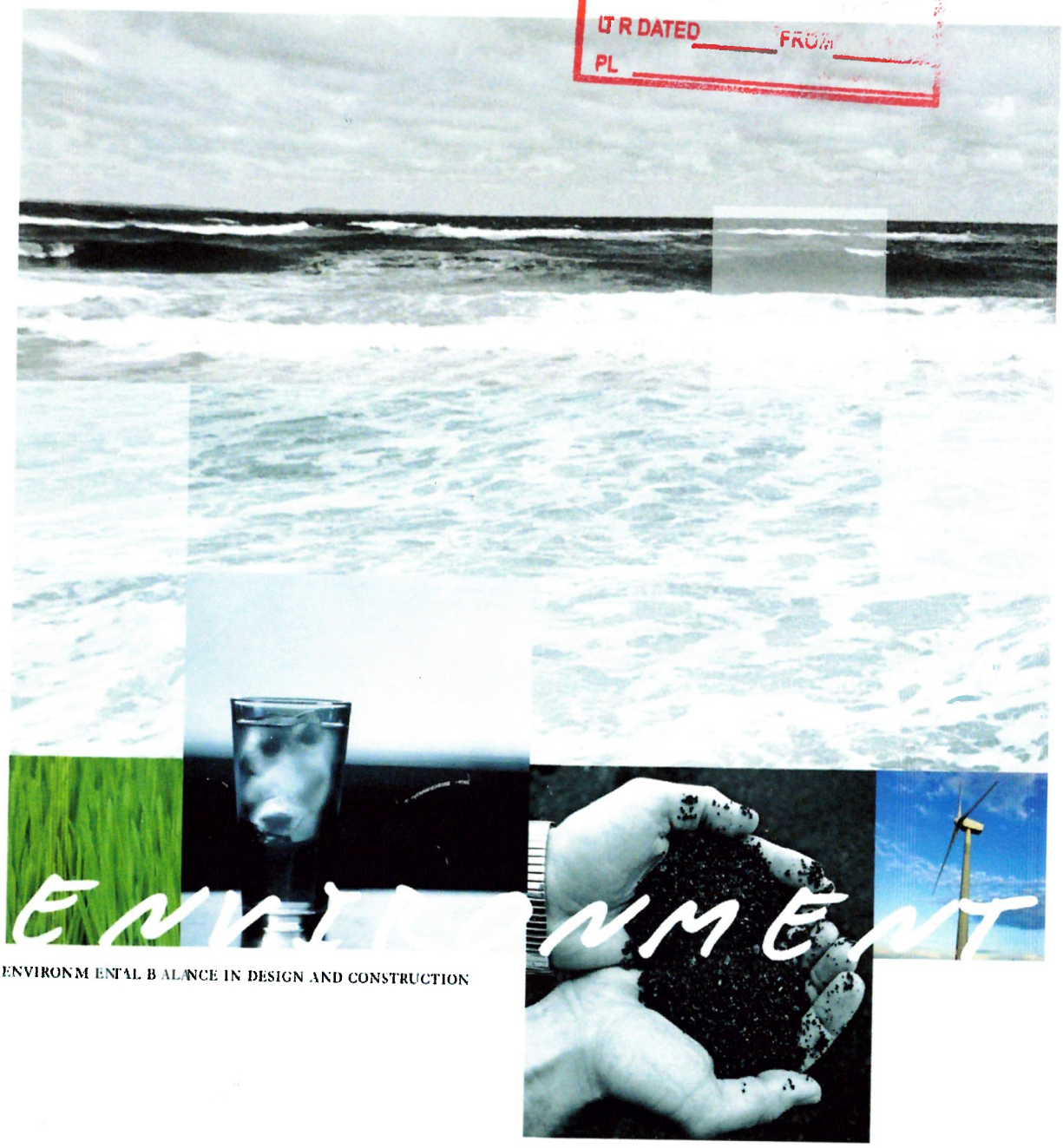

ENVIRONMENTAL REPORT

110 kV GRID CONNECTION SUBSTATION AT BARNADIVANE, CO. CORK

SEPTEMBER 2014

FEHILY TIMONEY & COMPANY

ENVIRONMENTAL REPORT

110kV GRID CONNECTION SUBSTATION AT BARNADIVANE, CO. CORK

User is Responsible for Checking the Revision Status of This Document

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Client: Arran Windfarm Ltd

Keywords: Barnadivane, substation, planning application, environmental report, Cork County Council

Abstract: Arran Windfarm Ltd (AWL) intends to seek planning permission to construct a 110kV Grid Connection Substation at Barnadivane (Kneeves) Co. Cork. The proposed substation is located within the planning boundary of a permitted wind farm and will replace a permitted 110kV substation and switch station that has not been constructed.

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Appendix 2	Appropriate Assessment Screening Report
Appendix 3	EIA Screening Report
Appendix 4	Details of Silt Fencing

1 PROJECT BACKGROUND

1.1 Introduction

Arran Windfarm Ltd (AWL) intends to seek planning permission to construct a 110kV Grid Connection Substation in Barnadivane (Kneeves) Co. Cork. The proposed substation is located within the planning boundary of a permitted wind farm and will replace a permitted 110kV substation and switch station that has not been constructed, section 1.4 considers the relevant planning history.

The original wind farm planning application included for a substation, however, since receiving the original planning consent new Eirgrid standards have been adopted which require 110kV substations to have a larger development footprint which includes available land for potential future expansion. As a consequence, a new planning application is required for this substation.

Fehily Timoney & Company (FTC) has prepared this environmental report (ER) on behalf of AWL to accompany a planning application for the proposed substation. The preparation of this ER broadly follows standard environmental impact assessment methodology in accordance with best practice EIA guidelines and addresses the key aspects of the development to the standard of an Environmental Impact Statement (EIS).

In advance of the preparation of the ER, an EIS Screening Report was prepared, to confirm that an EIS was not required for this development and this was submitted to the competent Authority, Cork County Council.

1.2 The Applicant

The applicant for the proposed substation development is Arran Windfarm Ltd. The applicant company has been formed for the specific purpose of applying for and developing the proposed substation project but forms part of a larger group of companies owned by Enerco Energy Ltd., an Irish-owned, Cork-based company with extensive experience in the design, construction and operation of renewable energy developments throughout Ireland.

1.3 Project Overview

The applicant intends to seek permission for a new grid connection substation in the townland of Barnadivane (Kneeves), near Coppeen, Co. Cork. A site location map is presented in Figure 1.1. The current substation application will replace a currently permitted substation that is not yet constructed.

Permission currently exists for a 110kV substation and switch station as part of a 14 turbine wind farm on the site. The permitted development was granted by both the Planning Authority and An Bord Pleanála under planning reference numbers 05/5907 and PL 04.219620 respectively, an extension of duration also being granted by Cork County Council under 11/6605 which extended the planning duration until 2016.The permitted development is discussed further in Section 1.5.

The permitted development has not yet commenced construction due to various reasons of a commercial, economic and technical nature that were outside the control of the developer, including significant delays in securing a grid connection offer due to the grid connection moratorium as well as uncertainty regarding the REFIT tariff and Single Energy Market. For large electrical generators, the grid connection location, method and voltage is determined by Eirgrid and communicated by means of a grid connection offer. In 2010, the wind farm secured a firm access agreement for connection to the transmission system within Gate 3 (a grid connection) under Grid No. TG44. Barnadivane Wind Farm is scheduled for a connection to the national grid in 2015.

The original wind farm planning application included for a substation but, since receiving the original planning consent, new Eirgrid standards require 110kV substations to have a standard layout and have available land to facilitate future expansion. Any wind farm electricity substation must meet the design, electrical and layout requirements of Eirgrid and/or ESB Networks, as the substation will form part of the national electricity grid and will be taken in charge by Eirgrid or ESB Networks.

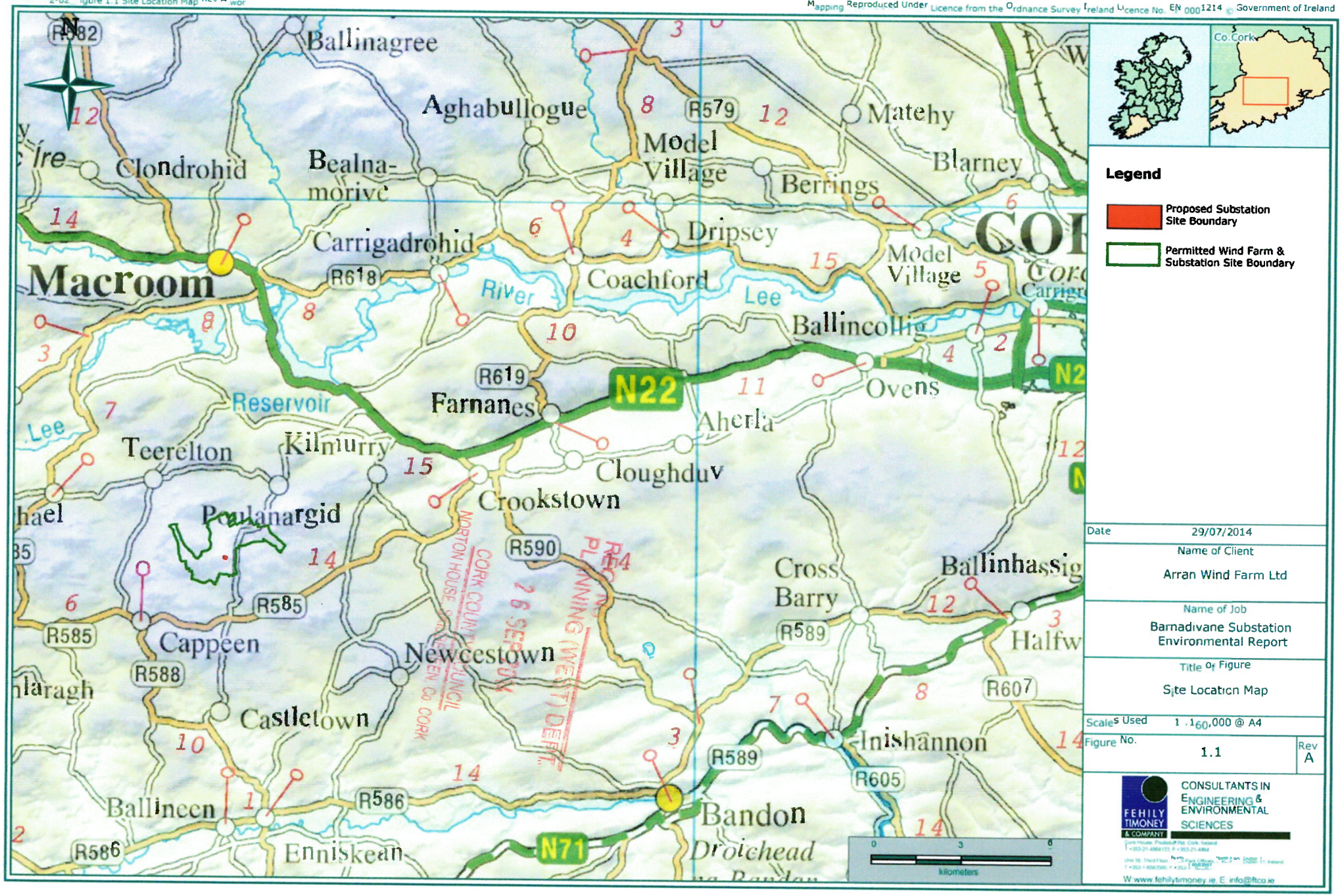
In this case, given the electrical rating of the substation at 110kV, the substation will be taken in charge by Eirgrid and, therefore, will have to meet current Eirgrid specifications and requirements.

Eirgrid's current design standards for substations of this nature were issued in 2011 after the planning application was made. As a consequence, a new planning application is required for this substation.

The proposed substation layout now takes account of the Eirgrid requirements, but gives rise to a larger development footprint than that of the permitted substation. The permitted substation is constrained to the west by the existing 110kV overhead line and to the east by the local road. On that basis, a near adjacent new site has been identified for the proposed substation within the study area of the permitted wind farm that meets the necessary criteria such as, capacity for accommodating Eirgrid requirements, proximity to transmission system, good access and visual screening.

The proposed 110kV grid connection substation will have a defined planning boundary which will include the 110kV grid connection substation compound with associated control buildings and electrical equipment as well as ancillary infrastructure such as internal access roads, septic tank, oil interceptor and security fencing. The proposed substation is discussed later in this document.

R:\Map Production\2014\LE14\702\02\Workspace\Substation Environmental Report
LE14-702-02 Figure 1.1 Site Location Map Rev A.wor



Legend

- Proposed Substation Site Boundary
- Permitted Wind Farm & Substation Site Boundary

Date	29/07/2014
Name of Client	Arran Wind Farm Ltd
Name of Job	Barnadivane Substation Environmental Report
Title of Figure	Site Location Map
Scales Used	1 : 160,000 @ A4
Figure No.	1.1
Rev	A

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1.4 Relevant Planning History

The proposed substation is situated within the planning boundary of the permitted wind farm development which was granted by both the Planning Authority and An Bord Pleanála under planning reference numbers 05/5907 and PL 04.219620 respectively, with an extension of duration being subsequently granted by Cork County Council under 11/6605. The permitted application was accompanied by an Environmental Impact Statement and was subject to an Environmental Impact Assessment carried out by the Planning Authority and An Bord Pleanala.

The current proposed substation development is seeking to replace the permitted substation. This section sets out the relevant planning history for the site.

Planning Reference No: 03/2365

In May 2003, Barna Wind Energy Ltd. originally applied for planning permission for 26 wind turbines to Cork County Council. This layout was revised in August 2003 to show 23 wind turbines. Planning Permission was granted by Cork County Council for 17 wind turbines. In March 2004, following third party and first party appeals, permission was refused by An Bord Pleanála (04.204928).

Planning Reference No: 05/5907

In August 2005, Barna Wind Energy Ltd. applied for planning permission for 18 wind turbines to Cork County Council (CCC). This layout was revised in June 2006 to show 14 turbines, with a revised site boundary to exclude pockets of the site not being developed. In August 2006, planning permission was granted by Cork County Council for 12 wind turbines. In February 2007, following third party and first party appeals, permission was granted by An Bord Pleanála (ABP)(04.219620) for all 14 wind turbines. ABP was satisfied that the development, by virtue of its revised scale and turbine configuration, had addressed to a sufficient degree ABP's concern in relation to the previous wind farm proposal on this site.

Planning Reference No: 11/06605

In December 2011, Barna Wind Energy Ltd. applied to extend the duration of the appropriate period of Planning Permission 05/5907, under Section 42 of the 2000 Act, as amended. Cork County Council granted an extension for a period of 5 years due to considerations of a commercial, economic or technical nature beyond the control of the applicant.

1.5 Overview of the Permitted Development

An Environmental Impact Statement accompanied the planning application for the permitted development. For the purposes of that EIS, the study area covered approximately 355 ha within which the permitted development is located. The development footprint, comprising the area taken up by the turbines, transformers, hardstanding, site tracks, substation, switch station and wind monitoring mast occupies less than 2% of the study area.

The permitted development site is located in the townlands of Barnadivane (Kneeves), Knockboy, Garranereagh, Lackareagh and Reenacaheragh, near Terelton, Co. Cork. Within the study area elevation ranges from 170 m on the southern aspect to 270 m along the north eastern boundary. Access to the site is off the R585 at Moneynacroha Cross Roads approximately 3 km east of Coppeen. The nearest villages to the study area are Terelton, approximately 2 km to the north and Coppeen approximately 2 km to the south west. The town of Macroom lies approximately 9 km north of the study area boundary.

The study area consists mainly of pastureland. A number of streams rising in the south of the study area join the River Bride, which is a tributary of the River Lee. The Cummer River rises near the study area's northern boundary and also drains into the Lee.

The overall permitted development included 14 turbines with a maximum tip height of 105 m, a meteorological mast, a 110 kV substation and switching station and all associated access roads, handstands, drainage, cabling and ancillary infrastructure.

The proposed substation which is the subject of this application is located centrally within the study area of the permitted development. Figure 1.2 illustrates the proposed substation location in the context of the permitted development.

1.6 Overview of the Proposed Development

The developer is seeking permission for a new 110kV grid connection substation that meets current Eirgrid standards, in place of the permitted 110kV substation and switch station. Figure 1.2 illustrates the proposed substation location in the context of the permitted development.

The original wind farm planning application included for a substation but, since receiving the original planning consent, new Eirgrid standards require 110kV substations to have available land to facilitate future expansion. A planning application to increase the size of the permitted substation location was initially considered however the permitted site is situated between the local road and the existing 110kV overhead line which constrained the site. On that basis, it was decided to consider other sites within the wind farm EIA study boundary where the construction costs, environmental impact and planning risks were not increased.

The proposed substation site is situated underneath the existing 110 kV Macroom to Dunmanway overhead line, within the EIA boundary for the permitted wind farm, approximately 500m southwest of the permitted substation location. The proposed site is situated within undulating improved grassland used for agricultural grazing on a south facing plateau. An existing local public road forms the northern boundary of the site and provides good accessibility. Proposed ground levels within the substation compound will be set approximately 8m below road level. Natural topography and mature tree screening to the north reduces the visual impact from the designated scenic route (S36), which is approximately 2km northwest of the proposed development.

Following review of a number of potential substation sites, the proposed site was considered the most suitable for the following reasons:

- takes advantage of natural topography and mature tree screening minimising visibility from the scenic route to the north
- underneath the existing ESB overhead line removing the need for additional 110 kV overhead lines while minimising the size of the substation
- located centrally within the permitted wind farm minimising the distance of the underground cable connection between the turbines and the substation
- not located close to dwellings, being over 250 metres from the nearest house (which is owned by a contributory land owner for Barnadivane Wind Farm)
- not located close to ecologically sensitive areas such as natura 2000 sites, rivers or woodland areas

The siting of the proposed substation away from sensitive environmental receptors such as residential areas, single dwellings, or environmentally vulnerable sites will result in little or no impact in terms of noise, pollution or any other potential nuisances.

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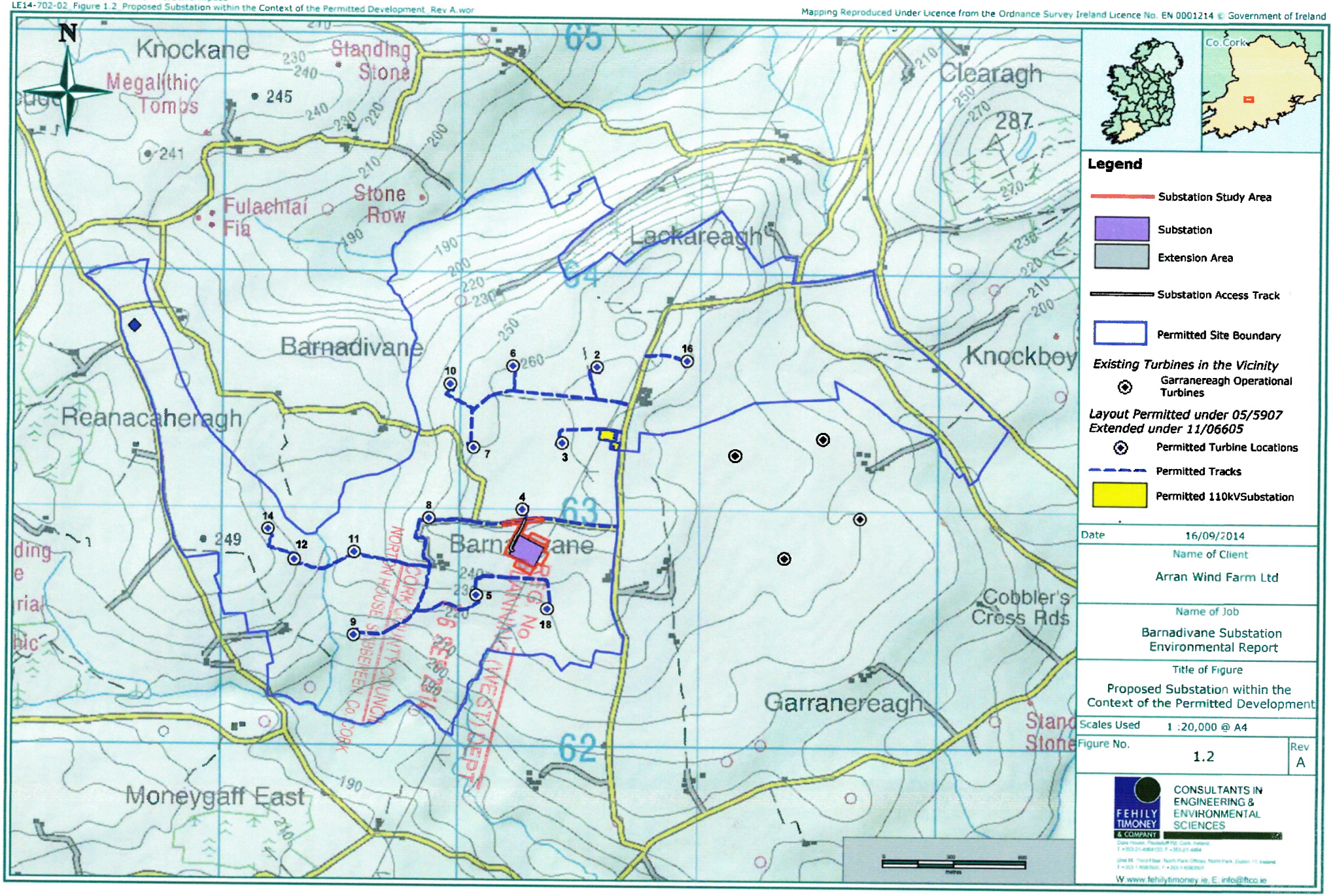
LE14-702-02_Figure 1.2_Proposed Substation within the Context of the Permitted Development_Rev A.wor



1.7 Need for the Proposed Development

It is necessary to find a suitable location to connect the electricity to be generated from Barnadivane Wind Farm to the national grid. The original wind farm planning application included for a substation. However, the proposed new substation is necessitated in order to meet current Eirgrid standards in substation design and will replace the currently permitted substation that is not yet constructed.

The proposed substation will facilitate the connection of Barnadivane Wind Farm to the national grid, thereby facilitating Ireland in meeting its renewable energy targets, as set out below.

The need for the renewable energy generated at Barnadivane is driven by the following:

- urgent need for increased capacity to generate electricity
- national renewable energy targets
- increasing national energy security
- commitment to limit greenhouse gas emissions under the Kyoto protocol
- provision of energy price stability
- provision of cost-effective power production

Ireland is one of the most energy import-dependent countries in the European Union, importing 85% of its fuel in 2012[1]. This makes Ireland particularly vulnerable to future energy crises and fluctuations given its location on the periphery of Europe. The international fossil fuel market is growing increasingly expensive and is increasingly affected by international politics. Any steps to reduce dependence on imported fossil fuels will add to financial autonomy and stability in Ireland.

The burning of fossil fuels for energy creates greenhouse gases, which contributes significantly to climate change. These and other emissions also create acid rain and air pollution. Sources of renewable energy that are utilised locally with minimal impact on the environment are necessary to meet the challenges of the future.

The EU has adopted a Directive (2009/28/EC)[2] on the Promotion of the Use of Energy from Renewable Sources in April 2009 which includes a common EU framework for the promotion of energy from renewable sources. The Directive sets a mandatory national target for the overall share of energy from renewable sources for each Member State. This package is designed to achieve the EU's overall 20:20:20 environmental target, which consists of a 20% reduction in greenhouse gases, a 20% share of renewable energy in the EU's total energy consumption and a 20% increase in energy efficiency by 2020. To ensure that the mandatory national targets are achieved, Member States must follow an indicative trajectory towards the achievement of their target.

Ireland's mandatory national target is to supply 16% of its overall energy needs from renewable sources by 2020. This target covers energy in the form of electricity, heat and transport fuels. For electricity alone, Ireland's national target is 40% by 2020. Government policies identify the development of renewable energy, including wind energy, as a primary strategy in implementing national energy policy.

Currently over 2,650MW of installed wind generating capacity is connected to the system on the island Ireland[3]. It is estimated that approximately 4,000MW of wind generating capacity will be required to meet the 40% target.

18 Environmental and Legislative Context

This section considers the proposed development in terms of the relevant environmental and legislative requirements.

1.8.1 Strategic Infrastructural Development

Under Section 182(A) of the Planning and Development Act where an undertaker:

> *"...intends to carry out development comprising or for the purposes of electricity transmission the undertaker shall prepare, or cause to be prepared, an application for approval of development under section 182B and shall apply to the Board for such approval accordingly".*

Subsection 9 of 182A states that:

In this section 'transmission', in relation to electricity, shall be construed in accordance with section 2(1) of the Electricity Regulation Act 1999 but, for the purposes of this section, the foregoing expression, in relation to electricity, shall also be construed as meaning the transport of electricity by means of—

> *(a) a high voltage line where the voltage would be 110 kilovolts or more, or*
> *(b) an interconnector, whether ownership of the interconnector will be vested in the undertaker or not.*

On this basis an application was made to An Bord Pleanála who determined that the proposal was not considered SID and should be applied to Cork County Council.

Environmental Impact Statement

Under section 182A(2) of the Act, an EIS is required to be prepared for development which belongs to a class of development identified as requiring assessment for the purposes of Section 176 of the Act. The relevant classes of development are set out in Schedule 5 of the *Planning and Development Regulations 2001 – 2013*.

The proposed 110kV substation development does not fall within the class of development in Schedule 5.

1.8.2 Appropriate Assessment Requirements

Appropriate Assessment is required under the EU Habitats Directive (92/43/EEC) – 'on the conservation of natural habitats and of wild fauna and flora'. It is an assessment of the potential impacts of a proposed plan or project, on its own or in combination with other plans or projects, on one or more Natura 2000 sites [Special Protection Areas (SPA) for birds, Special Areas of Conservation (SAC) for habitats and species].

Fehily Timoney and Company (FTC) was commissioned by AWL to prepare an Appropriate Assessment (AA) Screening Report, for the proposed 110 kV substation at Barnadivane, near Coppeen, Co. Cork. The AA Screening Report indicates that based on the objective scientific evidence provided, significant effects can be excluded and as such a full Appropriate Assessment is not required in this instance.

The findings of this assessment will be taken into account by the relevant competent authority to inform its assessment of the proposed development. A copy of the AA screening report is included in Appendix 2.

1.8.3 EIA Requirements

The European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, requires member states to ensure that a competent authority carries out an assessment of the environmental impacts of certain types of project, as listed in the Directive, prior to development consent being given for the project.

The requirement for the Environmental Impact Assessment of various types of developments are transposed into Irish Legislation under the *Planning and Development Acts 2000 – 2014* and the *Planning and Development Regulations 2001 – 2013.*EIS is compulsory for projects falling within classes of development prescribed by article 93 of, and Schedule 5 to, the *Planning and Development Regulations 2001 – 2013*. When a development does not fall within a class or is below the thresholds (sub-threshold) of Schedule 5, an EIS may still be required if the development is associated with *'significant effects on the environment'* (ref, Articles 103 the Planning and Development Regulations).

Screening is the first stage in the EIA process, whereby a decision is made on whether or not EIA is required. A screening report was prepared for this proposed development, with regard to the following legislation and guidance:

- *Planning and Development Acts 2001 - 2014*
- *Planning and Development Regulations 2001 - 2013*
- *Guidance on EIA, Screening, European Commission, 2001*
- *EIA, Guidance for Consent Authorities regarding Sub-threshold Development, DoEHLG, 2003*
- *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009.*

The proposed 110kV substation development does not fall within the mandatory requirements for the production of an EIS. Accordingly, EIA screening for the proposed 110kV substation must be undertaken by the competent authority. The EIA Screening Report indicates that based on the objective scientific evidence provided, significant effects can be excluded and as such a full EIS is not required in this instance. A copy of the Screening Report has been submitted to Cork County Council.

The findings of this assessment will be taken into account by the relevant competent authority to inform its assessment of the proposed development. A copy of the EIA screening report is included in Appendix 3.

1.9 Pre-Submission Consultation

1.9.1 Consultation with An Bord Pleanála (ABP)

The Developer commenced pre-application consultations with An Bord Pleanála in April 2014, in order to seek a determination as to whether the substation project is adjudged to be Strategic Infrastructure Development (SID) within the meaning of Section 182A of the Planning and Development Act, 2000, as amended. A copy of this correspondence is included in Appendix 1.

ABP requested a pre-application meeting in August 2014 to discuss the project in more detail before making a determination on the case. A pre-application meetings was held with ABP on 15 August 2014 to discuss the project. The minutes of the meeting are included in in Appendix 1.

In a letter dated 27 August 2014, ABP concluded that the development was not considered SID and the application should be made directly to the Local Authority in the first instance. A copy of the letter is included in Appendix 1.

1.9.2 Consultation with Planning Authority

A pre-planning meeting was held with Cork County Council on 16July 2014 to discuss the project. At this meeting, the background to the project was provided by the applicant, together with a description of the proposed development.

The applicant also detailed the pre-application process which was ongoing at the time with An Bord Pleanála with respect to whether a planning application to the Board would be required, in lieu of a planning application to Cork County Council.

The key environmental aspects of the proposed development were also outlined. The applicant also committed to undertaking AA/EIA screening for the proposed development and, should Cork County Council be determined as the relevant planning authority, that an EIA Screening Report and AA Screening Report would be submitted to the Council, to assist the council in its screening assessment.

1.10 Environmental Report Methodology

This environmental report presents the findings of the various environmental assessments of the potential impact of the proposed development. Where any potential impacts are highlighted, measures have been taken by design or through the recommendation of mitigation measures to eliminate or reduce to acceptable levels any remaining potential impacts.

The preparation of this ER broadly follows standard environmental impact assessment methodology in accordance with best practice EIA guidelines:

- *Guidelines on the Information to be contained in Environmental Impact Statements*, (EPA, 2002)
- *Advice notes on Current Practice (in the preparation of Environmental Impact Statements)* (EPA, 2003)

Firstly, the planning context, the background to the project including the need for the development, the alternatives assessed and the proposed development is described. This sets the reader in context as to the practical and dynamic process undertaken, in order to arrive at the layout and design of the proposed development that will cause least impact on the environment.

Subsequent chapters deal with specific environmental topics for example, traffic, air, hydrology, noise, etc. These assessments may involve specialist studies and evaluations. The methodology applied during these specific environmental assessments is a systematic analysis of the proposed development in relation to the existing environment. The broad methodology framework for these assessments is outlined below and is designed to be clear and concise and allow the reader to logically follow the assessment process through each environmental topic. In some instances, more specific topic related methodologies are outlined in the relevant chapters of the report.

The broad methodology framework used in all chapters includes:

- Introduction
- Assessment Methodology
- Receiving Environment
- Potential Impacts
- Mitigation Measures
- Residual Impacts
- Conclusion and Summary

Introduction
This section generally introduces the environmental topic to be assessed and the areas to be examined with the assessment.

Assessment Methodology
Specific topic related methodologies are outlined in this section. This will include the methodology used in describing the existing environment and undertaking the impact assessment. It is important that the methodology is documented so that the reader understands how the assessment was undertaken. This can also be used as a reference if future studies are required.

Receiving Environment
An accurate description of the existing environment is necessary to predict the likely significant impacts of a new development. Existing baseline environmental monitoring data can also be used as a valuable reference for the assessment of actual impacts from a development once it is in operation.

To describe the existing environment, desktop reviews of existing data sources were undertaken for each specialist area. This literature review relied on published reference reports and datasets to ensure the objectivity of the assessment. Desktop studies are also supplemented by specialised field walkovers or studies in order to confirm the accuracy of the desktop study or to gather more baseline environmental information for incorporation into the Environmental Report.

The existing environment was evaluated to highlight the character of the existing environment that is distinctive and what the significance of this is. The significance of a specific environment can be derived from legislation, national policies, local plans and policies, guidelines or professional judgements. The sensitivity of the environment was also described.

Potential Impacts
In this section individual specialists predict how the receiving environment will interact with the proposed development. The full extent of the proposed development's effects and emissions before the proposed mitigation measures are introduced is outlined here. Impacts from both the construction and operation phases of the proposed development are outlined. Interactions and cumulative impacts with other environmental topics are also included in this assessment. The evaluation of the significance of the impact is also undertaken. Where possible, pre-existing standardised criteria for the significance of impacts will be used. Such criteria can include Irish legislation, international standards, EPA guidelines or good practice guidelines. Where appropriate criteria do not exist the assessment methodology section states the criteria used to evaluate the significance.

Mitigation Measures
If significant impacts are anticipated mitigation measures are devised to minimise impacts on the environment. Mitigation measures by avoidance, by reduction and by remedy can be outlined.

Residual Impacts
The assessment identifies the likely impact that will occur after the proposed mitigation measures have been put in place. These impacts are described in detail and assessment of their significance undertaken.

Conclusion and Summary
An overall summary of the assessment undertaken, specific impacts predicted, mitigation measures outlined and final residual impacts is provided in this section.

1.11 Environmental Report Structure

The Environmental Report (ER) has been prepared using the "grouped format structure" as outlined in EPA guidance documents[4]. The format of this ER is designed to ensure that standard methods are used to describe all sections of the ER.

Using this structure there is a separate chapter for each topic, e.g. ecology, hydrology, noise etc. The description of the existing environment, the proposed development and the potential impacts, mitigation measures and residual impacts are grouped in the chapter. The grouped format makes it easy to investigate topics of interest and facilitates cross-reference to specialist studies.

