which flows into the sea

to the west of Skibbereen. The River Ilen is an important salmonid river and contains stocks of salmon and sea trout.

Principle habitats in the area consist of a mosaic of wet heath/blanket bog, wet grassland and conifer plantations. Land use in the surrounding area is a mix of agriculture (mainly sheep and cattle grazing) and conifer plantation forestry. A forest access track runs from the public road through the conifer plantation in the north of the site. A private access track runs along part of the southern boundary of the site.

2.2.1 Designated Areas

There are no Natura 2000 sites within the zone of influence of the proposed development. Derryclogher (Knockboy) Bog SAC is located 12km North West of the proposed development and the Bandon River SAC 11.8km East. The proposed development lies within different water catchments to the Derryclogher (Knockboy) Bog SAC and the Bandon River SAC. There are no Natura 2000 Special Protection Areas (SPA) sites within 15km of the proposed development.

Therefore, no Natura 2000 sites are considered to be within the zone of influence of the proposed development.

2.2.2 Habitats

The site consists predominantly of exposed or thinly covered bedrock and a mosaic of wet heath/upland blanket bog. Areas of dry heath are found on elevated areas with exposed rock. A large conifer plantation occurs in the northern part of the site. An elevated ridge runs across the centre of the site in a north-east to south-west direction. Below this ridge the site slopes off steeply to the south with more shallow peat soil. Vegetation along this slope indicates that there is a calcareous influence mostly likely due to the presence of glacial deposits. Peat depth across the majority of the site is >0.5m deep in particular on the southern slope. Blanket bog only occurs where the peat is >0.5m. This is mostly confined to the northern half of the site where deep peat is found in pockets.

Please refer to Figure 2.2 for Habitat Maps of the Dreenacreenig West Wind Farm site.

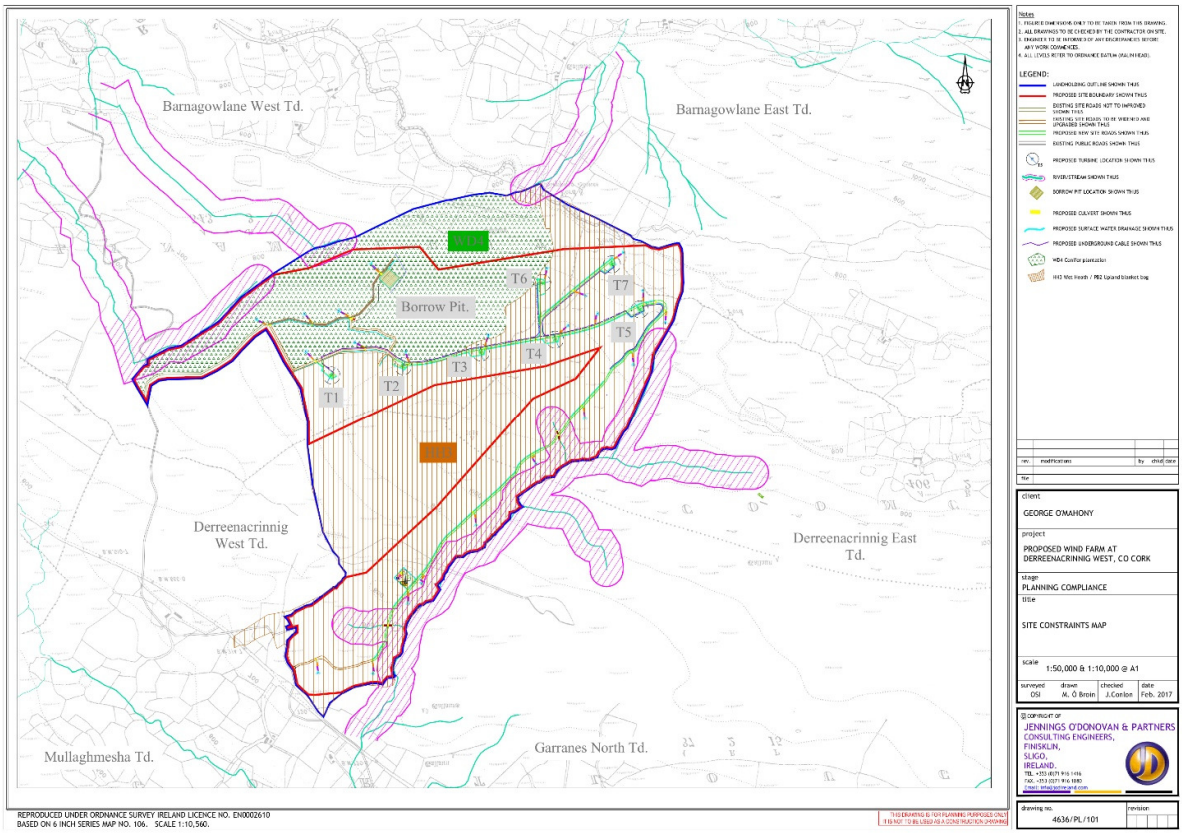

Figure 2.2 Habitat map

Two upland streams (FW1) drain the site to the north and south. Both streams are characteristic of an upland eroding river channel with a substrate of bedrock and very little aquatic vegetation.

- During the construction of the proposed development, waste materials may be generated such as excavated spoil/rubble during the works phase. This material will not be placed/stored on/near surface water features, scrub or hedgerow habitats occurring within the study area; disposal of any waste material at any location will require a waste permit.
- Appropriate measures will be taken to ensure that machinery does not facilitate the establishment and spread of non-native invasive species into the proposed development area. Refuelling of machinery will be undertaken away from the watercourses. Temporary toilet facilities will be provided and there will be no discharges to ground from this unit. Site management procedures will include provisions for removing rubbish generated by on-site staff.
- Land clearance and soil stripping within the footprint of the works will be limited to the works area, with habitats outside of the required works or access requirements left intact. Disturbed

areas within the footprint of the works will be allowed to regenerate naturally i.e. no reseeding/replanting to be carried out. The required works footprint for the proposed development, including turbine locations, access roads etc will be clearly defined and sited to reduce land take impacts affecting habitats. Fencing of the works area during construction will minimise impacts on adjoining habitats.

- The appointed Contractor will put in place a Surface Water Management Plan. This plan will be implemented to control surface water run-off and to protect water quality in all eroding watercourses draining the proposed development site.

2.2.3 Fauna

Birds

The Wildlife (Amendment) Act (2000) affords protection to breeding birds by prohibiting the clearance of vegetation during the period 1st March to the 31st of August inclusive except for the clearance of sites for development purposes. As the months of March to June are particularly important for breeding birds, where feasible best practice will be to avoid any clearance of vegetation during this period.

Fish

Generally accepted best practice pollution control measures, as outlined for the protection of the Mealagh and Ilen Rivers (section 2.2.1) are also relevant in relation to the fish, and will be employed and strictly observed during the construction phase when working in or near the minor watercourses in the study. Additional mitigation measures to protect water quality during the construction phase are detailed in hydrology section 2.4.

Freshwater Pearl Mussel

The proposed wind farm development is within a Freshwater pearl mussel catchment of other extant populations according to a Margaritifera Sensitive Area map published by the NPWS in February 2013. Evelyn Moorkens, an invertebrate specialist was consulted in relation to protected invertebrate species as part of the Environmental Impact Assessment for the wind farm. The freshwater pearl mussel (is present within the Ilen River and known to occur quite high up the river system (Moorkens consultation 2010).

A tributary of the Ilen River runs along the southern boundary of the site. Two streams which feed into the tributary of the Ilen River are crossed by the access road and a free spanning bridge rather will be utilised in order to prevent potential impacts to the freshwater pearl mussel. By bridging the watercourses no part of the stream bed or banks will be disturbed minimising the movement of suspended solids. Works in the vicinity of watercourses will be kept to a minimum and will be closely monitored. The construction of the wind farm has the potential to cause sedimentation and pollution to surface waters. However, the construction design will be to the highest standards, incorporating best practice methods, such that no sedimentation or pollution to surface waters will occur. Refer to Section 2.4 for mitigation measures which will apply when working within the watercourses or in the vicinity of watercourses.

Molluscs

The Environmental Impact Statement ecology chapter for the Dreenacreenig Wind Farm was prepared by Natura Environmental Consultants in 2010 who concluded that there was suitable habitat within the proposed development area for two protected species namely, the Kerry slug *Geomalacus maculosus* and the Geyer's Whorl snail *Vertigo geyeri*. Subsequent to the submission of the Environmental Impact Statement for the proposed wind farm in December 2010 an independent survey for these two species was requested by Cork County Council as part of a Further Information Request. DixonBrosnan Environmental Consultants conduct this survey in May 2011.

The results found that the Kerry slug species was not found within the footprint of the proposed wind farm. This was possibly due to the historical or recent land usage pattern i.e. overgrazing, burning etc or due to environmental variables i.e. temperature, moisture levels, food availability etc. In the absence of any recordings for the Kerry Slug species within the proposed footprint of the wind farm, no impact on this species is expected to occur as a result of these development works. Whilst the presence of the species in this general area could not be completely precluded, no evidence of the species was recorded on the areas of the proposed development which were surveyed. Thus no further surveys or mitigation measures were therefore considered necessary.

The Geyer's whorl snail species are generally associated with calcareous springs and flushes which are absent from this site, which is situated on a bedrock of old red sandstone. Calcareous springs and flushes remain wet through an upwelling of water, whereas springs and flushes within old red sandstone are more associated with depressions in the geology and are more prone to desiccation. Also, the conditions within the proposed wind farm site area do not support most of the plants

consumed by the species. Under the circumstances it is unlikely that the species would occur and no evidence of its presence was recorded. No impact on this species is expected to occur and no further surveys or mitigation measures were considered necessary.

2.2.4 Watercourses and Buffer Zones

The northern part of the wind farm site drains via a tributary into the Mealagh River, which flows into the sea at Bantry. The southern part of the site is drained by a tributary of the Ilen River which flows into the sea to the west of Skibbereen. The River Ilen is an important salmonid river and contains stocks of salmon and sea trout. The Mealagh and Ilen Rivers are both important salmon rivers providing suitable habitat for all age classes of Atlantic salmon. Tributaries of these rivers are also important for spawning and for juvenile fish. Good salmonid spawning habitat consists of a mix of cobbles, gravels and finer material, free of silt and detritus in fast flowing riffles, to ensure that there is an adequate flow of water and oxygen through the substrate.

Two streams which feed into the tributary of the Ilen River are also crossed by the proposed access road to the wind farm.

Erosion and sediment control measures will be incorporated into each element of the works. Work elements have been divided into the following;

- Upgrading of existing drainage network;
- Upgrading of existing access tracks and roadside drains
- New access tracks;
- Crane hardstanding areas and turbine foundations;
- Borrow pit;
- Substation compound/temporary construction compound, and cable trenches.

Where appropriate, the following measures will be used for each element of the works:

- Installation of interception drains installed upslope of proposed work areas;
- Installation of silt traps at discharge points from trackside swales;
- Blocking of any drains which currently collect discharge from roadside drainage channels and discharge directly to existing watercourses;

- Perimeter drains to collect dirty surface water runoff from crane hardstanding areas/turbine bases including locations of proposed check-dams, cross-drains, sediment traps and discharge points from same. All such features to be assigned unique reference number to facilitate ongoing inspection and monitoring of same during the course of the works;
- Settlement ponds to facilitate the treatment of potential silt laden water. Such features to be assigned unique reference number to facilitate ongoing inspection and monitoring during the course of the works;
- Application of a capping layer of crushed limestone or sandstone to both existing and newly constructed existing carriageways to protect the underlying shale material which is more prone to sedimentation under traffic;
- Repository sites for peat excavated on the basis of the detailed geotechnical assessment undertaken for each area;
- Silt control measures necessary to collect and treat surface water run-off from stored excavated peat.

Generally accepted best practice pollution control measures, as outlined below, will be employed during the construction phase when working in or near the minor watercourses in the study area to prevent the transport of deleterious substances to the Mealagh and Ilen Rivers.

- Release of suspended solids to all surface waters will be controlled by interception (e.g. silt traps) and management of site run-off. Any surface water run-off must be treated to ensure that it is free from suspended solids, oil or any other polluting materials;
- Silty water shall be treated using silt trays/settlement ponds and temporary interceptors and traps will be installed until such time as permanent facilities are constructed;
- Straw bales or silt fences shall be appropriately located near watercourses to help prevent untreated surface water run-off entering any watercourse;
- All fuels, lubricants and hydraulic fluids will be kept in secure bunded areas away from watercourses. The bunded area will accommodate 110% of the total capacity of the containers within it;
- Containers will be properly secured to prevent unauthorised access and misuse. An effective spillage procedure will be put in place with all staff properly briefed;
- Any waste oils or hydraulic fluids will be collected, stored in appropriate containers and disposed of offsite in an appropriate manner;
- Fuelling and lubrication will not be conducted within 50m of watercourses;

- Storage areas, machinery depots and site offices will be located at least 50m from the nearest watercourse;
- Foul drainage from the site offices and facilities will be properly treated and removed to a suitable treatment facility;
- Spill kits will be made available close to streams and all staff will be properly trained on correct use;
- Disposal of raw or uncured waste concrete will be controlled to ensure that watercourses or other sensitive areas will not be impacted;
- Settlement ponds and a constructed wetland shall be designed, allowing 24hr settlement before discharge into the surrounding watercourses.

The following design criteria shall apply to the construction of settlement ponds at the site:

- Install interceptor drains upslope of the works areas, where gradient requires to separate uncontaminated surface runoff and divert it away from the works.

- Settlement ponds will be lined with Bontec geotextile material.

- Side slopes to be shallow, nominally at a 1 in 3 side slope (maximum).

- Material excavated from the settlement ponds will be compacted around the edge of the pond, which will prevent site personnel from falling into the pond.

- Settlement ponds will be subject to regular inspection and maintenance by the contractor on site.

Works adjacent to or over watercourses within the study area will be carried out outside of the salmonid spawning season and the times that early life stages of salmonid fish will be present. Overall, no instream work will be undertaken during the period October to April. The publication '*Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites'* by Murphy (2004) and the NRA's '*Guidelines for the crossing of watercourses during the construction of national road schemes'* (NRA, 2005) and the IFI's '*Guidelines on Protection of Fisheries during Construction Work in and Adjacent to Water'* (IFI, 2016), will be followed during the construction of new access roads or instream works. It is imperative that no impacts (direct, indirect or cumulative) occur on the streams downstream of the proposed development or the

downstream catchment areas. In advance of any works taking place a Construction Management Plan for protecting the rivers streams on the site, shall be developed and agreed with the IFI and NPWS.

2.2.5 Landscaping

The following measures aim to reduce or eliminate the visual impact of the ancillary infrastructure and the haul route of the Dreenacreenig West Wind Farm. .

Control building

Screening of the control building will be carried out with planting of indigenous and suitable tree/shrub species around the perimeter of the substation compound to screen the substation from the surrounding landscape. The species of the trees and shrubs should be indigenous and grow locally as listed below.

- *Betula Pendula* (Silver Birch)
- *Salix purpurea (Purple Osier, Willow)*
- *Sorbus aucuparia (Rowan)*
- *Corylus avellana (Hazel)*

Indigenous trees and shrubs will form the main screening around the control building; the planting will consist of the above mentioned varieties of trees and shrubs. *Betula Pendula* should be planted 5m apart around the perimeter of the substation compound and *Salix Purpurea* should be planted 4m apart. Ulex Europaeus should be planted between *Betula Pendula* at a spacing of 1m.

All trees will be planted with maximum care, using suitable compost, sufficient watering and staked and tied with proprietary tree-tie to prevent wind damage. Due care should be exercised in the areas where cables are undergrounded, so that they will not be damaged by the roots of the planted groves in the long term.

The trees will be observed for the first six weeks after planting, any failures shall be replaced with a similar indigenous species during the following planting season.

The compound area should be fenced off using matt, non-reflective material preferably a palisade in a grey, black or green colour, which will help the fence, blend in with the surrounding landscape and also prevent the sun reflecting off its surface. The height of the fence will be up to 3m.

Local road between the L-4614 and the site entrance

The local road between the L-4614 and the site entrance will have to be upgraded as part of the development. Trees and bushes line the road on both sides of the road. The most common of these are willow trees, gorse and fuchsia bushes.

There will be some widening of this local road required to deliver the turbine components. For the most part this widening will be able to take place with the road verge and no trees or shrubs will have to be uprooted, some of this vegetation will be require trimming to provide the necessary transport corridor. Where trees, shrubs or bushes have to be uprooted to provide an adequate transport corridor they will be replanted or replaced with a similar flora species.

The re-vegetation of the roadside berms will be carried out as follows:

- Vegetation along the roadside will be trimmed or removed accordingly.
- The topsoil along the road verge will be excavated to allow for road widening. The excavated material will be used to construct a roadside berm.
- The roadside berms will be vegetated with suitable vegetation planted along the roadside will be of the same species as the vegetation originally removed from that location unless otherwise instructed by Cork County Council.
- After construction has been completed the roadside verges can be reinstated by providing a covering of approximately 15cm of topsoil along the road edge. Grass seeds can then be planted in the topsoil. The visible road width will be reduced to approximately 4m. This will be discussed and agreed with Cork County Council.

Site entrance to Dreenacreenig West Wind Farm

An existing site entrance to Dreenacreenig West Wind Farm located in the south western part of the site will have to be modified to provide the required visibility splays including:

- Removal of existing shrubs/bushes/trees from either side of the existing access gate.
- Replacement of the existing gate and construction of a new one constructed further back from the road.
- A wider splay will be constructed at the entrance with the road edge will be set back from its current location.

Similar species of flora that has to be removed from the existing entrance will be planted around the new site entrance. No vegetation will be planted where it will be an obstacle to the visibility of the traffic accessing and leaving the site.

New Internal Access Road

New access roads are required within the wind farm area, the roads will match the existing landscape profile and follow the existing topography.

Any topsoil excavated as part of the road construction will be sidecast to form a roadside berm, where suitable. These roadside berms will be located upslope of the road and will be vegetated with local species of grass and flora immediately after the completion of construction, if suitable. Indigenous plant species, such as whitethorn or blackthorn will be planted along the southern edge of the road which will greatly minimise and even remove the visual impact of the access road. Consideration will be given to reducing the visible width of the road by providing topsoil covering along the road edges.

Other Construction Areas

The turbine manufacturers require certain specifications for the access roads and the crane hardstands for their turbines. However, due care should be taken so that no more land will be used than necessary and, where possible, it should be discussed with the manufacturer to build smaller roads than required, e.g. the roads need a width of 5.0m but from time to time 4.0 or 4.5m might be sufficient.

Programming of Post-Construction Landscaping

Any planting of vegetation for the purposes of screening will be undertaken immediately upon completion of construction. Good house keeping practices will be maintained during the construction phase and avoid the build up of construction waste around the site. All unnecessary equipment, machines, materials, cable rollers, waste material will be removed from the wind farm upon completion of construction. Refer to Section 2.10.

2.3 SOILS AND GEOLOGY

As part of the design process comprehensive site investigations comprising trial pits (see Table 2.3, 2.3.1, 2.3.2) were undertaken by Priorty Geotechnical Ltd and (see Table 2.4) for trial pits undertaken by Whiteford Geoservices Ltd

Trial Pit Name	***Location***	***Primary Subsoil Lithology***	***Depth to Bedrock (m)***
TP01	Site Entrance	0.30m deep (TOPSOIL) Firm, brown slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded over 0.60m deep Firm, light brown grey, slightly gravelly sandy silt with medium cobble content and medium boulder content. Gravel is fine to coarse, angular to sub-angular, Sandstone lithology. Boulders are angular to sub-angular, 63-600mm dia. Sandstone lithology.	0.90
TP02	Along Access CH 100	0.20m deep(TOPSOIL) Firm, brown, slightly gravelly sandy SILT. Sand is fine to coarse over 1.24m deep Firm, light brown orange, slightly sandy slightly gravelly SILT with high cobble content and low boulder Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology., Boulders are angular to sub-angular, 200-500mm dia. Sandstone lithology. Firm, grey brown green, slightly gravely sandy SILT. Gravel is fine to coarse, angular to sub-rounded. Sand is fine to coarse. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology. Boulders are angular to sub-angular, 200-5600mm dia. Sandstone lithology.	2.10
TP03	Along Access CH 300	0.18m deep (TOPSOIL) Firm, brown, slightly gravelly slightly sandy SILT. Gravel is fine to coarse, angular to sub-rounded, Sandstone lithology. Sand is fine to coarse over 0.22m deep Firm, light brown, slightly gravelly sandy SILT with low cobble content. Gravel is fine to coarse, angular to subangular, Sandstone lithology. Sand is fine to coarse. Cobbles are angular to sub-rounded, Sandstone Lithology on 1.90m deep Firm, grey brown, slightly gravelly sandy SILT with medium cobble content and low boulder content. Gravel is fine to coarse, angular to sub-rounded, Sandstone lithology. Sand is fine to coarse. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology. Boulders are angular to sub-rounded, 200-500mm dia. Sandstone lithology.	2.30
TP04	Along Access CH 500	0.40m deep (TOPSOIL) Dark brown black, slightly sandy gravelly PEAT. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded. Sandstone lithology 0.60m Soft, light brown, slightly gravelly sandy SILT. Gravel is fine to coarse, angular to sub-rounded, Sandstone lithology on 0.70m deepFirm to stiff, blue grey, slightly sandy gravelly CLAY with	1.70

Trial Pit Name	*Location*	*Primary Subsoil Lithology*	*Depth to Bedrock (m)*
		medium cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded, Sandstone lithology.	
TP05	Along Access CH 600	0.40m deep (TOPSOIL) Firm, dark brown black, clayey PEAT 0.90m deep Soft, brown grey, slightly gravelly sandy CLAY with medium cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded. Sandstone lithology. Cobbles are angular to sub-rounded, 63-200mm dia. Siltstone lithology. Boulders are angular to sub-rounded, 200-1500mm dia. Siltstone lithology.	1.30
TP06	Along Access CH 700	0.40m deep (TOPSOIL) Dark brown black, clayey PEAT on 0.35m deep Soft to firm, slightly gravelly sandy CLAY with high cobble content. Gravel is fine to coarse. Sand is fine to coarse. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology over 0.45m deepFirm, light blue grey, slightly gravelly sandy SILT with medium cobble content and low boulder content. Gravel is fine to coarse, angular to sub-rounded. Sandstone lithology. Sand is fine to coarse. Cobbles are angular to sub-rounded, 60-200mm dia. Sandstone lithology. Boulders are angular to sub-rounded, 200-600mm dia. Siltstone and Sandstone lithology.	1.20
TP07	Along Access CH 900	0.17m deep (TOPSOIL) Dark brown black, slightly gravelly clayey PEAT on 0.63m deep Firm, light brown, slightly gravelly sandy CLAY with medium cobble content and medium boulder content. Gravel is fine to coarse, angular to sub-rounded. Sandstone lithology. Sand is fine to coarse. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology. Boulders are angular to sub-angular 200-1000mm dia. Sandstone lithology. Firm to stiff, blue grey, slightly gravelly sandy SILT with medium cobble content and low boulder content. Gravel is fine to coarse, angular to sub-rounded. Sandstone lithology. Sand is fine to coarse. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology. Boulders are angular to sub-rounded, 200-600mm dia. Sandstone lithology.	
TP08	Along Access CH 1000	0.50m (TOPSOIL) Firm to stiff, dark brown black, slightly gravelly clayey PEAT with low cobble content. Gravel is fine to coarse, angular to sub-rounded. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone Lithology over 0.25m deep Firm to stiff, light brown green, slightly gravelly slightly sandy SILT. Gravel is fine to coarse, angular to subrounded. Sand is fine to coarse over 0.85m deep Firm, blue green, slightly gravelly sandy SILT with medium cobble content and	1.60

Trial Pit Name	*Location*	*Primary Subsoil Lithology*	*Depth to Bedrock (m)*
		low boulder content. Gravel is fine to coarse, angular to sub-rounded. Sand is fine to coarse. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology. Boulders are angular to subrounded, 200-500mm dia. Sandstone lithology.	
TP09	Along Access Road Ch. 1200	0.28m deep(TOPSOIL) Dark brown, clayey PEAT over 170m deep Firm, light brown green, slightly gravelly CLAY with organic content. Gravel is fine to coarse, angular to subrounded over 1.0m deep Firm, light blue grey, slightly gravelly slightly sandy SILT with medium cobble content and low boulder content. Gravel is fine to coarse, angular to sub-rounded. Sand is fine to coarse. Cobbles are angular to sub-rounded, 63-200mm dia. Boulders are angular to sub-rounded, 200-400mm dia. Sandstone lithology	1.40
TP10	Along Access Road Ch.1400	0.70m(TOPSOIL) Dark brown black PEAT with low cobble content. Cobbles are angular top sub-rounded, 63-150mm dia over o.15m deep Firm, light brown, slightly gravelly sandy SILT with medium cobble content and low boulder content. Gravel is fine to coarse, angular to sub-rounded. Sand is fine to coarse. Cobbles are angular to sub-0angular, 63-200mm dia. Sandstone lithology. Boulders are angular to subangular, 200-300mm dia. Sandstone lithology over 1.10m deep Firm to stiff, slight blue grey, slightly gravelly sandy SILT with medium cobble content and low boulder content. Gravel is fine to coarse, angular to sub-rounded. Sand is fine to coarse. Cobbles are angular to sub-rounded, 630-200mm dia. Sandstone lithology. Boulders are angular to sub-rounded, 200-520mm dia. Sandstone lithology.	1.90
TP11	Along Access Road Ch1600	0.40m deep (TOPSOIL) Dark brown black, clayey PEAT with low boulder content over 0.45m deep Soft to firm, light brown, slightly sandy slightly gravelly SILT with medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology over 0.45m deep Firm, grey blue, slightly gravelly sandy SILT.	1.15
TP12	Along Access Road CH1700	2.0m deep (TOPSOIL) Dark brown black, clayey PEAT.	2.00
TP13	Along Access Road Ch1900	0.32m deep Firm, dark brown, peaty CLAY Over 0.43m Firm, grey brown, sandy slightly gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded. Cobbles are 63mm to 200mm dia, angular to sub-angular, Sandstone lithology.	-
TP14	Along Access Road Ch. 2100	0.50m deep Dark brown black, slightly gravelly peaty CLAY. Gravel is fine to coarse, angular to sub-angular over 0.70m deep Firm, light brown grey, slightly sandy slightly gravelly SILT with medium cobble content, low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded. Cobbles are 63mm to 200mm dia, angular to sub-	1.30