The report will have a number of chapters, including:

- Chapter 1 – Project Background
- Chapter 2 - Existing Site Setting
- Chapter 3 - Description of the Development
- Chapter 4 - Policy and Legislation
- Chapter 5–Human Environment
- Chapter 6 - Ecology
- Chapter 7 - Geology, Hydrogeology and Slope Stability
- Chapter 8 - Hydrology
- Chapter 9 - Landscape and Visual
- Chapter 10 - Noise
- Chapter 11 - Archaeological, Architectural and Cultural Heritage
- Chapter 12 - Air and Climate
- Chapter 13 – Interactions

1.1 2Contributors to the Environmental Report

Fehily Timoney and Company (FTC) is a consultancy based in Cork, specialising in civil and environmental engineering, and environmental science. FTC is well established as a leading consultancy in renewable energy development in Ireland. The company has established a professional team specialising in renewable energy. This team has the support of many in-house engineers and scientists.

FTC was retained by AWL to undertake the detailed environmental assessment and prepare the ER for the proposed development, as well as preparing a planning application to accompany this ER for submission to the competent authority

Specialist contributors involved in the preparation of the ER are outlined below:

Table 1-1: Contributors to the ER

Inputs	Consultants	Key Staff
Project Designers	**Enerco Energy Ltd.** Lissarda Business Park, Lissarda, Cork	William O'Connor
Noise Assessment	**Hayes McKenzie** Unit 3, Oakridge Office Park Whaddon, SalisburyWiltshireSP5 3HTUnited Ki ngdom	Rob Shepherd MEng MIoA AMIMechE, Andy McKenzie Phd BSc FIoA
Traffic and Transportation Assessment	**Alan Lipscombe Traffic and Transport Consultants** Claran, Headford, Co. Galw ay	Alan Lipscombe, B.Eng (hons) Transportation Engineering MIHT
Archaeological, Architectural and Cultural Heritage Assessment	**Tobar Archaeological Services** Saleen, Midleton, Co. Cork	Miriam Carroll, MSc Annette Quinn, MSc
Landscape and Visual Assessment	**MosArt Ltd.** The Phoenix Centre, Block 6 Broomhall Business Park Wicklow ,Coun tyWicklow	Richard Barker, BA (Environmental). PGDip (Forestry). MLA. MILI

1.13 Difficulties Encountered

There were no technical difficulties encountered during the pre paraton of this envi ronmental report.

2 SUMMARY OF THE SITE AND EXISTING ENVIRONMENT

The proposed substation is located in the townland of Barnadivane (Kneeves), approximately 3.4 km northeast of Coppeen and 10 km south of Macroom. The nearest village is Terelton, approximately 3.4 km to the north.

The substation is situated within the planning boundary of a currently permitted wind farm, granted by both the Planning Authority and An Bord Pleanála under planning reference numbers 05/5907 and PL 04.219620 respectively. An extension of duration was subsequently granted by Cork County Council under 11/6605. The proposed substation development covers an area of approximately 2.95 ha, within the overall study boundary of the permitted wind farm which covers an area of 355 ha.

There is a good network of local roads accessing the site. The nearest national route, the N22, is the main arterial route for traffic commuting between Cork and Killarney and is located approximately 5 km to the north at its closest. The nearest regional route, the R585 between Cork and Bantry, passes 1 km to the south of the site. The R585 connects to the N22 at Crookstown, 5 km to the east of the site.

The proposed substation is located on a south-facing plateau within the Bride River valley approximately 500m south west of the permitted substation. The proposed substation site ranges in elevation from 250 m on the southern boundary to 260 m along the northern boundary. The land to the south slopes downwards towards the River Bride and low-lying rolling farmland. To the north, the land slopes to the River Lee, which lies at approximately 70 m OD. The land to the east of the study area drops to below 200 m OD, with hills separated by river valleys. To the west of the site there is a series of hills with peaks in the region of 220 m OD to 240 m OD. An aerial view encompassing the permitted and proposed sites is presented in Figure 2.1.

The proposed site is currently used for agricultural grazing. The field boundaries are defined both by the hedgerows and by sod and stone banks. There are a number of occupied dwellings within 1km of the site, with the closest being over 250m from the proposed substation. The site is privately owned by a contributory landowner to the Barnadivane Wind Farm and is currently utilised for agriculture. There are no hospitals, schools, hotels or guesthouses within 1 km of the site. There are no recreational activities associated with this site. The nearest watercourse is a tributary of the River Bride over 500m west of the site.

The landform reflects the underlying geology of the region which is dominated by east-west anticlines and synclines. The anticlines form the hills with sandstone dominated bedrock and the synclines form the main river valleys (Lee, Bride and Bandon Rivers) which are underlain by limestone.

The proposed site does not lie within any Natura 2000 sites. There are three Natura 2000 sites (two cSACs[1] and one SPA) within a 10 km radius. The Gearagh cSAC (site code 000108) and the Gearagh SPA (004109) lie over 6.5 km to the north. The Bandon River cSAC (002171) lies over 9.5 km southwest of the proposed development site.

No recorded monuments occur within close proximity to the proposed sub-station site and only 2 monuments occur within 1km, the nearest being a ringfort situated over 770m from the proposed substation.

Existing land use in the area surrounding the site is predominately agricultural. There are a number of existing and permitted wind farm developments nearby. There is an existing wind farm, namely Garranereagh Wind Farm with 4 operational turbines adjacent to the site. The nearest turbine is approximately 1 km from the proposed substation. This development, along with any other planned or permitted wind farms in the vicinity, will be considered in the environmental assessment to evaluate any cumulative impacts that may arise.

Further details of the site and the surrounding environment are provided in the following sections.

[1] At present all SACs in Ireland are currently 'candidate' SACs, and referred to as cSACs. The relevant Statutory Instruments for the SACs in Ireland have not yet been put in place, though these sites must still be afforded protection in accordance with the EU Habitats Directive (92/43/EEC).

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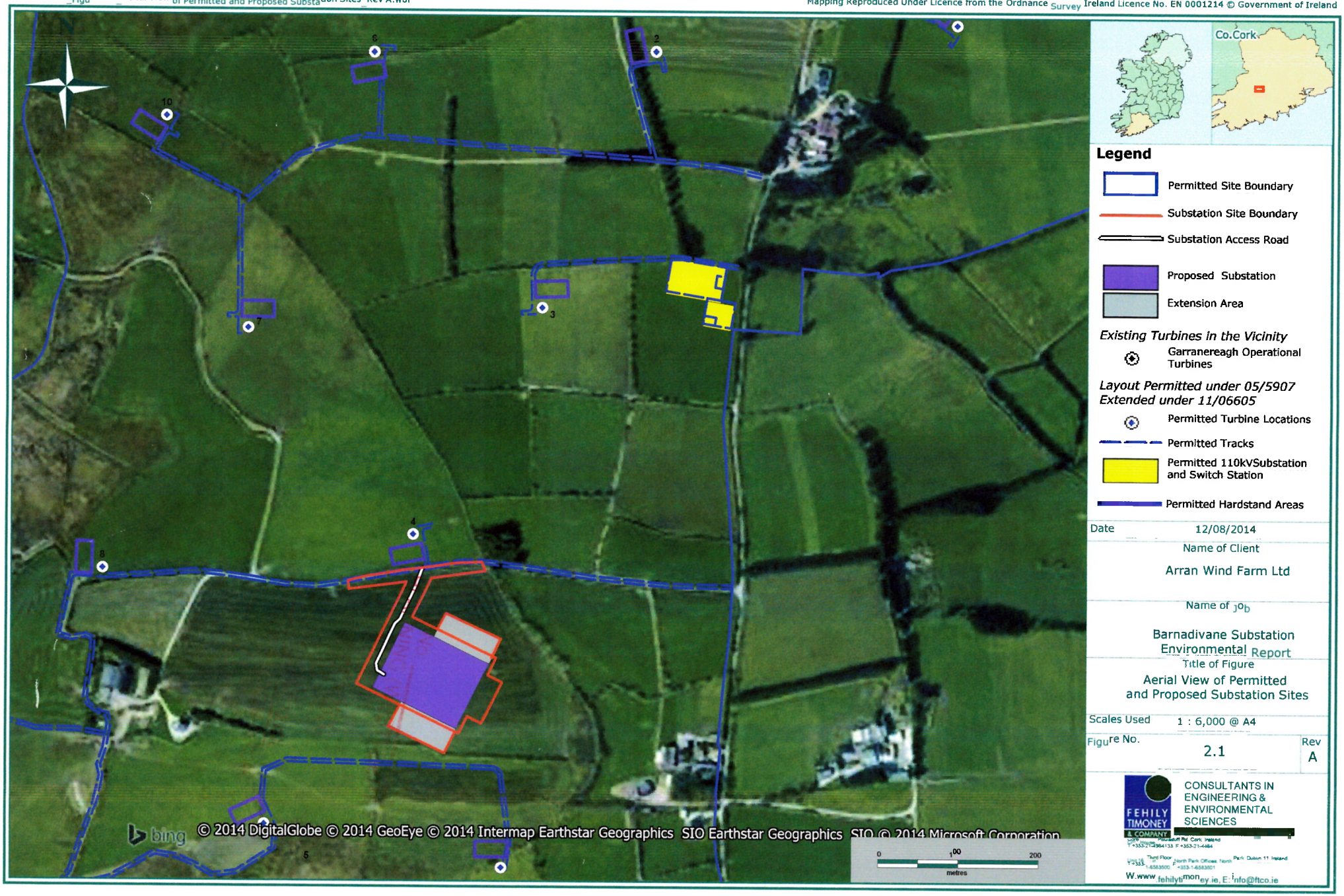
LE14-702-02_Figure 2.1 Aerial View of Permitted and Proposed Substation Sites Rev A.wor



Date	12/08/2014
Name of Client	Arran Wind Farm Ltd
Name of Job	Barnadivane Substation Environmental Report
Title of Figure	Aerial View of Permitted and Proposed Substation Sites
Scales Used	1 : 6,000 @ A4
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3 THE DEVELOPMENT

3.1 Introduction

This section outlines in detail the main characteristics of the proposed substation in terms of the construction, operation and decommissioning stages of the project. The proposed substation will replace an already permitted 110kV substation and switch station within the boundary of the permitted wind farm

3.2 Description of the Proposed Development

The 110 kV substation compound will cover an area of approximately 108 m x 86 m on plan including a buffer area to the perimeter. There will be three single storey control buildings on the site. The control buildings will be of standard masonry construction, rendered externally with a pitched roof. Finishes will be in keeping with the surrounding buildings. The maximum floor area of each building will be 185m^2 and the maximum height of the buildings will be approximately 6.2 m above finished ground level. The control buildings and electrical equipment will be enclosed by a 2.4m high steel palisade fence painted green perimeter fence encompassing an area of approximately 76m x 97m. The substation compound will be connected to the public road via a short access track approximately 200m long. An image of a typical 110kV substation layout is shown in Figure 3.1.

The compound will contain assorted electrical equipment including transformers, switch gear including circuit breakers, metering transformers, busbars, post insulators, lightning protection masts, line gantries, etc., all in accordance with Eirgrid requirements.

Two steel lattice mast structures will be located approximately 10 m from the edge of the 110 kV compound and directly underneath the line of the existing 110 kV overhead line. They will have a maximum height of approximately 18 m.

Although not permanently staffed, maintenance personnel will visit the substation on average three to four times a week. Any general office waste will be regularly disposed of to a licensed facility.

Figure 3-1: Representative 110kV Substation

Photograph taken at Mount Lucas Wind Farm, courtesy of Bord Na Mona

3.2.1 General Site Selection Issues

When surveying for a suitable site location within the wind farm study boundary and underneath the existing 110 kV overhead line, the primary drivers were selecting a site with the least environmental impacts and obtaining landowner agreement. In this regard, a number of site selection criteria were used as shown below:

- visual impact
- proximity to dwellings
- proximity to existing grid and wind farm
- impact on ecology
- proximity to designated areas (NHAs, SPAs & SACs)
- access to the site
- other environmental impacts
- community response
- cost
- technical feasibility
- landowner consent

Following the selection of the site that is the subject of this report, the preliminary layout was subsequently confirmed following site visits, the initial investigation of ground conditions and additional constraints identified through the environmental assessment. The proposed construction methods were also informed by the environmental assessment such that potential impacts were reduced.

The final layout was confirmed following a review of the interaction of all elements that were assessed during the environmental assessment. The proposed layout is presented on the planning drawings accompanying this application.

3.3 Project Construction

It has been assumed for the purposes of this ER, that the substation and wind farm will be constructed concurrently, as this represents the most onerous scenario in terms of cumulative impacts, particularly during the construction stage and the original EIS for the wind farm was prepared on that basis. However, the construction programme will not be finalised until the appointment of a contractor to carry out the works and the substation project may be constructed in advance of, in conjunction with or following the construction of the Barnadivane Wind Farm.

The project construction is not expected to exceed 52 weeks, project construction is described under the headings listed below:

- land use requirements
- construction material
- drainage
- waste management

3.3.1 Land Use Requirement

The land area requirement for the proposed development is approximately 2.95 ha (excluding potential expansion areas). The construction of the substation will be carefully managed. All earthworks required on site will be carried out by an experienced contractor in accordance with current best practice.

During the construction phase it will be necessary to provide temporary facilities for the workers. These facilities will be located within the proposed substation compound. Such facilities will include:

- site office and canteen
- site compound
- toilet facilities
- bottled water for potable supply
- a water tanker to provide water for other purposes
- diesel generator
- contractor lock-up facility
- employee parking

3.3.2 Construction Materials

Construction material for the fill and hardstanding areas at the substation and for the access track to the substation will be sourced from local quarries. It is likely that the total stone fill requirement will be in the order of 5,625 m^3. However, much of this fill material will likely be sourced on site, as there is a surplus of cut material available, from the excavations for the compound and road.

Other building materials required include the following:

- blocks, sand and cement, roofing material, etc., for the control buildings
- electrical equipment
- 2.4 m high security fencing (around the 110 kV substation compound)

Construction materials will be brought on-site as required. A temporary site compound will be provided during the construction phase to store construction materials.

The following is a non-exhaustive list of the plant associated with the construction phase:

- 2 track excavators (one with mounted rock breaker)
- 1 mobile crane (occasionally)
- 2 dump trucks
- 1 water bowser
- 1 petrol / diesel powered generator

- 1 Dozer
- 1 Roller
- 1 Asphalt Paver

Table 3-1: Estimate of Material Requirements for Construction

Item	Length (m)	Width (m)	Volume of Concrete (m^3)	Volume of Crushed Rock (m^3)	Volume of Bedding Sand (m^3)
110 kV Site Compound	108	96	0	5,100	
Control House 1	15	12.5	30	0	
Control House 2	11	18.5	30	0	
Control House 3	11	18.5	30	0	
Transformer Base and Plinths	various	various	50	0	
Access Tracks	210	5	0	525	
Cabling	210				19
Total Materials Required		260		5,625	
Total Materials Required to be Excavated				c. 10,000	

3.3.3 Drainage

Site drainage is discussed in detail in Chapter 8. The proposed drainage comprises swales and settlement ponds at the location of the proposed substation. Access track drainage will consist of swales with silt traps and diffuse discharge overland or to soakpits as required.

3.34 Wastes Generated During Construction and Operation of the Proposed Substation

What follows is an outline of the waste expected to be generated during the construction and operation of the proposed substation, including sources of waste and how they are proposed to be dealt with.

Construction Waste

Hardcore, stone and concrete not forming part of the permanent structures, subsoil not required for reinstatement purposes and all other wastes will be collected at the end of the construction phase, taken off site and reused, recycled and disposed of according to best practice in an authorised facility. It is not anticipated that there will be any significant surplus material of this nature. Lubricating oils and diesel will be removed from the site and disposed of by an approved waste contractor in accordance with the European Communities (Waste Oil) Regulations, 1992 (S.I. No. 399 of 1992). A waste management plan will be put in place prior to construction.

Operation/Maintenance Waste

All waste arising as a result of servicing and maintenance (e.g., lubricating oils, cooling oils, packaging from spare parts or equipment, unused paint, etc.) will be removed from the site and reused, recycled or disposed of in accordance with best practice in an authorised facility.

If fuels are required on site they will be placed within a secondary containment system capable of holding 110 % of the original volume as required under the EC Directive on Dangerous Substances (76/464/EEC).

Waste from the toilets within the substation buildings will be piped to a holding tank. Levels in the holding tank will be linked to the on-site SCADA system, with high level alarms. The maintenance and emptying of the tank will be managed by a licensed contractor.

Table 3-2: Construction Waste and Source

Waste	Source
hardcore, stone, gravel, concrete and plaster	temporary surfaces to facilitate construction
Timber	temporary supports, concrete shuttering and product deliveries
concrete blocks	left over from construction of the control building and temporary office accommodation
miscellaneous building materials	left over from construction of the control building and temporary office accommodation
waste from toilets	toilets
plastics	packaging of material
lubricating oils, diesel	unused quantities at end of construction period

3.4 Operation and Maintenance

During operation, most operation and monitoring activities will be carried out remotely with the aid of computers connected via a telephone broadband link. However, some visits (an average of three to four per week) will be necessary to carry out routine inspection and preventative maintenance.

3.5 Alternatives to the Proposed Development

A full assessment was undertaken to determine the most suitable means of connecting Barnadivane Wind Farm to the national grid. The various considerations that were taken into account with respect to the location of the substation are outlined in Section 3.2.1 above.

As part of the assessment process for grid connection for the permitted Barnadivane Wind Farm, a number of options were assessed before the current location was proposed. Details of some of these alternatives are outlined herein.

3.5.1 Alteration to permitted Substation

The initial planning consent for Barnadivane Wind Farm included a substation within the wind farm boundary. The Developer considered the option of seeking planning for the larger footprint now required at the location of the permitted substation on the wind farm site. The permitted substation is situated between the local road and the existing 110kV overhead line which constrained expansion at the permitted site. It was decided that altering the permitted layout was not viable due to existing constraints.

On that basis, it was decided to consider other sites within the wind farm EIA study boundary where the construction costs, environmental impact and planning risks might be reduced.

3.5.2 Alternative Locations within the wind farm EIA study boundary

A review of the entire area within the permitted wind farm site boundary was carried out to identify the most suitable location in terms of technical, planning and environmental requirements. The following key criteria were considered when selecting the location for the proposed substation:

Land Owner Consent:
The permitted wind farm and surrounding lands are situated on private lands. Land owner consent is required for the proposed development.

Capacity for accommodating future expansion:
The substation site needs to have sufficient land available to accommodate the expansion requirements of the transmission operator, Eirgrid.

Siting of the substation within the study area of permitted wind farm:
The EIA study area for the permitted wind farm comprised an area of approximately 355 ha. The sensitivity of the receiving environment within the study area was characterised at the time, the substation site should be located within this boundary while avoiding any environmentally sensitive areas.

Proximity to transmission system:
The substation site needs to be capable of connecting directly to the existing 110kV overhead cable traversing the site, and therefore needs to be along the line of the cable.

Road access to substation:
The substation site will require suitable access.

Visual screening:
The substation should not be excessively dominant or visually obtrusive in the landscape and should be sited and designed accordingly.

The proposed substation location was considered the most favourable from a technical, planning and environmental perspective considering all the relevant criteria.

3.5.3 'Do-Nothing' Scenario

Under this option, it would not be possible to connect the permitted wind farm to the national grid and accordingly, it would not be possible to construct the wind farm. This would have a negative impact on the achievement of binding renewable energy generation targets.

None of the indirect positive impacts associated with the proposed wind farm, i.e. displacement of carbon fuel burning generating plant and associated greenhouse gas emissions and health and climate impacts, would be achieved. There would be no direct negative impacts on the immediate environment in relation to any of the topics considered in this assessment.

3.5.4 Conclusion on Assessment of Alternatives

There are obviously a limited number of potential sites within the original wind farm boundary and adjacent to the existing overhead line, which could are suitable for the proposed substation development. The proposed site for the substation was chosen on the basis of the following, in line with the site selection criteria outlined above:

- the land required for the Eirgrid requirements was available
- there was adequate room for future expansion
- the site was proximal to the existing 110 kV overhead line
- the site was located within the original boundary of the consented wind farm
- there was improved screening due to the local topography and surrounding ditches and trees
- there was no increase in sensitive environmental receptors
- suitable access could be provided

4 PLANNING AND POLICY CONTEXT

4.1 Introduction

Government policies identify that national grid expansion is important in terms of ensuring adequacy of regional connectivity as well as facilitating the development and connectivity of sustainable renewable energy resources. To follow is a review of the key policies and legislation at European and National level that relate to the proposed substation.

4.2 EU Policy

4.2.1 Directive on the Promotion of the Use of Energy from Renewable Resources

The EU Directive on the Promotion of the Use of Energy from Renewable Sources (2009/28/EC)[5] sets a target of 20% of EU energy consumption from renewable sources by 2020 and a 20% cut in greenhouse gas emissions by 2020, the so-called 20:20:20 plan. The Directive recognises the need to promote renewable energy sources and technologies which will have a positive impact on:

- security of energy supply
- regional and local development opportunities
- rural development
- export prospects
- social cohesion
- employment opportunities

As part of this Directive, Ireland's overall national target for the share of energy from renewable sources in gross final consumption of energy in 2020 is 16% (increased from 3.1% in 2005)[6]. The sectoral components of the overall 16% target are detailed in Table 4.1, which outlines each form of renewable energy supply (RES). The current share of renewable energy in these components is also presented.

Table 4-1: Target and Current Share of Renewable Energy in Energy Sectors

Form of Renewable Energy Supply	Target Share (2020)	2012 Position[7]
Electricity (RES-E)	40%	19.6%
Heat (RES-H)	12%	5.2%
Transport (RES-T)	10%	2.4%

It is noted that the target set by the EU for Ireland of 16% is exceeded by Ireland's own national target of 40% of all electricity to come from renewable sources by 2020.

4.3 National Energy and Environment Policies

4.3.1 National Spatial Strategy

This National Spatial Strategy for Ireland (NSS) 2002-2020 is a twenty year planning framework designed to achieve a better balance of social, economic, physical development and population growth between regions. Its focus is on people, on places and on building communities.

Through closer matching of where people live with where they work, different parts of Ireland will for the future be able to sustain:

- a better quality of life for people
- a strong, competitive economic position and
- an environment of the highest quality.

The NSS states on page 36 that (emphasis added);

> *'National and international evidence also demonstrates that rural areas have a vital contribution to make to the achievement of balanced regional development. This involves utilising and developing the economic resources of rural areas, particularly in agriculture and food, marine, tourism, forestry,* ***renewable energy****, enterprise and local services, while at the same time capitalising on and drawing strength from vibrant neighbouring urban areas. In this way rural and urban areas are seen as working in partnership, rather than competing with each other. This urban — rural partnership model is in line with the approach taken in the European Spatial Development Perspective (ESDP).'*

4.3.2 White Paper 'Delivering a Sustainable Energy Future for Ireland'

This White Paper 'Delivering a Sustainable Energy Future for Ireland'[8] sets out the Government's Energy Policy Framework 2007 - 2020 to deliver a sustainable energy future for Ireland. It is set firmly in the global and European context which has put energy security and climate change among the most urgent international challenges. A number of key issues relating to renewable energy include the government's commitment to delivering a significant growth in renewable energy. The renewable target was increased to 40% of the electricity consumed in 2020 by the Minister for the Environment, Heritage and Local Government in his Second Carbon Budget in October 2008. It is estimated that wind energy will provide up to 90% of the energy required to meet this target.

The "All Island Grid Study" (2008), undertaken by the Department of Communications, Energy and Natural Resources, and the Northern Ireland Department of Enterprise, Trade and Investment, concluded that it was feasible to increase the share of electricity generated from renewable sources to 42% of total demand without incurring excess societal costs. The study concluded that the capacity of renewable plant required to deliver this contribution could include up to 6,000 MW of wind, 360 MW of base renewables such as biomass or biogas, and 285 MW of other variable renewables such as wave or tidal energy. Irish government targets are based on the results of this study.

According to the Irish Wind Energy Association the Republic of Ireland's total installed wind energy capacity is over 2,650 MW generated from over 211 wind energy developments in 26 counties[9]. Other renewable energy developments have grid connection offers and are expected to be constructed within the next two to five years, including Barnadivane Wind Farm.

The proposed substation is required to facilitate the connection of Barnadivane Wind Farm to the national grid.

4.3.3 National Climate Change Strategy

The second National Climate Change Strategy, published in 2007, provides a framework for action to reduce Ireland's greenhouse gas emissions to comply with the target, set by the EU, to reduce greenhouse gas emissions by 20% on 1990 levels by 2020. The strategy states that "*Electricity g eneration from renewable sources provides the most effective way of reducing the contribution of power generation to Ireland's greenhouse gas emissions. The Government has therefore established ambitious national targets for the contribution of renewables to power generation; 15% of electricity consumed will be from renewable sources by 2010 and 33% by 2020. These are above and beyond existing EU targets.*"

4.3.4 National Renewable Energy Action Plan

Directive 2009/28/EC requires each Member State to adopt a national renewable energy action plan and submit this to the European Commission. These plans are to set out Member States' national targets for the share of energy from renewable sources consumed in transport, electricity and heating and cooling in 2020, taking into account the effects of other policy measures relating to energy efficiency on final consumption of energy.

The National Renewable Energy Action Plan (NREAP)[10] sets out the Government's strategic approach and concrete measures to deliver on Ireland's 16% target under Directive 2009/28/EC.

The development of renewable energy is central to overall energy policy in Ireland. Renewable energy reduces dependence on fossil fuels, improves security of supply, and reduces greenhouse gas emissions creating environmental benefits while delivering green jobs to the economy, thus contributing to national competitiveness. The NREAP was submitted to the European Commission in July 2010.

4.3.5 Strategy for Renewable Energy 2012 -2020

The Strategy for Renewable Energy was published by the Department of Communications, Energy and Natural Resources in May 2012 and sets five strategic goals for renewable energy:

Strategic Goal 1 - Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets

Strategic Goal 2 - A sustainable bioenergy sector supporting renewable heat, transport and power generation

Strategic Goal 3 - Green growth through research and development of renewable technologies including the preparation for market of ocean technologies

Strategic Goal 4- Increase sustainable energy use in the Transport sector through biofuels and electrification

Strategic Goal 5 - An intelligent, robust and cost efficient energy networks system.

The Strategy acknowledges that the Government is confident that Ireland has the capability to achieve its 2020 target for renewable electricity, primarily through onshore wind power. With relevance to Barnadivane Wind Farm, the Strategy highlights the economic benefits the development of projects of this nature may have for the Irish economy.

> *"Further strategic deployment of onshore wind projects will develop a base of indigenous and foreign companies and create employment in the short-term in wind farm construction, possible turbine component manufacturing and servicing, the opportunity to capture international supply chain opportunities and the manufacture of niche onshore renewable energy generating equipment."*

A key action of the Strategy is to *"Support delivery of the 40% target for renewable electricity through the existing GATE processes."*

4.3.6 Green Paper on Energy Policy in Ireland (2014)

The Green Paper on Energy Policy in Ireland was published by the Department of Communications, Energy and Natural Resources in May 2014 with the purpose of this energy policy *'to provide the regulatory and financial framework to deliver a national energy system that enables a sustainable quality of life.'*[11]

The six policy priority areas in the Green Paper are:

Empowering Energy Citizens
In this priority the emphasis is on informing and raising awareness of energy production and consumption to citizens. It aims to reduce energy costs and carbon emissions from homes and to suggest ways to adapt and change relationships between energy suppliers and citizens.

The report goes on to say:

"*The relationship between energy suppliers and their customers will change to one of energy providers covering services such as home retrofits, advisors on energy efficiency and renewable energy options. Smart meters will give unprecedented access to data on how we use energy and how much of it we use.*"
This priority's aim is to start conservation on how energy is used and supplied in Ireland.

Markets and Regulation

In this priority the key questions posed for consultation are:

i. What long-term approach we should take to electricity and gas market integration after 2016?
ii. Whether any additional regulatory measures need to be taken with regard to increasing competition between energy providers, and their impact on energy prices for consumers?
iii. The role of the regulator (the Commission for Energy Regulation – CER) in ensuring a stable and predictable regulatory framework

Planning and Implementing Essential Energy Infrastructure
This priority discusses the need for improved energy infrastructure. It discusses the topics of:

i. How increasing shares of renewable electricity can be integrated to the Irish electricity grid while at the same time meet increasing electricity demand?
ii. What steps are necessary to improve electricity and gas systems integration?
iii. How oil storage and refining in Ireland can be secured?
iv. What needs to be done to improve the planning process of energy infrastructure in terms of empowering stakeholders and increasing efficiency for project developers?

Ensuring a Balanced and Secure Energy Mix
Driven by the pillars of competitive, secure and clean energy, we need to work towards achieving the right energy mix. Right now we import far too much energy, taking about €6.5 billion a year out of the Irish economy. We need to exploit our own resources more through increasing the shares of domestically produced renewable energy.

The main areas discussed in this theme are:

i. How to optimise the use of our indigenous natural resources?
ii. Our dependence on fossil fuels in transport and heating
iii. New approaches to energy storage and emergency planningthat mi ght be needed

Putting the Energy System on a Sustainable Pathway
This priority drives home the real need to shift from Ireland's depen dence on imported fossil fuels to a more indigenous, low-carbon economy based on renewable energy, energy efficiency and smart networks.

The main areas covered in this theme are:

i. How to enable a radical improvement in energy efficiency?
ii. What measures are needed to upscale the use of renewable energy across the sectors where it is most beneficial?

iii. **Sustainable development of the grid**
iv. How to maximise job creation during the energy transformation?
v. The role of SEAI in facilitating our shift to a sustainable energy pathway
vi. How climate change and our international mitigation commitments will affect our energy system?

Driving Economic Opportunity
This priority discusses how the energy sector needs to create jobs and protect existing ones.

The main areas covered in the economic opportunity theme include:

i. The measures needed to ensure a well-equipped energy workforce
ii. How to encourage strong investment in research and development?
iii. Fostering strategic partnership between industry and academia
iv. How to improve the gathering of relevant energy data and develop modelling hubs to process it?
v. Developing a collaborative governmental approach to energy policy

4.4 Regional and Local Development Policy

Regional and local policies that are relevant to the proposed development are discussed as follows:

- Regional Planning Guidelines for the South West Region 2010 - 2022
- Cork County Development Plan 2009 – 2015
- Cork County Draft Landscape Strategy

4.4.1 Regional Planning Guidelines for the South West Region 2010 - 2022

The Regional Planning Guidelines for the South West Region were first adopted in 2004. It is acknowledged in the guidelines that *"The south west has considerable potential for the generation of electricity from sustainable renewable resources such as wind and wave."* The objectives (RTS-09) for the South West Region relating to Energy and Renewable Energy are described below:

- *It is an objective to facilitate the sustainable development of additional electricity generation capacity throughout the region and to support the sustainable expansion of the network.* ***National grid expansion is important in terms of ensuring adequacy of regional connectivity as well as facilitating the development and connectivity of sustainable renewable energy resources.***

- *It is an objective to ensure that future strategies and plans for the promotion of renewable energy development and associated infrastructure development in the Region will promote the development of renewable energy resources in a sustainable manner. In particular, development of wind farms shall be subject to:*

    - *the Wind Energy Planning Guidelines*
    - *consistency with proper planning and sustainable development*
    - *criteria such as design and landscape planning, natural heritage, environmental and amenity considerations,*

- *It is an objective of the guidelines to promote the sustainable provision of renewable energy from tidal, wave and pumped storage developments together with bioenergy resources, as critical elements of the long-term secure energy supply throughout the region.*

4.4.2 Cork County Development Plan 2009 - 2015

The planning objectives for County Cork are set out in the Cork County Development Plan 2009-2015. The objectives of the Authority on renewable energy development are contained in Chapter 6 of the Plan. Those policies which are considered the most relevant are summarised in Table 4.2.

Table 4-2: Extracts from the Cork County Development Plan 2009

Policy	Description
Objective INF 7-3 *Renewable Energy Production*	It is an objective generally to encourage the production of energy from renewable sources, including in particular that from biomass, waste material, solar, wave, micro hydro power and wind energy, subject to normal proper planning considerations, including in particular the impact on areas of environmental or landscape sensitivity.
Objective INF 7-4 *Wind Energy Projects*	(a) It is an objective to encourage prospective wind energy businesses and industries. In assessing potentially suitable locations for projects, potential wind farm developers should focus on the strategic search areas identified in the Plan and generally avoid wind energy projects in the strategically unsuitable areas identified in this Plan. (b) It is an objective to support existing and established businesses and industries who wish to use wind energy to serve their own needs subject to proper planning and sustainable development. (c) It is an objective in the strategic search areas (and in those areas that are identified as neither strategic search areas nor strategically unsuitable areas), to consider new, or the expansion of existing, wind energy projects on their merits having regard to normal planning criteria including, in particular, the following: • The sensitivity of the landscape and of adjoining landscapes to wind energy projects; • The scale, size and layout of the project, any cumulative effects due to other projects, and the degree to which impacts are highly visible over vast areas; • The visual impact of the project on protected views and prospects, and designated scenic landscapes as well as local visual impacts; • The impact of the project on nature conservation, archaeology and historic structures; • Local environmental impacts including noise and shadow flicker; • The visual and environmental impacts of associated development such as access roads, plant, grid connections etc. • The proximity and sensitivity of a recognised settlement, • The impact of the project on archaeology and historic structures, • The impact of nature conservation, in particular avoiding designated and proposed European sites. (d) Similar criteria would be taken into account in the strategically unsuitable areas except that suitable projects will generally be on a smaller scale and on very special, carefully chosen sites.