Trial Pit Name	*Location*	*Primary Subsoil Lithology*	*Depth to Bedrock (m)*
		rounded. Boulders are 200mm to 600mm dia, angular to sub-rounded.	
TP15	Along Access Road to T7 Turbine	0.50m Dark brown, gravelly PEAT. Over 0.60m deep Soft, light brown, slightly gravelly very sandy SILT with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded. Cobbles are 63mm to 150mm dia, angular to sub-rounded, Sandstone and Shale lithology over 0.60m deep Firm, blue grey, slightly sandy very gravelly SILT with medium cobble content, low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded. Cobbles are 63mm to 200mm dia, angular to sub-rounded, Sandstone and Shale lithology. Boulders are 200mm dia, angular to sub-rounded, Sandstone and Shale lithology.	3.20
TP16	Along Access Road Ch. 2200	0.28m deep Soft, dark brown black, slightly gravelly peaty CLAY. Gravel is fine to coarse and sub-angular on 0.37m deep Firm, light brown, slightly sandy slightly gravelly SILT with medium cobble content, medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded. Cobbles are 63mm to 200mm dia, sub-angular to sub-rounded. Boulders are 200mm to 400mm dia, angular to sub-angular, Sandstone and Shale lithology. Obstruction at 0.60m	-
TP17	Along Access Road Ch 2300	0.25m deep Soft, dark brown black, PEAT on 0.30m deep Firm, light brown grey, slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded. Cobbles are 63mm to 200mm dia, angular to sub-rounded, Sandstone lithology. Boulders are 200mm to 400mm dia, angular to subangular, Shale lithology. Obstruction at 0.55m	-
T18	Along Access Road Ch2400	0.50m deep Dark brown black, peaty CLAY on 0.30m Firm, light brown, slightly gravelly sandy SILT with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded. Cobbles are 63mm to 200mm dia, angular to sub-rounded, Sandstone lithology. Firm to stiff, blue grey, slightly gravelly sandy SILT with high cobble content, medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded. Cobbles are 63mm to 200mm dia, angular to sub-rounded, Sandstone lithology. Boulders are 200mm to 400mm dia, angular to sub-angular, Sandstone and Shale lithology. Weathered Bedrock. Obstruction at 1.60m	1.60
T19	Along Access Road Ch2600	0.90m deep soft brown to black, slightly graavelly peaty Clayy - Sandstone lithologyon 0.20m deep soft to firm light brown grey slightly gravelly silt with medium cobbles 63-200mm with boulders 200-400 Sandstone lithology	1.10

Trial Pit Name	*Location*	*Primary Subsoil Lithology*	*Depth to Bedrock (m)*
T20	Along Access Road Ch2700	0.35m deep soft brown to dark brown slightly gravelly peaty clay on 0.20m firm gravelly silt with low cobbles 63 – 200 mm dia Sandstone lithology ON 0.84m deep soft to firm grey brown slightly sandy gravelly silt with high cobble content gravel is fine to coarse	1.40
TP21	Along Access Road Ch2900	0.15m deepsoft dark brown to black slightly sandy peaty clay sand is fine to coarse on on 0.30m deep soft to light brown slightly gravelly sandy silt gravel is fine to coarse aith cobbles 63-200mm on 1.95m deep soft to firm slightly gravelly silt . gravel is fine to coarse with cobbles 63-200mm and boulders 200-800mm Sandstone lithology.	2.40
TP22	Along Access Road Ch3030	0.95m deep soft to firm slightly gravelly sandy silt with medium cobbles 63-200mm dia and 200-500mm boulders Sandstone lithology	0.95

Table 2.3 Summary of Trial Pit Investigations along Access Road

Trial Pit Name	*Location*	*Primary Subsoil Lithology*	*Depth to Bedrock (m)*
TP1A	Turbine No 1	0.20m Soft, black, slightly gravelly peaty CLAY (Topsoil) on 0.20m deep Firm, light brown, slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded, Sandstone lithology. Over 0.60m deep Soft to firm, red brown, slightly gravelly slightly sandy SILT with medium cobble content and low boulder content. Gravel is fine to coarse., angular to subrounded. Sand is fine to coarse. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology on 0.20m deep Soft, grey brown, slightly sandy gravelly SILT with high cobble content and high boulder content. Cobbles are angular to sub-angular, 63-200mm dia. Sandstone lithology. Boulders are angular to sub-angular, 200-500mm Sandstone lithology.	1.25
TP2A	Turbine No 1	0.20m deep Soft, dark brown black, slightly gravelly peaty CLAY. Gravel is fine to coarse, angular to rounded. (Topsoil) on 0.70 m deep Soft, grey brown, slightly gravelly slightly sandy SILT with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded, Sandstone lithology. Cobbles are angular to sub-angular, 63-200mm dia. Sandstone lithology. Boulders are angular to sub-angular, 200-500mm dia. Sandstone lithology.	0.70
TP3A	Turbine No 3	0.30m (TOPSOIL) Soft, dark brown silty PEAT on 0.70m Firm, slightly gravelly	1.70

		sandy SILT with medium cobble content. Gravel is fine to coarse, angular to sub-rounded. Sand is fine to coarse. Cobbles are angular to subrounded, 63-150mm dia. Sandstone lithology over 0.40m deep Firm to stiff, blue grey slightly sandy gravelly SILT with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded, Sandstone lithology. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology.	
TP4A	Turbine No 4	0.22m deep (TOPSOIL) Soft, dark brown black, slightly gravely clayey PEAT over 0.83m deep Firm to stiff, slightly sandy slightly gravelly SILT with medium cobble content and low boulder content. Sand is fine to coarse. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology. Boulders are angular to sub-angular, 200-400mm dia. Sandstone lithology.	1.05
TP5A	Turbine No 5	0.50m deep Dark brown black, peaty CLAY. (Topsoil) 0n 0.30m deep Dark brown black, peaty CLAY with low cobble content. Cobbles are 63mm to 200mm dia, angular to subrounded. Over 0.70m deep Firm, grey blue, slightly sandy gravelly SILT with medium cobble content, low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to subrounded, Sandstone lithology. Boulders are 200mm to 550mm dia, angular to sub-rounded, Sandstone lithology.	1.50
TP6A	Turbine No 6	0.17m deep (TOPSOIL) Dark brown black, gravelly clayey PEAT. Gravel is fine to coarse, angular t sub-angular, Sandstone lithology over 0.63m deep Firm, light brown grey, slightly gravelly slightly sandy SILT with medium cobble content. Gravel is fine to coarse, angular to sub-rounded. Sand is fine to coarse. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology.	0.80
TP7A	Turbine No 7	0.28m deep(TOPSOIL) Dark brown black, slightly gravelly PEAT. Gravel is fine to medium, angular to sub-angular Sandstone lithology over 0.83m deep Firm to stiff, light brown grey, slightly sandy gravelly SILT with medium cobble content. Gravel is fine to coarse, angular to sub-angular. Sand is fine to coarse. Cobbles	1.20

		are angular to sub-rounded, 63-200mm dia. Sandstone and Siltstone lithology.	

Table 2.3.1 Summary of Trial Pit Investigations at Turbine Locations.

Trial Pit Name	*Location*	*Primary Subsoil Lithology*	*Depth to Bedrock (m)*
TPS1	Electric Compound	0.35m deepSoft, dark brown to black, gravelly very silty PEAT 0.20m deep Firm, red brown, slightly gravelly slightly sandy SILT with medium cobble content. Gravel is fine to coarse, angular to sub-angular. Sand is fine to coarse. Cobbles are angular to sub-angular, Sandstone lithology over 1.55m deep Grey, silty sandy GRAVEL with medium cobble content and medium boulder content. Gravel is fine to coarse, angular to sub-angular. Sand is fine to coarse. Cobbles are angular to sub-angular, 63-200mm dia. Sandstone lithology.	2.1
TPS2	Electric Compound	0.40m deep Soft, dark brown to black, slightly gravelly peaty CLAY 0.60 m deep Gravelly clayey COBBLES and BOULDERS. Gravel is fine to coarse, angular to sub-rounded. Cobbles are angular to sub-angular, 63-120mm dia. Sandstone lithology. Boulders are angular to sub-angular, 200-1000mm dia. Sandstone lithology on 1,20mdeep Firm, blue grey, slightly sandy gravelly SILT with medium cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded, Sandstone lithology. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology. Boulders are angular to sub-rounded, 200-400mm dia. Sandstone lithology.	2.2
TPS3	Electric Compound	0.50m deep Dark brown to black, slightly gravelly peaty CLAY on 0.60m deep Soft, light brown, slightly sandy gravelly SILT with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular. Cobbles are angular to sub-angular, 63-200mm dia. Sandstone lithology. Boulders are angular to subangular. Sandstone lithology 0n 0.80m deep Firm, grey blue, slightly sandy gravelly SILT with medium cobble content and medium boulder content. . Sand is fine to coarse. Gravel is fine to coarse, angular o subrounded. Cobbles are angular to sub-rounded, 63-200mm dia. Sandstone lithology. Boulders are angular to sub-angular, 200-700mm dia. Sandstone lithology.	

Table 2.3.2 Summary of Trial Pit Investigations at Electric Substation Location.

Trial Pit Name	*Location*	*Primary Subsoil Lithology*	*Depth to Bedrock (m)*
TP1	Borrow Pit	PROFILE OF ROCK FACE Large intact block of SANDSTONE (approx.. 2.00m x 2.00m) present. 0.35m of rock excavation possible using 460mm toothed bucket at 0.00m. 0.10m of rock excavation possible using 460mm toothed bucket at 1.00m up rock face. No rock excavation possible using 460mm toothed bucket at 1.50m up rock face. Minimal fines material present. Suitable for use as road base and structural fill material.	
TP2	Borrow Pit	PROFILE OF ROCK FACE 0.35m of weathered rock excavation possible using 460mm toothed bucket at 0.00m on rock face. 0.30m of weathered rock excavation possible using 460mm toothed bucket at 1.00m on rock face. (15 minutes). 0.20m of weathered rock excavation possible using 460mm toothed bucket at 2.20m on rock face. Fresh SANDSTONE underlying weathered rock. Minimal fines material present. Suitable for use as road base and structural fill material.	

Table 2.3.3 Summary of Trial Pit Investigations at Borrow Pit Locations.

Detailed Site Investigations are now complete and the above information is taken from the logs presented by PGL Priority Geotechnical Report and Whiteford Geoservices Ltd., attached in Appendic B.

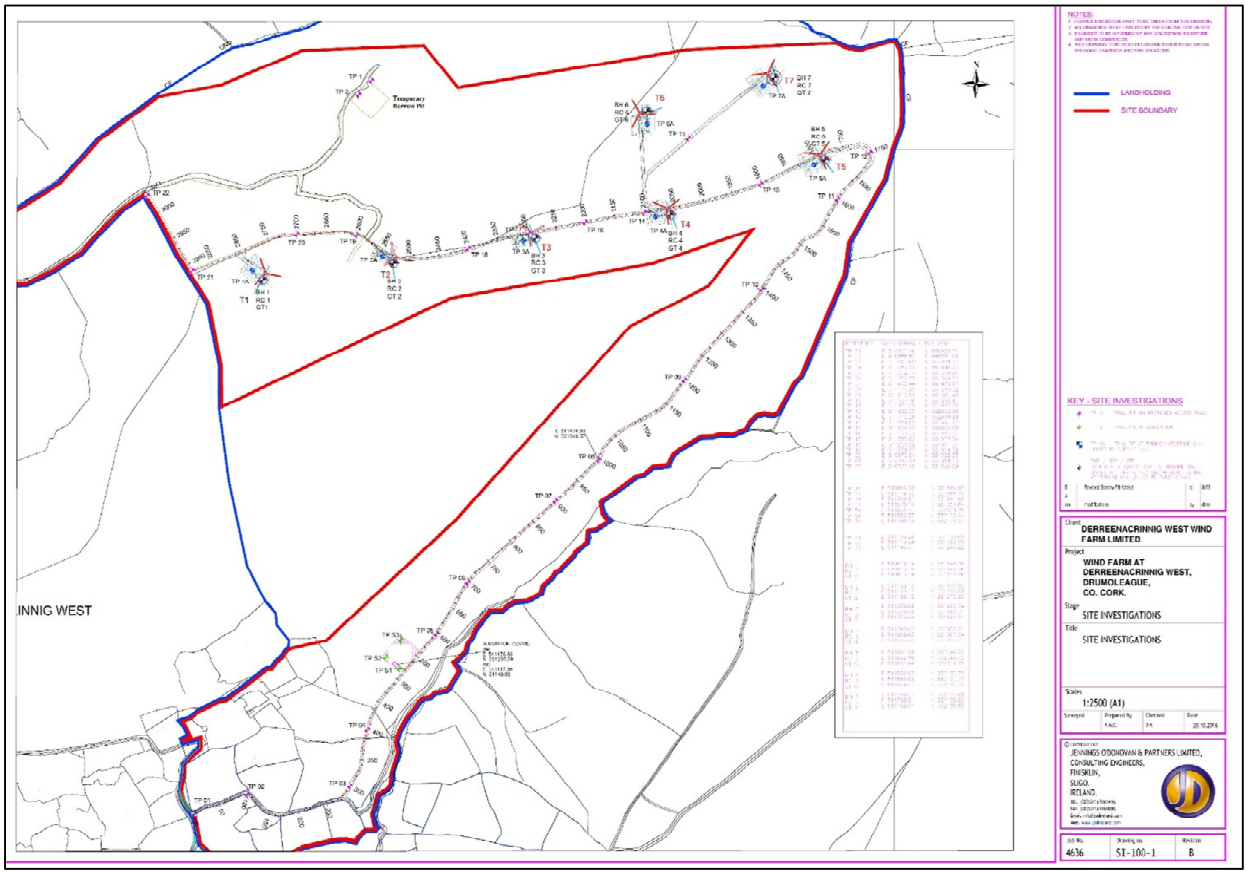

Figure 2.4 Site Investigations Map

2.3.1 Peat, Subsoil Excavation and Bedrock Excavation

- No turbines or directly related infrastructure will be constructed near or on any designated sites such as NHAs or SACs;
- Rock aggregate for construction purposes is to be sourced on site within 1 borrow pit
- The soil, subsoil and bedrock which will be removed during the construction phase will be localised to the turbine location and access roads.

2.3.2 Contamination of Soil by Leakages and Spillages and Alteration of Peat/Soil Geochemistry

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Off-site refuelling will occur at a controlled fuelling station;
- On site refuelling will be undertaken using a double skinned bowser with spill kits on the ready for accidental leakages or spillages;

- Fuels stored on site will be minimised. Storage areas, where required, will be bunded appropriately for the fuel storage volume for the time period, and fitted with a storm drainage system and an appropriate oil interceptor;
- The electrical control building will be bunded appropriately to the volume of oils likely to be stored; and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- The plant used during construction will be regularly inspected for leaks and fitness for purpose;
- An Emergency Response Plan for the construction phase to deal with accidental spillages will be contained within Technical Schedule 1 of this document. Spill kits will be available to deal with and accidental spillage in and outside the refuelling area.

2.3.3 *Erosion of Exposed Subsoils During Tree Felling, Access Road and Turbine Base Construction Work*

- Peat and subsoils removed from turbine locations and access roads will be used for landscaping, cast aside and deposited on-site;
- Any excess temporary mounded subsoils in storage for long periods will be covered by a polyethylene sheets or seeded at the earliest opportunity. This will prevent erosion of soil. Silt fences will be installed around stockpiles to limit movement of entrained sediment in surface water runoff. The use of bunds around earthworks and mounds will prevent egress of water from the works;
- In order to minimise erosion of mineral subsoils stripping of topsoil will not take place during extremely wet periods (to prevent increased silt rich runoff). Temporary drainage systems will be required to limit runoff impacts during the construction phase;
- In forestry areas, brash mats will be used to support vehicles on soft ground, reducing topsoil and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting.

2.3.4 *Peat Instability and Failure*

Ground / Peat Stability

Geotechnical investigations at the Dreenacreenig West site indicate that the site is a low to medium risk / probability to slope failure or peat slides. There is historic recorded evidence of two bog or landslide occurrences within 20km of the proposed development. One is located 17 km to the north at GRID REF. 101591, 67019 at Gortacreenteen in County Kerry where a landslide from an embankment was recorded in 2004. The second is located 19.5 km to the north at GRID REF 113730, 72070 at Fuhiry in County Cork where a peat landslide from a mountain valley was recorded in 1997. There are no landslide events recorded within 17 km of the Dreenacreenig West site. Applying the precautionary principle however, the following procedures are recommended as best-practise mitigation measures to avoid slope instability at wind farm sites. These are as follows:

1. All site excavations and construction should be supervised by a geotechnical engineer/engineering geologist. The contractor's methodology statement should be reviewed and approved by a suitably qualified geotechnical engineer/engineering geologist prior to site operations. Particular attention and pre-construction assessment and mitigation planning should be given to the proposed access road.

2. Any excavations that may tend to undermine the up-slope component of a peat and / or unstable subsoil slope should be sufficiently supported by buttress, frame or rampart to resist lateral slippage. To this end, all turbine foundation locations should be supported by a restraining / support wall during the construction phase.

3. In such excavations, pore water pressure should be kept low at all times and careful attention should be given to the existing drainage and how structures might affect it. In particular, ponding of water should not be allowed to occur in recent excavations, particularly where slopes are >10° and where peat is >1.5m. All deliberate or incidental sumps must be drained to carry water away from the sump following rainfall. Otherwise, this water will increase hydraulic heads locally, increase pore water pressure and can potentially lead to instability.

4. Prior to excavation, drains should be established to effectively drain grounds prior to earthworks. Such drains should be positioned at an oblique angle to slope contours to ensure ground stability. Drains on areas of the site with minimal risk of bog failure as identified by site investigations can be positioned at a more acute angle to the slope contour in order to reduce the velocity of surface water drainage.

5. Due to peat's fluid-like properties, all peat excavated should be immediately removed from sloping area. If peat is required for reinstatement, then acrotelm peat (<0.3m shallow, living layer) should be stripped off the surface of the bog and placed carefully at the margins of the development along the access road and hardstand margins that are characterised by near-horizontal slopes (<6°), are >100m away from any significant break of slope and are >100m away from drains and streams.

6. The development of a borrow pit by blasting of bedrock as opposed to manual breakout of rock is not recommended in a blanket bog environment.

7. Where possible, construction activities should be undertaken during the drier months of the year (typically the summer months of May to August). During this period, rainfall is expected to be low and pore water pressures should be stable. Ultimately however, considering currently changing patterns of rainfall intensity within and between seasons, once the mitigation measures outlined above are complied with, construction work can be undertaken throughout the year. If construction is undertaken during the traditionally wetter months of the year (October to March), Minerex recommends that a geotechnical monitoring programme is undertaken during this period to monitor and report on site conditions on at least a weekly basis.

8. From examination of factual evidence to date, the majority of landslides occur after an intense period of rainfall. An emergency response system will be developed for the construction phase of the project, particularly during the early excavation phase. This at the minimum should involve 24 hour advance meteorological forecasting (Met Eireann download) linked to a trigger-response system. When a pre-determined rainfall trigger level is exceeded (e.g. 1 in 100 year storm event or very heavy rainfall at >25mm/hr), planned responses are undertaken. These responses should include cessation of construction until the storm event including storm runoff has passed over and where excavation is progressing in peat >1.0m depth, slope support structures are put in place until the storm runoff event passes.

Whitefords Geoservices Ltd appraisal of the Hazard Rankings, for each proposed turbine and structure location indicates that the site (encompassing turbines T1, T2, T3, T4, T5, T6, T7 and the electrical switchroom) carry INSIGNIFICANT Hazard Rankings in relation to peat instability.

Application of the following procedures will have the effect of reducing the Hazard Ranking associated with Peat Instability:

- Excavated spoil will not be deposited on the down slope or up slope edges of the adjacent peat. This spoil will instead be deposited on the two flanks either side of the excavation where gradient is least.
- Bog Burst is recognised to be a difficult condition to mitigate against. Bog Burst tends to occur within deep peat (> 3.00m thickness) after very heavy or prolonged precipitation. To ward against this possibility the design of turbine bases should be engineered to ensure that excavations do not cut into deep peat .
- The hardstandings surrounding the turbine bases should be designed in a manner such that crane loadings can be transferred directly onto the competent strata underlying the peat soils. In order to facilitate these works it will be necessary to undertake limited excavations.
- Movement can often occur during or following severe rainstorm events, particularly when following a prolonged dry spell. Extra vigilance will be maintained at such times, during construction.
- All slopes will be regularly checked for development of tension cracks.
- Extra care will be taken where the peat has previously been tilled. Note; during site visits there was evidence of peat harvesting at the proposed site.
- Construction Management Plans will be followed at all times.
- Slopes will not be undercut or excavations left unsupported for periods in excess of 24 hours. Excavations are to be backfilled as soon as practicable. Excavation and filling operations shall be coordinated to minimise the time an excavation remains opened.
- Pore water pressure within excavations should be kept low at all times by draining deliberate or intentional sumps at regular intervals. This is to prevent ponding of water within excavations which can in turn increase hydraulic heads locally and potentially lead to instability.
- The potential for Peat Slide will be monitored regularly during the construction works, by means of regular site visits and assessments, by a suitably qualified and experienced professional.
- Site staff will also undergo induction training to learn about the risks associated with working on "*upland environments*" and procedures aimed at reducing Peat Slide risk.

2.3.5 Subsoil Excavation Volumes and Repository Areas

The overall indicative volume of subsoil excavation in Dreenacreenig West Wind Farm site has been established as being approximately 21,355m^3 from roads and 11,255 m^3 from the footprint of turbine foundations / hardstands and the substation. The estimated volume of subsoil to be re-used on site is approximately 8,500m^3. On site construction will be progressed with the objective of employing the top layer of soil / sub soil for immediate re-use of site under the following:

- Saving the top layer of the subsoil excavated for landscaping uses over any backfilled areas.
- Placing the excavated subsoil along roadside berms as indicated in Tender Drawings

The subsoil management proposals are discussed further in Section 2.3.6.

In the unlikely event that excess subsoil is encountered, which cannot be reused on site, this subsoil will be disposed of in an environmentally sensitive manner by a licensed waste contractor in consultation with Cork County Council.

2.3.6 Subsoil storage management and restoration

Any surplus soil / sub-soil generate on site which will be surplus to the material required for landscaping / reinstatement of the site following completion of the wind farm instructure shall be employed with the reinstatement of the proposed on-site borrow pit. Subsoil with a volume of approximately **8,500m³** will be re-used during the construction phase as follows;

- Landscaping of hardstanding and splay areas.
- Reinstatement of splays, stilling ponds, etc.
- Roadside berms and landscaping
- Landowner land reclamation/improvement activities

Subsoil will not be placed:

- Within 50 m of natural watercourses.
- Within 20 metres of a major arterial drain or 10m of any minor drain or drains containing dry weather flows greater than 1 litre/second.
- Within areas of gradient greater than 1:20.

- Within areas designated as sensitive habitat.

2.36 Subsoil Excavation and Reinstatement Methodology

The following methodology is proposed for such work:

- Prior to excavation, all grass areas shall be cut into turves and will be carefully stacked and re-used within one week of cutting during the period 1st April to 31st August or within two weeks of cutting during the remainder of the year. Turves not used within these periods shall be regarded as topsoil.

- Subsoil will be re-used to form berms either side of the track as indicated on drawing. Berm heights will not exceed 0.5m.

- All reinstatement areas will be suitably fenced and signs warning the public will be erected.

- Bare subsoil will be seeded with a wild flower mix to enhance biodiversity.

- Any bare areas to be seeded shall be covered with topsoil to a minimum depth of 100mm which shall be reduced to a fine tilth, free from stones and debris with any dimensions greater than 35mm. The topsoil shall be graded and lightly compacted to a 100mm thickness or existing thickness-whichever is greater. Any upstanding debris or stones exceeding 35mm dimension shall be removed.

- Due regard will be paid to the season and weather condition before sowing the wild flower seed. Immediately prior to sowing the seed, the topsoil shall be reduced to a fine tilth. An even distribution of the approved mix will be applied. The seed shall be covered by lightly raking into the surface of the topsoil.

- All work will be carried out in an environmentally sensitive manner in consultation with the Local Authority and the National Parks and Wildlife Service.

- A waste license will be obtained from the Local Authority / Environmental Protection Agency prior to any disposal of subsoil as per the Waste Management Regulations 2006 and the Waste management Act 1996 to 2008.