The Council has prepared a Renewable Energy Strategy for the County in Section 6.7.12 of the County Development Plan 2009-2015. The Council's Wind Energy Strategy identifies two classifications for wind farm development:

- ***"STRATEGIC SEARCH AREAS**: Areas which have both relatively high wind speeds and relatively low landscape sensitivity to wind projects. These could be considered to be strategic 'search areas' for wind farm development. Prospective developers would be encouraged generally to focus on these areas when searching for potentially suitable sites in County Cork. While not all locations within these areas would be suitable for wind projects..., they do give a strategic representation of generally preferred areas.*

- ***STRATEGICALLY UNSUITABLE AREAS**: Areas which, because of high landscape sensitivity, are considered generally to be unsuitable for wind energy projects. While there may be a small number of locations within these areas with limited potential for small-scale wind projects, their contribution to any significant reduction in greenhouse gas emissions would be negligible. Except on a small scale and at particularly suitable locations, wind projects would normally be discouraged in these areas."*

The proposed site is located in a 'strategic search area' on Figure 6.3 of the County Development Plan as indicated on Figure 4.1. The proposed substation development is ideally located within the footprint of a permitted wind farm and in close proximity to an existing 110kV overhead transmission line which allows the energy generated at the wind farm to connect directly to the national grid, avoiding the need for additional overhead cables and minimising electrical losses.

4.4.3 Cork County Draft Landscape Strategy

County Cork is divided in to sixteen differing landscape character types in the County Development Plan. A Draft Landscape Strategy was prepared for Cork County in 2007. This document evaluates the sixteen different landscape types in terms of:

- Landscape Value- the environmental or cultural benefits, including services and functions, which are derived from various landscape attributes.
- Landscape Sensitivity- the measure of a landscape's ability to accommodate change or intervention without suffering unacceptable effects to its character and values.
- Landscape Importance- importance of a landscape rated as Local, County, or National.

The proposed substation site is within a landscape type defined as *Fissured Fertile Middle Ground* in the County Development Plan known as Type 10(a) as shown in Map 14 of the Landscape maps in Volume 3 of the Cork County Development Plan 2009 - 2015. The draft strategy states that landscape Type 10(a) – Fissured Fertile Middle Ground has a landscape value of **"low"**, a landscape sensitivity of **"low"** and a landscape importance of **"local"**. The nearest designated scenic route is located on a third class road near the village of Terelton approximately 3.4km northwest of the proposed substation.

Further details on the surrounding landscape and the potential impact the proposed development could have on these areas, are discussed in Chapter 9 of this document.

4.4.4 Cumulative impact of proposed development on CDP

We are not aware of strategic areas in the vicinity of the development that would be prevented from being developed as a result of this proposed substation.

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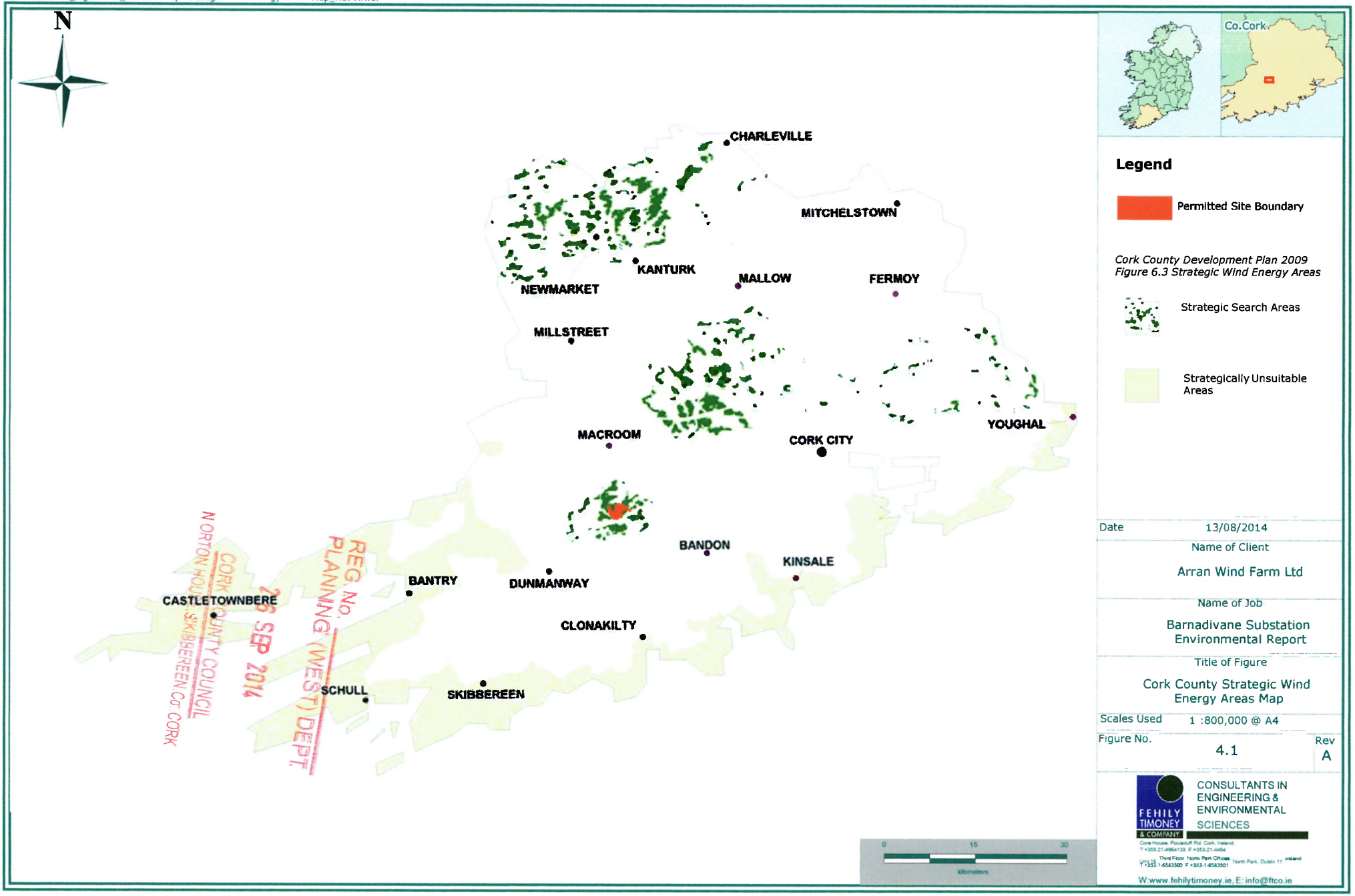

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4.4.5 Overall Compliance with Relevant Plans and Policies

By virtue of the existing permission, the principle of this type of development has already been established in the vicinity. The substation is required to facilitate the connection of electrical energy generated at Barnadivane Wind Farm to the national grid.

It is considered that the proposed development is in keeping with relevant plans and policies for the region in terms of strategic search areas, the provision of renewable energy infrastructure and contribution to renewable energy targets.

5 THE HUMAN ENVIRONMENT

5.1 Introduction

There are a number of potential impacts from the proposed development on the human environment. These impacts include noise, visual, air quality, traffic and transportation, land use, electromagnetic impacts and health and safety. Landscape and visual impacts are addressed in Chapter 9 and noise impacts are addressed in Chapter 10.

This section includes a description of the existing human environment and the likely impacts arising from the proposed development. These impacts include:

- land use
- socio-economic
- health and safety
- electromagnetic impacts
- recreation, amenity and tourism
- traffic and transportation

5.2 Methodology

The Cork County Development Plan 2009 – 2015, as well as the Central Statistics Office (CSO), have been consulted for this Chapter.

Any concerns raised by the Local Authority during a pre-planning meeting have been addressed in this ER. Fáilte Ireland published a new guideline on tourism and environmental impacts in 2011 titled 'Guidelines on the treatment of tourism in an Environmental Impact Statement'. This publication has been taken into consideration in this Chapter.

5.3 Land Use

5.3.1 Receiving Environment

The proposed substation is in a rural upland setting. Historically, the land use in the area surrounding the site is predominately agricultural. More recently, there have been a number of existing and permitted wind farm developments in the wider area and there is an existing wind farm, namely Garranereagh Wind Farm with 4 operational turbines adjacent to the site. The nearest existing turbine is approximately 0.9 km from the proposed substation. The nearest permitted turbine is approximately 120m from the proposed substation. This proposed substation is intended to replace the substation and switch station already permitted as part of a wind farm.

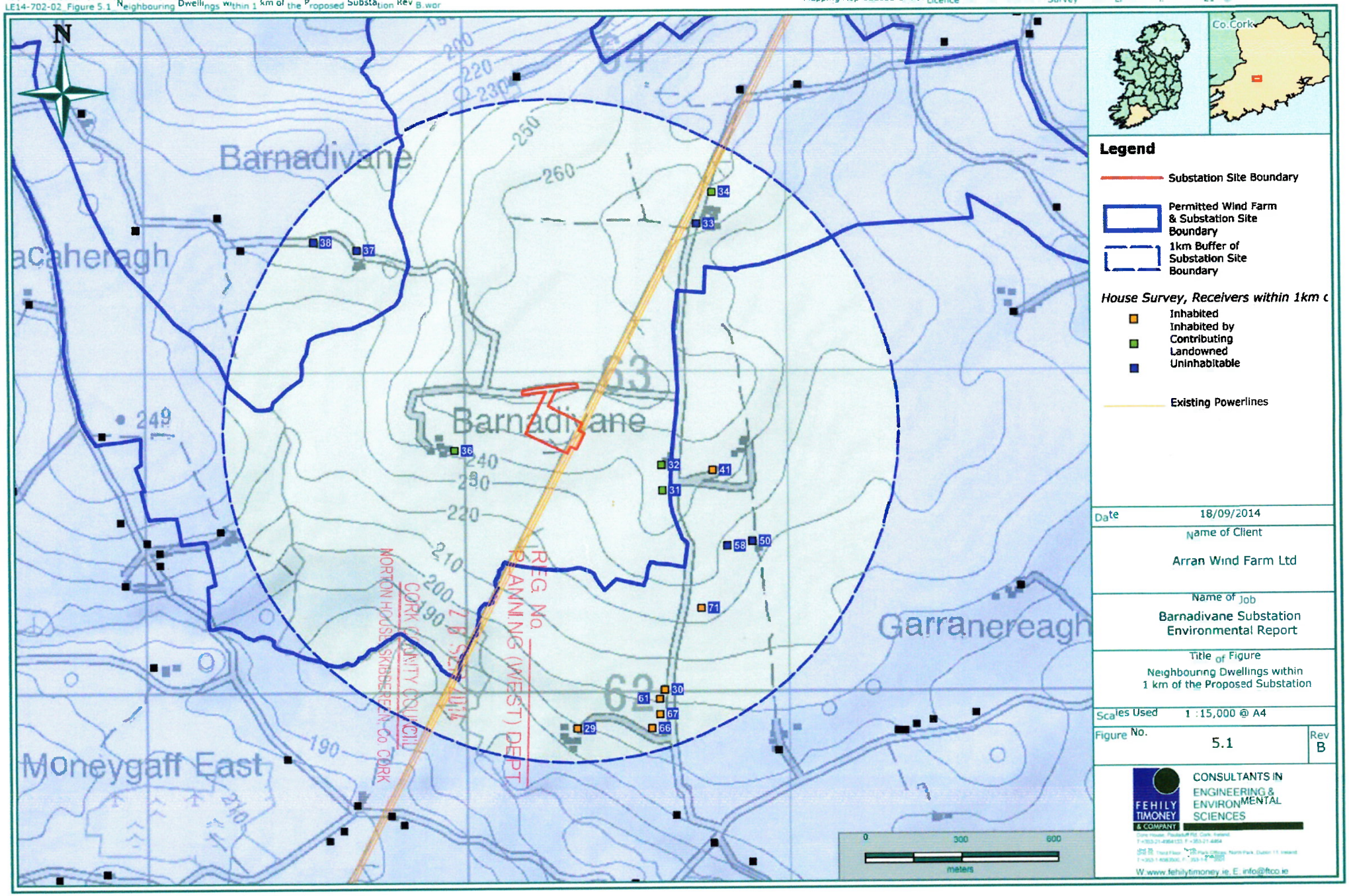
Population density in the vicinity of the study area is low-moderate. The more densely populated areas in the vicinity of the study area are located in the surrounding settlements of Coppeen, Poulanargid and Terelton. The inhabited dwellings within 1 km of the development are shown in Figure 5.1 and are listed in Table 5.1. The closest inhabited dwelling to the proposed substation is a contributory land owner to Barnadivane Wind Farm and is situated over 250 m from the substation, as shown in Figure 5.1. There are a total of 11 inhabited residential dwellings within 1 km of the proposed site boundary. Distances to the proposed substation are presented in Table 5.1.

Table 5-1: Dwellings within 1 km of Proposed Substation

Property ID	Easting	Northing	Distance to Substation[2] (m)	Comment
32	134612	62704	284	Contributory land owner to Barnadivane Wind Farm
36	133972	62753	286	Contributory land owner to Barnadivane Wind Farm
31	134615	62625	321	Contributory land owner to Barnadivane Wind Farm
41	134772	62687	441	
49	134865	62783	516	Uninhabited
58	134816	62450	584	Uninhabited
50	13489	62464	645	Uninhabited
71	134733	62257	655	
33	134726	63458	746	Uninhabited
37	133671	63380	799	Uninhabited
30	134617	62002	823	
61	134601	61972	846	
34	134775	63558	858	Contributory land owner to Barnadivane Wind Farm
67	134602	61923	892	
29	134345	61878	894	
38	133536	63405	921	Uninhabited
66	134577	61878	928	

[2]Distances are approximate based on GIS mapping

R:\Map Production\2014\LE14\702\02\Workspace\Substation Environmental Report LE14-702-02_Figure 5.1_Neighbouring Dwellings within 1km of the Proposed Substation Rev B.wor



Legend

- Substation Site Boundary
- Permitted Wind Farm & Substation Site Boundary
- 1km Buffer of Substation Site Boundary

House Survey, Receivers within 1km c

- Inhabited
- Inhabited by Contributing Landowned
- Uninhabitable

- Existing Powerlines

Date	18/09/2014
Name of Client	Arran Wind Farm Ltd
Name of Job	Barnadivane Substation Environmental Report
Title of Figure	Neighbouring Dwellings within 1 km of the Proposed Substation
Scales Used	1 :15,000 @ A4
Figure No.	5.1
Rev	B

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5.3.2 Potential Impacts

Substation structures are not land intensive. The development footprint of the substation is approximately 2.95 ha based on the area of the compound and access track. There is potential for expansion to the north and south of the proposed site in accordance with standard Eirgrid requirements. The small amount of land use lost due to the development relative to the abundant availability of similar land in the immediate vicinity, as described in Section 5.1, means that the substation will have a minor impact on land use. Assuming this proposal is permitted then the previously permitted substation and switch station will not be developed.

The substation and access track are located entirely on agricultural land currently used for grazing.

5.3.3 Mitigation Measures

The footprint area of the proposed development is considered negligible in the context of the abundant agricultural land in the vicinity. The footprint is dictated by standard Eirgrid requirements, but will be kept to the minimum necessary. On that basis that the impacts are considered to be negligible, no additional mitigation measures are necessary.

5.3.4 Residual Impacts

Residual impacts for land use are imperceptible for the construction and operation stages.

5.3.5 Conclusions

There are negligible impacts on surrounding land use.

5.4 Socio-Economics

5.4.1 Receiving Environment

The population of Cork County and City was 481,295 in 2006 and increased by 7.8 % to 519,032 in 2011[12]. The population of Cork County (excluding Cork City) was 361,877 in 2006 but results from the 2011 census indicate that this has increased by 10.5% to 399,802 in 2011. The 2011 population of the County comprises 198,658 males and 201,144 females.

Macroom is the nearest town to the proposed development, at approximately 10km to the north of the site. The 2011 population of Macroom was 3,738, which is an increase of 9. 7% from 2006 (3,407)[66]. Residences in the surrounding area mainly consist of small villages (e.g. Coppeen) and farmhouses and domestic dwellings. The 2011 population census of Ireland states that the population of Macroom's rural surrounding area is 15,452, a 5.3% increase on 2006.

Other towns of note are Dunmanway, approximately 12 km to the south-west, and Bandon which approximately lies 15 km to the south-east.

5.4.2 Potential Impacts

The design and planning stage of the proposed substation will provide employment for a number of technical consultants. This will be relatively short-term. The potential employment generated by the construction and operation of the proposed grid connection is outlined below.

Construction

The construction phase of the proposed substation project will provide employment for trades-people, labourers and specialised contractors. Construction staff will spend money locally on accommodation, subsistence, etc. This will have a direct short-term positive impact on the local economy.

Operation

On the basis that the substation is ancillary infrastructure required to facilitate the connection of Barnadivane Wind Farm to the national grid, it is not considered appropriate to separate the contribution of the grid connection and substation from the general operation of the permitted wind farm. It is estimated that approximately three to four full-time equivalent jobs plus commercial and office support will be required for the duration of operation of the permitted wind farm with occasional short-term work for contractors as required. Local businesses are likely to be supported by people required to attend the site.

Rates paid by the developers of the permitted wind farm will contribute significant funds to Cork County Council which are used to improve the services available to the people of the county.

Cumulative

Potential cumulative socio-economic impacts will be positive based on the spending in the area likely to arise from the construction of the proposed substation and Barnadivane Wind Farm and due to the development contributions and rates associated with both developments. The construction of the proposed substation will also facilitate the connection of Barnadivane Wind Farm to the national electricity grid thus assisting in the achievement of national and EU targets for renewable energy generation.

5.4.3 Mitigation Measures

The proposed development will provide potential employment opportunities to the local community during the construction phase, and ongoing sustainable income for the developers and landowners involved. There will also be some level of economic expenditure on local businesses and services, mostly during the construction stage but also to a lesser extent during operation of the project. There will be a contribution of rates for the benefit of Cork County Council and the wider community through the services that they will fund. As these effects are positive, no mitigation measures are necessary.

5.4.4 Residual Impacts

Residual impact for socio-economic impacts will be significant positive for the duration of the construction for some businesses in the area and will be moderately positive in general. Residual socio-economic impacts during operation will be slightly positive.

5.4.5 Conclusions

In terms of socio-economics, the development is expected to have a positive impact, especially during the construction phase.

5.5 Recreation, Amenity and Tourism

5.5.1 Receiving Environment

The South West region, on an annual basis, generates €1.3 billion in tourism revenues and welcomes in excess of 3.6 million visitors each year[13]. In 2012, approximately 1,228,000 overseas tourists visited Cork City and County, contributing approximately €399 million to the local economy[14].

In 2010, approximately 966,000 overseas tourists visited Cork City and County, contributing approximately €352 million[15] to the local economy. County Cork possesses extensive areas of scenic beauty which, in addition to its heritage, culture and leisure facilities, are a major indigenous resource. The main recreational activities in the County include golfing, swimming, fishing and angling, cycling, pony trekking and walking.

The site is approximately 10km south of Macroom and the natural attractions of the Lee Valley. Activities in the Macroom area include water sports, GAA, golf, pitch & putt and cycling.

Visitor attractions and sites of interest located near Macroom include a hydroelectric scheme at Carrigadrohid, the Gearagh (the remains of the only ancient post-glacial alluvial forest in Western Europe) and Bealick Mill, a major tourism and heritage attraction.

Additional recreational activities in the local area include road bowling, walking and angling.

5.5.2 Potential Impacts

The proposed development is not expected to have a significant, adverse impact on recreation and amenity in the surrounding area. The proposed development is not particularly visible from local roads or other known recreation areas and there are no significant distant effects.

5.5.3 Mitigation Measures

It is not considered that mitigation measures are necessary with respect to recreation and amenity in the vicinity.

5.5.4 Residual Impacts

Residual impacts for recreation and amenity will be a slight negative during the construction stage and imperceptible during operation of the proposed substation.

5.5.5 Conclusions

The development is not expected to have any significant or adverse effect on tourism in the area or result in a critically adverse landscape impact. The proposed development does not lie within or adjacent to any tourist routes or significant sites of interest (see also Section 9).

5.6 Material Assets

Material assets are considered to be resources that are valued and intrinsic to a specific place. Assets can be of human and natural origin and their value can be linked to either economic or cultural reasons. Examples of natural assets are non-renewable resources (e.g. soils and minerals), assimilative capacities of air and water and renewable resources (e.g. hydraulic and wind resources). Man-made assets are considered to be heritage linked sites/ buildings, landscapes, buildings/ structures and infrastructure.

The proposed site is within the footprint of a permitted wind farm. Accordingly, the wind speeds at the site have been assessed and it has been determined that the site has potential to be economically viable for a wind farm.

For the purposes of this assessment, the existing utilities infrastructure is considered most relevant to the proposed development.

5.6.1 Receiving Environment

The existing Macroom - Dunmanway 110kV overhead transmission line traverses the site, the proposed substation will connect directly to this line. There is an operational wind farm neighbouring the site, the nearest turbine being less than 1km from the proposed substation.

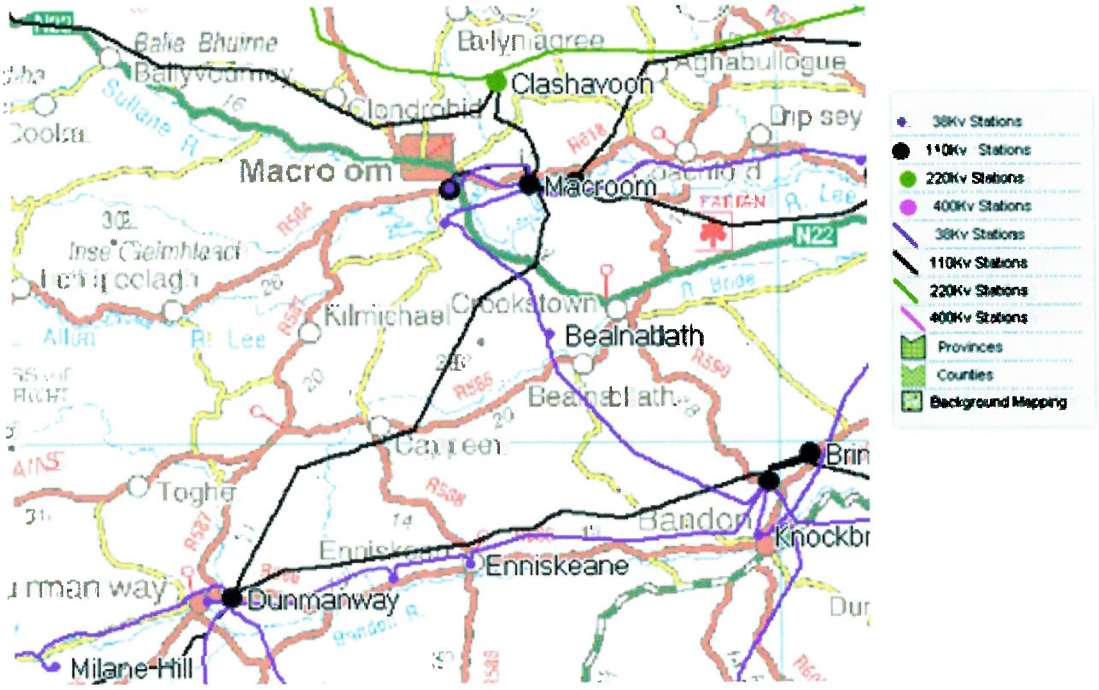

Figure 5-2: ESB High Voltage Networks

In 2010, a firm access agreement was secured for the connection of Barnadivane Wind Farm to the transmission system within Gate 3 under Grid No. TG44.

5.6.2 Potential Impacts

The proposed grid connection substation will connect directly to the overhead line traversing the site. The proposed development will facilitate the supply of electricity to the National Grid. The direct effect of electricity generated by wind on an ongoing basis relative to electricity generated by oil, gas or other fossil fuels is a reduction in the quantity of fossil fuels required for electricity generation. It will do so without contributing to climate change and the generation of pollution associated with power generation from fossil fuels.

5.6.3 Mitigation Measures

Mitigation measures associated with the utilities infrastructure are not considered necessary.

5.6.4 Residual Impacts

It is not anticipated that there will be residual impacts associated with the proposed development.

5.6.5 Conclusions

The development is not expected to have any significant or adverse effect on the material assets in the area.

5.7 Electromagnetic Impacts

5.7.1 Receiving Environment

There is good existing electricity transmission infrastructure in the vicinity of the proposed development. The existing Macroom - Dunmanway 110kV overhead transmission line traverses the site, the proposed substation will connect directly to this line. There is an operational wind farm neighbouring the site, the nearest turbine being less than 1km from the proposed substation.

5.7.2 Potential Impacts

The possible health effects from electric and magnetic fields (EMF's) associated with the transmission, distribution and use of electricity have caused some level of public concern both in Ireland and internationally in recent years. The main interest in this country has centred on the electro-magnetic fields produced by ESB power transmission lines.

An information booklet prepared by Eirgrid, 'Information on Electric and Magnetic Fields'[16] states that *'Transmission substations produce small fields with the maximum values generally occurring where the line(s) and/or cable(s) enter and exit the substation. Typical values are as per the values referenced ... for transmission lines and cables.'*

Following from the above, the assessment of the electromagnetic effects associated with the proposed development was based on the values associated with a 110 kV line as the substation is connecting to an existing 110 kV overhead line passing through the proposed site.

The relevant parameters used to measure electro-magnetic forces, electric field strength and magnetic flux density, vary with distance from source. The EU/ICNIRP (International Commission on Non-Ionising Radiation Protection) guideline limit for electric field strength is 5 kV/m and the guideline limit for magnetic flux density is 100 μT.

Typical electric field strength and magnetic flux density at 30 metres from overhead transmission lines in Ireland (and thus for this substation also) for a 110 kV double circuit is 0.043 kV/m and 0.01 μT respectively. The nearest occupied building to the proposed substation is over 300 m away.

This means that the typical electric field strength, at 30 m from the proposed substation, will be less than 1 % of the recommended guideline limit. The magnetic flux density, at 30 m from the proposed substation, will be 0.01 % of the recommended guideline limit.

For the purposes of comparison, some typical electric field strength and magnetic flux density values associated with some common household appliances are shown below:

Table 5-2: Typical Values of Electric and Magnetic Fields in the Environment[17]

Item	Electric Field Strength kV/m	Magnetic Flux Density μT
Electric blanket (as used)	2.00	3.3
Hairdryer (at 30 cm)	0.04	7.0
Television (at 30 cm)	0.03	2.0
Electric Cooker (at 30 cm)	0.01	4.0

In October 2005, the World Health Organisation convened an international panel of experts to form the EMF Task Group. The EMF Task Group's main objective was to review the scientific literature on the biological effects of exposure to extremely low frequency (ELF) fields (such as electricity power lines) in order to assess any health risks from exposure to these fields and to use this health risk assessment to make recommendations to national authorities on health protection programs.

The group published an Environmental Health Criteria (EHC) monograph of its findings in June 2007.The Task Group concluded that there are no substantive health issues related to ELF electric fields at levels generally encountered by members of the public.

Based on this assessment, it is concluded that the potential electromagnetic impact arising from the proposed substation will be insignificant and that there is no risk to human health arising from the insignificant electromagnetic impact.

Cumulative Impacts

There is no potential for cumulative electromagnetic effects as the predicted electromagnetic forces are due to the electricity lines connecting to and leaving from the substation. As these are existing 110 kV overhead lines there will be no additional impacts associated with the proposed development.

5.7.3 Mitigation Measures

As the potential impacts from electromagnetic effects are assessed to be insignificant, no further mitigation measures are required except that all electrical equipment should meet Eirgrid minimum standards.

5.7.4 Residual Impacts

Residual impacts for electromagnetic effects will therefore be insignificant.

5.7.5 Conclusions

The electromagnetic effects of the proposed development from the design phase through to construction and operation of the substation have been taken into account. Based on this assessment, it is concluded that the potential electromagnetic impact arising from the proposed substation will be insignificant and that there is no risk to human health arising from this insignificant electromagnetic impact.

5.8 Health and Safety

5.8.1 Receiving Environment

Existing health and safety issues are associated with thecu rrent landuses . Health and safety issues on the farmed land are routine for such lands and there is no public dimension as there is nopublic access.

5.8.2 Potential Impacts

The developer has significant experience managing the safety of their projects. While zero accidents and pollution prevention are tangible aims during the course of construction and operation of the grid connection and substations, any development can give rise to both occupational and public accidents, and this development is no exception.

The proposed development will be designed, constructed and operated in accordance with the following health and safety regulations:

- *Safety, Health & Welfare at Work (Construction) Regulations 2013*
- *Safety, Health & Welfare at Work Act 2005*
- *Safety, Health & Welfare at Work (General Applications) Regulations 2007*

A detailed Safety and Health Plan addressing all aspects of the construction process will deal more fully with these and other related issues.

Access to the site during construction will be restricted by the presence of security personnel. It should be noted that the substations will be located on private land, to which members of the public have no automatic right of access. The substation will have a palisade fence 2.4 m in height around the perimeter during the operational lifetime of the substation.

Potential Impacts during Construction

Occupational accidents are most likely to occur during the construction phase. The developer will appoint a Project Supervisor Construction Stage (PSCS) who will be responsible for the management of health and safety in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013. The PSCS will be responsible for co-ordinating the activities of all the separate contractors involved in the construction phase and for ensuring that the relevant regulations are adhered to. A Project Supervisor for the Design Process (PSDP) has been appointed from the inception of the design of the project. During construction of the proposed substation, the PSDP will be responsible for liaising with the PSCS on design related matters.

Aspects of the development will present health and safety issues, as follows:

- potential impact of construction on health and safety
- traffic safety during the transport of loads to the site
- assembly of heavy prefabricated components
- working with electricity during decommissioning
- general construction site safety (e.g. slip/trip, moving vehicles, etc.)

The health and safety risks associated with the proposed development are not considered to be significant beyond normal construction risks, which will be mitigated where necessary.

Considering that the nearest building or residence is over 250m away, damage to nearby buildings is not anticipated to present a risk for the proposed development.

Potential Impacts during Operation

Once operational, the substation will require on-going maintenance. Maintenance checks involve a low level of vehicle movement, perhaps an average of three to four vehicles per week. The substation will be locked at all times where there is no person in attendance. No personnel will be allowed to access the substation area except in the presence of a fully trained representative of the operator of the wind farm. The substation will be constructed in accordance with Eirgrid requirements which take account of the health and safety of on-site personnel. Operational risks are not considered to be significant.

Potential Cumulative Impacts

The construction works for the wind farm could potentially overlap with the construction of the substation to a certain degree, but the majority of the wind farm construction works will be carried out at relatively large separation distances from the substation construction and therefore significant cumulative impacts are not expected. Mitigation measures include a Safety & Health Plan which will further reduce the likelihood of cumulative impacts.

There is no potential for cumulative health and safety impacts during the operational phase as the site is self-contained and there are no other adjacent works currently permitted in the immediate vicinity.

5.8.3 Mitigation Measures

Mitigation measures for Health and Safety are divided into those occurring during construction and those occurring during operation.

Construction Health and Safety Mitigation Measures

The developer aims to ensure that construction hazards are managed by everyone, and that plans are adequately prepared to ensure that there is an accident and incident free environment. In particular, the contractors will:

- ensure that hazards are identified and that the risk to those involved in the project and to third parties (e.g. the public) are minimised
- consider mitigation against hazards and reduce risk during the design stage. Risk assessments, methods of construction and information regarding the maintenance shall be completed and submitted to the safety file
- ensure the life cycle of the project is assessed so that hazards are eliminated or reduced to lower the risk level for workers

A site specific Safety and Health Plan will be prepared for the project in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013. This document will be prepared on a preliminary basis during the preparation of contract documents and prior to the appointment of a contractor. This document will be finalised by the contractor prior to commencing work on site.

This document will address all safety, health and welfare issues associated with the construction phase of this project including, but not limited to, the following:

- site access and induction training
- general site safety
- excavations and earthworks
- compressed air
- transport, earthmoving and material handling machinery
- working with heavy, pre-fabricated loads
- lifting appliances
- protection from overhead power lines
- chains, ropes and lifting gear
- special provisions for hoists
- carriage of persons and securing loads
- protective clothing and footwear required
- lock-out/tag-out procedure for safe electrical work
- measures to ensure ground stability
- measures to deal with emergencies

All hazards will be identified and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to provide adequately for all hazards and risks associated with the construction phase of the project.

Suitable access to and egress from the proposed development will be maintained for the emergency services during the construction phase.

FÁS Safepass registration cards are required for all construction, delivery, and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme (CSCS) card where required.

The developer is required by law to ensure that a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety & Health Plan. Public safety will be addressed by restricting site access during construction. Appropriate warning signs will be posted, directing all visitors to the site manager.

Operational Health and Safety Mitigation Measures

For security purposes, the main gate to the substation compound will be kept locked except while maintenance and caretaking duties are carried out. The compound will be surrounded by a 2.4 m palisade fence.

As detailed in section 5.7.2, the impacts of the electro-magnetic fields arising from the proposed development on public health are insignificant. As a result, there are no mitigation measures required to protect the public from electro-magnetic fields arising from the proposed development.

The plant will be constructed to Eirgrid design specifications and following completion, the substation will be taken over by Eirgrid. The Eirgrid design specifications and standard operating procedures incorporate standard health and safety industry practice.

5.8.4 Residual Impacts

Following from the correct implementation of the suggested mitigation measures, residual impacts for health and safety during construction will be minor and will be slight during operations for construction and operations staff. Residual impacts for health and safety will be imperceptible for the public during construction and operation.

5.8.5 Conclusions

The health and safety implications of the proposed development from the design phase through to construction and operation of the substation have been taken into account.

The construction phase is deemed the most hazardous stage of the proposed development. The construction works for the wind farm could potentially overlap with the construction of the substation to a certain degree.

This will be addressed by the developer who will identify a project site manager with responsibility for coordinating good environmental and health and safety practices during construction of substation and the wind farm.

The majority of the wind farm construction works will be carried out at relatively large separation distances from the substation construction and therefore significant cumulative impacts are not expected.

5.9 Traffic and Transportation

5.9.1 Existing Environment

There is a good network of local roads accessing the site. The nearest national route, the N22, is the main arterial route for traffic commuting between Cork and Killarney and is located approximately 5 km to the north at its closest. The nearest regional route, the R585 between Cork and Bantry, passes 1 km to the south of the site. The R585 connects to the N22 at Crookstown, 5 km to the east of the site.

Access to the site will be provided from the R585, along a local road north to Garranereagh, which then turns west and south, to the proposed site entrance at Barnadivane. A new access road will provide access from the public road, to the substation site.

5.9.2 Potential Impacts

During construction of the substation, there will be an impact on traffic in the area, with the delivery of construction materials and the electrical infrastructure. The largest component to be delivered to site will be the transformer unit, which will constitute an oversized load. The developer will liaise with the local authority, An Garda Siochana and local residents in relation to the delivery of the transformer to the site.

As with any construction development project, the transport of materials onto the site will give rise to increased traffic and associated impacts. However due to the very nature of construction these impacts will be temporary.

During operation, there will not be a permanent presence on site, with operation and maintenance personnel travelling to site 3 to 4 times each week. The impact during operation is therefore expected to be imperceptible.

In terms of cumulative impact, it is expected that the consented Barnadivane Wind Farm will be constructed in parallel with the proposed substation. There will therefore be a cumulative impact on local traffic during the construction phase. The construction activities will be co-ordinated for both developments throughout, in order to minimise this impact.

5.9.3 Mitigation Measures

Public perception of the construction phase will be influenced primarily from the impact of traffic movements. The degree of traffic disturbance caused by the construction phase will depend on the civil engineering requirements for the proposed development, the electrical equipment to be delivered to the substation site and the length of the construction period.

Construction traffic will require regular access to the site at varying times throughout the construction phase. Procedures will be put in place to manage traffic effectively on site and in the immediate vicinity of the proposed substation to ensure the continued movement of traffic on the public roads and to minimise disturbance during transportation of materials, particularly oversize loads.

Prior to the commencement of construction, a construction traffic management plan will be prepared by the main contractor, in liaison with all relevant stakeholders. This document will be updated as necessary throughout the project.

The hours of construction activity will be limited to avoid unsociable hours as per Section 8.5 (d) of the code of practice for BS 5228: Part 1: 1997. Construction operations will generally be restricted to between 08:00 hours and 19:00 hours Monday to Saturday. Work on Sundays or public holidays will only be conducted in exceptional circumstances or in an emergency. Additional emergency works may also be required outside of normal working hours as quoted above.

Construction commencement dates are yet to be confirmed at this stage; these will be made known to the Planning Authority by way of formal Commencement Notice.

Access to the substation site will be via the local public roads, off the R585, as indicated above. It is not envisaged that any alterations to the local roads will be required, save at the entrance to the site, as shown on the planning drawings. The precise nature of any improvement works to the public roads will be agreed between the developer, the local authority and the local landowners, should this be required.

5.9.4 Residual Impacts

The main impact on traffic and transportation will be during the construction phase of the project, which will be of short duration. Even when the cumulative impact of parallel construction of the consented Barnadivane wind farm is assessed, the overall impact will not be significant.

During operation, the impact will be imperceptible.

5.9.5 Conclusions

Mitigation measures have been proposed to minimise the construction stage impacts. If all of these mitigation measures are implemented, there is a high degree of confidence that the traffic and transportation impacts associated with this development will not be slight.

6 ECOLOGY

6.1 Introduction

An ecological impact assessment of the proposed 110kV grid connection substation at Barnadivane (Kneeves), Co. Cork was carried out by FTC between November 2013 and August 2014. The ecological impact assessment was carried out through a combination of ecological surveys and a comprehensive desktop review of the available ecological data for the site.

The proposed substation is located in the townland of Barnadivane (Kneeves), approximately 3.4 km northeast of Coppeen and 10 km south of Macroom. The nearest village is Terelton, approximately 3.4 km to the north.

The ecological surveys were carried out to assess and describe the habitats, mammals (including bats) and birds in the study area. Based on the results of these studies, and the desktop review, the potential impacts of the proposed development on the existing ecology of the area were considered, and appropriate mitigation measures to minimise or avoid any potential impacts were provided.

The proposed substation site ranges in elevation from 250 mOD on the southern boundary to 260 mOD along the northern boundary. The surrounding landscape primarily consists of improved agricultural grassland (GA1), which is cattle or sheep grazed, with a good network of hedgerows (WL1) and earth banks (BL2). There are small pockets of wet grassland (GS4) on wetter ground, supporting abundant rushes, and with cattle grazing also occurring. Small areas of scrub (WS1) and mature and semi-mature conifer plantation (WD4) are also present in the surrounding landscape.

The substation site boundary is situated within the catchment of the River Bride. It lies within the SW_Lee228Bride_3Upper - IE_SW_19_1213 waterbody subcatchment. Drainage from the site boundary is in a south-easterly direction, however there are no watercourses within the substation site boundary.

A full description of the proposed development is available in Section 3.2 of this Environmental Report and the site location is shown on Figure 1.1. It is worth noting that this proposed substation is to replace the substation included in the wind farm planning consent, and is therefore a development which has already been deemed appropriate for this area, by the planning authority.

6.1.1 Aim of Ecological Study

The purpose of this ecological assessment was to:

- undertake a comprehensive desktop review of available ecological data for the study area including a desktop review of the designated nature conservation sites within 10 km of the proposed development;
- undertake baseline ecological field surveys in the study area for habitats, mammals, birds and bats;
- evaluate the ecological significance of the study area;
- assess the potential impacts of the proposed development on the ecology of the study area and surrounding areas;
- consider mitigation measures to reduce the potential negative impact(s) of the proposed development on the ecology of the study area and surrounding land.

6.2 Methodology

6.2.1 Consultation

A number of consultations were carried out with the NPWS in relation to ecology at the site all Barnadivane Wind Farm, within which the substation is located. NPWS Divisional Ecologist, Dr. Jervis Good was contacted by phone on 01 November 2013. Following discussions with Dr. Good, a winter bird vantage point survey, following best practice Scottish Natural Heritage (SNH, 2013) guidance was carried out in the overall area (encompassing the wind farm and substation sites) from November 2013 to March 2014.

NPWS staff Declan O'Donnell and Danny O'Keefe were contacted by phone on 13 May 2014. With regard to assessing the potential impact(s) of the proposed substation development (and the wind farm site within which the substation is located) on ecology, advice was given to screen for impacts on Hen Harrier, Golden Plover, Merlin, Barn Owl, Short-eared Owl, White-tailed Eagle, Red Grouse and Curlew, and also to address potential impacts on Freshwater Pearl Mussel.

6.2.2 Desktop Study

Designated Nature Conservation Sites

A desktop study was carried out to identify the designated nature conservation sites such as candidate Special Areas of Conservation (cSACs), Special Protection Areas (SPAs), Natural Heritage Areas (NHAs), and proposed Natural Heritage Areas (pNHAs) located within 10 km of the proposed substation. FTC holds an archive of GIS data that includes the location and extent of designated conservation areas.

These were plotted on an OSI background map using MapInfo Professional (v 10.5) GIS application. Information on the designated sites was obtained from the National Parks and Wildlife Service (NPWS) website www.npws.ie. These designated sites are described in Section 6.3.1.

The EU Habitats Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora formed a basis for the designation of cSACs[3]. Similarly, SPAs are legislated for under the Birds Directive (Council Directive 79/409/EEC on the Conservation of Wild Birds). Collectively, cSACs and SPAs are referred to as Natura 2000 sites. In general terms, they are considered to be of exceptional importance in terms of rare, endangered or vulnerable habitats and species within the European Community.

NHAs are sites that are protected in Ireland under the Irish Wildlife Acts (1976–2012). Proposed NHAs or pNHAs are subject to limited protection in Ireland, though they are of some significance for wildlife and habitats.

Where developments are proposed proximal to European designated Natura 2000 sites, an Appropriate Assessment (AA) of the impacts of the project on these sites must be made by the Competent Authority. Appropriate Assessment is required under Article 6(3) and6(4) of the EU Habitats Directive (92/43/EEC). It is an assessment of the potential effects of a proposed plan or project, on its own or in combination with other plans or projects, on one or more Natura 2000sites (SPA s and cSACs).

The first stage of the AA process, production of anAA Screening Report was completed by FTC for the proposed substation, and is included in Appendix 2 of this report.

Freshwater Pearl Mussel

The site was assessed for its proximity to known Freshwater Pearl Mussel records. Information on Freshwater Pearl Mussel in the Bandon Sub-Catchment was obtained from the '*Freshwater Pearl Mussel Second Draft Bandon Sub-basin Management Plan*' (NS 2, 2010). Information on sensitive areas for Freshwater Pearl Mussel was obtained from the '*Margaratifera* Sensitive Areas Map' (V05, Feb 2013, Department of Arts, Heritage and the Gaeltacht). Data on known populations was also obtained from the NBDC online mapping tool (http://maps.biodiversityireland.ie).

[3] At present all SACs in Ireland are 'candidate' SACs, and referred to as cSACs. The relevant Statutory Instruments for the SACs in Ireland have not yet been put in place, though these sites must still be afforded protection in accordance with the EU Habitats Directive (92/43/EEC).

Rare or Protected Flora and Fauna

A desktop study was undertaken to locate any record of rare or protected flora and fauna that have previously been recorded for the study area and surrounding hinterland. The proposed substation is located within the 10 km grid square W36. Records for W36 available on the National Biodiversity Data Centre (NBDC) (http://maps.biodiversityireland.ie) website was reviewed. In addition, the NPWS provided records of rare or protected species within the 10 km grid square W36 in which the proposed substation is located.

Records of bats previously recorded in the wider area were obtained from Bat Conservation Ireland (BCI).

6.2.3 Ecological Surveys

Habitats

The habitats in the study area were identified during a habitat walkover survey on 11 June and 08 July 2014. The habitats were classified according to *'A Guide to Habitats in Ireland'* (Fossitt, 2000), during the habitat survey. The dominant plant species present in each habitat type were recorded.

Annex 1 of the EU Habitats Directive (92/43/EEC) lists habitats which are natural habitat types of community interest whose conservation requires the designation of special areas of conservation. The habitats listed on Annex 1 of this Directive were reviewed for any links or correspondence with the habitats recorded on site.

Botanical species were assessed in accordance with their occurrence on the Flora Protection Order, 1999 (S.I. No. 94/1999) and The Irish Red Data Book of Vascular Plants (Curtis & McGough, 1988).

Mammals

Mammal observations or signs (tracks, droppings, prints etc.) were recorded during the habitat walkover surveys of the study area on 11 June and 08 July 2014. The conservation status of mammals within Ireland and Europe was assessed using one or more of the following documents; the Irish Wildlife Acts (1976–2012), the Red List of Terrestrial Mammals (Marnell *et al.*, 2009) and the EU Habitats Directive (92/43/EEC).

A series of bat activity surveys were carried out at the substation site and surrounding landscape on the nights of the 11–12 June, 08–09 July and 26–27 August 2014. Surveys were carried out following Bat Conservation Trust good practice guidelines (Hundt, 2012). The site was first walked in daylight hours to locate potential bat roosting areas, and potential commuting routes. The night-time activity surveys were carried out through a combination of walked and car-based driven transects within the study site and surrounding landscape.

A frequency division bat detector (BatBox Duet) with a Zoom H1 recorder, a time expansion bat detector (Pettersson D240X) with an Edirol MP3 recorder, and a real time expansion Wildlife Acoustics EchoMeter EM3+ bat detector with internal recorder were used.

Birds

Breeding birds were recorded in the surrounding landscape by means of a transect methodology on 11 June and 08 July 2014. Two transects were surveyed, one 550 m to the north of the proposed substation site and one 400 m to the west. The results of these surveys give an indication of the breeding birds present in the vicinity of the proposed substation site. The survey methodology followed that of Bibby *et al.*, (2000). The transects were walked and all birds seen or heard were recorded within 0–25 m, 25–100 m or >100 m distance bands of the transect line.

A winter season Vantage Point (VP) bird survey, following Scottish Natural Heritage (SNH, 2013) guidance was carried out in the townland of Barnadivane (Kneeves) as part of overall ecological surveys. The VP surveys were carried out to assess the presence of Hen Harrier in the area, in addition to wintering birds of conservation concern such as Golden Plover, Whooper Swan and Lapwing. The surveys commenced in November 2013 and were completed in March 2014. Two VP locations were used during the survey and 36 hours of VP watches in total were completed per VP. One of the VPs had a view of the proposed substation area.

The conservation status of the bird species recorded during the bird surveys was assessed using the most recent (2013) 'Birds of Conservation Concern in Ireland '(BoCCI) list (Colhoun & Cummins, 2013). BoCCI are classified into three separate lists, red, amber and green. In general, red-listed species are of high conservation concern, amber-listed species are of medium conservation concern and green-listed species are not considered to be of conservation concern (Colhoun & Cummins, 2013). The status of the bird species was also assessed with reference to Annex 1 of the EU Birds Directive (Council Directive 79/409/EEC of the Conservation of Wild Birds).

6.2.4 Potential Impacts & Mitigation/Enhancement Measures

The overall assessment of the potential impacts associated with the proposed development on the existing ecology of the site and surrounding area, and the consideration of mitigation and/or enhancement measures to minimise potential impacts, was undertaken with reference to the guidelines produced by the EPA (2002) and the NRA (2009).

6.3 Description of the Existing Environment

The ecology of the existing environment of the proposed substation site, and surrounding landscape, is described within this section.

6.3.1 Designated Nature Conservation Sites

The proposed substation site does not lie within any designated nature conservation site. It lies within an approximate 10 km radius of six designated sites. Three of these are Natura 2000 sites (two cSACs and one SPA). There are no NHAs within 10 km, but there are three pNHAs. It should be noted that one of the pNHAs, the Gearagh, is also designated as an cSAC. Figure 6.1 shows the location and extent of the designated nature conservation sites within 10 km of the proposed substation site.

The cSACs are as follows:

- The Gearagh cSAC (000108) – also a pNHA
- Bandon River cSAC (002171)

The SPA is as follows:

- The Gearagh SPA (004109)

The pNHAs are as follows:

- Boylegrove Wood pNHA (001854)
- The Gearagh pNHA (000108)
- Killaneer House Glen pNHA (001062)

Table 6.1 below, summarises these designated sites, their qualifying interests, or special conservation interests, where applicable, as well as the distances of these sites from the proposed substation. The NPWS site synopses, where available, for the designated areas can be viewed in full on www.npws.ie.

An additional SPA, the Mullaghanish to Musheramore Mountains SPA (004162), lies approximately 14.7 km north of the proposed substation. This extensive site is an SPA under the E.U. Birds Directive, of special conservation interest for Hen Harrier. During the breeding season, Hen Harriers forage over a large home range, and may feed (especially males) up to 10 km from a nest site (Hardey *et al.*, 2009).

As the proposed development site is greater than 14 km from the SPA, and outside of the typical foraging range for Hen Harriers from the SPA, it is not considered likely to negatively impact on the status of Hen Harrier within the SPA. Furthermore, a winter season Vantage Point (VP) survey, following Scottish Natural Heritage (SNH, 2013) guidance was carried out in the townland of Barnadivane (Kneeves) as part of the ecological surveys for the proposed development. The VP surveys were carried out to assess the presence of Hen Harrier in the area, in additional to wintering birds of conservation concern such as Golden Plover, Whooper Swan and Lapwing. The surveys commenced in November 2013 and were completed in March 2014. Two VP locations were used during the survey and 36 hours of VP watches in total were completed per VP. Two Hen Harrier observations (both of males) were made during the entire 36 hours of survey time. The total Hen Harrier observation time was 187 seconds or 0.14% of the total survey time. The results of the VP surveys showed that the Barnadivane area is not an important site for Hen Harrier during the winter period, for roosting or foraging, and it is unlikely that there is any connection between the Barnadivane area and the Mullaghanish to Musheramore Mountains SPA. Therefore the SPA is not considered to be in the zone of potential impact of the substation, and it is not assessed further in this ecological report.

Table 6-1: Summary of the Designated Sites within approximately 10 km of the Proposed Substation

Site Name & Code	Site Summary & Qualifying Interests*	Area	Conservation Objectives*	Threats	Distance from Proposed Substation
Killaneer House Glen pNHA (001062)	Killaneer House Glen is a linear wooded stream valley. Site summary not available.	-	-	The site is damaged by illegal refuse disposal.	6.4 km to the southeast
Boylegrove Wood pNHA (001854)	Boylegrove Wood is a small deciduous woodland. The wood is part of an old estate attached to Boylegrove House. It is a locally important deciduous woodland of mainly Oak (*Quercus petraea*) and Birch (*Betula pubescens*).	unknown	n/a	There is some dumping and littering activity occurring in the wood but it is not thought to be seriously damaging the wood.	6.5 km to the northwest
The Gearagh cSAC and pNHA (000108)	The site is a cSAC selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): **Qualifying Interests** [3260] Floating River Vegetation [91A0] Old Oak Woodlands [91E0] Alluvial Forests* [1355] Otter (*Lutra lutra*) This unusual area has formed where the River Lee breaks into a complex network of channels (2 to 6 m wide) weaving through a series of wooded islands. The alluvial woodland which remains today at the Gearagh is of unique scientific interest, and qualifies as a priority habitat under Annex I of the E.U. Habitats Directive. The islands in the Gearagh consist of rather dry alluvium, and support an almost closed canopy of Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Birch (*Betula* spp.). Within the heavily forested channels there is little or no aquatic vegetation, but in the more open areas the E.U. Habitat type 'floating river vegetation' occurs. An	557.95 Ha	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected.	There are no major threats to this site. Damage to marginal areas from drainage attempts and grazing/poaching by cattle may occur in some areas. Illegal removal of timber may occur from time to time. The aquatic communities could be adversely affected by eutrophication.	6.7 km to the north

	oakwood occurs just north of Toon Bridge. Otter, an Annex II species on the E.U. Habitats Directive, is frequent throughout the site. The Gearagh supports part of an important wintering bird population. At the Gearagh, Whooper Swans are regular (40-110, 1990's), as are Wigeon (640, average max.1992-1994), Teal (707, average max. 1992-94), Mallard (250 in January 1993) and Tufted Duck (154, average max. 1992-94). Golden Plover utilise the site on occasions (e.g. 2,000 in January 1994), while there is a regular flock of Dunlin (100-200, 1990s), a species unusual at inland sites. A late summering flock of Mute Swan is regular, with numbers between 120 and 250 from 1992 to 1994. Great Crested Grebe and Tufted Duck breed in small numbers, while there is a feral flock of about 50 Greylag Goose. Despite the fact that about half the original area has been destroyed, the Gearagh still represents the only extensive alluvial woodland in Ireland or Britain, or indeed west of the Rhine in Europe. For this reason it is a unique site and has been designated also as a Statutory Nature Reserve. The international importance of the site is recognised by its designation both as a Ramsar site and as a Biogenetic Reserve. The reservoir is also a Wildfowl Sanctuary.				
The Gearagh SPA (004109)	This site, located c. 2 km south-west of Macroom, comprises a stretch of the River Lee that was dammed in the 1950s as part of a hydroelectric scheme. The valley formerly held an extensive area of alluvial forest but only part of the forest now survives. The SPA extends from Annahala bridge westwards to Toon bridge. The principal habitat is now a shallow lake which is fringed by wet woodland, scrub and grassland that is prone	322.72 Ha	To maintain or restore the favourable conservation condition of the bird species listed as special conservation interests for this SPA.	There are no imminent threats to the wintering bird populations as the site is a Nature Reserve. However, some disturbance is caused to the birds by illegal shooting.	6.8 km to the north

	to flooding. At times of low water, a diverse ephemeral pioneering plant community develops on the mud. The site supports important populations of wintering waterfowl, including swans, dabbling duck, diving duck and some waders. Habitat quality is good and the site provides both feeding and roost sites for the birds. Six of the species have populations of national importance: Mute Swan (*Cygnus olor*), Wigeon (*Anas penelope*), Teal (*Anas crecca*), Northern shoveler (*Anas clypeata*), Coot (*Fulica atra*) and Golden plover (*Pluvialis apricaria*). Other species which occur regularly include Whooper Swan (*Cygnus cygnus*), Tufted duck (*Aythya fuligula*) and Lapwing (*Vanellus vanellus*). The site is a Nature Reserve, Ramsar site and Biogenetic Reserve. **Qualifying Interests:** [A052] Teal (*Anas crecca*) [A050] Wigeon (*Anas penelope*) [A053] Mallard (*Anas platyrhynchos*) [A125] Coot (*Fulica atra*) [A999] Wetlands				
Bandon River cSAC (002171)	The Bandon River cSAC consists of relatively short adjoining stretches of the Bandon and Caha Rivers. These rivers flow in a southerly direction to the east of Dunmanway, Co. Cork. The site is a cSAC selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): **Qualifying Interests** [3260] Floating River Vegetation [91E0] Alluvial Forests* [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*)	321.26	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected.	Water quality of the river is presently quite good. There is the threat of local enrichment from agricultural run-off. This will impact on Annex II animal species. There is a proposal to alleviate flooding of the River. It is not known whether this proposal will proceed. Forestry upstream poses a threat. Agricultural improvement/reclamation along entire stretch also poses a threat.	10.8 km southwest

	[1096] Brook Lamprey (*Lampetra planeri*) Wet broadleaved semi-natural woodland is found in an undisturbed area of braided river channels and islands below Dunmanway. Floating river vegetation is found along the length of the river and is dominated by water-crowfoots (*Ranunculus* spp). Some small areas of woodland occur within the site north of Long Bridge. A population of Freshwater Pearl Mussel is found in the river. This species is listed on Annex II of the E.U. Habitats Directive. The river also supports populations of protected fish species, notably Brook Lamprey and Salmon (*Salmo salar*), both of which are also listed on Annex II of the E.U. Habitats Directive. This site contains good examples of two habitats listed on Annex I of the E.U. Habitats Directive - alluvial forest and floating river vegetation - and supports populations of four Annex II species - Otter, Salmon, Brook Lamprey and Freshwater Pearl Mussel. The presence of a number of Red Data Book plant and animal species adds further interest to the site.				

*Qualifying interests and conservation objectives are applicable to Natura 2000 sites only.

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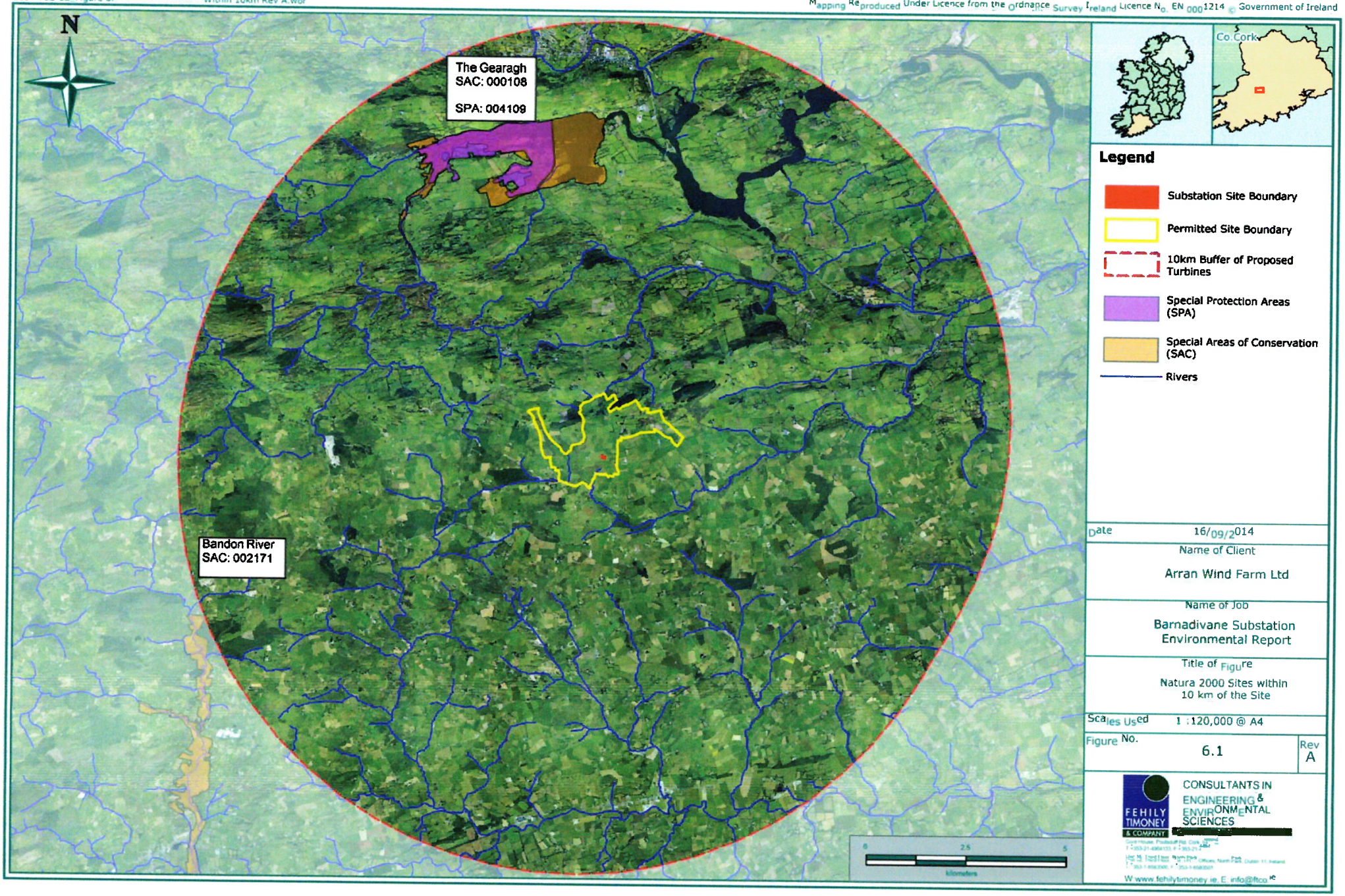
LE14-702-02_Figure 6.1 Natura 2000 Sites Within 10km Rev A.wor



Date 16/09/2014

Name of Client
Arran Wind Farm Ltd

Name of Job
Barnadivane Substation
Environmental Report

Title of Figure
Natura 2000 Sites within
10 km of the Site

Scales Used 1 :120,000 @ A4

Figure No. 6.1

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6.3.2 Rare or Protected Flora and Fauna

The proposed development site lies within the 10 km grid square W36. Existing records of rare or protected species within this grid square were obtained from the NPWS and the NBDC (see Section 6.2.2).

Table 6-2: Rare or Protected Flora and Fauna Recorded within 10 km Grid Square W36 in which Proposed Substation is located

Common Name	Scientific name	Conservation Status	Location
Badger	*Meles*	Protected Species under the Wildlife Acts (1976–2012). Of 'Least Concern' in Ireland (Marnell *et al.*, 2009).	Records exist from Coppeen approx. 3 km southwest of the proposed substation. These were from 1990 and 2007.
Barn Owl	*Tyto alba*	Protected Species under the Wildlife Acts (1976–2012). Of 'Least Concern' in Ireland (King *et al.*, 2011).	Unknown. One record from Hare Survey of Ireland 2006/2007.
Common Frog	*Rana temporaria*	Protected Species under the Wildlife Acts (1976–2012). Of 'Least Concern' in Ireland (King *et al.*, 2011).	Unknown. Records from 2011 National Frog Survey.
Irish Hare	*Lepus timidus hibernicus*	Protected Species under the Wildlife Acts (1976–2012). Protected under Habitats Directive 92/43/EEC, Annex V. Of 'Least Concern' in Ireland (Marnell *et al.*, 2009).	Records from Coppeen in 1990 (approx. 3 km southwest of proposed substation).
Irish Stoat	*Mustela erminea subsp. hibernica*	Protected Species under the Wildlife Acts (1976–2012). Of 'Least Concern' in Ireland (Marnell *et al.*, 2009).	Record from 1969 from Kinnalea
Mudwort	*Limosella aquatica*	Rare or Threatened	Records from the Gearagh (appox. 7 km north of proposed substation)
Otter	*Lutra*	Protected Species: Habitats Directive Annex II and IV Wildlife Acts (1976–2012)	Record from Cummer Bridge, northwest of Poulnagarid (appox. 3 km northeast of substation)
Red Squirrel	*Sciurus vulgaris*	Protected Species under the Wildlife Acts (1976–2012). Of 'Near Threatened' in Ireland (Marnell *et al.*, 2009).	Unknown. The Irish Squirrel Survey 2007.
West European Hedgehog	*Erinaceus europaeus*	Protected Species under the Wildlife Acts (1976–2012). Of 'Least Concern' in Ireland (Marnell *et al.*, 2009).	Record from Macroom, 1983. Animal Survey IBRC Species Records.
Smooth Newt	*Lissotriton vulgaris*	Protected Species under the Wildlife Acts (1976–2012). Of 'Least Concern' in Ireland (King *et al.*, 2011).	Unknown. National Newt Survey 2012.

None of the rare or protected species listed above were recorded during the ecological walkover survey of the proposed substation site. An adult Hedgehog was recorded outside of the substation site, on a local road to the east, on 08 July 2014.

6.3.3 Freshwater Pearl Mussel

The proposed substation is within the Lower Lee catchment, or within the SW_Lee228Bride_3Upper - IE_SW_19_1213 waterbody subcatchment (see Figure 8.1 of Chapter 8). This catchment is an area with pre-1970 live Freshwater Pearl Mussel records, and '*unlikely to contain extant populations*' (*Margaratifera* Sensitive Areas Map, V05, Feb 2013, Department of Arts, Heritage and the Gaeltacht). According to the NBDC map viewer there are no records of Freshwater Pearl Mussel in the Lower Lee catchment but there are historic records in the Upper Lee at Toon and Coolmountain.

The proposed substation site boundary is outside of the Bandon River Catchment which is a known Freshwater Pearl Mussel catchment. This catchment is approximately 10 km to the southwest. The Bandon Freshwater Pearl Mussel catchment is drained by the Bandon and Caha rivers and lies east of the Shehy Mountains. Freshwater Pearl Mussel distribution in the Bandon River is known to be widespread, with records from Cullenagh Lake to Bandon Town. The Caha and Blackwater Rivers also have wide distributions of the mussel. In the Bandon River main channel, the mussel is abundant in places, although the conservation status of the mussels in the catchment is unfavourable (NS 2, 2010).

6.3.4 Habitats

Habitats at the Proposed Substation Site

The proposed substation lies within a large field of improved agricultural grassland (GA1) habitat, which is predominantly used for cattle grazing and silage cutting. This habitat contains perennial rye grass (*Lolium perenne*), Yorkshire fog (*Holcus lanataus*), velvet bent (*Agrostis canina*), daisy (*Bellis perennis*), ribwort plantain (*Plantago lanceolata*), docks (*Rumex* spp.), spear thistle (*Circium vulgare*), creeping buttercup (*Ranunculus repens*), white clover (*Trifolium repens*), soft rush (*Juncus effusus*) and red fescue (*Festuca rubra*).

Improved agricultural grassland is also the dominant habitat in the surrounding landscape, outside of the substation site. This is an artificial habitat, and is considered to be of 'Local Importance (Lower Value)' according to NRA (2009) guidelines.

The field in which the proposed substation is located is bounded to the north by earth banks (BL2) with vegetation cover of grasses, ferns, gorse (Ulex europaeus), foxglove (Digitalis purpurea) and germander speedwell (*Veronica chamaedrys*). To the east and south the field boundary is bounded by a hedgerow (WL1) with hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), gorse, bramble (*Rubus fructicosus* agg.), fuschia (*Fuchsia magellanica*) and an understory of foxglove and nettles (*Urtica dioica*). The earthbanks and hedgerows are considered to be of 'Local Importance (Higher Value)', according to the NRA (2009) guidelines and they provide habitat links and ecological corridors for wildlife between habitats in the surrounding landscape.

The site for the proposed substation site drains south-eastwards into two agricultural drains or drainage ditches (FW4) which meet at a T-Junction at the bottom of the field. The drains were dry at the time of the survey. This is an artificial habitat, and of low ecological value.

Habitats in the Surrounding Landscape

The surrounding landscape is largely dominated by improved agricultural grassland (GA1), although pockets of wet grassland (GS4) with abundant soft rush are found on the wetter or poorly draining areas. Patches of scrub (WS1) are also found in the surrounding landscape with gorse dominating. Both wet grassland and scrub are of 'Local Importance (Higher Value)' according to the NRA guidelines (2009), and they provide cover for birds, mammals and other wildlife. Pockets of conifer plantation (WD4) with mature and semi-mature sitka spruce (*Picea sitchensis*) are located to the west and north of the proposed substation. This is an artificial habitat of 'Local Importance (Lower Value)'.

No habitats listed on Annex 1 of the EU Habitats Directive were recorded at the substation site or in the surrounding landscape. Similarly, no botanical species on the Flora Protection Order, 1999 (S.I. No. 94/1999) or on the Irish Red Data Book of Vascular Plants (Curtis & McGough, 1988) were recorded.