2.4 HYDROLOGY AND DRAINAGE

The drainage measures proposed for this seven turbine development provide a surface water management regime that will mitigate any adverse impact on the hydrology of the site and surrounds during the construction phase of the project.

2.4.1 *Wind Farm Drainage System*

The following mitigation measures apply when working within the watercourses or in the vicinity of watercourses.

- Site drainage and associated pollution control measures shall be implemented on site before the main body of construction activity commences. The appointed Contractor will put in place a Surface Water Management Plan for the control of silt-laden water and other pollutants within the site. A fundamental aim of the Surface Water Management Plan will be to intercept silt laden waters and remove sediment prior to release into the watercourse. The IFI and the NPWS will be consulted and supplied with a detailed Construction Management Plan outlining the proposed methodology for the undertaking of works within and affecting the watercourses within the proposed development site.

- Monitoring of streams and drains will be carried out on a regular basis during the construction phase so that construction works are not significantly impacting on existing streams/drains or watercourses down gradient of the site.

- Drainage outfall will be via indirect buffered outfalls to surface watercourses or onto the bog surface. The drains end by fanning out onto the surrounding vegetation via tapering drains. The tapering drain end should contain hard core material (of local baseline geochemistry) to entrap suspended sediment.

- In addition, these outfalls promote sediment percolation through vegetation in the buffer zone, reducing sediment loading to any adjacent water courses and avoiding direct discharge to the watercourse. A minimum buffer width of 50 m will be imposed between the end of the drain fan and water courses.

- Runoff from excavations will not be pumped directly to watercourses. Where dewatering of excavations is required, water shall be pumped to the head of a settlement system (drain or

concrete sump in the case of turbine bases) in order to receive full settlement prior to re-entry to the natural drainage system.

- The implementation of a comprehensive Surface Water Management Plan designed with drainage awareness and aimed at retaining of soil / sediment and reducing the incidence of surface water pollution within the boundary of the proposed development will help protect water quality in sensitive aquatic areas downstream, including the Mealagh and Ilen Rivers.

- The surface run-off attenuation design strategy will be implemented to protect the minor watercourses within the study area, limited to the surface catchments of the Ilen and Mealagh rivers

- Where haul roads pass close to watercourses, silt fencing will be used to protect the streams. These fences will be secured into the ground and divert water into silt traps.

- Silt traps should be constructed at locations that will intercept run-off to the drainage network and should not be constructed immediately adjacent to watercourses. A buffer zone should remain between the silt trap and the watercourse with natural vegetation left intact so as to assist silt interception. All natural watercourses which have to be traversed during site development and road construction works should be effectively bridged prior to commencement. Additional silt fencing will be kept on site for the ongoing maintenance of the structures provided. Again, maintenance and monitoring of such silt fences will be subject to an on-site quality management system.

- Wheel washing facilities will be provided at the site entrance draining to silt traps. Spoil heaps from the excavations for the turbine bases will be covered and surrounded by silt fences to filter sediment from the surface water run-off from excavated material.

- Berms will be covered with excavated turfs to expedite the vegetation cover. The berms will be surrounded by silt fencing until the vegetation has been established.

- The construction of drains for access road drainage will follow the natural flow paths on site where possible. Existing overland flow channels will be maintained and cross-drains provided in the access roads to allow continuity of flow. Interceptor drains will be constructed upslope where there are no existing channels with cross-drains provided at 50m intervals. The roadside

drains will therefore only carry the access road run-off and so avoid carrying large volumes of water and concentrating flows. Where drains are laid at slopes greater than 2%, check dams will be provided. This will reduce effective slope, run-off velocities and any consequent potential for erosion. Furthermore, excavation and installation of roads / access tracks should be undertaken so as not to result in the creation of preferential flow paths that may result in erosion. During the construction process and operation phase, natural flow paths should not be interrupted or diverted so as to give rise to create potential for erosion.

- Cross-drains will be provided for drainage crossings and conveying flows from existing and proposed drains across the access tracks. Sub-surface drains will be installed if a water ponding problem is likely to develop, this will be taken into account in the detailed design of the Construction Management Plan..

- The contractor shall ensure that erosion control and attenuation facilities, namely sediment/silt traps, drainage channels and outfalls are regularly maintained during the construction phase and will review same on a regular basis and maintain a log of issues/maintenance and any remediation completed. The contractor shall ensure that all personnel working on site are trained in pollution incident control response.

- Appropriate signage will be in place on site outlining the spillage response procedure and a contingency plan to contain silt.

- The operation of machinery within watercourses affected by the proposed development and any instream works will be minimised through strategic scheduling.

- All of the construction machinery operating in or near these watercourses will be systematically checked in order to avoid leaks of oils, hydraulic fluids and fuels.

- All oils and fuels should be stored in secure bunded areas, and particular care and attention should be taken during refuelling and maintenance operations on plant equipment. Where site works involve the discharge of drainage water to receiving rivers and streams, temporary oil interceptor facilities should be installed and maintained. Adequate security should be provided on site to prevent spillage as a result of vandalism.

- Standing water in the excavations will contain an increased concentration of suspended solids. The excavations will be pumped into temporary settlement basins which will be lined and which will drain into existing or proposed drainage channels on site following settlement of suspended solids. The settlement basins will be constructed in advance of any excavations for the turbine bases.

- Cables will be installed in trenches underneath and directly adjacent to access tracks as far as possible.

- Trenches will be excavated during dry periods where possible in short sections and left open for minimal periods to avoid acting as a conduit for surface water flows.

- Clay bunds will be constructed within the cable trench at intervals. Pre-cast concrete should be used whenever possible, to eliminate the risk to all forms of aquatic life. When cast-in-place concrete is required, all work must be done in periods of dry weather and effectively isolated from any water that may enter the drainage network for a period sufficient to cure the concrete. A risk assessment will be prepared prior to any wet concrete operations being carried out and will only be conducted where sufficient periods of dry weather are forecast.

- Stream structures should not damage fish habitat or create blockages to fish and macroinvertebrate passage. A Construction Management Plan for stream crossings (if required) will be agreed in advance with NPWS and the fisheries authorities. IFI is charged under the Fisheries Act (1980) with the responsibility to protect and conserve all freshwater fisheries within its area of jurisdiction. This is not expected to represent an issue, as the reaches of the Ilen and Mealagh rivers.The Mealagh and Ilen Rivers are both important salmon rivers providing suitable habitat for all age classes of Atlantic salmon. Tributaries of these rivers are also important for spawning and for juvenile fish. Good salmonid spawning habitat consists of a mix of cobbles, gravels and finer material, free of silt and detritus in fast flowing riffles to ensure that there is an adequate flow of water and oxygen through the substrate.

- Any diesel or fuel oils stored on site will be bunded to 110 % of the capacity of the storage tank. Such facilities will not be located near any drain or watercourse. Design and installation of fuel tanks will be in accordance with best practice guidelines. Refuelling of plant during construction will be carried out away from watercourses, draining to an oil interceptor. Drip trays and spill kits will be kept available on site. Only emergency breakdown maintenance

will be carried out on site. Appropriate containment facilities will be provided to ensure that any spills from the vehicle are contained and removed off site.

- Direct crossings of watercourses and any required diversions will be carried out outside of the salmonid spawning season and the times that early life stages of salmonid fish will be present. Overall, no instream work will be undertaken during the period October to April inclusive following agreement with Inland Fisheries Ireland (IFI). The publication '*Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites*' by Murphy (2004) and the NRA's '*Guidelines for the crossing of watercourses during the construction of national road schemes*' (NRA, 2008) will be followed during the construction works. Work on the site will be timed to occur outside periods where very heavy rainfall would be expected (i.e. the winter months).

- The construction period will also not coincide with major forestry operations. Portaloos will be used to provide temporary toilet facilities for site personnel. Sanitary waste will be removed from site via a licensed waste disposal contractor.

- A regular review of weather forecasts of heavy rainfall will be required and the contractor is required to prepare a contingency plan for before and after such events in relation to pre-cast concrete use, in-stream work or work in proximity to any watercourse.

All drains and streams on and in the vicinity of the proposed development site have been surveyed in detail. By incorporating a SuDS design, all surface water run-off shall be strictly controlled such that no silt or other pollutants enter watercourses and that no artificially elevated levels of downstream siltation or no plumes of silt arise when substratum is disturbed. The drainage design adopts the following temporary works during the construction phase:

- Open Constructed Settlement Channels for development run-off

- Infiltration Interception Drains for upslope "*clean*" water

- Filtration Check Dams to reduce velocities along steeper slopes

- Stilling ponds and Buffered Outfalls to control and store development runoff to encourage settlement prior to discharge.

- Greenfield Runoff for the site will not be exceeded and settlement ponds have been designed to ensure that the capacity is adequate to achieve this.

In areas of steep slope, tracks will be constructed with an appropriate surface cross slope so as to ensure all storm water flow will be directed towards the constructed roadside drains. The flow will then be directed through filtration check dams and settlement ponds before being discharged into green-field areas.

Please refer to **Technical Schedule 4** –Watercourse Crossings Plan for details of the Watercourse Crossing and Section 50 applications will be lodged pre-construction.

Technical Schedule 6 outlines the Water Quality Monitoring Plan. A detailed version of TS 6 shall be prepared by the Contractor prior to construction commencing.

2.4.2 *Clear Felling of Coniferous Plantation*

It is expected that a small amount of the existing coniferous plantation forestry will be felled to allow for development of the proposed wind farm infrastructure. The large distance between proposed felling areas and sensitive aquatic zones means that potential poor quality runoff from felling areas can be adequately managed and attenuated prior to even reaching the aquatic buffer zone and primary drainage routes. Where tree felling is required in the vicinity of streams, the following additional mitigation measures will be employed.

- During the wind farm construction phase a self-imposed buffer zone of 50m will be maintained for all streams where possible. These buffer zones are shown on Figure 2.3.

- Machine combinations will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance;

- Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicle through watercourses will occur, as vehicles will use road infrastructure and watercourse crossing points. Where possible, existing drains will not be disturbed during felling works;

- Drainage channels which drain from the area to be felled towards surface watercourses will be blocked, and temporary silt traps will be constructed. No direct discharge of such drains to

watercourses will occur. Drains and sediment traps should be installed during ground preparation. Collector drains will be excavated at an acute angle to the contour (0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains must be provided with water drops and rock armour where there are steep gradients, and should avoid being placed at right angles to the contour;

- Sediment traps will be sited outside of buffer zones and will have no direct outflow into the aquatic zone. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of away from all aquatic zones. Where possible, all new silt traps will be constructed on even ground and not on sloping ground;

- All drainage channels will taper out before entering the aquatic buffer zone. This ensures that discharged water gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils silt traps will be installed at the end of the drainage channels to the outside of the buffer zone;

- Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimised and controlled;

- Brash mats will be used to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal should take place when they become heavily used and worn. Provision should be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction should be suspended during periods of high rainfall;

- Works should be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water run-off;

- Checking and maintenance of roads and culverts will be on-going through the felling operation;

- Refuelling or maintaining machinery will not be permitted within 50m of an aquatic zone. Dedicated refuelling areas will be used during the felling works; and,

- Branches, logs or debris will be prohibited to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but avoid removing natural debris deflectors.

2.4.3 *Potential Release of Hydrocarbons during Construction and Storage*

- On site refuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built re-fuelling trailer will be filled off site, and will be towed around the site by a 4x4 jeep to where machinery is located. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;

- Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction;

- The electrical control building shall be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage of any associated chemicals and to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;

- The plant used shall be regularly inspected for leaks and fitness for purpose; and,

- An Emergency Reponses Plan for the construction phase to deal with accidental spillages will be contained within Technical Schedule 1. Spill kits will be available to deal with accidental spillages.

2.4.4 *Groundwater and Surface Water Contamination from Wastewater Disposal*

- Self-contained port-a-loos with integrated waste holding tank will be used at the site compound, maintained by the providing licensed contractor, and removed from site on completion of the construction works;

- Water supply for the site office and other sanitation will be brought to site and removed after use from the site to be discharged at a suitable off-site treatment location;

- No water will be sourced on the site, or discharged to the site.

2.4.5 *Release of Cement-Based Products*

- Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;

- Where possible, pre-cast elements for culverts and concrete works will be used;

- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;

- Where concrete is delivered on site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be tanked and removed from the site to a suitable, non-polluting, discharge location;

- Use weather forecasting to plan dry days for pouring concrete;

- Ensure pour site is free of standing water, and plastic covers will be ready in case of sudden rainfall event.

2.4.6 *Morphological Changes to Surface Watercourses & Drainage Patterns*

- Where possible all proposed new stream crossings will be bottomless culverts and the existing banks will remain undisturbed. No in-stream excavation works are proposed and therefore there will be no impact on the stream at the proposed crossing location;

- Where the proposed electrical connection cable route runs adjacent to a proposed access road or road proposed for upgrade, the cable will pass over the culvert within the access road;

- Any guidance/mitigation measures proposed by the OPW or the Inland Fisheries Ireland will be incorporated into the design of the proposed crossings;

- As a further precaution near stream construction work will only be carried clear of the drainage channel and outside the period permitted by Inland Fisheries Ireland for in-stream works

according to the "Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters Inland Fisheries Ireland, 2016", that is, May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses.

- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas;

- Access road river/stream crossings require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

The proposed mitigation measures for protection of surface water quality which will include buffer zones and drainage control measures (*i.e.* interceptor drains, settlement ponds) will ensure that the quality of runoff from proposed development areas will remain unchanged.

2.4.7 ***Surface Water Quality Monitoring***

Sampling will be done before, during (if the operation is conducted over a protracted time) and after the construction works. The 'before' sampling should be conducted within 4 weeks prior to the construction work beginning, preferably in medium to high water flow conditions. The "during" sampling will be undertaken once a week or after rainfall events. The 'after' sampling should comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e. where an impact has been shown).

Criteria for the selection of water sampling points include the following:

1. Avoid man-made drains and watercourses without all-year flow;
2. Select sampling points upstream and downstream of the works;
3. It is advantageous if the upstream location is outside/above the site in order to evaluate the impact of land-uses other than the development works; and,
4. Where possible, three downstream locations should be selected: one immediately below the working area, the second at exit from the site boundary, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other

land-uses where impact increases at third downstream location relative to second downstream location).

Technical Schedule 6 outlines the Water Quality Monitoring Plan. A detailed version of TS 6 shall be prepared by the Contractor prior to construction commencing.

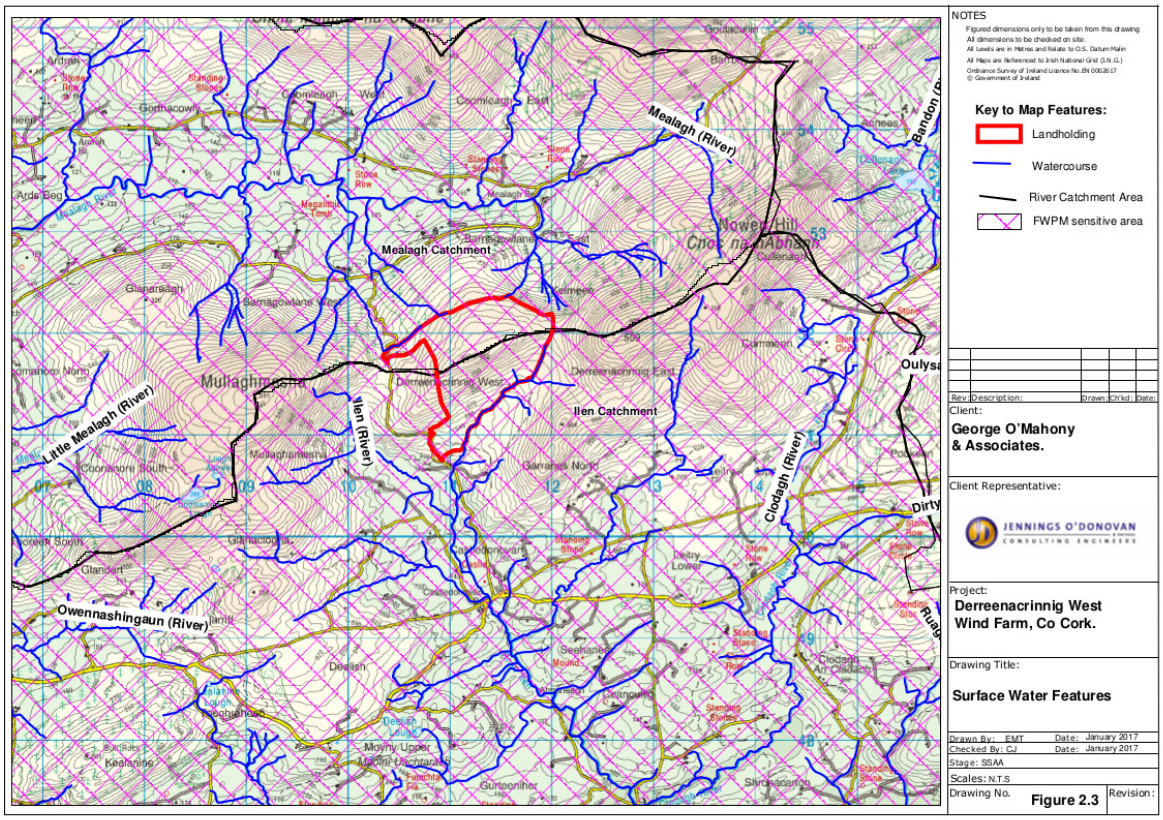

Figure 2.3 Surface Water Features Map

2.5 AIR AND CLIMATE

As with all projects, construction activities are likely to generate some dust emissions.

- Where dust suppression is considered to be required by the Contractor, such requirements and methodology shall be subjected to the agreement with Ecological Clerks of Works.

- Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.

- Dust Minimisation Plan will be formulated as part of the Construction Management Plan for the construction phase of the project.

2.6 ARCHAEOLOGY AND CULTURAL HERITAGE

The proposed development area is located within the townland of Dreenacreenig West, c. 10km W of Dunmanway in the western part of County Cork. The landscape setting is rural in nature and characterised by rough uplands necessary for the establishment of wind farms. There are a large number of recorded archaeological sites located within the landscape surrounding the proposed development, with seventeen recorded within c. 1km. Some of these recorded sites contain multiple features with at least two enclosures and six hut sites located within one RMP constraint (CO106-067). There are no recorded archaeological sites situated within the boundaries of the proposed wind farm.

John Cronin & Associates (JCA) have been appointed to monitor all site development works and have undertaken a programme of archaeological monitoring of pre-development geotechnical site investigations at the wind farm site. In the event that archaeological material is found to be present, works will cease pending consultation with the Department of the Arts, Heritage and the Gaeltacht and the planning authority on how best to record any archaeological material found.

On completion of the wind farm development, a full and final report will be prepared by John Cronin & Associates and submitted to the Planning Authority and the National Monuments Service.

- Archaeological Monitoring will be carried out under Licence to the Department of Arts, Heritage and the Gaeltacht and the National Museum of Ireland. Provision should be made for the full excavation and recording of any archaeological features or deposits that may be exposed during monitoring;

- It is recommended that a written and photographic record be created, well in advance of any development works, where the access tracks truncate the townland, parish, barony and county boundaries.

- It is also recommended that monitoring be carried out where the access tracks truncate the townland, parish, barony and county boundaries. Provision should be made for the full excavation and recording of any archaeological features or deposits that may be exposed during monitoring.

2.7 NOISE

To ensure that construction noise remains below '*nuisance'* levels, reference will be made to BS 5228: Part 1: 1997 (Noise Control on Construction and Open Sites – Part 1. Codes of Practice for Basic Information and Procedures for Noise Control) which offers detailed guidance on the control of noise from demolition and construction activities. The following mitigation measures for control of construction noise will be implemented, as recommended in BS 5228: Part 1:1997:

- The hours of construction activity will be limited to between 08.00 hours and 20.00 hours Monday to Friday and 08.00 hours and 18.00 hours on Saturdays. It should be noted that it may be necessary to commence turbine base concrete pours from 06.00 due to time constraints incurred by the concrete curing process. Additional emergency works may also be required outside of normal working hours as quoted above;

- Communication links will be established and maintained between the developer, contractor, Local Authority and local residents;

- Equipment and technology with generation of low noise levels will be selected where possible;

- Noise generating equipment will be located as far as possible away from local noise sensitive areas identified;

- In the unlikely event that irregularities or complaints arise, the source of the problem will be sought and dealt with;

- Temporary barriers or screens can be erected if necessary around noisy equipment such as generators and compressors.

2.8 VIBRATION

The road quality survey and any consequent improvements to the road surface will ensure that vehicles travelling to and from site do not cause significant ground borne vibrations at houses along local roads leading to the site.

Construction activity on site is not expected to be a source of significant vibration at nearby houses. However, similar to the case of environmental noise it is prudent to appoint a liaison to which residents

can address any vibration related complaints arising from the construction works. If any piling activity is required which may give rise to perceptible vibration at the neighbouring houses, then the residents should be informed in advance of the timing and duration of such works.

2.9 TRAFFIC

A Traffic Impact Assessment has been prepared by Jennings O'Donovan & Partners Limited, the following mitigation measures have been considered:

- A Traffic Management Plan shall be agreed with the local authority as part of the Construction Management Plan in advance of the commencement of works;
- Traffic movements will be limited to 08:00 - 18:00 Monday to Friday and 08:00 – 16:00 on Saturdays, unless otherwise agreed in writing with Cork County Council. Further, deliveries will be scheduled to avoid peak times around the morning and evening peak hours. This will avoid HGV traffic arriving during the morning peak hour creating conflict with local residents on their commute/school run. Construction personnel will be encouraged to car-pool, or to travel to site in minibuses;
- Wheel wash equipment will be used on site to prevent mud and stones being transferred from The Application Site to the public highway. All drivers will be required to ensure their vehicle is free from dirt and stones prior to departure from the construction site. In addition, any dust generating activities will be minimised where practical during windy conditions, and drivers will adopt driving practices to minimise dust creation. Finally, loads will be covered into and out of the site where required;
- During the construction phase, clear construction warning signs will be placed on the L-4614, advising the general public as to the presence of the construction site. The site entry point will also be appropriately signed. Access to the construction site will be controlled by on site personnel and all visitors will be asked to sign in and out of the site by security / site personnel. Security gates will be sufficiently set back from the road, so that vehicles entering the site will stop well clear of the public road. Site visitors will all receive a suitable Health and Safety site induction, and Personal Protective Equipment ("PPE") will be worn.
- Once construction of the Development is completed all portacabins, machinery and equipment will be removed and temporary hardstandings excavated and reinstated. The area will be re-graded with the stockpiled topsoil to a natural profile and allowed to regenerate from the seed bank within the topsoil.

2.10 WASTE

Subsoil excavation and reinstatement methodology measures, as outlined in section 2.3.6 are also relevant in relation to waste control measures, and will be employed and strictly observed during the construction phase:

- All waste arising during the construction phase will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations.

- Any excess construction material shall be installed be immediately removed from the area and disposed of in a fully licenced landfill.

- No stockpiling of material should be permitted in the constraint zones.

- A Detailed Subsoil (Spoil) Management Plan will be prepared prior to the commencement of construction at the site.

- A Waste Management Plan (Technical Schedule 3) has been prepared and shall be developed in detail by the contractor in advance of the works commencing.

2.11 PROPOSED CONSTRUCTION SCHEDULE

The construction programme is anticipated to take approximately 9 - 12 months, taking into account the erection and commissioning of the turbines. This programme will take due cognisance of the requirements of the Planning Conditions.

An example of the Employer's Project Programme can be found in **Appendix C**.

2.12 CONSTRUCTION SEQUENCE

The outline construction period and the Contractor's proposed sequence of works will take due cognisance of the requirements of any stipulated Planning Conditions and by the Contractors Contractual obligations.

The outline construction sequence of the proposed development is as follows:

- The construction of the site entrances;

- Construction of the temporary construction compound for off-loading materials and components, and to accommodate temporary site offices;

- Construction of bunded areas for oil, fuel and lubricant storage tanks;

- Progressive construction of internal on-site access tracks;

- As the internal access tracks progress to each turbine location, foundation excavations for the turbines and substation will commence and foundations laid. The hardstanding areas and the substation, switchroom and compound will be constructed as the track advances;

- Once the tracks are completed, the trenching and laying of underground cabling will begin. Where possible, cable trenches will be constructed at the same time as access track construction to allow re-vegetation of topsoil as quickly as possible;

- Installation of turbines will commence once the site tracks, hardstandings, reinforced concrete turbine foundations and drainage measures are in place and the temporary road junction upgrade is complete. It is anticipated that each turbine will take 2 to 3 days to install. Two cranes will be used for this operation. As each turbine is completed, the electrical connections will be made;

- Hardstanding's will remain in-situ, where necessary, following construction phase crane operations;

- Progressive site reinstatement and restoration including removal of temporary construction compound. Once the turbines are installed, the substation and electrical system completed, the turbines will be tested and commissioned.

Given the pre-existing local road network, 2 site entrances are proposed, 2 of which are already in existence. The areas of hardstanding for crane operations and on-site access tracks will generally be constructed as follows:

- Topsoil and subsoil will be removed and stored in separate mounds in appropriate areas adjacent to the crane site/access tracks;

- Crushed stone will be laid on a geo-textile mat to an appropriate depth;

- For hardstandings, after turbines are erected the topsoil will be used to cover the hardstanding where appropriate, to reduce the visual and environmental impact, but the hard-standing shall be retained in situ for the operational phase of the wind farm. In the event that maintenance work requiring a large crane is needed (e.g. replacement of a blade set), the crane hardstanding areas will be re-exposed following expected revegetation by nature.