Invasive species

The invasive species Japanese knotweed (*Fallopia japonica*) was found along a local road outside of the substation site, about 1 km northwest (GPS position 33565, 63425). Japanese Knotweed is a non-native invasive plant species. It is listed on the 'most unwanted' list by Invasive Species Ireland; a joint project between the Northern Ireland Environment Agency and the NPWS. Japanese Knotweed is a threat in open and streamside areas. It can spread rapidly to form dense stands, excluding native vegetation and reducing species diversity. Once stands become established, they are extremely persistent and difficult to remove.

6.3.5 Terrestrial Mammals

No mammal burrows, tracks or signs were recorded during the ecological surveys of the proposed substation site. However, Fox (Vulpes vulpes) were found to be common and widespread in the surrounding landscape, with droppings and tracks found frequently. A Fox den was found to the south of the proposed substation site (about 700 m south). Rabbit (*Oryctolagus cuniculus*) were also recorded frequently in the surrounding landscape. Fox and Rabbit are thus likely to use the proposed substation site for foraging. Fox and Rabbit are of 'least concern' in Ireland (Marnell *et al.*, 2009) and are not protected under the Wildlife Acts (1976–2012).

Hedgehog are likely to be present in the surrounding landscape and an adult was recorded on the local road to the east of the substation site on 08 July 2014. Thus, Hedgehog are also likely to use the substation site for foraging. Hedgehog are afforded protection in Ireland under the Wildlife Acts (1976–2012) though they are of 'least concern' (Marnell *et al.*, 2009).

As can be seen from Section 6.3.2, other terrestrial mammals likely to occur in the wider area include Badger, Otter, Sika deer, Hare, Stoat and Red Squirrel. There were no signs of these species in the agricultural grassland habitat in which the proposed substation is located.

Bats

A series of bat activity surveys were carried out at the substation site and surrounding landscape on the nights of the 11–12 June, 08–09 July and 26–27 August 2014. No bats were recorded at the substation site which was likely a result of the high degree of exposure of the site. In addition, no bats were recorded along the earth banks bounding the north of the substation site or the hedgerows to the east and south. There is no potential for roosting bats in the earth banks or hedgerows surrounding the proposed substation and although bats were not found to forage there, likely due to the high degree of exposure of the site, they may do so occasionally.

In the surrounding landscape bats were commonly recorded foraging along hedgerows and earth banks at lower elevations. Common pipistrelle (*Pipistrellus pipistrellus*) were most frequently recorded with Soprano pipistrelle (*Pipistrellus pygmaeus*) to a lesser extent. A Brown long-eared bat (*Plecotus auritus*) was found roosting in a farm building along a local road approximately 700 m to the northeast of the proposed substation site. A single Leisler's bat (*Nyctalus leisleri*) was also recorded foraging at this location along with a low number of Daubenton's bats (*Myotis daubentonii*).

Records obtained from BCI for the wider area have found a number of species within 10 km of the site including: Common and Soprano pipistrelle, Brown long-eared bat, Leisler's bat, Lesser Horseshoe bat (*Rhinolophus hipposideros*), Daubenton's bat and Whiskered bat (*Myotis mystacinus*).

All of the above species are protected under the Wildlife Acts (1976–2012). All are listed as of 'least concern' in Ireland, apart from Leisler's bat which is listed as 'near threatened' (Marnell *et al.*, 2009). All species are protected under Annex IV of the EU Habitats Directive and Lesser Horseshoe bat is also listed on Annex II.

6.3.6 Birds in the Existing Environment

Breeding Bird Surveys

The results of the breeding bird transect surveys are shown on Tables 6.3 and 6.4. The tables show the total abundance of each species for both transects on both visits.

Visit 1 was 11 June 2014 and visit 2 was 08 July 2014. The maximum count of each species from both transects on both visits is also shown. The conservation status of each species on the most recent Irish Birds of Conservation Concern in Ireland (BoCCI) list (Colhoun & Cummins, 2013) is also shown, as well as any birds listed on Annex I of the EU Birds Directive.

As can be seen from Table 6.3, a total of 21 species were recorded on the two transects between 0–25 m and 25–100 m of the transects. Of these, the most commonly occurring species were Blackbird, Chaffinch, Meadow pipit, Robin, Rook and Wren. Three amber-listed species, of medium conservation concern in Ireland (Colhoun & Cummins, 2013), were recorded; Robin, Skylark and Starling. One red-listed species, of high conservation concern (Colhoun & Cummins, 2013), Meadow pipit was recorded.

Table 6-3: Birds Recorded during the Breeding Bird Transects between 0–25 m and 25–100 m of the Transects

		T1 & T2, 0-100m	T1 & T2, 0-100m		Conservation Status	
Species Name	Scientific Name	Total Abundance Visit 1	Total Abundance Visit 2	Max. Count	BoCCI	Annex I
Blackbird	*Turdus merula*	9	5	9	Green	No
Blue Tit	*Cyanistes caeruleus*	2	0	2	Green	No
Chaffinch	*Fringilla coelebs*	15	6	15	Green	No
Chiffchaff	*Phylloscopus collybita*	1	1	1	Green	No
Coal Tit	*Periparus ater*	4	3	4	Green	No
Dunnock	*Prunella modularis*	4	3	4	Green	No
Great Tit	*Parus major*	0	1	1	Green	No
Hooded Crow	*Corvus cornix*	5	2	5	Green	No
Jackdaw	*Corvus monedula*	6	0	6	Green	No
Magpie	*Pica pica*	3	1	3	Green	No
Meadow pipit	*Anthus pratensis*	5	2	5	Red	No
Pied wagtail	*Motacilla alba*	1	0	1	Green	No
Reed bunting	*Emberiza schoeniclus*	1	1	1	Green	No
Robin	Erithacus rubecula	6	5	6	Amber	No
Rook	*Corvus frugilegus*	11	10	11	Green	No
Song Thrush	*Turdus philomelos*	2	0	2	Green	No
Skylark	*Alauda arvensis*	3	8	8	Amber	No
Starling	*Sturnus vulgaris*	0	6	6	Amber	No
Willow warbler	*Phylloscopus trochilus*	0	1	1	Green	No
Wood pigeon	*Columba palumbus*	1	13	13	Green	No
Wren	*Troglodytes troglodytes*	14	14	14	Green	No
Total species	**21**					

Table 6-4: Birds Recorded during the Breeding Bird Transects >100 m of, or Flying over the Transects

		T1 & T2, >100 m	T1 & T2, >100 m		Conservation Status	
Species Name	Scientific Name	Total Abundance Visit 1	Total Abundance Visit 2	Max. Abundance	BoCCI	Annex I
Blackbird	*Turdus merula*	1	1	1	Green	No
Goldfinch	*Carduelis carduelis*	1	0	1	Green	No
Hooded Crow	*Corvus cornix*	1	3	3	Green	No
Jackdaw	*Corvus monedula*	1	5	5	Green	No
Jay	*Garrulus glandarius*	1	0	1	Green	No
Magpie	*Pica pica*	1	1	1	Green	No
Pheasant	*Phasianus colchicus*	1	1	1	none	No
Pied wagtail	*Motacilla alba*	0	1	1	Green	No
Robin	*Erithacus rubecula*	2	0	2	Amber	No
Rook	*Corvus frugilegus*	10	6	10	Green	No
Snipe	*Gallinago gallinago*	1	0	1	Amber	No
Song Thrush	*Turdus philomelos*	1	0	1	Green	No
Swallow	*Hirundo rustica*	12	10	12	Amber	No
Wood Pigeon	*Columba palumbus*	2	2	2	Green	No
Total species	**14**					

Table 6-5: Additional Species recorded in Surrounding Landscape

Common Name	Scientific Name	Status (BoCCI)	Status (Annex species)
House sparrow	*Passer domesticus*	Amber	No
Lesser Black-backed Gull	*Larus fuscus*	Amber	No
Linnet	*Carduelis cannabina*	Amber	No
Kestrel	*Falco tinnunculus*	Amber	No
Stonechat	*Saxicola torquata*	Amber	No
Willow Warbler	*Phylloscopus trochilus*	Green	No

As can be seen from Table 6.4, a total of 14 species were recorded >100 m from the transects, or flying over the transects. Of these, Hooded crow, Jackdaw, Rook and Swallow were the most commonly recorded species. Three species are amber-listed (Colhoun & Cummins, 2013); Robin, Snipe and Swallow.

The passerine species recorded during the transects are among the most common and widespread breeding birds in Ireland (Balmer *et al.*, 2013; Crowe *et al.*, 2014). As per NRA (2009) guidance, the majority of the passerine species recorded are not key environmental receptors. Most species recorded are of *'local importance (lower value)'*, as per NRA (2009) guidance, i.e. assemblages on site comprise less than 1% of the local population. Meadow Pipit are red-listed on the most recent BoCCI list due to short-term (13-year) declines of more than 50% in their breeding populations, coincident with the prolonged cold weather experienced during the winters of 2009/10 and 2010/11 (Colhoun & Cummins, 2013).

Table 6.5 shows additional species that were recorded on a casual basis in the surrounding landscape in the vicinity of the proposed substation site. These include five amber-listed species (Colhoun & Cummins, 2013), House sparrow, Lesser black-backed gull, Linnet, Kestrel and Stonechat. An additional green-listed species (Colhoun & Cummins, 2013), Willow warbler, was also recorded.

There were no Annex I bird species recorded during the breeding season.

Winter Bird Surveys

A winter bird Vantage Point (VP) survey following SNH (2013) guidelines, was carried out in the area from November 2013 to March 2014. Two fixed VPs overlooking the site and surrounding area were monitored for a total of 36 hours for bird activity over the site. One of the VPs included a view over the proposed substation area. The VP surveys were carried out to assess the presence of Hen Harrier in the area, in addition to wintering birds of conservation concern such as Golden plover, Whooper swan and Lapwing. All of these species are listed on Annex I of the EU Birds Directive. Golden plover are both red-listed in Ireland, while Hen harrier and Whooper swan are both amber-listed (Colhoun & Cummins, 2013).

Two Hen Harrier observations (both of males) were made during the entire 36 hours of survey time. The total Hen Harrier observation time was 187 seconds or 0.14% of the total survey time. Neither of these sightings occurred over the proposed substation site. Thus, the Barnadivane area does not appear to be an important site for Hen harrier during the winter period, for roosting or foraging. There is no suitable heath, or immature conifer plantation habitats on the site for Hen harrier breeding to occur.

A small flock of about 35 Golden plover were recorded flying about 2 km west of the proposed substation on one occasion in January 2014. Again, the site was not observed to be used regularly by over-wintering flocks of Golden plover.

No Whooper swan or Lapwing were observed during the VP surveys. A Buzzard was heard calling from approximately 1.3 km south of the proposed substation area in November 2013. Buzzard is green-listed in Ireland and not of conservation concern (Colhoun & Cummins, 2013). Both Kestrel and Sparrowhawk were recorded on three occasions hunting or flying in the vicinity of the proposed substation though not directly over the area. Kestrel and Sparrowhawk are both amber-listed in Ireland (Colhoun & Cummins, 2013).

In terms of the qualifying interests/species of the Gearagh SPA, which is situated 6.8 km to the north of the proposed substation, only Mallard was recorded flying over the site, on one occasion in January 2014. Golden plover is not a qualifying species of the Gearagh SPA, but the SPA does support a population of national importance. No other qualifying species, or species of note, from the SPA were recorded.

6.4 Potential Impacts of the Proposed Development on Ecology

A full description of the proposed development is provided in Chapter 3, Section 3.2 – Description of the Proposed Development.

6.4.1 Potential Impacts on Ecology during Construction

Impacts on Designated Nature Conservation Sites

There are no designated nature conservation sites within an approximate 10 km radius of the proposed substation site. Thus there will be no direct impact on the size and scale of any designated site as a result of the proposed development. Similarly the proposed development will not result in any land-take from any designated site. There will be no resource or excavation requirements from any designated site as a result of the proposed development.

The individual elements of the proposed substation development that could potentially give rise to impacts on the designated nature conservation sites are:

- Siltation or pollution of watercourses during construction and operation of the substation leading to pollution of watercourses draining to sites designated for aquatic habitats and species. The designated sites within 10 km of the site which contain aquatic habitats and species include the Gearagh cSAC (and pNHA), Bandon River cSAC and Killaneer House Glen pNHA. Siltation or pollution of watercourses could result in a significant negative impact on aquatic species by affecting growth and reproduction in aquatic species and/or reducing the scale of aquatic habitats.
- Disturbance/displacement impacts on birds from the Gearagh SPA arising from construction of the substation. This could result in a significant negative impact on the SPA and could impact on the conservation objective of the SPA which is to maintain a favourable conservation condition (or population status) of the birds for which the SPA is designated.

Boylegrove Wood pNHA, which is designated for deciduous woodland, will not be impacted by the above potential impacts as it is located approximately 6.5 km northwest of the proposed development and is not designated for aquatic habitats and species, or birds.

Hydrological Impacts on Designated Nature Conservation Sites

The substation site is situated within the catchment of the River Bride (see Figure 8.1 of Chapter 8 Hydrology). The River Bride rises at an elevation of 220 m OD between Monteygaff East and Barnadivane (Kneeves) over 1.5 km to the southwest of the site. It flows in an easterly direction and then veers south eastwards from the proposed site for 5 km towards the R585 regional road. The river then flows north east adjacent to the R585 to Crookstown. It then follows the N22 eastwards to Ovens. The River Bride joins the River Lee just north east of Ovens.

There are no watercourses within the proposed substation site. The site drains south-eastwards into two agricultural drains, or drainage ditches, which meet at a T-Junction at the bottom of the field. There will be no direct discharges from the proposed development to any natural watercourses, with all drainage waters being dispersed to soakaways or as overland flows via vegetation filters at a significant distance from the nearest natural watercourses. Further detail on the proposed drainage design is provided in Chapter 8 – Hydrology and Drainage.

The proposed development location is not within an area of 'benefitting lands' or 'drainage districts' and there are no reported incidents of flooding in the vicinity of the proposed development, as per national flood hazard mapping (www.floodmaps.ie).

As a result of the significant separation between the proposed development and designated sites and the construction best practice measures to be applied, the substation is expected to have a negligible impact on the receiving environment in terms of surface water.

The proposed development will not result in any drainage to any designated site, and thus there will be no negative impacts on any aquatic habitats or species of special conservation interest in any designated site. In addition, all sites are a minimum distance of 6.4 km from the proposed substation site.

Disturbance/Displacement Impacts on Designated Nature Conservation Sites

In terms of potential disturbance to key species in designated sites during construction of the substation, the Gearagh SPA is the site most likely to be impacted as it is designated for numerous bird species. The Gearagh SPA lies approximately 6.8 km to the north of the proposed substation. The SPA supports important populations of wintering waterfowl, including swans, dabbling duck, diving duck and some waders. The qualifying interests of the site are Teal, Wigeon, Mallard and Coot and wetland habitat. Should birds from the SPA commute regularly over the proposed development site, indirect impacts could occur through noise disturbance or displacement during construction works.

A winter bird Vantage Point (VP) survey following SNH (2013) guidelines, was carried out at the proposed development site from November 2013 to March 2014. Two fixed VPs overlooking the site and surrounding area were monitored for a total of 36 hours for bird activity over the site. In terms of the qualifying interests/species of the Gearagh SPA, only Mallard was recorded flying over the site, on one occasion, in January 2014.

Golden plover is not a qualifying species of the Gearagh SPA, but the SPA does support a population of national importance. A small flock of about 35 Golden plover were recorded flying about 2 km west of the proposed substation on one occasion in January 2014. No other qualifying species, or species of note, from the SPA were recorded. Taking into consideration the low levels of activity of wintering waterbirds recorded during VP watches, it is not likely that the construction of the substation will result in adverse impacts, or disturbance of key species from the Gearagh SPA. Furthermore the proposed substation is at a distance of 6.8 km from the SPA and it is highly unlikely that construction noise will create a disturbance to birds in the SPA.

A Stage One Appropriate Assessment Screening Report has been prepared to assess the potential impact(s) of the proposed development on the Natura 2000 sites within 10 km. This report is available in Appendix 2 of this Environmental Report.

Impacts on Habitats

There will be some permanent loss of habitat resulting from the proposed works. The land area requirement for the proposed development is approximately 2.95 ha (excluding potential expansion areas). The majority of the land-take will be from improved agricultural grassland (GA1) habitat. This is an artificial habitat, and is considered to be of 'Local Importance (Lower Value)' according to NRA (2009) guidelines, and it does not contain any key environmental receptors.

In addition to the loss of improved agricultural grassland habitat there will be some small-scale permanent loss of Hedgerow (WL1) and earth banks (BL2) from the proposed development. Approximately 70 m of hedgerow habitat will be removed along the southern boundary of the field in which the substation is located. Approximately 15 m of earth bank habitat will be removed along the northern boundary of the field. Both habitats are considered to be of 'Local Importance (Higher Value)', according to the NRA (2009) guidelines, as they provide habitat links and ecological corridors for wildlife between habitats in the surrounding landscape.

No Annex I habitats will be removed as a result of the proposed works. There will be no impact through loss of rare or protected species as none were found in the survey area.

The removal of hedgerows and earth banks is expected to cause a permanent negative impact on the local wildlife by reducing potential breeding habitat for passerine birds and potential foraging habitat for bats and other mammals. However as the amount of habitat removal is relatively small and as there is a good network of wildlife corridors (hedgerows, treelines and earthbanks) in the surrounding landscape this impact is only expected to be slight. Mitigation measures will be put in place to minimise the impact of habitat removal on birds and mammals (see Section 6.5).

Impacts on Terrestrial Mammals

The proposed construction works will have a temporary negative impact on mammals through noise disturbance and increased human presence in the area during construction. In addition the removal of approximately 70 m of hedgerow and approximately 15 m of earth banks, as described above, will result in a reduction in potential foraging habitat for mammals.

As described in Section 6.3.5, no mammal burrows, tracks or signs were recorded during the ecological surveys of the proposed substation site. Signs of Fox, Rabbit and Hedgehog were found in the surrounding landscape and these species are likely to forage at the proposed substation site. Thus there will be a permanent loss of foraging habitat for these species as a result of the proposed development. Other species which may occasionally occur within the site include Badger, Otter, Sika deer, Hare, Stoat and Red Squirrel, as these species have all been recorded in the wider area.

The potential negative impact on terrestrial mammals from the proposed works is expected to be slight, as the amount of habitat removal is relatively small and as there is a good network of wildlife corridors (hedgerows, treelines and earthbanks) in the surrounding landscape which will provide suitable alternative habitat for mammals. In addition to this, mitigation measures will be put in place to minimise the impact of habitat removal on mammals (see Section 6.5).

Impact on Bats

As described in Section 6.3.5 the bat activity surveys at the proposed substation site did not show any significant bat activity, although bats may occasionally forage along the hedgerows to the east and south. The lack of bat activity recording during field surveys is likely due to the high degree of wind exposure of the site. Bats were found to forage in the more sheltered hedgerows, earth banks and treelines at lower elevations in the surrounding landscape. The proposed substation site, dominated by agricultural grassland and with bordering hedgerow and earth banks, does not provide roosting potential for bats. Thus, the potential impact of the proposed substation on bats is imperceptible.

Impact on Birds

The main impacts on birds from the proposed construction works will be from short-term noise disturbance caused by machinery, and increased human presence, as well as small-scale habitat loss. Habitat loss can in turn result in reduced feeding, nesting and roosting opportunities for birds. Hedgerows are an important habitat for some passerine species and approximately 70 m of hedgerow will be removed as a result of the proposed development. Earth banks to a lesser extent provide habitat for breeding birds, and approximately 15 m of this habitat will be removed.

However, the passerine species recorded during the transects to the north and west of the proposed substation site are among the most common and widespread breeding birds in Ireland (Balmer *et al.*, 2013; Crowe *et al.*, 2014). As per NRA (2009) guidance, the majority of the passerine species recorded are not key environmental receptors. Most species recorded are of '*local importance (lower value)*', as per NRA (2009) guidance, i.e. assemblages on site comprise less than 1% of the local population. Meadow Pipit was the only red-listed species recorded from transects. Meadow Pipit have been red-listed due to recent declines in their breeding populations, possibly linked with recent cold winters in Ireland (Colhoun & Cummins, 2013). The species recorded in the transects may be found in the proposed development site area, however given the relatively small scale of the development (2.95 ha), habitat removal and disturbance are only expected to have a slight negative impact on birds. Furthermore there is a good network of wildlife corridors (hedgerow, earth bank and treelines) in the surrounding environment which will provide suitable alternative habitat for birds. In addition, mitigation measures will be put in place to minimise the potential impact to birds associated with hedgerow removal (see Section 6.5).

The potential impacts on birds associated with designated sites is discussed under 'Disturbance/Displacement Impacts on Designated Nature Conservation Sites' above.

Impacts on Freshwater Pearl Mussel

There will not be any negative impact on Freshwater Pearl Mussel as a result of the proposed development. As discussed in Section 6.3.3, the Lower Lee catchment, downstream of the proposed development site, is unlikely to contain extant populations of Freshwater Pearl Mussel. Furthermore, there are no watercourses within the proposed substation site. There will be no direct discharges from the proposed development to any natural watercourses, with all drainage waters being dispersed to soakaways or as overland flows via vegetation filters at a significant distance from the nearest natural watercourses. As described in Chapter 8 Hydrology, the substation is expected to have a negligible impact on the receiving environment in terms of surface water.

As there will be no impact on surface water from the proposed development, there will be no negative impacts associated with fisheries.

Overall Impact Assessment on Ecology from Construction Works

In general, through small scale habitat loss of improved agricultural grassland, hedgerow and earth bank habitat and disturbance to mammals and birds, the impact of the proposed works is thought to be *Slight* (EPA, 2002).

6.4.2 Potential Impacts on Ecology during Operation

There are not expected to be any further impacts on ecology associated with the proposed substation during the operational phase.

6.4.3 Potential Impacts on Ecology during Decommissioning

In the event of decommissioning of the proposed substation, which is extremely unlikely, activities will take place in a similar fashion to the construction phase, and increased human presence and noise disturbance will be expected. Potential impacts will be similar to the construction phase.

6.4.4 Potential Cumulative Impacts of the Proposed Works

The proposed substation location is within the planning boundary of a permitted wind farm (refer to Section 1.4 for details). There is also an existing wind farm to the east of the proposed substation, Garranereagh Wind Farm. This site has 4 operational turbines, the nearest of which is 1 km from the proposed substation. There is no other significant permitted or planned development in the immediate vicinity of the proposed site.

The construction of the permitted wind farm is likely to overlap with the construction of the substation to a certain degree, and thus there may be a cumulative disturbance impact on birds and mammals through noise and increased human presence in particular. However, the majority of the wind farm construction works will be carried out at relatively large separation distances from the substation construction, thus reducing the potential for cumulative disturbance impacts.

There is likely to be a cumulative impact on habitats through habitat loss from the permitted wind farm. However this only expected to cause a slight negative impact. The permitted wind farm has been designed with minimal habitat loss (less than 1% of the study area). The sensitive wet heath and intact wet grassland habitats in the permitted wind farm site, which support the wider diversity of species, will not be disturbed (FTC, 2006).

The proposed substation location is approximately 500m southwest of the permitted substation, within the planning boundary of the permitted wind farm which was subject to an EIA by both Cork County Council and An Bord Pleanála. The proposed substation will replace the already permitted substation that has not yet been constructed. Accordingly, a development of this nature has already been deemed appropriate within the area.

No significant cumulative impacts on ecology are therefore expected as a result of the proposed substation.

6.5 Mitigation Measures for Ecology

Mitigation measures for ecology are outlined herein.

6.5.1 Mitigation Measures for Ecology during Construction

Mitigation for Designated Nature Conservation Sites

Although potential impacts on surface water quality, and in turn the surface water quality of designated sites, from the proposed works will be negligible, standard mitigation measures for the protection of watercourses will be put in place during construction of the proposed substation. These are described in full in Chapter 8 – Hydrology & Water Quality of this report.

Mitigation for Habitats and Flora

- Construction works will be confined to the footprint of the proposed development so as to avoid unnecessary disturbance to adjoining habitats.
- No disturbance to habitats or flora outside the proposed development footprint will occur. All works and temporary storage of material will be restricted to the immediate footprint of the development, which will be wholly within the development site boundary.
- It is proposed to enhance the value of the habitat at the site, where possible, by planting the perimeter of the site (where slope and land availability allow) with semi-mature trees. Native tree species will be used where possible to provide suitable habitat for birds and mammals found in the surrounding landscape.

Mitigation for Mammals

- Construction operations will take place, where possible, during the hours of daylight to minimise disturbances to faunal species at night.
- A qualified ecologist will check the hedgerow and earth bank areas earmarked for removal for mammals immediately prior to vegetation clearance. In the event that a breeding mammal site is found, the NPWS will be informed and any relevant derogation licences required will be obtained prior to construction.

Mitigation for Bats

- Construction operations will take place, where possible, during the hours of daylight to minimise disturbances to bats foraging at night.

Mitigation for Birds

- Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000, restricts the cutting, grubbing, burning or destruction by other means of vegetation growing on uncultivated land or in hedges or ditches during the nesting and breeding season for birds and wildlife, from 01 March to 31 August. To comply with the Wildlife Acts, clearance of hedgerows and earth banks on site should be confined to outside of the restricted period where possible.
- Construction operations will take place during the hours of daylight, where possible, to minimise disturbances to roosting birds, or active nocturnal bird species.
- It is proposed to enhance the value of the habitat at the site, where possible, by planting the perimeter of the site (where slope and land availability allows) with semi-mature trees. Native tree species will be used where possible to provide suitable habitat for birds and mammals found in the surrounding landscape.

6.6 Residual Impact on Ecology

As a result of the mitigation measures to be applied as part of the proposed development, the proposed substation is expected to have a slight to imperceptible impact on ecology (according to EPA (2002) guidelines). This substation also replaces a substation which is permitted under the wind farm planning consent and which has already been assessed by Cork County Council as appropriate development.

6.7 References

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OPW National Flood Hazard Mapping www.floodmaps.ie (accessed 09/09/2014).

7 GEOLOGY, HYDROGEOLOGY AND SLOPE STABILITY

7.1 Introduction

This chapter of the ER addresses soils, geology, hydrogeology and peat stability in the existing environment, identifies potential impacts of the proposed development and outlines measures to mitigate potential impacts. The proposed substation is to replace a substation which has already been consented as part of a wind farm in the general area. The proposed substation is located within the consented wind farm area.

7.2 Methodology

This section was prepared having regard to the publication *"Guidelines for the Preparation of Soils, Geology and Hydrogeology Sections of Environmental Impact Statements"* published by the IGI[18]. It was prepared using available published literature and included a walkover survey of the site. Intrusive site investigations were also carried out as part of this assessment to determine the ground conditions at the site.

The literature reviewed included:

- "Groundwater Protection Scheme for County Cork" (Geological Survey of Ireland, 1999)[19]
- "Geology of South Cork" (Sheet 25, Geological Survey of Ireland, 1994)[20]
- "General Soil Map of Ireland" (National Soil Survey, 1980)[21]

Following the compilation of site investigation data and published information on the existing environment, the details of the proposed development were reviewed to identify potential impacts on geology, hydrogeology and peat stability.

7.3 Receiving Environment

7.3.1 Bedrock Geology

The GSI publication "Geology of West Cork" is the reference source for the description of the bedrock geology of the region. The GSI 1:100,000 scale bedrock geology map (Sheet 24) shows that Devonian "Old Red Sandstone" underlies the site (Toe Head Formation). The bedrock geology of the site and surrounding area is shown in Figure 7.1.

The Toe Head Formation consists predominantly of cross-bedded sandstone and minor mudstone.

7.3.2 Overburden Geology

The main soil associations within this part of Co. Cork are Brown Podzolics derived from the parent sandstone/mudstone with associated Gleys and Podzols. The main Quaternary sediments identified in this area of Co. Cork are glacial till deposits derived from the underlying sandstone and siltstone which outcrops throughout the area along with minor pockets of peat. The Quaternary deposits are shown in Figure 7.2.

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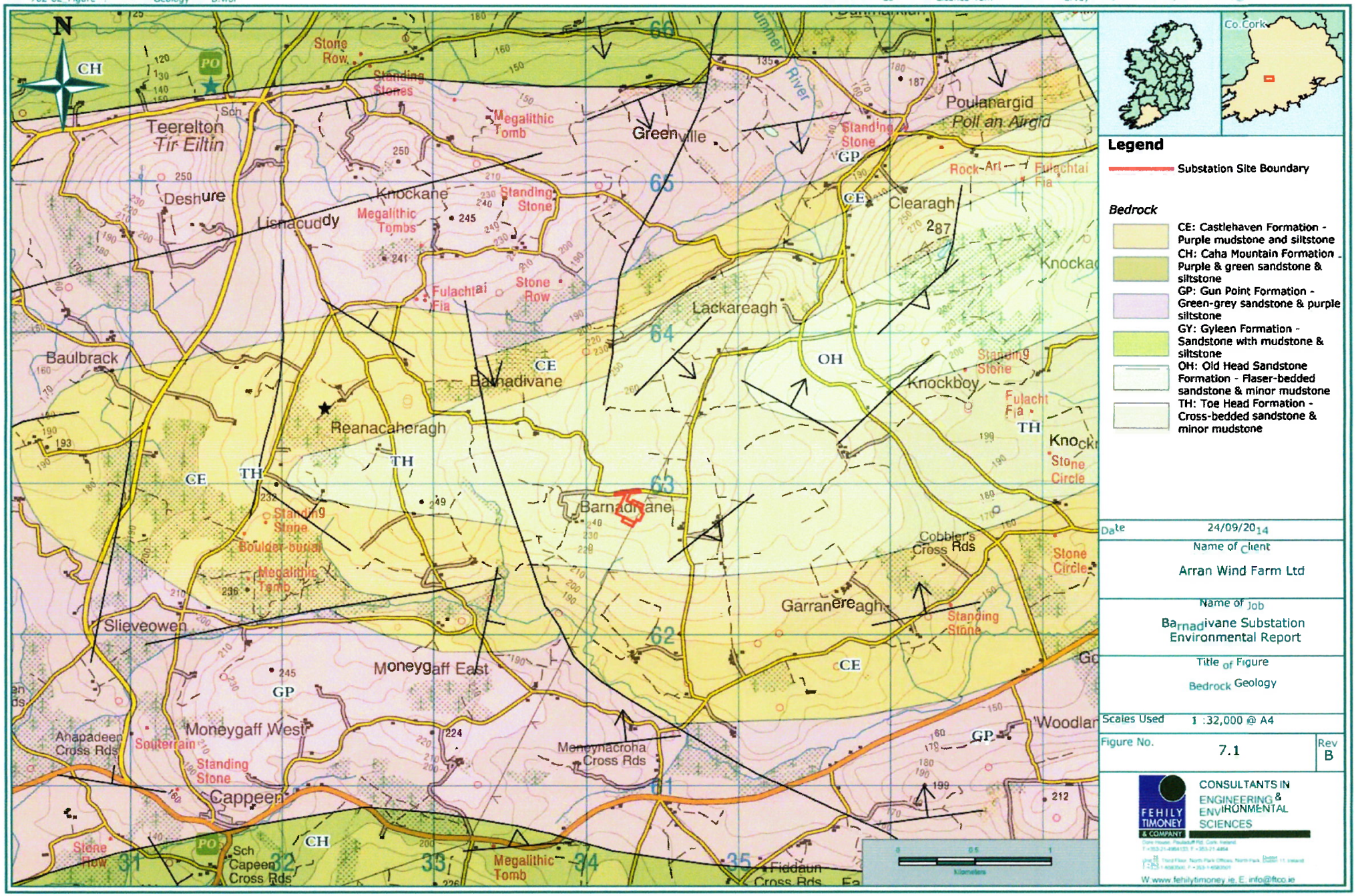
LE14-702-02_Figure 7.1 Bedrock Geology Rev B.wor



Date	24/09/2014
Name of Client	Arran Wind Farm Ltd
Name of Job	Barnadivane Substation Environmental Report
Title of Figure	Bedrock Geology
Scales Used	1 :32,000 @ A4
Figure No.	7.1
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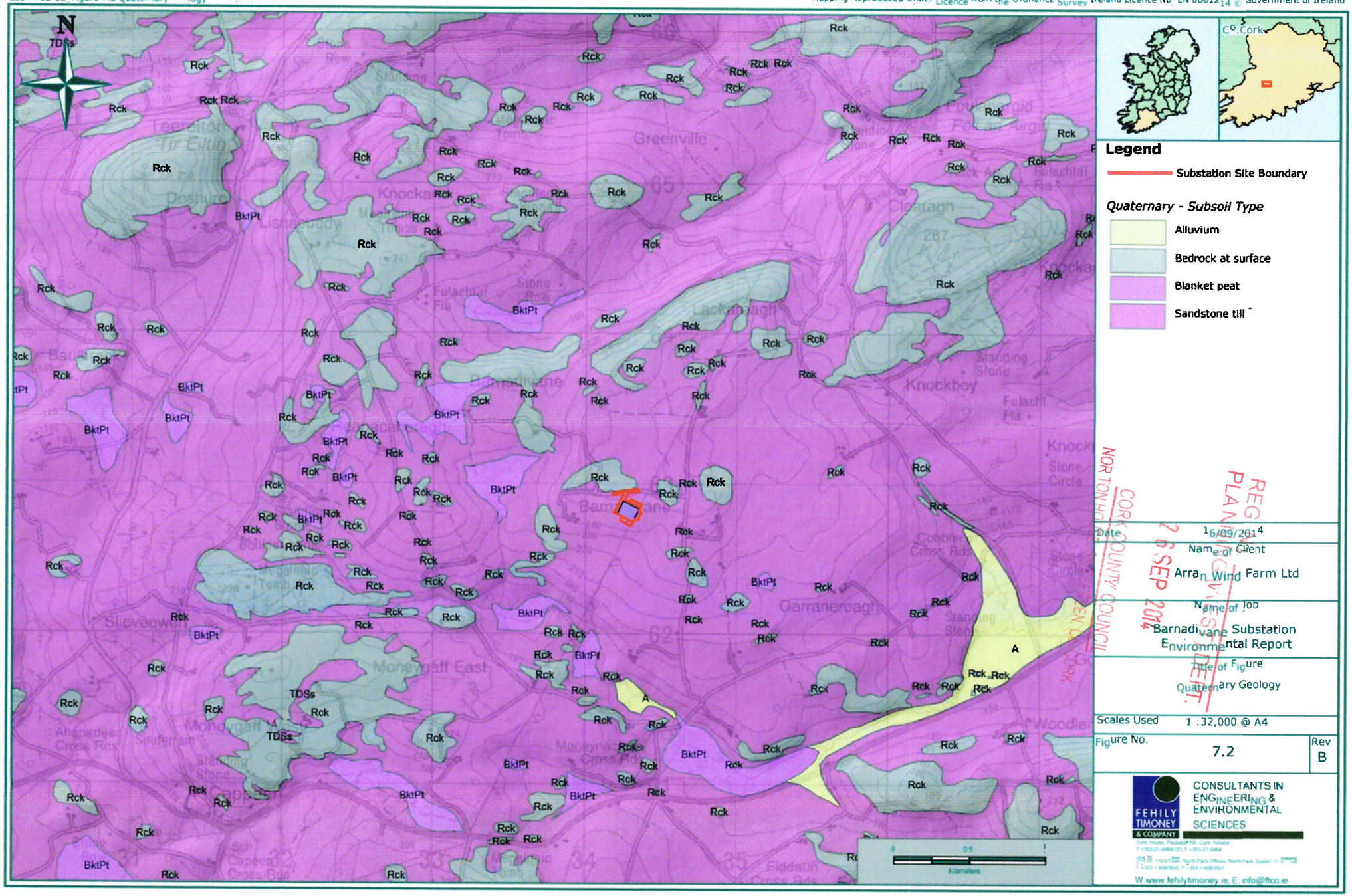
LE14-702-02_Figure 7.2 Quaternary Geology Rev B.wor



Date: 16/09/2014

Name of Client: Arran Wind Farm Ltd

Name of Job: Barnadivane Substation Environmental Report

Title of Figure: Quaternary Geology

Scales Used: 1 :32,000 @ A4

Figure No.: 7.2

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During the site walkover, hand-held probes were undertaken on the site in order to determine the presence or absence of peat/soft ground. These probes met refusal at a depth of 0.1 to 0.2 m within topsoil or mineral soil. There is no evidence of peat at the substation site. A summary of the probe results is presented in Table 7.1.

Table 7-1: Results of Hand Held Probes undertaken during Site Walkover 22 July 2014

Turbine/ID	GPS Coordinates (ING)		Maximum Probe Depth (m)	Maximum Slope	Notes
	X	Y			
Substation	34298	62814	0.2	5-10°	Grass field. Substation located on level ground on break in slope

7.3.3 Hydrogeology

The groundwater section of the GSI website classifies the bedrock underlying the site as predominantly a 'Locally Important Aquifer (Ll)', with bedrock which is 'moderately productive only in localised zones' as shown in Figure 7.3. The southern part of the site (near T6) is classified as a 'Poor Aquifer (Pl)' which is 'generally unproductive except in local zones'.

Groundwater within the aquifer occurs mainly within fracture zones which may occur within the rocks. Yields are generally 0.2 to 1 litre per second and occasionally higher in major fracture zones. Well specific capacities are generally around 1 to 10 m^3/day/m, abstracted mainly by domestic properties and farms.

The GSI lists no groundwater wells within the site boundary but lists about eleven wells within 2 km of the study boundary, as shown on Figure 7.3. It is possible that other properties in the area are also served by groundwater wells.

Groundwater vulnerability, as defined by the GSI, is the term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater could be contaminated by human activities.

The vulnerability of an aquifer to contamination is influenced by the leaching characteristics of the topsoil, the permeability and thickness of the subsoil, the presence of an unsaturated zone, the type of aquifer, and the amount and form of recharge (the hydrologic process where water moves downward from surface water to groundwater). Groundwater vulnerability is determined mainly according to the thickness and permeability of the subsoil that underlies the topsoil, as these properties strongly influence the travel times and attenuation processes of contaminants that could be released into the subsurface from below the topsoil (as in the case of contaminants from landfills, septic tank systems and underground storage tanks). The type of recharge is also considered where indirect recharge (termed 'point recharge' in Ireland) can occur through swallow holes or sinking streams.

The GSI distribution of vulnerability for the area is predominantly 'High' for the site due to the areas of relatively shallow bedrock as shown in Figure 7.4.

The assessed vulnerability for site is shown in Table 7.2. The table illustrates the standard ratings of vulnerability used by the GSI, with the existing site conditions highlighted based on the findings of the site walkover.

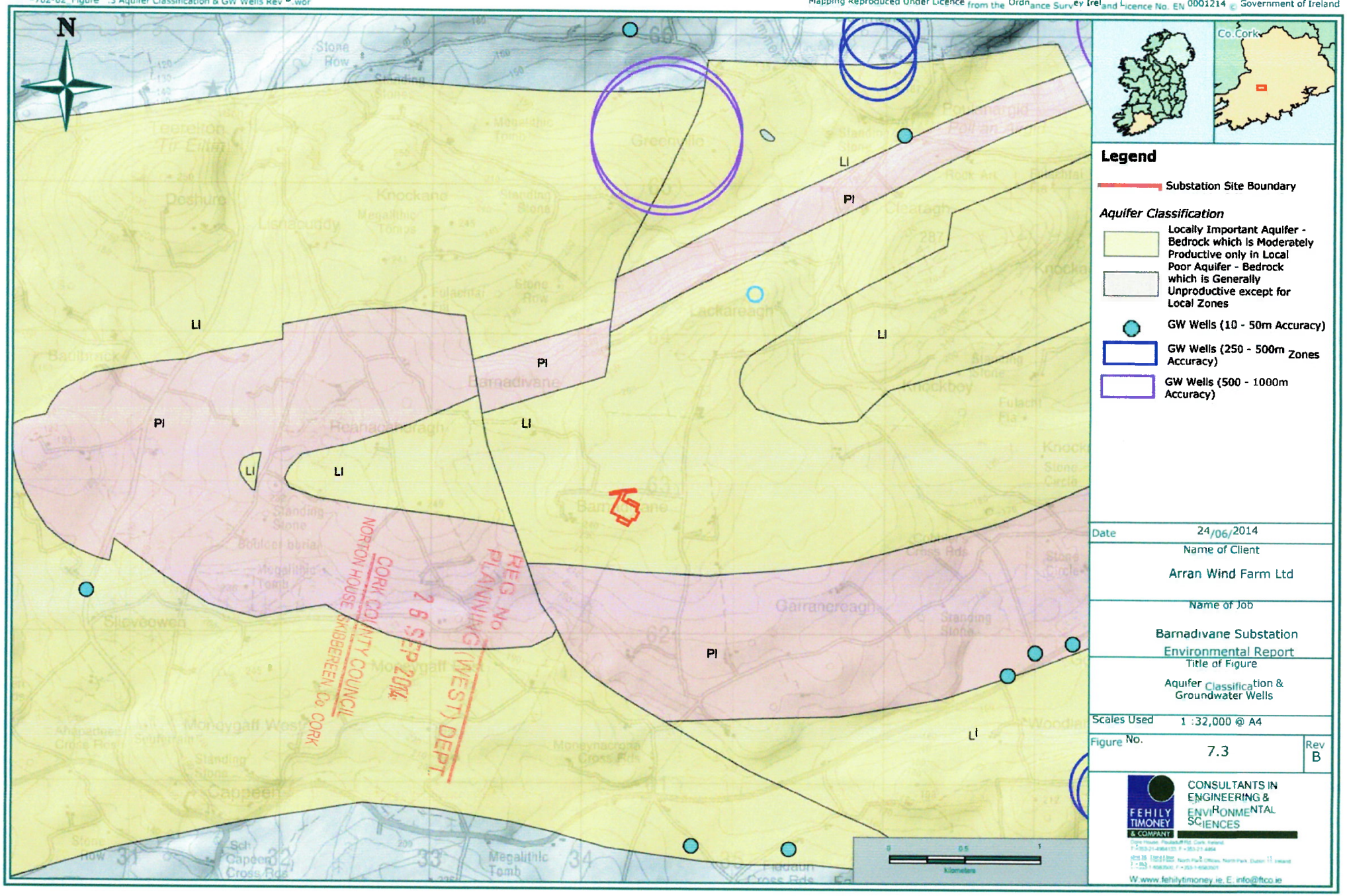
Table 7-2: Groundwater Vulnerability at Barnadivane Substation

Vulnerability Rating	Hydrogeological Conditions		
	Subsoil Permeability (Type) and Thickness		
	High Permeability (Sand/gravel)	Moderate Permeability (e.g., Sandy soil)	Low Permeability (e.g., Clayey subsoil, clay, peat)
Extreme(E)	0 - 3.0 m	0 - 3.0 m	0 - 3.0 m
High (H)	> 3.0 m	3.0 -10.0 m	**3.0 - 5.0 m**
Moderate (M)	Not applicable	>10.0 m	5.0 - 10.0 m
Low (L)	Not applicable	Not applicable	>10 m

Based on the findings from the desk study, the sub-soil thickness on the site is considered to be between 3m and 5 m. This suggests that any contamination will encounter some attenuation prior to reaching bedrock.

The overburden deposits of glacial till have generally low permeability and may therefore act as a confining layer, preventing the free movement of surface water to the underlying aquifer within the bedrock. The topography of the site is generally sloping gently towards the south. Groundwater at the site is expected to flow in the general direction of the topography and surface water courses which again flow predominantly from north to south.

R:\Map Production\2014\LE14\702\02\Workspace\Subsation Environmental Report LE14-702-02_Figure 7.3 Aquifer Classification & GW Wells Rev B.wor



Date	24/06/2014
Name of Client	Arran Wind Farm Ltd
Name of Job	Barnadivane Substation Environmental Report
Title of Figure	Aquifer Classification & Groundwater Wells
Scales Used	1 :32,000 @ A4
Figure No.	7.3
Rev	B

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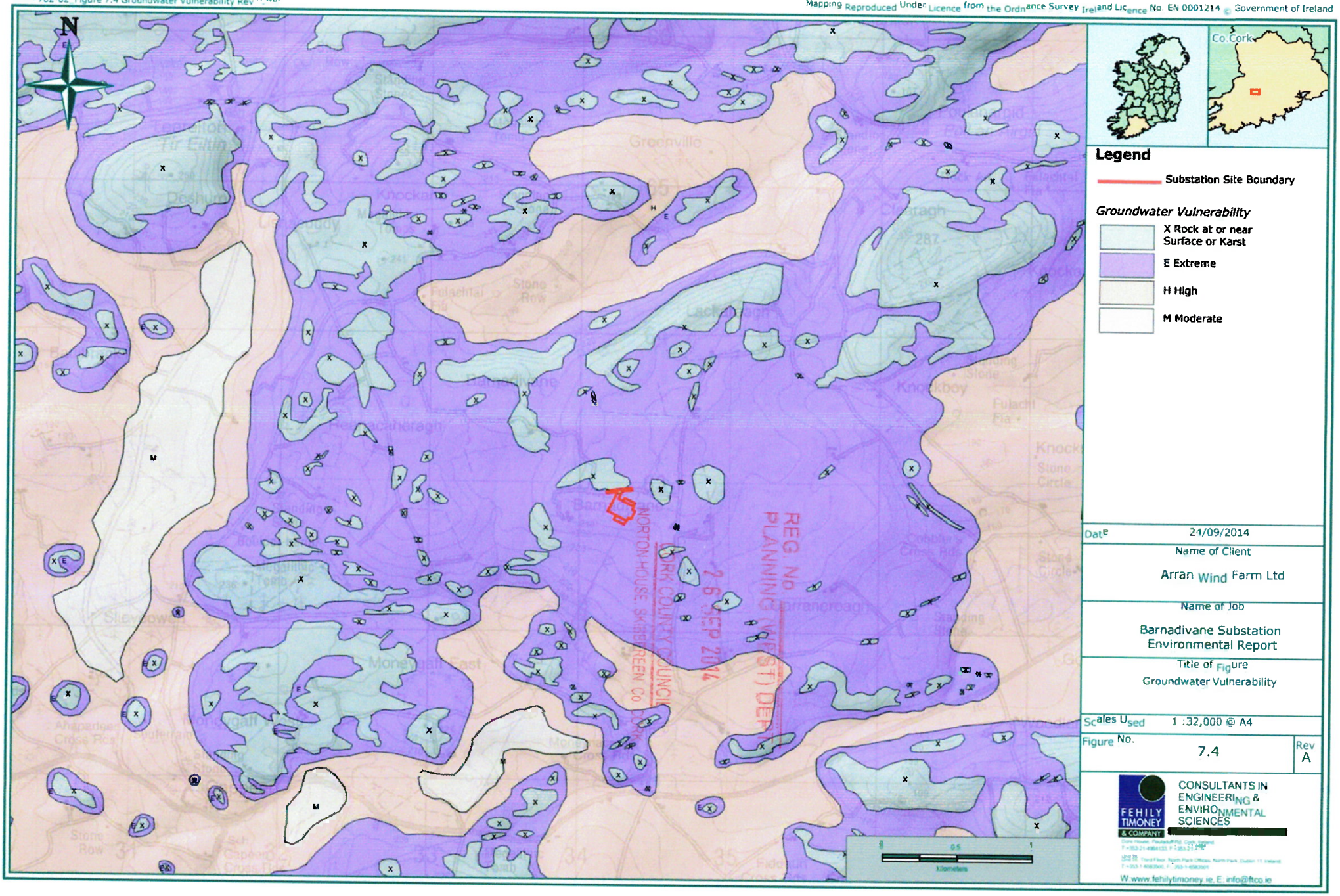
R:\Map Production\2014\LE14\702\02\Workspace\Subsation Environmental Report LE14-702-02_Figure 7.4 Groundwater Vulnerability Rev A.wor



Date	24/09/2014
Name of Client	Arran Wind Farm Ltd
Name of Job	Barnadivane Substation Environmental Report
Title of Figure	Groundwater Vulnerability
Scales Used	1 :32,000 @ A4
Figure No.	7.4
Rev	A

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7.3.4 Existing Slope Stability

The site walkover, undertaken as part of the report preparation, was carried out on 22 July 2014 and included a series of hand-held probes undertaken to determine the depth of peat and/ or soft soils on the site.

The land use across the site generally consists of grazing land.

The slope of the site is characterised by gentle to moderate slopes generally from north to south with typical slopes of between 5° and 10° although the area of the substation is on a fairly level break in the slope. No evidence of slope instability was observed on the site.

Following the site walkover, a review of the potential for a landslide hazard as outlined in Figure 3.1 of the Scottish Executive – Peat Landslide Hazard and Risk Assessments (2006) was carried out.

The potential for a landslide risk is defined in the Scottish Executive "Peat Landslide Hazard and Risk Assessments, Best Practice Guide for Proposed Electricity Generation Developments" (2006) as the following:

- Peat is present at the development site in excess of 0.5 m depth,

and;

- There is evidence of current or historical landslide activity of the site,

or;

- Slopes > 2° are present on-site,

or;

- The works will impinge on the peat covered areas and cannot be relocated to avoid peat covered areas.

The site walkover did not find any evidence of peat close to the substation site and only very thin areas of peat elsewhere on the wind farm site. Based on the desk study combined with information gathered during the site walkover, it is considered that conditions conducive to peat instability are not present on the site and a peat landslide hazard is considered to be absent. A more detailed peat stability assessment is therefore deemed to be unnecessary for the site.

7.4 Potential Impacts

The proposed works require the construction of a substation and associated access tracks and landscaping works where the generalised geology consists of topsoil and glacial till covering bedrock. Existing drainage consists of surface water runoff intercepted by manmade drainage channels at field boundaries. The potential impacts of the development on the geology, hydrogeology and peat stability of the site are assessed below.

7.4.1 Impact Assessment Methodology

The following elements of the development were examined in order to determine the potential impacts on the geology and hydrogeology aspects of the proposed substation at Barnadivane:

- characterisation of the topography, geology and geomorphology of the site
- assessment of stability issues, in the context of the existing environment and the proposed development
- evaluation of the risks and potential impacts of the proposed development

The following sections detail the potential impacts that have been identified from the assessment methodology presented above. Appropriate mitigation measures are then proposed to avoid or adequately mitigate these impacts.

7 4.2 Potential Impacts due to the Excavation and Removal of Soil

The following on-site activities have been identified as the sources of potential risks to the geology and hydrogeology of the site:

- Soil excavation/reuse
- Construction of substation
- Construction of access tracks
- Construction of landscaping berms
- Drainage

The excavation and removal of soil and interference with existing site drainage is a direct permanent effect that, without mitigation, could alter the existing hydrological balance of the site.

The construction of the substation and associated access track may impose hydrological impacts in the form of modifying the natural seepage adjacent to the excavation for the substation, which may deprive ditches and streams of their natural supply of water which may lead to reduced baseflow. Due to the absence of any significant drains in the vicinity, this potential impact is considered to be slight or imperceptible.

Construction of the access track and substation will require excavation of the soil to founding level with access being provided from constructed tracks. The importation of granular fill and other products in the form of concrete or other construction related products will have a permanent, albeit slight, impact on the source quarries or borrow pits.

Soil compaction may occur due to movement of construction and maintenance traffic. This will occur particularly within areas of topsoil which are highly compressible. This could lead to an increase in runoff and subsequently to an increase in erosion. This is not likely to be significant as all traffic will use constructed surfaces with associated drainage mitigation measures (see Chapter 8) as soon as they are ready.

Removal of subsoils may result in the exposure of the underlying rock to sources of contamination. Pollution may occur as a result of spillage or leakage of chemicals, runoff from vehicle washing facilities, unset concrete, storage of fuels or refuelling activities etc. Pollutants may enter groundwater supplies and have potentially significant implications for damage to ecology and local water supplies.

Due to the nature of the soils and the moderate slopes at the site of the proposed substation and access track, the potential impact on slope stability is slight.

7.4.3 Potential Impact on Groundwater

Restrictions to near-surface groundwater flow could occur due to construction of the access track and the substation. This may result in changes to the moisture content of the so ils and may have implications for ecology, sediment transport, flooding and erosion. Due to the localis ed nature of the construction and the generally shallow depth of excavation required, any such impacts are determined to be slight.

7.4.4 Potential Impacts due to Operation and Maintenance of the Proposed Substation

Chemical pollution may occur as a result of spillage or leakage of h ydraulic fluids or fuel or storage of chemicals. Chemical pollutants may enter groundwater supplies and h ave potentially significant implications for damage to ecology and local water supplies.

7.4.5 Potential Cumulative Impacts

The proposed substation location is within the planning boundary of a permitted wind farm (refer to Section 1.4 for details).There is also an existing wind farm, namely Garranereagh Wind Farm, with 4 operational turbines neighbouring the site, the nearest turbine is approximately 1 km from the proposed substation. There is no other significant permitted or planned development in the immediate vicinity of the proposed site.

The proposed substation location is approximately 500m southwest of the permitted substation, within the planning boundary of the permitted wind farm which was subject to an EIA by both Cork County Council and An Bord Pleanála. The proposed substation will replace the already permitted substation that has not yet been constructed. Accordingly, a development of this nature has already been deemed appropriate within the wind farm site.

The construction works for the wind farm are likely to overlap with the construction of the substation to a certain degree, but the majority of the wind farm construction works will be carried out at relatively large separation distances from the substation construction.

Due to the separation distance of the proposed development from any other significant permitted or planned development and due to the qualities of the soil in the vicinity (stable), there will not be any significant cumulative impacts on the geology, hydrogeology and slope stability.

7.4.6 Do Nothing Scenario

In the case that the proposed development is not constructed, it is likely that the lands will continue to be used as they are now used and there will be no impacts on geology, hydrogeology and slope stability.

7.5 Mitigation Measures

The following sections outline appropriate mitigation measures to avoid or reduce the potential impact of the proposed development.

7.5.1 Mitigation Measures for the Excavation and Removal of Soils and Rock

One of the primary mitigation measures employed at the preliminary design stage is the minimisation of volumes of soil excavation and lengths of track and trench construction.

The proposed substation location has been carefully selected in an area of the site which is relatively close to the main road and existing tracks to minimise the length of access track and has been located close to existing power lines to minimise additional infrastructure. Drainage will be towards the south, into the existing drainage network.

To mitigate against erosion of the exposed soil or rock, all excavations will be opened and backfilled as quickly as possible. Excavation will stop during or immediately after heavy rainfall. To mitigate against possible contamination of the exposed bedrock/aquifer, refueling of machinery and plant will only occur offsite or in a specially designated area within the site compounds.

Simple excavation will precede the substation construction. Soil will be excavated and replaced with granular fill where required. Surplus soil excavated during the course of the works will be re-used on site in the form of landscaping and berms. No off-site disposal of soil will be required.

Excavation will be carried out from access roads where possible in order to reduce the compaction of topsoil.

Soils excavated during construction will be re-used on-site; no spoil will be left on site after construction is completed.

All temporary cuts/excavations will be carried out such that they are stable or adequately supported. Gravel fill will be used to provide additional support to drains where appropriate. Unstable temporary cuts/excavations will not be left unsupported. Where appropriate and necessary, temporary cuts and excavations will be protected against the ingress of water or erosion. Temporary works will be such that they do not adversely interfere with existing drainage channels/regimes.

Excavated material will not be stored with side slopes greater than 1 in 2.

7.5.2 Mitigation Measures for Groundwater

The effects of groundwater control, if required during excavation, are likely to be temporary and reversible. To reduce the impact on groundwater flow, controls such as dewatering or physical cut-offs will be avoided where possible. New drainage ditches will be constructed only around the proposed substation and adjacent to the access track as far as the existing drainage ditches. Due to the small scale of the development and the shallow depths of the proposed drains (typically less than 0.5m), the effects of the new drains on the existing agricultural land and the existing groundwater table will be negligible.

7.5.3 Mitigation Measures for Operation of the Proposed Substation

Ongoing monitoring and maintenance of the operation of the wastewater facilities and drainage systems will be sufficient. The substation site will be visited regularly and any maintenance issues will be addressed at an early stage.

To mitigate against possible contamination of the exposed bedrock/aquifer, hydraulic fluids, etc. stored on site will be kept in areas bunded to 110 % of the volume of the stored substance.

7.5.4 Mitigation Measures for Cumulative Impacts

As there are no significant cumulative impacts anticipated, therefore no specific mitigation measures are required.

7.6 Residual Impact

The following generalised conclusions can be drawn, in relation to geology, hydrogeology and slope stability:

- the site geology typically consists of topsoil and glacial till overlying sandstone/mudstone bedrock
- drainage of the area comprises manmade drains leading to natural drainage channels
- the slope gradients are low to moderate
- there is no peat at the proposed substation site

The available information indicates that the proposed development at Barnadivane has a potential slight impact on the soils and hydrogeology with a negligible risk of slope instability.

A desk study and site walkover has been undertaken for the site in order to assess the potential impacts on the geology and hydrogeology.

Residual impact due to the excavation and removal of soils and rock is considered to be negligible.

Residual impact on groundwater is considered to be negligible.

The operation of the proposed substation will not result in any perceptible impact on geology, hydrogeology and slope stability.

There will be no perceptible cumulative impact with any other known development in the area.

Provided that the mitigation measures suggested in Section 7.4 are carefully implemented, the overall residual risk to the geology, hydrogeology and slope stability associated with the construction and operation of the site is considered to be negligible.

8 HYDROLOGY AND WATER QUALITY

This chapter has been prepared to describe the aspects of the hydrological environment that could be affected by the activities associated with the construction of the proposed substation at Barnadavine near Macroom in Co. Cork. A substation was previously permitted, as part of the permitted Barnadavine wind farm, at a location approximately 500 m to the north east of the proposed new location. Precedent for such a development in this area is therefore already established.

This chapter also assesses the potential impact of the proposed development on the water quality of the local environment. The drainage of the associated hard standing areas and access track are considered, taking account of mitigation measures to reduce or eliminate any potential impacts.

8.1 Methodology

The following sources of information were considered in this assessment:

- the design layout of the proposed substation
- published literature as described below
- A desk-based assessment of the surface water hydrology and water quality within the site boundary of the proposed substation
- The EIS for the permitted Barnadavine Wind Farm

A review of relevant planning and policy documents was undertaken to identify relevant objectives relating to surface water. The following documents have been reviewed:

- Sustainable Development: A Strategy for Ireland, Department of the Environment, 1997
- White Paper 'Towards a Sustainable Energy Future for Ireland 2007-2020'
- "Wind Farm Planning Guidelines" published by the Department of the Environment, Heritage and Local Government (2006) "
- Cork County Development Plan 2009-2015
- West Cork Electoral Area: Electoral Area Local Area Plan, June 2013.

Following the review of the planning and policy documents the main objectives in relation to surface water issues are identified as follows:

- avoid blocking existing drains
- avoid construction, if possible, on wet areas
- avoid the excavation of drains, where possible
- if drains are unavoidable, ensure silt traps are constructed and that there is only diffuse discharge of water
- culverts to be placed under the proposed access track, where appropriate, to preserve existing surface drainage channels

This section presents the methodology used in assessing the baseline surface water environment. In addition to considering the relevant Environmental Protection Agency (EPA) guidance with respect to the preparation of an EIS (EPA 2002, 2003), the scope and methodology for the baseline assessment has been devised in consideration of the following guidelines:

- Greater Dublin Strategic Drainage Study (GDSDS): Technical Documents of Regional Drainage Policies, March 2005
- Protection and Conservation of Fisheries Habitat with particular reference to Road Construction, Shannon Regional Fisheries Board, September 2009(current guidance document adopted by IFI for all fisheries areas).
- Department of Environment, Heritage and Local Government (DoEHLG) – 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities', November 2009.

- Lee Catchment Flood Risk Assessment and Management Study (LEECFRAMS), Draft Flood Risk Management Plan, February 2010 and Flood Extent Mapping.
- CIRIA Environmental Good Practice on Site
- BPGCS005, Oil Storage Guidelines
- Irish Wind Energy Association, 2012, Best Practice Guidelines for the Irish Wind Energy Industry
- CIRIA Control of Water Pollution from Linear Construction Sites. Technical Guidance (C648)
- CIRIA Control of Water Pollution from Construction Sites. Guidance for Consultants and contractors (C532)
- CIRIA Sustainable Construction Procurement. A Guide to Delivering Environmentally Responsible Projects (C571)
- UK Pollution Prevention Guidelines (PPG):
    - PPG1: General Guide to the Prevention of Water Pollution
    - PPG2: Above Ground Oil Storage Tanks
    - PPG3: Pollution Prevention Guidelines
    - PPG4: The Disposal of Sewage where no Mains Drainage is Available
    - PPG5: Works in, near or liable to affect Watercourses
    - PPG6: Working at Construction and Demolition Sites
    - PPG8: Safe Storage and Disposal of Used Oil
    - PPG21: Pollution Incident Response Planning
    - PPG26: Dealing with Spillages on Highways
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (National Roads Authority, 2005)
- Design Manual for Roads and Bridges (2013)
- South Western River Basin District, River Basin Management Plan 2009-2015
- Environmental Protection Agency, Biological River Water Quality Data
- Flood Mapping Website http://www.floodmaps.ie
- OPW preliminary flood risk assessment (PFRA) indicative mapping website www.cfram.ie

8.2 Receiving Environment

The proposed substation is located just to south of a plateau within the Upper Bride River valley, approximately 500m to the south west of the location of the previously permitted substation for the consented development at Barnadavine Wind Farm. The proposed substation site is at an elevation of approximately 253 m. The land to the south, slopes downwards towards the Barnadavine tributary of the River Bride. The rise of this tributary is at a distance of 300 m to the south of the proposed substation. The predominant landuse to the south of the proposed substation is farmland. The proposed site is currently undeveloped and is used for agricultural grazing. The field boundaries are defined both by hedgerows and by sod and stone banks.

There is no environmentally designated protected area within 10 km of the site boundary with hydrological links to the site for the proposed substation.

The proposed site, which covers a development area of approximately 2.95 ha, is located as shown in Figure 1.1.

An existing wind farm, Garranereagh Wind Farm is located to the east of the proposed development.

8.2.1 Prominent Hydrological Features

The substation study area is located within Hydrometric Area No. 19 (HA 19) (Lee, Cork Harbour and Youghal Bay) of the Irish River Network System and is situated in the South Western River Basin District (SWRBD).

The Water Framework Directive (WFD - 2000/60/EC) mapping shows the proposed development to be situated within the waterbody catchment as shown in Figure 8.1 – Waterbody Catchment Map. This waterbody is known as:

- SW_Lee228Bride_Bride_Bride_3 Upper

The baseline environment of the study area within the site boundary is described below.

The River Bride

The River Bride rises at an elevation of 220 m OD between Moneygaff East and Reanacaheragh to the southwest of the site. It flows firstly in an easterly direction and then turns in a south easterly direction, at a location, approximately 0.8 km to the south of the site for the proposed substation. It then follows the R585 regional road for approximately 5 km. The River Bride continues through Beal na Blath and Crookstown and then follows the N22 eastwards to Ovens. The River Bride joins the River Lee just to the north east of Ovens, near Ballincollig.

8.2.2 Existing Site Drainage

A site walkover survey took place on 4 August 2014 to establish the pattern of existing drainage on the site and to record any significant hydrological features. The field within which the proposed substation is situated drains south-eastwards towards existing field drains. Two existing agricultural field drains follow part of the southern and eastern boundary. These drains meet at the lowest part of the field in the south-eastern corner before discharging in a southerly direction, towards the Barnadavine Tributary of the River Bride. A photograph of the existing field drain can be seen in Figure 8.2.

R:\Map Production\2014\LE14\702\02\Workspace
LE14-702-02_Figure 8_1 Waterbody Catchments Rev B.wor

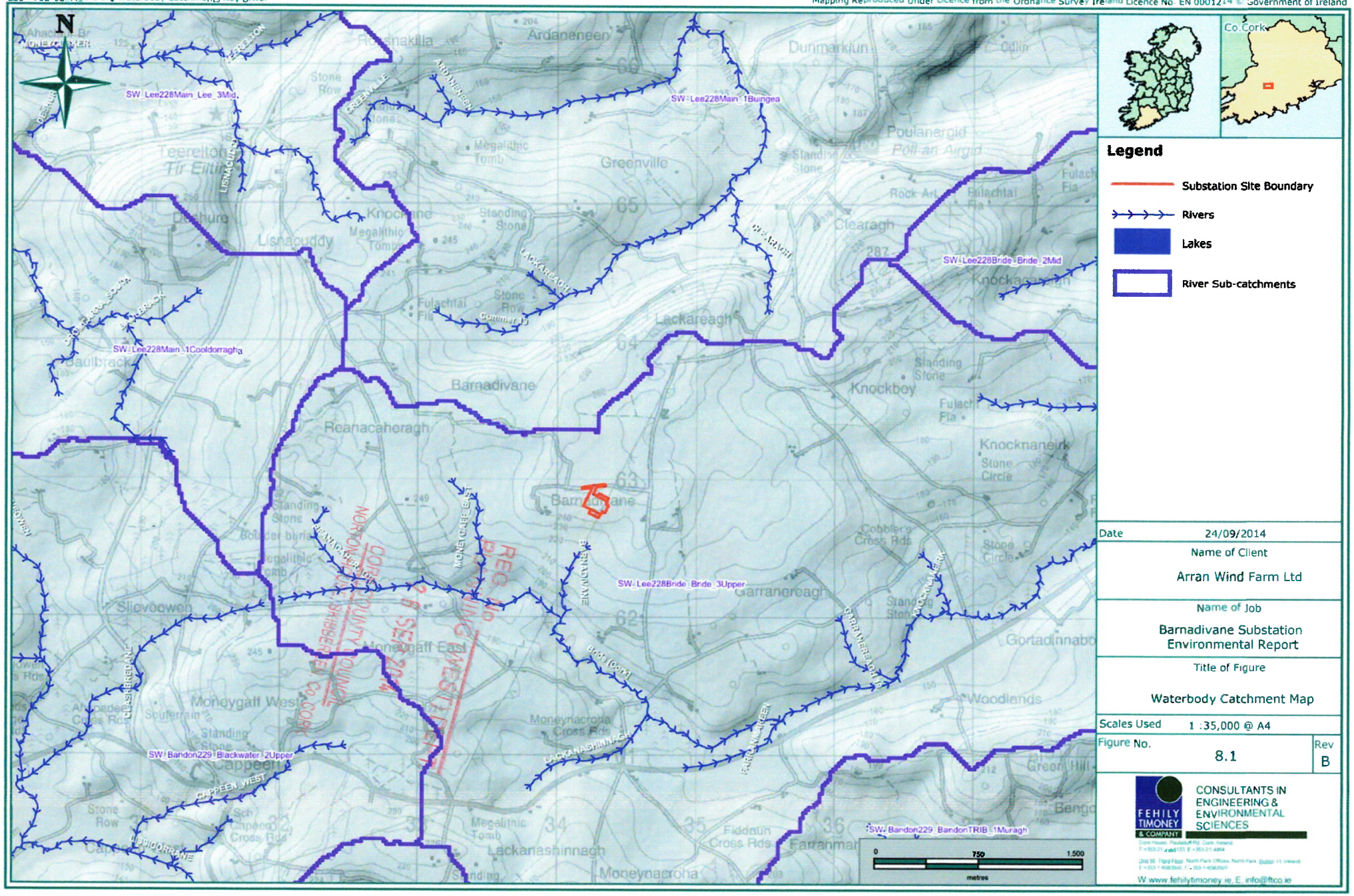

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Figure 8-2: Existing Field Drains

8.2.3 Flooding History in the Vicinity of the Proposed Substation

The national flood hazard mapping website, www.floodmaps.ie, does not indicate any record of flooding within 2.5 km of the site in either the Barnadavine Tributary or the main channel of the River Bride. Areas known as 'benefitting lands'[22] and a 'drainage district'[23] as defined in the OPW flood hazard mapping website have not been identified for this site.