Where access tracks require to cross any drainage ditches or water feature, appropriate methods will be used to prevent any interference with watercourses as detailed in the Watercourse Crossing Plan (Technical Schedule No. 4);

- The hardstanding and on-site access tracks will be removed during the decommissioning phase, unless the Planning Authority agree to their retention for forestry/agricultural activities.

- During the construction period, a temporary construction compound will be required and will comprise:

- Temporary cabins to be used for the site office, the monitoring of incoming vehicles and welfare facilities for the construction staff, including temporary toilets;

- Parking for construction staff, visitors and construction vehicles;

- Secure storage for tools, plant and small parts;

- Safe bunded storage of components and materials including fuels, lubricants and oils;

- Security fencing around the compound.

- Temporary portaloo chemical toilets for construction staff will be sealed chemical units to ensure that no discharges will escape into the local environment. These will be supplied and maintained by a licensed supplier. Potable drinking water (for drinking, food preparation, hand washing etc.) will be supplied on-site by water dispenser.

A detailed Construction Management Plan (CMP) for construction will be prepared by the Contractor in advance of all construction activities and will incorporate all mitigation measures recommended elsewhere in this report. This report will be issued to the Contractor to ensure that all environmental mitigation measures required will be captured in the detailed CMP.

2.13 PLANNING CONDITIONS AND OUTLINE CONSTRUCTION MANAGEMENT PLANS

This CEMP and its future versions/revisions will form part of the Contract for Dreenacreenig West Wind Farm. It will therefore be updated and revised during the different stages of the wind farm development. Table 2.6 will list all the planning conditions issued by An Bord Pleanala.

The Contractor will consider all of the mitigation measures and best practice construction methods detailed within the above consents in his design and in any detailed environmental plans as required by this CEMP or the Contract.

Please refer to the Mitigation Management Summary in **Appendix E** which summarises all mitigation measures from the EIS and associated documents.

Where any mitigation measures or construction methods described in other documents deviate in any way from those contained within this CEMP, the Contractor will abide by whichever is the most onerous and stringent in terms of environmental protection.

TABLE 2.6 RELEVANT PLANNING CONDITIONS AND RELATED DOCUMENTATION

Condition No.	Planning Condition	
5.	5. Prior to commencement of development, a detailed construction method statement and environmental management plan, including the following details, shall be submitted to and agreed in writing with the planning authority. (a) Details of the proposed water monitoring protocol and drainage inspection regime. (b) A detailed method statement for the construction of the borrow pit. (c) A detailed method statement for geotechnical investigation, design and monitoring, including all aspects of the proposed borrow pit, and all aspects of management of excess spoil, such that slope stability measures and prevention of water pollution are fully implemented. Reason: In the interest of environmental protection and orderly development.	
6.	6. (a) Noise levels emanating from the proposed development following commissioning, when measured externally at a noise sensitive location, shall not exceed the greater of 43dB(A) L90, or 5dB(A) above background levels.	

TABLE 2.6 RELEVANT PLANNING CONDITIONS AND RELATED DOCUMENTATION		
Condition No.	**Planning Condition**	
	(b) All noise measurements shall be made in accordance with I.S.O. Recommendations R1996/1 and 2 "Acoustics – Description and measurement of Environmental noise". (c) Prior to commencement of development, the developer shall agree a noise compliance monitoring programme for the operational wind farm with the planning authority, which shall include additional monitoring of baseline noise conditions. Reason: In the interest of residential amenity	
7.	7. The landscaping of the site and access road shall be carried out in accordance with the details submitted to An Bord Pleanála on the 12th day of June, 2012 within the first planting season following substantial completion of construction works. All planting shall be adequately protected from damage until established. Any plants which die, are removed or become seriously damaged or diseased, shall be replaced within the next planting season with others of similar size and species, unless otherwise agreed in writing with the planning authority. Reason: In the interests of residential and visual amenity.	
8.	8. (a) Any damage caused to the nearby public road by construction traffic during development works shall be made good by the Council at the developers' expense. (b) The developer shall carry out a survey of the condition of the public road network which will be used as a haulage route for deliveries to the site and any culverts which run under the public roads along that route. The extent of the route to be surveyed shall be agreed with the planning authority prior to the carrying out of the survey. Any damage caused to these culverts during the construction phase shall be repaired immediately by the developer to the satisfaction of the planning authority. (c) Prior to commencement of development and post-construction of development, inspection of the local L-8767 and L-4711 roads shall be carried out by the developer and the planning authority to determine any damage or repair works necessary to restore the road to pre-development standards. Reason: To protect the local infrastructure and enable proper reinstatement post-construction.	
9.	9. The local access road to the site shall be fully re-instated following construction operations, including the repair of any stone walls and replanting of any hedges removed, generally in accordance with the details received by An Bord Pleanála on the 12th day of June, 2012. Details in this regard shall be submitted to and agreed in writing with the planning authority prior to commencement of development. Reason: In the interest of traffic safety.	
10	10. The developer shall facilitate the archaeological appraisal of the site and shall provide for the preservation, recording and protection of archaeological materials or features which may exist within the site. In this regard, the developer shall:	

TABLE 2.6 RELEVANT PLANNING CONDITIONS AND RELATED DOCUMENTATION		
Condition No.	**Planning Condition**	
	(a) notify the planning authority in writing at least four weeks prior to the commencement of any site operation (including hydrological and geotechnical investigations) relating to the proposed development, and (b) employ a suitably-qualified archaeologist prior to the commencement of development. The archaeologist shall assess the site and monitor all site development works. The assessment shall address the following issues: (i) the nature and location of archaeological material on the site, and (ii) the impact of the proposed development on such archaeological material.A report, containing the results of the assessment, shall be submitted to the planning authority and, arising from this assessment, the developer shall agree in writing with the planning authority details regarding any further archaeological requirements (including, if necessary, archaeological excavation) prior to commencement of construction works. In default of agreement on any of these requirements, the matter shall be referred to An Bord Pleanála for determination. Reason: In order to conserve the archaeological heritage of the area and to secure the preservation (in-situ or by record) and protection of any archaeological remains that may exist within the site.	

Table 2.6 Relevant Planning Conditions and Related Documentation

2.14 SCHEME AMENDMENTS

Scheme Amendments will be recorded in Table 2.7. These amendments do not include changes to the scheme design which are completed in accordance with the existing planning consent; instead, this refers to changes in the design of the wind farm for which additional approvals and / or consents may be required from the Cork County Council. For example, amendments to track layouts or turbine locations outside of approved micrositing boundaries as per the current grants of planning.

The purpose of recording Scheme Amendments here is to provide a record of any changes in the design and siting of the wind farm infrastructure such that any associated environmental impacts and mitigation measures may be appropriately instigated through this CEMP.

TABLE 2.7 SCHEME AMENDMENTS			
Reference	**Date**	**Scheme Amendment Description**	**Environmental Sensitivities Potentially Impacted by Scheme Amendment.**

Table 2.7 Scheme Amendments

2.15 REGISTER OF VARIATIONS

Where any amendments and variations to the Technical Schedules and CEMP are required (either as a result of Scheme Amendments or through corrective actions or improvements noted and undertaken on site) these will be recorded in Table 2.8, Register of Variations. Furthermore, all changes to construction methods, design, mitigation and the implications of these changes and authorising personnel will be recorded in Table 2.8.

TABLE 2.8 REGISTER OF VARIATIONS			
No.	**Variation Description**	**Authorising Personnel**	**Completion Date**

Table 2.8 Register of Variations

3.0 COMMUNICATION PLAN

3.1 INTRODUCTION

Both the Contractor and the Client will appoint Project Managers to the wind farm project. These Project Managers will be the main points of contact between the two parties. The Contractors team will report directly to the Construction Project Manager, with all Client staff reporting directly to the Client Project Manager.

It is envisaged that main project communications will take the form of structured reporting arrangements and meetings.

All issues in relation to environmental management/monitoring will be reported to the Site Environmental Manager/Engineer. The Site Environmental Manager/Engineer shall report to the Contractor and Client on a regular basis.

3.2 COMMUNICATIONS CONSULTANT

Both the Contractor and the Client will appoint an external Communications Consultant to whom members of the public, third parties and the Planning Authority can address any queries or complaints in relation to the proposed development.

It is envisaged that the Communications Consultant will structure a process for which queries/complaints can be reported and maintain regular communications with the local householders (i.e. through flyers advising of construction updates and a web page etc.).

3.3 CONTACT SHEETS

Table 3.1 provides a list of all Dreenacreenig West Wind Farm, Contractor and relevant third party contact details. This table should be updated and kept current by the Contractor for the duration of the Contract.

TABLE 3.1 CONTACT SHEETS			
Company	**Position**	**Name**	**Telephone**
Dreenacreenig West Wind Farm Limited	Client Project Manager		
Contractor	Site Manager / Environmental Manager		
Contractor	Contracts Manager		
Contractor	General Manager		
Contractor	Foreman		
Contractor	Ecological Clerk of Works		
Contractor	Communications Consultant		
Jennings O'Donovan	Construction Project Manager		

Table 3.1 Contact Sheets

3.4 MEETINGS REPORTS AND CONSULATIONS

Table 3.2 lists all meetings and consultations as required by the Contract. The table also provides details on the schedule/frequency, scope & objectives and attendees / responsibility for each meeting.

3.5 ROLES AND RESPONSBILITIES

Roles and responsibilities for environmental management, monitoring and reporting are detailed in Table 3.3.

The Contractors Site Environmental Manager/Engineer will be responsible for the delivery of all elements of the Environmental Management Plan.

The Site Environmental Manager/Engineer will retain all responsibility for issuing, changing and monitoring the Environmental Management Plan.

TABLE 3.2 MEETINGS, REPORTS AND CONSULTATIONS			
Meeting/Report	**Schedule/Frequency**	**Scope & Objective**	**Attendees/Responsibilities**
A Record of all meetings, checks, permissions and licenses will be retained within Section 4 of this CEMP			
Site Inductions	All new site personnel and visitors		Contractor to organize and maintain records
Weekly environmental meetings	Weekly	To provide updates on environmental mitigation measures and performance and identify actions for improvement. As per Pollution Prevention measures outlined in Section 10 of the CMS, the ECoW is required to maintain a Pollution Prevention Measures Register (PPMR) in which mitigation measures put into place will be listed, and checked weekly to assess the requirement for maintenance. The results of these checks will be discussed at the meeting and corrective actions agreed as required.	Attendance required: ECoW, Site Manager, and any other relevant personnel or statutory consultees where necessary. Meeting minutes to be summarised by ECoW and forwarded to the Site Environmental Manager in the event that any significant environmental issues are reported.
Monthly Environmental Report & Monthly Environmental Management Group Meeting	Monthly	To provide a compiled record of weekly meeting minutes and environmental performance and monitoring results (e.g. air, noise or water quality monitoring as appropriate). To identify any areas / action for improvement.	To be prepared by ECoW. Report to be issued to the Contractor and Construction Project Manager before the end of each calendar month. Report to be discussed at the monthly meeting with recommendations for improvement passed to the Contractor in written format
Final Environmental Report	Upon completion of construction works	The final report will document the environmental and ecological effects of the construction period. The evidence for effects will be based on findings included in the minutes of weekly meetings and monthly meetings, together with other recording information maintained by the ECoW. The report will relate results to residual effects predicted in the ES.	The Final Report will be prepared by the ECoW. The report will be made available to the Contractor, Construction Project Manager, Planning Authority.

TABLE 3.2 MEETINGS, REPORTS AND CONSULTATIONS			
Meeting/Report	**Schedule/Frequency**	**Scope & Objective**	**Attendees/Responsibilities**
Environmental Checks and Monitoring of Mitigation Works	As required in advance of construction works regular checks should also be made at least every 14 days.	Environmental Checks are to be carried out in advance of construction works. This will comprise an on-site meeting / inspection to confirm the appropriate use of identified mitigation measures and highlight any further issues / measures which may be relevant prior to commencement of works in any area. As a minimum, Environmental Checks will be completed at each main piece of site infrastructure (turbine bases, construction compounds, sub-station, control room) prior to works commencing in that area. Advance checks will be undertaken no less than every 100m of constructed or upgraded access track. Environmental Checks will include: • Checks for visual evidence of contamination / sediment alongside watercourses, nearby working areas and in areas of surface water discharge. • Regular checks of all plant and equipment to identify any oil or fuel leaks to confirm the condition of the plant. • Inspection of drainage and erosion and sediment control measures. Additional checks should be made before, during (where safe to do so) and immediately following anticipated storm events or periods of continuous or heavy intermittent rainfall over one or more days. • Environmental checks will also encompass a review of: – Waste management procedures; – General site tidiness;	Environmental checks will be undertaken by the Contractor, supervised by the ECoW where appropriate. The ECoW may also undertake regular checks, either independently or in conjunction with the Contractor's checks as required. The Contractor and ECoW will retain a record of all inspections / findings of Environmental Checks within Section 4 of this CEMP. All records will be made available for audit / review. All records will also be made available for discussion during regular meetings as scheduled herein.

TABLE 3.2 MEETINGS, REPORTS AND CONSULTATIONS			
Meeting/Report	**Schedule/Frequency**	**Scope & Objective**	**Attendees/Responsibilities**
		– Temporary materials storage (extracted materials stockpiles) and restoration works; And – Peat stability	
Environmental Audit	At least once every month.		Environmental Audits may be carried out by the Contractor, Dreenacreenig West Wind Farm Ltd or any other interested party at any time during the works. Audit procedures and forms are included within Section 4 and TS1. These will be followed / completed by the Employer when undertaking environmental audits and may also be adopted by the Contractor, unless alternative procedures and forms are submitted and approved as part of the Contractor's detailed EMP.
Liaison with regulator / statutory Consultees	As Required	Provide regular updates to relevant authority on environmental performance and maintain good working relationships with the regulatory bodies.	Contractor and ECoW where required. Meetings will be initiated as required by Planning Condition, Technical Schedules or as agreed throughout the duration of the construction phase. The Contractor is responsible for obtaining all relevant permissions, consents, licenses and permits. Some permits may require application and implementation by an appropriately qualified person. In these instances, the Contractor will consult with the ECoW or other specialist Environmental Consultant where required.

Table 3.2 Meetings, Reports and Consultations

TABLE 3.3 ROLES AND RESPONSIBILITIES	
Position	Roles and Responsibilities
Construction Project Manager	The Construction Project Manager will: Ensure that the Contractor has obtained the relevant approvals and licenses and consents from regulatory bodies and statutory consultees where required. Ensure that the Contractor has submitted all relevant documentation to the ECoW and Project Environmental Manager, Liaise with the Site Manager and the ECoW and ensure that corrective actions and variations to the CEMP have been instigated.
Project Site Manager/Engineer	The Site Manager will provide liaison between the ECoW and the Contractor where environmental sensitivities, instruction for environmental performance improvements or corrective actions are requested by the ECoW, Environmental Manager or other appropriate person(s) as a result of environmental checks or audits conducted by these person(s). The Site Manager will ensure that all notifications of environmental sensitivities and incidents as well as other general observations on environmental performance are reported back to the Construction Project Manager. The Project Site Manager is responsible for review and further development of the CEMP.
ECoW: Ecological Clerk of Works	The Ecological CoW will work with Dreenacreenig West Wind Farm Ltd and the Contractor to ensure compliance with best practice and with all environmental mitigation and monitoring requirements as detailed within the ES, relevant planning conditions and CEMP. Where a particular ecological concern exists at the site, or specific habitat management activities are to be undertaken in conjunction with the main civils construction works, a Specialist Ecologist / Environmental Consultant may also be required unless the ECoW is suitably qualified to undertake the particular ecological responsibilities. The main roles of the Ecological CoW are as follows: • Organise start-up meeting / Tool box talks with the Contractor to agree working methods, specifically including communications; weekly schedules; monitoring of data storage; and preparation of plans indicating location of key features including mitigation measures, monitoring points and sensitive habitats. • Maintain a weekly presence on site during the main construction works. • Organise a minimum of weekly meetings with the Site Manager and / or Foreman, to allow briefing on the programme of works on site and to provide on-site guidance during construction. Note: It is essential that the Contractor supplies information on proposed works and scheduling to the ECoW in advance in order to anticipate and address any issues, specifically including drainage, silt mitigation measures, cabling, roads, turbine bases, met masts, compounds, landscaping, topsoil removal, storage and replacement, vegetation reinstatement and restoration works, planting, felling and habitat management. • Highlight the need for compliance with planning conditions. **Note: If failures occur and actions are taken which contravene legislation then the ECoW has the power to stop works in the affected area with immediate effect and the appropriate statutory agency and planning officer will be informed. These actions will only be taken where appropriate. Notification to stop works will be by verbal means, followed up with written confirmation**

	recording the time and date of the instruction, personnel involved and reasons for the instruction. Upon recommencement of works, details of any corrective actions and / or remedial measures implemented will be recorded within Section 4. • Give tool box talks as agreed with the site contractor to address key areas, including water pollution prevention, protected species management, and on-site biodiversity. • Monitor potential environmental impacts, including: – Use of and storage of oils and toxic chemicals on site, e.g. cement – Dewatering of excavations (including turbine bases) – Silt control – Water management, including working in or close to watercourses – Protection of ecological interests, e.g. protected species and habitats • Identify environmentally-sensitive areas and ecological hazards for demarcation by the Contractor. • Produce written reports to the Contractor following site visits and meetings. This includes monthly reports and a final report.
Specialist Ecologist / Environmental Consultant	Where a Specialist Ecologist / Environmental Consultant is employed on a project, this person(s) will: • Provide advice and maintain regular liaison with the Project Site Manager, Project Manager, Ecologist and Environmental Manager, Contractor and / or ECoW other specialist Environmental Consultant as and when required. • Undertake specific monitoring activities and reporting as defined in agreed documentation prepared as part of the planning process.
Contractor Appointments	
Construction Manager	[The Contractor is required to specify roles and responsibilities for each individual below]
Site Agent	
Foreman	
Environmental Manager	
Communications Consultant	

Table 3.3 Roles and responsibilities

3.6 TRAINING, AWARENESS AND COMPETENCE

All site personnel will receive environmental awareness information as part of their initial site briefing. The detail of the information should be tailored to the scope of their work on site. This will ensure that personnel are familiar with the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

The CEMP will be posted on the main site notice board during the project. The environmental performance at the site will be on the agenda of the monthly project management meetings for the project. Elements of the CEMP will be discussed at these meetings including objectives and targets, the effectiveness of environmental procedures etc. Two-way communication will be encouraged by inviting all personnel to offer their comments on environmental performance at the site.

3.7 EMERGENCY PREPAREDNESS AND REPONSE

An emergency preparedness and response procedure is required to prevent environmental pollution incidents. Suitable spill kits and absorbent material for dealing with oil spills will be maintained on site. In the event of pollution or potential risk of pollution, Cork County Council should be informed immediately. In the case of water pollution in addition to Cork County Council Inland Fisheries Ireland should also be informed immediately.

4.0 CORRESPONDENCE, RECORDS & REPORTS

4.1 REQUIREMENTS

The Contractor will insert / file all communication records and reports associated with Environmental Management and implementation of this CEMP under this Section 4. As a guide, the following sub-sections of filed information are required (at a minimum):

4-A) Meeting minutes and attendance record

4-B) Weekly Environmental Reports

4-C) Monthly Environmental Reports

4-D) Environmental Checks

4-E) Audit Reports

4-F) Ecology documentation and monitoring records

4-G) Pollution Prevention, including a Pollution Prevention Measures Register

4-H) Water Quality documentation and monitoring records

4-I) Archaeology documentation and monitoring records

4-J) Ground Risk, including a Geotechnical Risk Register

4-K) Waste Management documentation

4-L) Licensing and Consents: copies of all permissions, consents, licenses and permits and related correspondence. A summary record of all such documents shall also be provided as per Table 4.1 of this CEMP.

4-M) General Correspondence: all other relevant internal and external communication records relating to environmental management issues and implementation of the CEMP.

4-N) Training Records

4-O) Toolbox Talk Records

4-P) Environmental Manager Reports

All of these documents and records should be made available for inspection in the site office. The documentation shall be to date and shall be reviewed on a regular basis with revisions controlled in accordance with the site quality plan.

TABLE 4.1 RECORD OF ENVIRONMENTAL CONSENTS, LICENSES AND PERMITS ISSUED		
Consents, Licenses & Permits	**Governing Legislation**	**Licensed Activity**
Pollution Control & Hydrology		
Section 50 consent for watercourse crossing will be made should the planning decision be favorable	EU(Assessment and Management of Flood Risks) Regulations SI 122 of 2010 and Section 50 of The Arterial Drainage Act, 1945	Construction, Replacement or Alteration of Bridges and Culverts (Please refer to TS4 for details).
Biodiversity		
Waste Management / Contaminated Land		
Noise / Vibration		
Archaeology		
Transport		
Other		

Table 4.1 Record of Environmental Consents, Licenses and Permits Issued

4.2 ENVIRONMENTAL AUDITS

The Site Environmental Manager will consult and assist with the Client Environmental Manager in evaluating compliance with applicable legislation by means of a monthly Environmental Audit.

A blank Environmental Audit Report form is included in TS1 Environmental Incident and Emergency Response Plan.

All completed audit report forms and records of corrective actions (and close outs) must be filed within this Section of the CEMP.

4.3 ENVIRONMENTAL CONSENTS, LICENSES AND PERMITS

The Contractor's Environmental Manager (or otherwise nominated responsible person(s), in conjunction with the ECoW, will complete the summary record for all applicable permissions, consents, licenses and permits obtained for the site. This record will follow the format provided in Table 4.1.

4.4 ENVIRONMENTAL MONITORING AND MEASURING

All of the Environmental Procedures will contain a section on monitoring, where applicable. The Contractor will put in place a program of monitoring for dust, noise, vibration and water sampling in accordance with the requirements of this CEMP.

Copies of these records will be maintained in the site office and will be reviewed by the Contractor.

4.5 NON-CONFORMANCE, CORRECTIVE AND PREVENTATIVE ACTION

Non-Conformance Notices will be issued where there is a situation where limits associated with activities on the project are exceeded, or there is an internal/external complaint associated with environmental performance.

Non-Conformance is the situation where essential components of the EMS are absent or dysfunctional, or where there is insufficient control of the activities and processes to the extent that the functionality of the EMS in terms of the policy, objectives and management programmes, is compromised.

Correction will be required in order to improve the identified non-conformance. The EMS and all its components must conform to the CEMP, objectives and targets and the requirements of the ISO 14001

management standard. In the event of non-conformance with any of the above, the following must be undertaken:

- Cause of the non-compliance;
- Develop a plan for correction of the non-compliance;
- Determine preventive measures and ensure they are effective;
- Verify the effectiveness of the correction of the non-compliance;
- Ensure that any procedures affected by the corrective action taken are revised accordingly.

Responsibility must be designated for the investigation, correction, mitigation and prevention of non-conformance.

5.0 TECHNICAL SCHEDULES & AVAILABLE INFORMATION

5.1 TECHNICAL SCHEDULES

Various Technical Schedules have been prepared by Dreenacreenig West Wind Farm as listed in Table 5.1. These are intended to provide a benchmark for best practice and to define Dreenacreenig West Wind Farm's minimum requirements for environmental management and mitigation.

5.2 CONTRACTOR REQUIREMENTS

The Contractor is required to further develop the Technical Schedules into detailed site and works specific environmental plans, construction management plans and procedural documents. Table 5.1 provides a summary of the content of the Technical Schedules and the Contractor's obligations for their further development.

TABLE 5.1 LIST OF TECHNICAL SCHEDULES

TS 1	Environmental Incident and Emergency Response Plan	The Contractor will prepare a detailed Environmental (Incident and Emergency) Response Plan. This will include procedures for dealing with containment of accidental chemical or fuel spills, potential overload of the drainage system by silt during unforeseen adverse weather conditions and also procedures for dealing with potential mass movement of material from peat instability / slide events.
TS 2	Communication Plan (in the event of a spillage)	The Contractor will prepare a Communication Plan for emergency response in the event of a spillage. Detailed procedures will be outlined in this document.
TS 3	Waste Management Plan (WMP)	A WMP is intended to implement reduction and effective management of resources and waste during the early design stages of the wind farm construction, through to completion, such that legal compliance is met; project build costs are minimised; a framework for continuous improvement and best practice is implemented and maintained; and carbon emissions and other negative environmental impacts associated with the production and management of waste materials are minimised. The WMP contained within Technical Schedule TS3 provides an outline of the minimum requirements to be contained within the Contractor's detailed WMP. TS3 also provides an outline of the anticipated waste management procedures and routes that may apply during construction. In preparation of the detailed WMP, the Contractor will liaise the local authority and relevant bodies to determine requirements for, and obtain, licenses and

		consents associated with waste management and foul water discharge from the site where appropriate.
TS 4	Watercourse Crossing Plan (WCP)	The Contractor will carry out a detailed survey of all watercourse crossings at the detailed design stage and prepare a detailed Watercourse Crossing Plan. The Contractor is responsible for liaison with the OPW & IFI to determine all authorisations required.
TS 5	Induction Schedule	The Contractor is required to produce detailed Site Induction Procedures
TS 6	Water Quality Monitoring Plan	The Contractor is required to produce a detailed version of the Water Quality Monitoring Plan which shall be submitted to the Local Authority for approval prior to commencement of construction.

Table 5.1 List of Technical Schedules

APPENDICES

Appendix A
Planning Conditions

Appendix B
Site Investigation Reports

Appendix C
Employer's Project Programme

Appendix D
Mitigation Management Summary

Appendix E
Mitigation Managemnt Summary

Appendix F
Drawings