The OPW has produced indicative flood mapping to assist in a preliminary flood risk assessment (PFRA) on its website www.cframs.ie. These maps were produced by the OPW from a number of sources. The indicative flood mapping is shown on Figure 8.3 OPW Flood Map and no part of the site is within an indicative floodplain. Indicative flooding for a 1 in 100 year return period event is shown in the main channel of the River Bride, but not in the Barnadavine Tributary to the south of the proposed location for the substation.

The Lee Catchment Flood Risk Assessment and Management Study (LEECFRAMS) provides a detailed examination of the flood risk, with flood extent mapping provided in the lower section of the River Bride near Crookstown, however no studies were undertaken as part of the LEECFRAMS in the vicinity of the site.

The Geological Survey of Ireland (GSI) website www.gsi.ie provides information on subsoils for the site. The soil is topsoil and glacial till overlying sandstone/mudstone bedrock within the boundary of the site for the proposed substation. The presence of alluvium can be an indicator of historic flooding. There is no evidence of alluvium downstream of the site in the Barnadavine Tributary, as can be seen in Figure 7.2. The description of the soil, geology and hydrogeology of the proposed site for the proposed substation is discussed in more detail in Chapter 7 Soils, Geology and Hydrogeology.

82 .4 Existing Water Quality

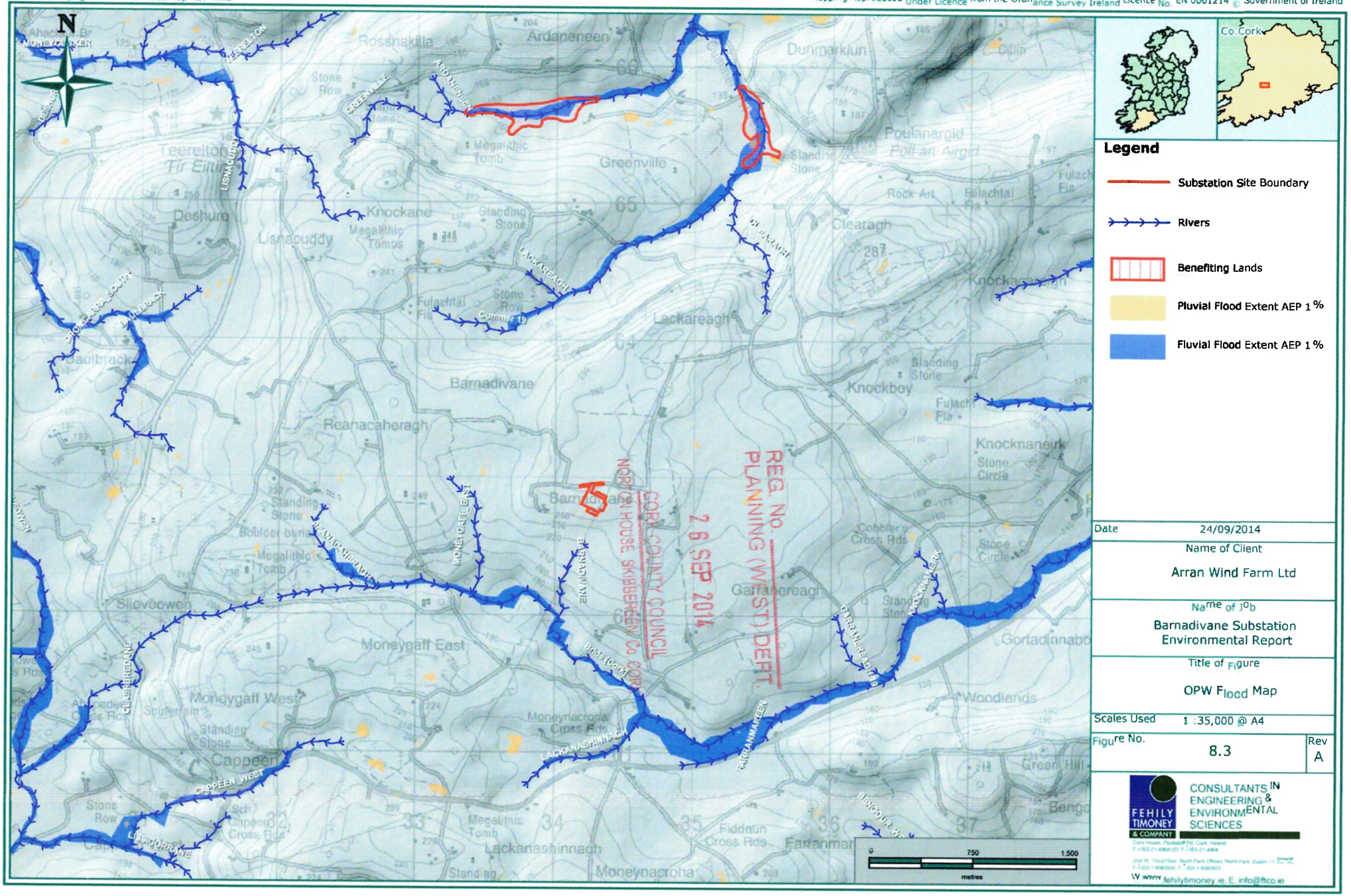
An outline of the background behind the Water Framework Directive (WFD) is presented below together with an assessment of the existing water quality of waters draining the site.

Water Framework Directive

The WFD was established by the European Community in 2000. This Directive was transposed into Irish legislation in December 2003 as the European Communities (Water Policy) Regulations 2003, (S.I. No 722 of 2003).

The overriding purpose of the WFD is to achieve at least "good status" in all European waters by 2015 and ensure that no further deterioration occurs in these waters. European waters are classified as groundwaters, rivers, lakes, transitional and coastal waters. The WFD has been implemented in Ireland by dividing the island of Ireland into eight river basin districts. As discussed, the development is located in the SWRBD.

R:\Map Production\2014\LE14\702\02\Workspace
LE14-702-02_Figure 8.3 OPW Flood Map Rev A.wor



Legend

- Substation Site Boundary
- Rivers
- Benefiting Lands
- Pluvial Flood Extent AEP 1 %
- Fluvial Flood Extent AEP 1 %

Date	24/09/2014
Name of Client	Arran Wind Farm Ltd
Name of Job	Barnadivane Substation Environmental Report
Title of Figure	OPW Flood Map
Scales Used	1 :35,000 @ A4
Figure No.	8.3
Rev	A

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Water Framework Directive Waterbody Status

The 2009 Surface Water Regulations[1] give effect to the criteria and standards to be used for classifying surface waters in accordance with the WFD. In accordance with the regulations, waters classified as 'High' or 'Good' must not be allowed to deteriorate. Waters classified as less than good must be restored to at least good status within a prescribed timeframe.

A water body must achieve both good ecological status and good chemical status before it can be considered to be of good status. The chemical status of a water body is assessed based on certain chemical pollutants.

The regulations also state that, for the purpose of classification, a status of less than good is assigned in the case of a body of surface water where the environmental objectives for an associated protected area requiring special protection by virtue of obligations arising from specific national legislation for the protection of water, or for the conservation of habitats and species directly dependent on water, are not met.

Water Framework Directive Risk Assessments

A baseline risk assessment was completed of the water bodies within each River Basin District in 2005. This assessment involved using information on water pollution indicators, point and diffuse pollution sources, water abstraction and existing commercial activities. The risk assessment indicated whether the water body would meet the criteria for "good status" or would be considered "at risk" of not meeting the standards by 2015. This assessment was presented in a characterisation report submitted to the EU in March 2005. This assessment provided the baseline information to prepare the River Basin Management Plan and Programme of Measures necessary to comply with the WFD standards. The assessment of many of the indicators was updated in 2008.

Current WFD Status and Risk Assessment

The status of the river waterbody Bride, tributary of the River Lee as shown in www.wfdireland.ie is currently of 'good' status and is classified as 'not at risk' of failing to retain its status by 2015. The ecological status of this waterbody is monitored.

Biological Water Quality

Biological Water Quality Ratings at stations on the River Bride are summarised in Table 8.1 over.

The nearest station, Station ID 19B040400, on the River Bride is at Hornhill Bridge, approximately 6.5 km downstream of the site. The EPA's Q-values were indicated as Q4 (unpolluted) in 2011, with previous ratings of Q4 in 2008, 2005 and 2003. The ratings were considered to be mostly satisfactory with Good Ecological Quality and this trend continues further downstream.

Table 8-1: Biological River Water Quality Ratings

Station ID	Location	Biological Quality Rating 1990	Biological Quality Rating 1994	Biological Quality Rating 1997	Biological Quality Rating 1999	Biological Quality Rating 2003	Biological Quality Rating 2005	Biological Quality Rating 2008	Biological Quality Rating 2011
19B040400	Hornhill Br	4	4	4	4	4	4	4	4
19B040600	Br at Crookstown LHS	4-5	4	4	4	4-5	4	4-5	4
19B040900	Coolmucky Br	5	4-5	4	4-5	4-5	4-5	5	4-5
19B0401300	Kilcrea Br	4	4	4	4	4	4	4-5	4

8.2.5 Conclusions on Water Quality in the Existing Environment

The Biological Water Quality Rating of the River Bride is considered to be mostly satisfac tory with Good Ecological Quality. This is supported by the Q4 (good) biological status in the stations nearest the site at Barnadivane.

8.3 Proposed Surface Water Management

The proposed drainage is shown in Figure 8.4.

It is proposed to drain the substation hard standing area to drainage swales runn ing around the edge of the hard standing area. These swales will drain to a stilling pond to reduce the velocities of the surface water run-off and to provide a Silt Protection Control (SPC) for the development. The stilling ponds will outfall diffusely and these will be left in place after the construction period.

The roofs of the Control Buildings will drain to soakpits.

The access track to the proposed substation will drain to roadside swales, which will gravitate towards a stilling pond.

Where overland flow will be obstructed as a result of the location of the development on this site, interceptor ditches will be provided to divert the 'clean' overland flow around the development. The interceptor ditches will drain diffusely to vegetated areas on site.

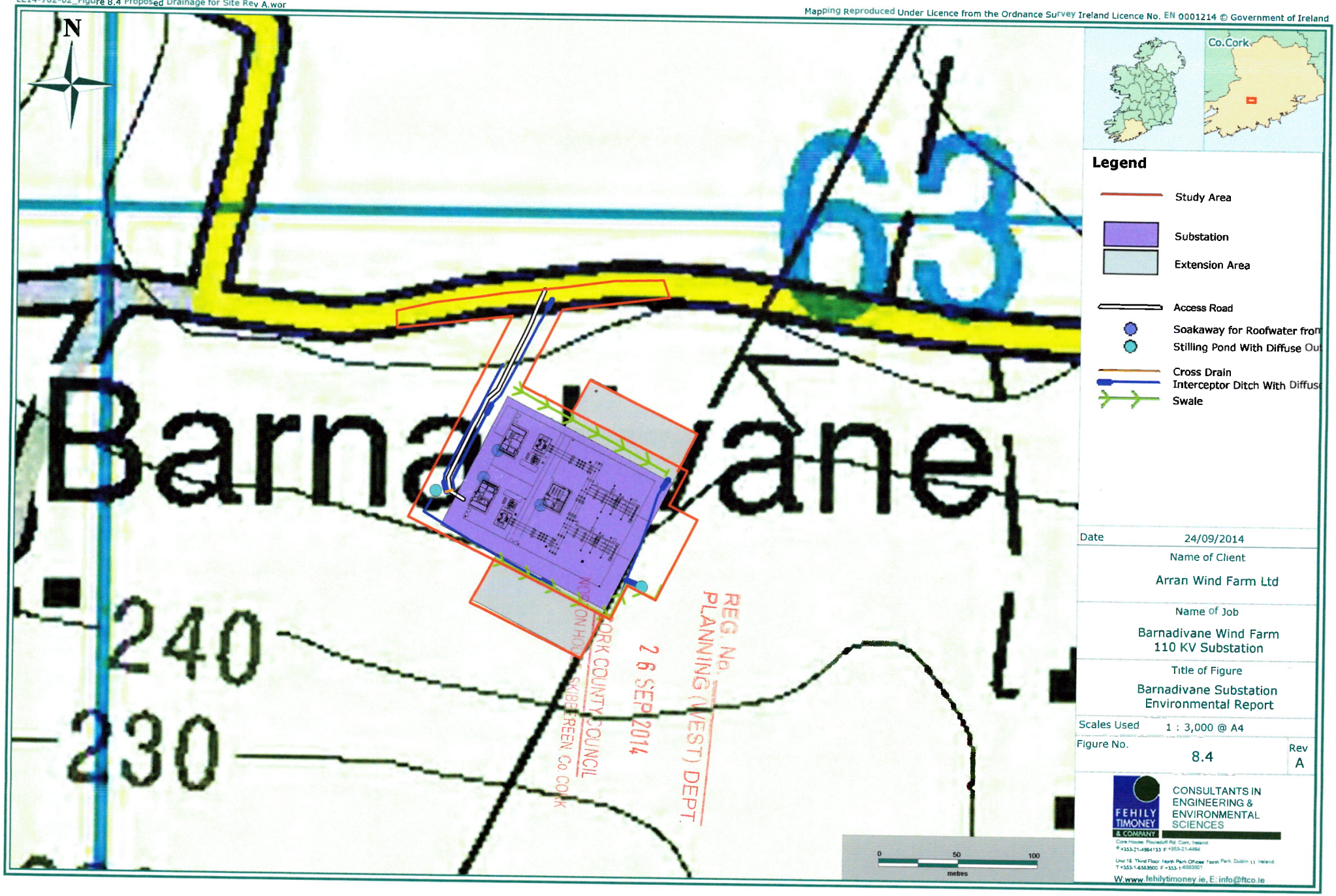
It is also proposed to erect silt fencing along the southern boundary of the proposed development during the construction period, to further protect the Barnadavine Tributary, which rises 300 m to the south of the proposed location for the substation. This would be in addition to any measures agreed with the IFI to protect fisheries and water quality.

The stilling ponds will be put in place prior to any excavation for the substation or associated infrastructure. Any interceptor drains and silt traps will also be put in place ahead of construction such that excavation works and any constructed hardstandings will have a functioning drainage/silt management system in place.

8.3.1 Control of Flooding

There is no recorded history of flooding at or in the vicinity of the site. However, indicative flooding as shown in Figure 8.4 in the main channel of the River Bride, is shown to occur at a distance of approximately 0.8 km to the south of the site. It is proposed therefore to reduce the velocities in the surface water run-off from the proposed development with the use of swales, stilling ponds and diffuse discharge methods to mitigate any impact on the receiving waters. Consequently, any increase in the rate of surface water run-off is considered to be of very low significance.

R:\Map Production\2014\LE14\702\02\Workspace
LE14-702-02_Figure 8.4 Proposed Drainage for Site Rev A.wor



Date	24/09/2014
Name of Client	Arran Wind Farm Ltd
Name of Job	Barnadivane Wind Farm 110 KV Substation
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8.4 Potential Impact

During each phase (construction, operation, maintenance and decommissioning) of the substation development, a number of activities will take place on site, some of which will have the potential to cause impacts on the hydrological and water quality regime at the site.

The main potential hydrological impact of the development is an increase in silt laden run-off to watercourses in the vicinity of the proposed development and to a lesser extent a very minor increase in runoff from a storm event, due to the change in land use and an increase in impermeable ground conditions.

In addition possible impacts during construction activities include:

8.4.1 Potential Impacts during Construction

During the construction period the development has the potential to introduce the following impacts on the existing hydrology and drainage at the site:

- spoil heaps from the excavations for the substation will be stored temporarily; if left exposed, this could lead to an increase in silt-laden run-off draining off site.
- excavations for drainage systems could disturb underlying soils
- small diameter cross-drains could lead to blockages and consequent flooding and concentration of flows
- drainage carrying overland flow from upslope could lead to high volumes of run-off eroding the drainage.
- crushing of stone in access tracks by heavy vehicles, creates fines and consequent oozing of soluble material in very wet weather out from the tracks and into the drainage conduits
- standing water in the excavations will contain an increased concentration of suspended solids as a result of the disturbance to the underlying soils
- silt carried on the wheels of vehicles leaving the site could be carried onto the public road
- an increase in impermeable surfaces could result in an increase in surface water run-off from the proposed development.
- wet concrete operations could lead to contamination of receiving waters
- suspended solids could potentially lead to siltation and consequent effects on flora and fauna in aquatic habitats
- siltation arising from excavations at the site could impact on the water quality status of the receiving waters
- refuelling activities could result in fuel spillages
- sanitary waste could lead to contamination of groundwater.
- there is the potential for fuel spill/leaks from storage tanks which will be stored on site for plant machinery
- cable trenches could act as a conduit for surface water flows
- open bodies of water present a risk to the safety of site personnel and the public.
- incorrect site management of excavations or material storage areas could lead to the release of suspended solids to surface waters

There are no in-stream works or stream crossings required for this development.

The magnitude of the impact does not take into account the proposed mitigation measures.

8.4.2 Potential Impacts during the Operation and Maintenance of the substation

When operational, the proposed development will have a negligible effect on surface water quality as there will be no further disturbance of soils post construction and all equipment with the potential for oil spillage will be bunded.

The hard standing area for the substation is made up largely of hardcore material which is partially permeable and will not therefore lead to significant run-off volumes.

The roofs of the Control Buildings will drain to soakpits. Further, any surface water run-off will drain to swales running around the perimeter of the substation hard standing area. The swales will discharge to stilling ponds with a diffuse outflow. Due to the insignificant increase in potential run-off from the site and the non-intrusive nature of site operations, there should be negligible release of sediment to the watercourses post-construction.

It is not envisaged that maintenance will involve any significant impacts on the hydrological regime of the area.

8.4.3 Potential Impacts during Decommissioning

The potential impacts during decommissioning would be similar to those listed above for the Construction phase. The drainage and treatment facilities will remain in place and will serve to reduce any potential for a release of sediment. It is not envisaged therefore that decommissioning will involve any significant impacts on the hydrological regime or on surface water quality.

8.4.4 Potential Cumulative Impacts on Hydrology

There is an existing neighbouring wind farm within the same waterbody catchment as the proposed development. Garranereagh Wind Farm is located to the east of the proposed development for the substation. This is an operational wind farm and as such no potential cumulative impact would arise during the construction phase of the proposed substation development. Any potential impact during the operation phase of the substation development would be of low significance given the insignificant increase in potential run-off from the proposed development.

Part of the permitted wind farm drains into the same tributary of the River Bride as the proposed development. The potential cumulative impact is expected to be of low significance, given the mitigation measures which are proposed to be put in place at the substation and at the permitted Barnadavine Wind Farm which was given consent for development by Cork County Council. It should be noted that a substation was permitted as part of the consented development at Barnadavine Wind Farm and this new substation location is proposed to replace the consented substation. It is within the same waterbody catchment as the previously permitted substation. In effect therefore no cumulative impact arises between this new substation and the permitted Barnadavine Wind Farm

8.4.5 Do Nothing Scenario

In the case that the proposed substation is not constructed at this location, the lands will continue to be used as they are now and there will be no impact on hydrology and water quality. The permitted substation will then likely be constructed, with the impacts on hydrology and water quality as assessed within the EIS for Barnadivane Wind Farm.

8.5 Mitigation Measures

8.5.1 Mitigation Measures during Construction

This section outlines mitigation measures recommended to reduce and protect the receiving waters from the potential impacts, outlined in Section 8.4, during the construction of the proposed development.

- During the construction period, spoil heaps from the excavations for the substation will be stored temporarily. However these spoil heaps will be surrounded by silt fences to filter sediment from the surface water run-off from excavated material. Details of silt fencing are provided in Appendix 4.
- Construction activities will be located away from watercourses as far as possible. The contractor will ensure that trafficking on site will be kept to a minimum. No haul roads will be used other than the existing tracks and the proposed site track to the substation. Wheel washing facilities will be provided at the site entrance, draining to silt traps. Silt fencing will be kept on site for use in emergencies.

- Swales, silt traps and settlement ponds will be put in place in advance as construction progresses across the site.
- The construction of swales for access track drainage follows the natural flow paths on site where possible. Existing overland flow channels will be maintained where possible and cross-drains provided in the access tracks to allow continuity of flow. Interceptor drains will be constructed upslope where there are no existing channels. The roadside swales will therefore only carry the access track run-off and so avoid carrying large volumes of water and concentrating flows.
- Where swales are laid at slopes greater than 2 %, check dams will be provided. This will reduce effective slope and run-off velocities and any consequent potential for erosion.
- Cross-drains of 450 mm diameter will be used, where required, to prevent a risk of clogging for drainage crossings.
- The developer will ensure that erosion control and settlement facilities, including sediment/silt-traps, swales and stilling ponds, will be regularly maintained during the construction phase. Personnel working on site will be trained in pollution incident control response. A formal procedure will be prepared to deal with queries and comments from the general public in the emergency response plan. During the construction period an emergency facility will be provided to shut off the outfall from the stilling ponds. This will mitigate any accidental spillage on site from affecting watercourses. In addition, appropriate information will be available on site outlining the spillage response procedure and a contingency plan to contain silt. Adequate security should be provided on site to prevent spillage as a result of vandalism. A regular review of weather forecasts of heavy rainfall is required and a contingency plan will be prepared for before and after such events.
- Standing water in the excavations will contain an increased concentration of suspended solids as a result of the disturbance to the underlying soils. The excavations will be pumped into temporary settlement basins which will be lined and which will discharge to diffuse overland flow. The settlement basins will be constructed in advance of any excavations for the turbine bases.
- Cables will be installed in trenches 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.
- refuelling of plant during construction will only be carried out at a bunded area in the site compound. Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be kept available on site, to ensure that any spills from the vehicle are contained and removed off site.
- Any other diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks – the bund area will have a volume of at least 110 % of the volume of such materials stored.
- Welfare facilities will be provided for site personnel. Sanitary waste will be removed from site by a licensed waste disposal contractor.
- Open bodies of water and saturated ground present a risk to the safety of site personnel and the public. It is proposed to install stilling ponds on site as part of the mitigation measures to minimise any risk of flooding. All ponds will be protected by fencing.

All of the mitigation measures detailed above will ensure that the water quality status of the receiving waterbodies is not affected by the proposed development and the water framework directive management plan objectives will be achieved subject to these mitigation measures and those for the consented wind farm being implemented in full.

8.5.2 Mitigation Measures during the Operation and Maintenance of the Substation

The maintenance of the substation will provide for the activities associated with keeping the drainage system operating effectively. The developer will have the responsibility for maintaining the drainage system at the wind farm. The maintenance regime will include:

- inspecting swales and cross-drains for any blockages
- inspecting downstream watercourses
- inspecting the ponds
- testing the water quality in the downstream watercourses periodically

Maintenance will be in accordance with CIRIA C697 (SuDS and Maintenance Manual). Weekly visual inspections will be required during the construction period, followed by fortnightly visual inspections until the vegetation has been re-established satisfactorily.

8.6 Residual Impact

The residual impact significance rating of the effects of the proposed development for the substation on downstream receptors is expected to be negligible taking account of mitigation measures as outlined in Section 8.3 and Section 8.5.

The activities that would take place during the operation phase would not have a significant effect on the receiving watercourses. The risk of an increase in flooding is of a very low significance and therefore a failure in mitigation measures provided by a blockage for instance in the stilling ponds would not have a significant effect on the receiving watercourses. The degree of confidence in mitigation measures preventing a significant release of silt into the receiving watercourses lies in the developer adopting the responsibilities for the mitigation measures as outlined in Section 8.5. If these responsibilities are adopted then a high degree of confidence can be assured that any effects on the receiving environment would be negligible.

All mitigation systems will be put in place in advance, as construction progresses across the site. It will be the responsibility of the developer to ensure that these facilities are put in place and a suitably qualified person will be appointed by the developer to ensure their efficient operation and maintenance.

8.7 Conclusions on Hydrology and Water Quality

The surface water hydrology impacts of the proposed Barnadivane substation development, if not mitigated, could potentially affect both the surface water run-off and the existing water quality of the receiving waters in the tributaries of the River Bride, albeit to a minor degree. It is proposed that this substation will replace an already permitted substation as part of the permitted Barnadavine Wind Farm development . Inthis regard it is very similar to that already, albeit of a slightly larger scale to meet current Eirgrid re quirements During construction, there is potential for an increase in the sediment and nutrient load to thewa tercourses due to construction works.

The impact on hydrology and water quality during construction will be mitigated by the us e ofappropriately sized stilling ponds and additional mitigation measures as outlined in Section 8.3 and Section 8.5. Management of surface water run-off from the project will include reducing the velocity in the surfa ce water run-off and by the settling of suspended solids. This will be achieved by laying ap propriately sized swales along the site tracks and by directing the run-off from new tracks and hard stand ing areas on the ste through the stilling ponds. The ponds will discharge diffusely overland.

The existing overland run-off will be kept separate from the development run-off in the proposed drainage layout. Stilling ponds have been successfully used in sites to reduce velocities in surface water flows. A high degree of confidence in the success of this method of mitigation can be expected, provided they are installed correctly and maintained regularly.

The developer will have responsibility for ensuring that all the mitigation and maintenance measures included above are put in place. Water quality monitoring will also be the responsibility of the developer. The developer will appoint a suitably qualified person to supervise the works in this regard.

The developer will prepare an emergency plan which will include the requirement for the shutting off of outfalls from the ponds during the construction period when very heavy rain is forecasted. Silt fencing will be kept on site to be deployed as required in case of an emergency.

All drainage systems will be installed in advance, as construction progresses across the site.

Based on the measures outlined in Section 8.5 to prevent a release of silt laden run-off from the substation development during the construction phase, a high degree of confidence can be assured in the mitigation measures proposed for hydrology and water quality.

9 LANDSCAPE AND VISUAL ASSESSMENT

9.1 Introduction

This report describes the landscape context of the proposed 110kV substation at Barnadivane, Co. Cork and assesses the likely landscape and visual impacts of the proposed development on the receiving environment. The proposed substation is to replace a substation which has already been consented as part of a wind farm in the general area. The proposed substation is located within the consented wind farm area.

9.1.1 Guidelines and Basis for Landscape Impact Assessment

Although closely linked, landscape and visual impacts are assessed separately as the effects on the physical landscape and landscape character resulting from the development form the baseline of the assessment of visual impacts from key visual receptors.

Landscape Impact Assessment (LIA) relates to changes in the physical landscape, brought about by the proposed development, which may alter its character and how this is experienced. This requires a detailed analysis of the individual elements and characteristics of a landscape that go together to make up the overall landscape character of that area. By understanding the aspects that contribute to landscape character it is possible to make judgements in relation to its quality (integrity) and to identify key sensitivities. This, in turn, provides a measure of the ability of the landscape in question to accommodate the type and scale of change associated with the proposed development, without causing unacceptable adverse changes to its character.

Visual Impact Assessment (VIA) relates to changes in the composition of views as a result of changes to the landscape, how these are perceived and the effects on visual amenity. Such impacts are population based rather than resource based as in the case of landscape impacts. Visual impacts are measured on the basis of:

- Visual Obstruction (blocking of a view, be it full, partial or intermittent) or;
- Visual Intrusion (interruption of a view without blocking).

This landscape and visual impact assessment is based on:

- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Statements (2002) and the accompanying Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2003).
- Landscape Institute and the Institute of Environmental Management and Assessment publication entitled Guidelines for Landscape and Visual Impact Assessment (2013).
- Scottish Natural Heritage (SNH) Environmental Assessment Handbook –Guidance on the Environmental Impact Assessment Process Appendix 1: Landscape and Visual Impact Assessment (2011)

9.2 Methodology

Production of this Landscape and Visual Impact Assessment involved a professional evaluation by qualified and experienced Landscape Architects. This entailed the following:

- Desktop study to identify relevant landscape and visual designations in the Cork County Development Plan as well as other sensitive visual receptors;
- Fieldwork to establish the landscape character of the receiving environment and to confirm the visual receptors most likely to be affected by the proposal;
- Assessment of the significance of the landscape impact of the proposal as a function of landscape sensitivity weighed against the magnitude of the landscape impact;
- Assessment of the significance of the visual impact of the proposal as a function of visual receptor sensitivity weighed against the magnitude of the visual impact;

9.2.1 Asse ssment Criteria

The criteria used by MosArt to estimate the sensitivity of VRPs include those listed below. These criteria are used by the assessors as a checklist of issues to be considered when estimating landscape sensitivity, and no relative importance is inferred by the order of listing:

- Intensity of use, popularity (number of viewers);
- Likely mental disposition of viewers (e.g. commuters hurriedly driving on busy national route versus golfers enjoying panoramic views in a leisure mode);
- Recreational facility;
- Provision of elevated panoramic views;
- Sense of remoteness and / or tranquillity;
- Presence of water (river, lake, sea);
- Mountains present;
- Ruggedness of landform / exposure of rock outcrops;
- Degree of perceived naturalness;
- Presence of striking or noteworthy features (distinctiveness and memorability);
- Historical, cultural and / or spiritual significance evident or sensed;
- Rarity or uniqueness (including noteworthy representativeness of a landscape type);
- Integrity of character (condition / intactness);
- Sense of place (special sense of wholeness and harmony); and
- Sense of awe.

The significance of the impact of development is determined by the following:

- Sensitivity of view;
- Aesthetic impact on the landscape; and
- Visual presence of the development.

Significance of impact is summarised in Table 9.1 below.

Table 9-1: Significance of Impacts

Level of Impact	Description
Neutral	An impact which is so low it cannot be measured
Imperceptible	An impact capable of measurement but without noticeable consequences
Slight	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate	An impact that changes the character of the environment in a manner that is consistent with existing and emerging trends
Significant	An impact, which by its character, magnitude duration or intensity alters a sensitive aspect of the environment
Profound	An impact which obliterates sensitive characteristics

9.3 Receiving Environment

The proposal site is located in a landscape of rolling pastoral farmland where a network of relatively modest sized fields defined by broadleaf hedgerows and coniferous tree lines meets a more extensive field pattern of rough grazing and semi-natural grassland. The latter occurs immediately to the west of the site and has a more open character than the landscape to the east due to the low scrubby hedgerows that prevail. The site is located near the top of a south facing slope that overlooks the headwaters of the River Bride.

The terrain of the wider area is relatively steeply undulating but uniform in height with occasional rocky outcrops along ridges. The land use mixture of pastoral farmland and rough grazing continues along with occasional stands of plantation forestry. Most notably, the operational Garranereagh Wind Farm is located a short distance to the east. Although this is an anthropogenic landscape, there remains some sense of remoteness and tranquility.

In the Cork County Landscape Character Assessment, which forms part of the 2009 development plan, the site is identified as being located in Landscape Character Type (LCT) 10 – Fissured Fertile Middle Ground. This corresponds to Landscape Character Area (LCA) 55 – Cappeen, which is described as *"Upland of intimate rolling farmland mosaic with scrub and rocky outcrops."* This LCA is one of only a few in the county to be considered of low landscape value, low landscape sensitivity and to be only locally important. The nearest and only relevant scenic route designation in respect of this proposal is S36 which occurs on elevated ground at Knockane approximately 1.75km away to the north-northwest. The proposal will be screened from view along this scenic route by the intervening ridgeline.

The site is surrounded by a network of local roads serving a scattering of farmsteads in the near vicinity. The nearest of these dwellings is over 250m downslope to the southwest with another few slightly further away to the southeast. The R585 is the nearest major route to the site and this is approximately 2km to the south at its nearest point.

9.3.1 Planning Context

The proposed substation site is within a landscape type defined as *Fissured Fertile Middle Ground* in the County Development Plan known as Type 10(a) as shown in Map 14 of the Landscape maps in Volume 3 of the Cork County Development Plan 2009 - 2015.

The draft landscape strategy for County Cork classifies the landscape value of each landscape type within the county from very low to very high. The landscape value of each area was derived from an assessment of the natural, scenic and cultural value as determined within that area. Generally, Landscape value represents aesthetic, ecological, historical, socio-cultural, religious and other characteristics of the LCA. Landscape Character Sensitivity identifies the landscapes ability to accommodate change without adverse impact on its character.

The draft strategy states that landscape Type 10(a) – Fissured Fertile Middle Ground has a landscape value of **"low"**, a landscape sensitivity of **"low"** and a landscape importance of **"local"**. The nearest designated scenic route is located on a third class road near the village of Terelton, with the nearest point being approximately 1.75 km northwest of the proposed substation.

A substation is already permitted 500m to the north east as part of a wind farm development. This application will replace the substation consented as part of that development.

9.4 Potential impacts

In visual terms this proposal consists of two steel lattice structures, approximately 18m high, that lie outside the substation compound but within the site boundary and connect the existing 110kV electricity line into the sub-station. The lines will connect to a gantry with a height of approximately 10 m. At ground level the substation plant consists of a series of transformers, circuit breakers and post insulators which are all vertical structures between approximately 5 m and 10 m in height. Lightning masts of approximately 15 m height are also located within the compound. Also contained within the substation compound are three single storey control buildings and associated car parking areas. The control buildings and electrical equipment will be enclosed by a 2.4m high perimeter fence encompassing an area of approximately 76m x 97m. The substation site is approximately 90 m x 117 m in area and will be surrounded by a 2.4 m high security fence.

As a form of industrial infrastructure of a reasonable scale and extent, the proposed substation has the potential to physically alter the existing land form and land cover of the site itself and to influence the prevailing rural character of the local area. From a visual impact perspective it has the potential to intrude on views from local roads and dwellings and also on more distant uphill views from the R585.

9.5 Mitigation measures

The proposed substation sits within a consented wind farm, which also includes a 110 kV substation, albeit in a different location. As such, planning precedent for such a development is already in place and the substation is likely to be less out of place in this elevated rural context given the presence of wind turbines around it. Notwithstanding this, as the proposed substation is most exposed to uphill views from the south and southeast, it is proposed that the perimeter of the site (where slope and land availability allows) will, where possible, be planted with semi-mature native trees to provide year round screening of the substation infrastructure. This type of planting is a familiar feature in this landscape, particularly surrounding the fields a short distance to the east of the site.

9.6 Residual impact

There will be a permanent impact on the land cover of the site, which will be converted from improved grassland and will require some degree of levelling in order to construct the various substation elements and control buildings. This is considered to be a minor localised effect in the context of an already modified landscape.

There will be a long term impact on the landscape character of the immediate area due to the construction of this industrial facility, which consists of numerous and varied vertical elements of a mechanical nature. The intensity and clutter of the proposed substation structures contrasts with the relatively low intensity of other rural land uses in the vicinity including Garranereagh Wind Farm just to the east. Nonetheless, this existing wind farm and the permitted Barnadivane Wind Farm, to which this proposal is paired, will provide a thematic justification for the substation. In other words, the proposed substation in isolation might appear somewhat out of place in this elevated rural context except for the presence of wind turbines all around it. It is also likely to be much less noticeable by comparison to the turbines, particularly beyond distances of approximately 500m. For these reasons the proposed substation is only likely to have noticeable impacts on landscape character in the immediate vicinity. Following mitigation these impacts are likely to be of a moderate to low magnitude, and in the context of this relatively robust landscape setting the effect on landscape character is not considered to be significant.

From a visual impact perspective the proposed substation is uphill from the nearest residential receptors who enjoy a higher degree of amenity from the southward views over the valley in the opposite directio n. Indeed several of these dwellings utilise shelter vegetation to their uphill sides, which will screen views of the substation. The substation will draw the eye of viewers in the immediate vicinity and as a clutte red industrial form of development it will detract from the amenity of the broad rural views. However , t represents a minor intrusion on such views and not a visual obstruction. It will also blend into the visu al context to a greater degree as any mitigation planting which can be planted, matures.

For people travelling along the R585 nearer the base of the valley, the proposed substation will intrud e on pleasant uphill views. However, it will be a small scale feature in such views, particularly in the context of the existing Garranereagh and permitted Barnadivane wind turbines, which also make it a less incongruous feature in the landscape. The substation is likely to be difficult to discern oncemitiga tion pa nting matures.

Overall, it is considered that the proposed substation at Barnidivane will not give rise to significant landscape and visual effects. Instead the effects will be slight and localised in nature.

9.6.1 Assessment of Cumulative Impacts

The proposed substation location is within the planning boundary of a permitted wind farm (refer to Section 1.4 for details).There is also an existing wind farm, namely Garranereagh Wind Farm, with 4 operational turbines neighbouring the site, the nearest turbine being approximately 1 km from the proposed substation. There is no other significant permitted or planned development in the immediate vicinity of the proposed site.

The proposed substation location is approximately 500m southwest of the permitted substation, within the planning boundary of the permitted wind farm which was subject to an EIA by both Cork County Council and An Bord Pleanála. The proposed substation will replace the already permitted substation that has not yet been constructed. Accordingly, a development of this nature has already been deemed appropriate within the wind farm site.

As the impacts from the proposed development are estimated to be slight to imperceptible it is unlikely that there will be any significant cumulative impacts arising from the proposed development.

The visual impact of the substation will be slight or imperceptible in any view of the permitted Barnadivane Wind Farm therefore there will be no significant cumulative visual impact arising.

9.6.2 Do Nothing Scenario

In the case that the proposed substation is not constructed, the lands will continue to be used as they are now and there will be no landscape and visual impacts. A substation will be constructed in the currently permitted location.

9.6.3 Conclusion

As a general comment, it is considered that the locality has the ability to absorb the proposed development on the following basis:

- The draft strategy defines low value landscapes as *"monotonous landscapes without particular scenic quality, local level of natural or cultural heritage"* and low sensitivity landscapes as *"robust landscapes, which are tolerant to change, and which have the ability to accommodate development pressure".*
- The proposed substation location is approximately 500m southwest of the permitted substation, within the planning boundary of the permitted wind farm which was subject to an EIA by both Cork County Council and An Bord Pleanála. Accordingly, this area is deemed suitable for a development of this nature.
- The proposed location is within a strategic search area for a wind farm, strategic search areas have been identified by Cork County Council as the most suitable areas for wind farm development in the county, including associated infrastructure.
- The proposed location is further from the scenic route than the currently permitted substation location, and the natural topography and mature tree screening to the north will offer natural screening from the scenic route.
- The intensity and clutter of the proposed substation structures contrasts with the relatively low intensity of other rural land uses in the vicinity including Garranereagh Wind Farm just to the east. Nonetheless, this existing wind farm and the permitted Barnadivane Wind Farm, to which this proposal is paired, will provide a thematic justification for the sub station.
- An existing 110kV overhead electricity line supported on double timber poles traversing the site creates a thematic association with the proposed substation.

10 NOISE

10.1 Introduction

This chapter describes the noise impact of the construction and operation of the proposed substation at Barnadivane. Predicted construction and operational noise levels have been assessed against the relevant noise limits.

10.2 Methodology

10.2.1 Substation Construction Assessment Methodology

There is no specific Irish guidance on appropriate noise limits for construction noise, and therefore the noise limits specified in the British Standard, BS 5228:2009, *Code of Practice for Noise and Vibration Control on Construction and Open Sites*, have been applied for this assessment. This document contains two example methods for assessing the significance of construction noise.

The first is based on the use of criteria defined in the Department of the Environment Advisory Leaflet (AL) 72, *Noise Control On Building Sites*[4] which sets a fixed limit of 70 dB(A) in rural suburban and urban areas away from main roads and traffic. Noise levels are generally taken as façade L_{Aeq} values with free-field levels taken to be 3 dB lower, giving an equivalent noise criterion of 67 dB L_{Aeq}.

The second is based on noise change, with a 5 dB increase in overall noise considered to be significant. However, where existing noise levels are low, and construction activities continue for more than one month, minimum criteria are applicable. These are 45, 55 and 65 dB L_{Aeq}, for night-time (2300-0700), evening and weekends, and daytime (0700-1900) including Saturdays (0700-1300) respectively.

It is proposed that construction noise with a duration greater than one month is assessed against this daytime noise limit of 65 dB L_{Aeq}, as this is when construction noise will be generated.

Road traffic noise due to construction traffic associated with the substation will be assessed against an increase of 3 dB. If the increase in road traffic noise is less than 3 dB then the impact can be considered to be imperceptible and is determined to be insignificant.

10.2.2 Substation Operational Noise Assessment Methodology

The operational noise will be assessed using the methodology described in BS 4142:1997, *Method for Rating Industrial Noise Affecting Mixed Residential and industrial Areas*. BS 4142:1997 assesses the likelihood of complaints by comparing the rating level of the noise source (including any applicable penalties for character) with the background noise and concludes that;

- a difference of around +10 dB indicates that complaints are likely;
- a difference of around +5 dB is of marginal significance;
- if the rating level is more than 10 dB below the measured background noise level then complaints are unlikely.

The introduction to the standard states that *'the method is not suitable for assessing the noise measured inside buildings or when the background and rating noise levels are both very low'* and clarifies this stating that *'for the purposes of this standard, background noise levels below about 30 dB and rating levels below about 35 dB are considered to be very low'*.

[4] Department of the Environment, Environment Advisory Leaflet (AL) 72, Noise Control On Building Sites, 1969

10.3 Receiving Environment

Substation construction and operational noise has been assessed for the nearest residential receptor to the proposed substation location. The nearest residential properties to the substation are shown in Table 10-1 below.

Table 10-1: Nearby Residential Receptors to Substation

Property ID	Easting	Northing	Distance to Substation (m)
32	134612	62704	284
36	133972	62753	286
31	134615	62625	321
41	134772	62687	441
49	134865	62783	516
58	134816	62450	584
50	13489	62464	645
71	134733	62257	655
33	134726	63458	746
37	133671	63380	799
30	134617	62002	823
61	134601	61972	846
34	134775	63558	858
67	134602	61923	892
29	134345	61878	894
38	133536	63405	921
66	134577	61878	928

10.4 Potential Impacts

10.4.1 Construction Phase

Detailed noise predictions have not been carried out for each construction activity because the specific plant and schedule for construction activities is not known at this stage, instead an indicative assessment has been carried out based on worst case assumptions for the assumed plant detailed in Table 10-2 with octave band sound pressure levels for each item provided in Table 10-3 taken from BS 5228:2009. It has been assumed that one of each of the plant listed in the table will be used.

Table 10-2: Construction Plant Assumed for the Substation Construction

Plant ID	Table Ref	Ref No.	Equipment	Power Rating, kW	Equipment Size, weight (mass), capacity
A	C.2	4	Tracked excavator idling (22 tonne)	102	22
B	C.2	3	Tracked excavator (22 tonne)	102	22
C	C.2	10	Dozer (41 tonne)	239	41

Plant ID	Table Ref	Ref No.	Equipment	Power Rating, kW	Equipment Size, weight (mass), capacity
D	C.2	31	Dump truck (29 tonne)	306	29
E	C.2	33	Articulated dump truck (23 tonne)	187	23
F	C.4	14	Wheeled backhoe loader (9 tonne)	62	9
G	C.4	15	Fuel tanker lorry (11 tonne)	—	11
H	C.2	14	Tracked excavator - earthworks	226	40
I	C.2	30	Dump truck (29 tonne)	306	29
J	C.5	12	Dozer spreading chipping/ fill	104	14
K	C.5	19	Road roller 22 tonne	95	22
L	C.5	20	Asphalt paver (and tipper lorry)	112	12
M	C.9	11	Excavator mounted rock breaker	125	29

Table 10-3: Octave Band Noise Data

Plant ID	63	125	250	500	1k	2k	4k	8k	A-weighted sound pressure level (dB L_{Aeq} at 10m)
A	59	49	45	45	49	46	39	31	52
B	80	83	76	73	72	70	69	66	78
C	89	90	81	73	74	70	68	64	80
D	86	79	79	79	79	84	69	60	87
E	85	87	77	75	76	73	69	62	81
F	68	67	63	62	62	61	54	47	67
G	79	73	71	75	72	67	59	50	76
H	85	78	77	77	73	71	68	63	79
I	85	74	78	73	73	74	67	63	79
J	80	78	71	70	74	68	65	61	77
K	87	85	75	73	75	73	69	63	80
L	78	77	72	72	71	69	62	56	75
M	91	89	85	89	87	87	84	80	93

The predicted construction noise levels have been calculated according to BS 5228:2009 and assume that the plant is operating for 100% of the time, 50% soft ground attenuation, no topographical barrier attenuation, and atmospheric attenuation for 10 degrees Celsius (°C) and 70% humidity conditions. In practice, it is likely that at least some of the plant would be screened from view and the construction activities would not be occurring for 100% of the time, but the calculation represents a worst case.

The nearest residential property to the proposed substation is 284 m away, and at this distance the predicted noise level for all plant operating simultaneously is 61 dB L_{Aeq}.

Construction Noise Impact Assessment

The worst case predicted construction noise level at the nearest residential property is 61 dB L_{Aeq} which is below the adopted construction noise limit of 65 dB L_{Aeq} over the working day.

It should be noted that in practice the plant will not all be operating simultaneously for 100% of the working day, and that noise levels during the construction phase are likely to be significantly lower.

10.4.2 Road Traffic Noise

Construction operations at the site will result in an increase in traffic levels along the local road networks. However, this minor increase will not be any greater than that for the already consented substation which the current proposal replaces (part of consented wind farm). If the predicted increase in road traffic noise is less than twice the existing flow rate (with the same proportion of heavy vehicles) then the increase in road traffic noise would be 3 dB. The predicted increase in road traffic associated with the construction of the substation is lower than this, and therefore no significant impacts are predicted. Further, relocation and increasing the footprint of the substation will cause minimal increase in traffic and therefore no significant impacts are predicted.

10.4.3 Operational Phase Impacts

Noise will be produced by two transformers located in the substation and will be a combination of a 'hum' from the unit together with noise generated by the cooling fans. The noise level is likely to depend on the load on the transformer which is dependent on the wind speed (as the wind turbines produce more energy in high wind speeds).

The proposed transformers are TrafoStar 63 MVA units. The specification sheet includes a table detailing achievable noise levels for 80, and 93 dB(A) under typical and high conditions respectively, and that 65 dB(A) is achievable if requested. They are to be located externally in the substation compound. It is understood that the transformers selected for this site will be selected to ensure that they do not operate above the achievable reference sound pressure level of 65 dB(A).

Operational Noise Impact Assessment

Hayes McKenzie has been informed that the noise levels presented in the TrafoStar documentation, included in Appendix 5, are measured sound pressure levels at 2 m from the transformer. Predicted noise levels have been calculated based on hemispherical propagation from the transformer to the nearest residential property (284 m distant) and assume that the two transformers are located equidistant from the property. The results of the predictions are presented in Table 10-4 for the achievable noise conditions described in the transformer documentation. It is assumed that all other plant located in the substation will be quieter than the transformers. It is likely that the transformers will emit a tonal audible hum, and therefore a plus 5 dB penalty has been added to the predicted noise level as recommended by BS4142:1998.

Table 10-4: Substation Sound Power Levels[24]

Transformer Type	Operational Mode	Reference Sound Pressure Level, dB(A)	Sound Power Level, dB(A)	Predicted Sound Pressure Level at 284 m dB(A)	Rating Level including character penalty dB $L_{A,Tr}$
TrafoStar Transformer 63 MVA	Achievable	65	79	25	30

The results of the operational transformer noise predictions show that predicted noise levels at the nearest residential property are 30 dB $L_{A,Tr}$. It should be noted that rating levels below about 35 dB $L_{A,Tr}$ are considered to be very low, and therefore with the transformers operating at their achievable noise level then operational noise levels at the nearest residential location are not significant.

10.4.4 Potential Cumulative Noise Impacts

The proposed substation location is within the planning boundary of a permitted wind farm (refer to Section 1.4 for details). There is also an existing wind farm, namely Garranereagh Wind Farm, with 4 operational turbines neighbouring the site, the nearest turbine being approximately 1 km from the proposed substation. There is no other significant permitted or planned development in the immediate vicinity of the proposed site.

The proposed substation location is approximately 500m southwest of the permitted substation, within the planning boundary of the permitted wind farm which was subject to an EIA by both Cork County Council and An Bord Pleanála. The proposed substation will replace the already permitted substation that has not yet been constructed. Accordingly, a development of this nature has already been deemed appropriate within the wind farm site.

The construction works for the wind farm are likely to overlap with the construction of the substation to a certain degree, but the majority of the wind farm construction works will be carried out at relatively large separation distances from the substation construction, in addition, the mitigation measures proposed in this chapter will be implemented to control noise generation. Therefore significant cumulative noise impacts are not expected.

Operational noise levels from the proposed sub-station are not expected to exceed a noise rating level 30 dB $L_{A,Tr}$, which is considered to be very low, and therefore cumulative noise from the operation of the sub-station and the wind turbines is insignificant.

10.5 Mitigation Measures

10.5.1 Construction Phase

The noise impact for construction works traffic would be mitigated by generally restricting movements along access routes to the standard working hours and excluding Sundays, unless specifically agreed otherwise.

Consultation with the local community is important in minimising the likelihood of complaints and therefore construction will be undertaken in consultation with the local authority as well as the residents being informed of construction activities through a community liaison group.

Working hours would be generally 0700-1900 hours Monday to Friday, and Saturdays from 0700-1300 hours. However, to ensure that optimal use is made of fair weather windows, or at critical periods within the programme, it could occasionally be necessary to work outside these hours. Any such out of hours working would be agreed in advance with the local planning authority.

10.5.2 Operation Phase

The transformers located at the substation are available with a range of noise output, and the equipment will be specified to operate at the lowest possible noise level. As such with the transformers operating within their achievable noise level of 65 dB(A), operational substation noise levels will not be significant at the nearest residential location, and no specific mitigation is required.

10.5.3 Mitigation Measures for Cumulative Noise Impacts

As discussed at section 10.4.4 there is potential for construction of the wind farm to be carried out simultaneously with the construction of the substation. Working hours for all construction activities will be controlled such that activities will be carried out during normal working hours, and it is likely that cumulative construction activities will be below the 65 dB L_{Aeq} adopted criterion at residential properties in the vicinity of the wind farm and substation such that the no significant impacts are predicted.

10.6 Residual Impacts

Noise from construction activities will be below the 65 dB L_{Aeq} adopted criterion such that no significant construction impacts are predicted.

Noise arising from increased road traffic associated with the construction of the substation are likely to result in imperceptible increases in road traffic noise such that road traffic noise levels are considered to be not significant.

If the transformers installed at the substation conform to their achievable noise levels as specified in the documentation for the TrafoStar 63 MVA then operational noise levels will be below 30 dB L_A,T_r, which is considered to be very low, and therefore no significant operational noise impacts are predicted.

10.6.1 Conclusions

Noise levels arising from the construction and operation of the proposed substation at the Barnadivane Wind Farm have been assessed against the relevant noise limits for such activities.

Noise from construction activities have been assessed against a proposed noise limit of 65 dB L_{Aeq} described in BS5228:2009, *Code of Practice for Noise and Vibration Control on Construction and Open Sites*, and will be below this adopted criterion such that no significant construction impacts are predicted.

Noise arising from increased road traffic associated with the construction of the substation is likely to result in an increase of road traffic noise levels of less than 3 dB resulting in an imperceptible increase in road traffic noise such that road traffic noise levels are considered to be not significant.

Operational noise from the transformers located at the substation has been assessed according to BS 4142:1997, *Method for Rating Industrial Noise Affecting Mixed Residential and industrial Areas*. If the transformers installed at the substation conform to their achievable noise levels as specified in the documentation for the TrafoStar 63 MVA then operational noise levels will be below 30 dB L_A,T_r, which is considered to be very low, and therefore no significant operational noise impacts are predicted.

10.7 References

BS 5228:2009, *Code of Practice for Noise and Vibration Control on Construction an d Open Sites*

Department of the Environment Advisory Leaflet (AL) 72, *Noise Control On Bu ilding Sites*

BS 4142:1997, *Method for Rating Industrial Noise Affecting Mixed R esidential and in dustrial Areas*

11 AIR AND CLIMATE

11.1 Introduction

Fossil fuel combustion remains the principal source of classic primary air pollutants such as particulate matter, sulphur dioxide, nitrogen oxides and carbon monoxide. This section presents details on air quality and climate within the existing environment in the vicinity of the proposed development. The potential impacts of the proposed development on the receiving atmosphere are assessed and where necessary, mitigation measures are described.

11.2 Methodology

Production of this air and climate assessment involved a professional evaluation by qualified Scientists at FTC. This entailed the following:

- Desktop study to identify any sensitive receptors and establish the air quality in the receiving environment;
- Assessment of the significance of the impact of the proposal during the construction, operation and decommissioning of the development;
- Recommendation of mitigation measures to eliminate or reduce any potential impacts

The Cork County Development Plan 2009 – 2015 has been consulted for this Chapter, along with the relevant legislative requirements for air quality.

11.2.1 Legislative Requirements for Air Quality

Air quality monitoring, assessment and management in Ireland is carried out in accordance with the Air Quality Standards Regulations 2011. These regulations give effect to Council Directive 2008/50/EC[25] on ambient air quality and cleaner air for Europe. Table 11-1 lists the limits set down for specific pollutants for the protection of human health.

Table 11-1: Limit Values Specified for Specific Air Pollutants

Pollutant	Limit Value ug/m^3	Averaging Period
sulphur dioxide (SO_2)	125	24 hours
Nitrogen dioxides (NO_2)	200	1 hour
Lead (Pb)	0.5	calendar year
Particulate matter (PM_{10})	50	24 hours
carbon monoxide (CO)	10,000	8 hours
Benzene (C6H6)	5	annual mean
Ozone (O_3)	120	8 hours

*target value effective from 31 December 2012

Kyoto Protocol (1997)

Following the World Summit Conference held in Kyoto, Japan in 1997, nations which signed the Protocol agreed to take actions to control, reduce or limit their emissions of the six main greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride).

The Kyoto Protocol (1997) to the United Nations Framework Convention on Climate Change, 1992 (UNFCCC) imposes legally binding targets to be achieved in the period 2008 - 2012:

- 5% overall reduction in the emission of greenhouse gases in developed countries
- 8% reduction below 1990 levels within the EU
- Ireland's contribution is a limit of 13 % above 1990 greenhouse gas emission levels
- countries not fulfilling their obligations will be forced to purchase carbon credits on an open market from compliant countries

The agreement came into force on 16 February 2005. The Kyoto Protocol limits Ireland's total emissions to an average of 62.8 million tonnes (Mt) of carbon dioxide equivalent (CO_{2eq}) per annum during the period 2008 – 2012.

In April 2012 the EPA released projections of Ireland's greenhouse gas emissions to 2020[26]. Under the most ambitious reduction scenario, total greenhouse gas emissions are required to be reduced by a further 0.8 Mt per annum of CO_{2eq}, or 4.1 Mt of CO_{2eq} over the period 2008 - 2012 to meet the Kyoto Protocol target for each year.

In its 2012 State of the Environment Report, "Ireland's Environment – An Assessment"[27], the EPA provides an assessment of the likely compliance with Ireland's Kyoto limit for 2008 - 2012. Total greenhouse gas emissions in 2010 were estimated to be 61.314 Mt CO_{2eq}. Based on these latest inventory figures, Ireland's emissions in 2010 were approximately 1.5 Mt CO_{2eq} lower than the average annual Kyoto limit. This can be seen in Figure 11.1 which is reproduced from the EPA's 'Ireland's Environment – An Assessment' in 2012.

The EPA emissions projections indicate that even under the most optimistic scenario, Ireland will exceed its annual limit in 2017 and will exceed its 2020 target.

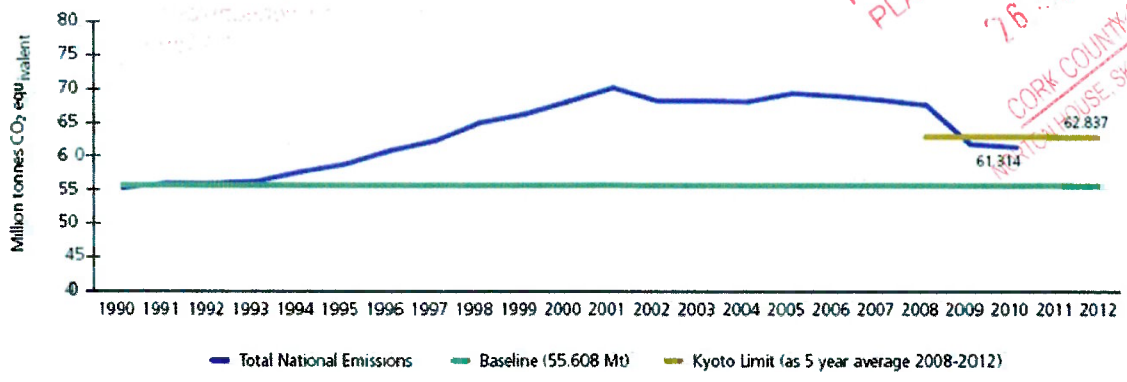

Figure 11-1: Greenhouse Gas Emissions - Distance to Ireland's Kyoto Limit*

Conference of the Parties 18

The Conference of the Parties is the highest body of the United Nations Climate Change Convention and consists of environment ministers who meet once a year to discuss the Convention's developments. The 18th and most recent meeting was in Doha, Qatar, between 26 November and 08 December 2012.

At this meeting the following agreements were made:

- Governments decided that the length of the second commitment period of the Kyoto Protocol will be 8 years, from 01 January 2013.
- Countries that are taking on further commitments have agreed to review their emission reduction commitments by 2014 with a view to increasing their respective levels of ambition.
- The Kyoto Protocol's Market Mechanisms – the Clean Development Mechanism (CDM), Joint Implementation (JI) and International Emissions Trading (IET) – can continue as of 2013.
- Governments have agreed to work toward a universal climate change agreement covering all countries from 2020, to be adopted by 2015, and to find ways to scale up efforts before 2020 beyond the existing pledges to curb emissions so that the world can stay below the agreed maximum 2 degrees Celsius temperature rise.

Strategy for Renewable Energy

The Strategy for Renewable Energy was published by the Department of Communications, Energy and Natural Resources in May 2012 and sets five strategic goals for renewable energy. A key action of the Strategy is to *"Support delivery of the 40% target for renewable electricity through the existing GATE processes."*

11.3 Receiving Environment

11.3.1 Air in the Existing Environment

The EPA undertakes continuous ambient air monitoring at various sites in Ireland. Although no data is available on air quality in the immediate vicinity of the study area, it is expected that the quality at the site is good.

The ambient air quality at the site is expected to be very high and characteristic of a rural environment. There are no significant point sources of industrial atmospheric pollution in the vicinity of the site. There are no significant atmospheric emissions associated with the existing operational turbines at Garranereagh Wind Farm. Minor contributions of atmospheric pollutants in the area will arise through smoke from open fires, domestic boilers and vehicle exhausts.

Levels of sulphur dioxide and oxides of nitrogen at the site are expected to be low and in line with typical rural measurements for those parameters. Annual mean concentrations of nitrogen oxides (NO_x) in rural atmospheres are expected to be in the range of 0 – 30µg/m^3, with annual mean concentrations of sulphur dioxide (SO_2) expected to be in the range of 3 – 6 µg/m^3. Dust deposition rates in the vicinity of the site are expected to be typical of agricultural land use activities carried out in the area, with yearly average dust deposition (expressed as a rate in mass per unit area per day) rates of less than 30 mg/m^2/day.

11.3.2 Climate in the Existing Environment

The dominant influence on Ireland's climate is the Gulf Stream. Consequently, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude. Average annual temperature is about 9°C.

The nearest synoptic station to the study area is located at Cork Airport, approximately 31 km to the east. Roche's Point synoptic station is located 47 km east, and Valentia synoptic station is approximately 98 km to the west.

Terelton is the nearest climatological station, 3.4 km to the north of the study area, followed by Crookstown, located 7 km to the east and Ballineen located 8 km to the south.

Monthly and annual rainfall averages (1961-1990) for these stations are presented in Table 11.1 below. The average annual precipitation in the area is 1,443 mm (based on rainfall data from Terelton between 1961 and 1990). The corresponding figure for Cork Airport synoptic station during the same period is 1,207 mm.

11.4 Potential Impacts

11.4.1 Potential Impacts of the Development on Air Quality

The proposed development is in a rural area. Figure 5.1 shows the neighbouring dwellings within 1 km of the site. The nearest dwelling is located over 250m from the proposed substation.

Construction Phase

While there will be some dust and exhaust emissions from construction traffic during construction, these impacts will be of temporary duration and their impacts are considered likely to be minor as the site is in a rural, isolated area. Dust or pollutants generated from the proposed development could arise from:

- disturbance of the land surface during construction of the proposed sub-station foundations
- movement of construction vehicles over land
- wind blowing over unprotected, unconsolidated soils
- emissions from uncovered truckloads
- movement and placement of fill material
- exhaust emissions from construction vehicles and machinery

Mitigation measures are outlined in Section 11.4.1.

Operational Phase

There are no significant potential impacts on air and climate during the operational phase as there will be no emissions or dust from the substation once operational. There will be minimal traffic accessing the site.

11.4.2 Potential Impacts of the Development on Climate

The proposed substation development will facilitate the greater use and development of renewable wind energy in accordance with EU and Irish Government policies. This will ultimately have a net positive benefit in reducing carbon emissions.

11.4.3 Potential Cumulative Impacts of the Development

The proposed substation location is within the planning boundary of a permitted wind farm (refer to Section 1.4 for details).There is also an existing wind farm, namely Garranereagh Wind Farm, with 4 operational turbines neighbouring the site, the nearest turbine being approximately 1 km from the proposed substation. There is no other significant permitted or planned development in the immediate vicinity of the proposed site.

The proposed substation location is approximately 500m southwest of the permitted substation, within the planning boundary of the permitted wind farm which was subject to an EIA by both Cork County Council and An Bord Pleanála. The proposed substation will replace the already permitted substation that has not yet been constructed. Accordingly, a development of this nature has already been deemed appropriate within the wind farm site.

The construction works for the wind farm are likely to overlap with the construction of the substation to a certain degree, but the majority of the wind farm construction works will be carried out at relatively large separation distances from the substation construction, in addition, the mitigation measures proposed in this chapter will be implemented to control dust generation. Therefore significant cumulative construction air impacts are not expected.

11.4.4 Do Nothing Scenario

It is considered that the proposed substation is the best possible location for connecting Barnadivane Wind Farm to the national grid. In the case that the proposed substation is not permitted the substation will not be constructed in this location and it is unlikely that an alternative location will be found that would be more suitable. This will make it more difficult for Ireland to achieve its targets to comply with the Kyoto Protocol emissions levels.

If the proposed substation is not constructed, the permitted substation will be built.

11.5 Mitigation Measures

11.5.1 Construction Phase

To address the potential impact of dust and particulate pollution, the following mitigation measures will be implemented:

- dust-generating vehicle loads will be covered using strong, waterproof sheets such as tarpaulin and will not be overloaded
- dust generation from construction of the substation foundations will be minimised by the use of material which has a low dust potential
- the drop height of excavated materials during substation compound construction will be minimised to a practicable level, to limit fugitive dust generation.
- the site supervisor will undertake daily visual inspections to examine dust generation
- the working area will be kept as small as possible so as to minimise potential dust generation
- reinstatement of excavated areas and landscaping berms will be undertaken as soon as practicable

11.5.2 Operational Phase

No mitigation measures are required for operation of the proposed development.

11.6 Residual Impact

Any potential minor impacts arising from dust associated with the construction works will be mitigated through construction management techniques. There will not be any significant cumulative impacts arising.

The proposed development will transmit energy from the permitted Barnadivane Wind Farm, resulting in a negligible impact on air quality and climate. This will result in an avoidance of greenhouse gas emissions that would otherwise arise from fossil fuel power generating plants. The avoided emissions therefore result in a direct, neutral impact, and a small, indirect, positive impact on air and climate.

12 CULTURAL HERITAGE

12.1 Introduction

12.1.1 Scope of Work

This chapter presents the results of an archaeological and cultural heritage impact assessment for a proposed sub-station at Barnadivane, near Terelton, Co. Cork (Figure 12.1). The proposed development will consist of the construction of a sub-station in a green field site. The proposed development site comprises mainly pasture land and scrub. The proposed substation is to replace a substation which has already been consented as part of a wind farm in the general area. The proposed substation is located within the consented wind farm area.

The purpose of this report is to assess the potential impacts of the proposed sub-station on the surrounding archaeological, architectural and cultural heritage landscape and any features of archaeological note within the proposed development site. The assessment is based on both a desktop review of the available cultural heritage and archaeological data and a comprehensive programme of field walking of the proposed development site. The report amalgamates desk-based research and the results of field walking to identify areas of archaeological/architectural/cultural heritage significance or potential, likely to be impacted by the proposed development. An assessment of potential impacts is presented and a number of mitigatory measures are recommended where appropriate. The visual impact of the proposed development on newly discovered monuments/sites of significance as well as known recorded monuments is also assessed.

12.1.2 Proposed Development and Previous Planning History

The proposed development comprises the construction of a sub-station in a green field site in the townland of Barnadivane (Kneeves). The proposed substation is within the planning boundary of a permitted wind farm and will replace the currently permitted substation described below.

Associated Application and Previous Permissions

Planning permission for a windfarm was granted by both the Planning Authority and An Bord Pleanála under planning reference numbers 05/5907 and PL 04.219620 respectively, with an extension of duration subsequently granted under 11/6605. The existing permission is for the construction of 14 wind turbines at a total height not exceeding 105 m, 14 transformers, a 110 kV substation and switch station, 1 no. 70 m high wind monitoring mast, construction and upgrading of site entrances, site tracks, and associated works.

12.1.3 Project Team and Qualifications

Miriam Carroll and Annette Quinn are the directors of Tobar Archaeological Services and both graduated from University College Cork in 1998 with a Masters degree in Methods and Techniques in Irish Archaeology. Both directors are licensed by the DAHG to carry out excavations and are members of the Institute of Archaeologists of Ireland. Annette Quinn and Miriam Carroll have been working in the field of archaeology since 1994 and have undertaken numerous projects for both the private and public sectors including excavations, site assessments (EIS/EIA) and surveys.

12.1.4 Site Location and topography

The proposed development is located in the townland of Barnadivane approximately 2km to the south-east of Terelton and 1.6 km south-west of Poulanargid, Co. Cork. The town of Macroom lies approximately 10 km north of the study area boundary. The surrounding land-uses include, cattle and sheep grazing and commercial forestry (Figure 12-1). The proposed sub-station site will be constructed in a green field site on a gentle south-facing slope.

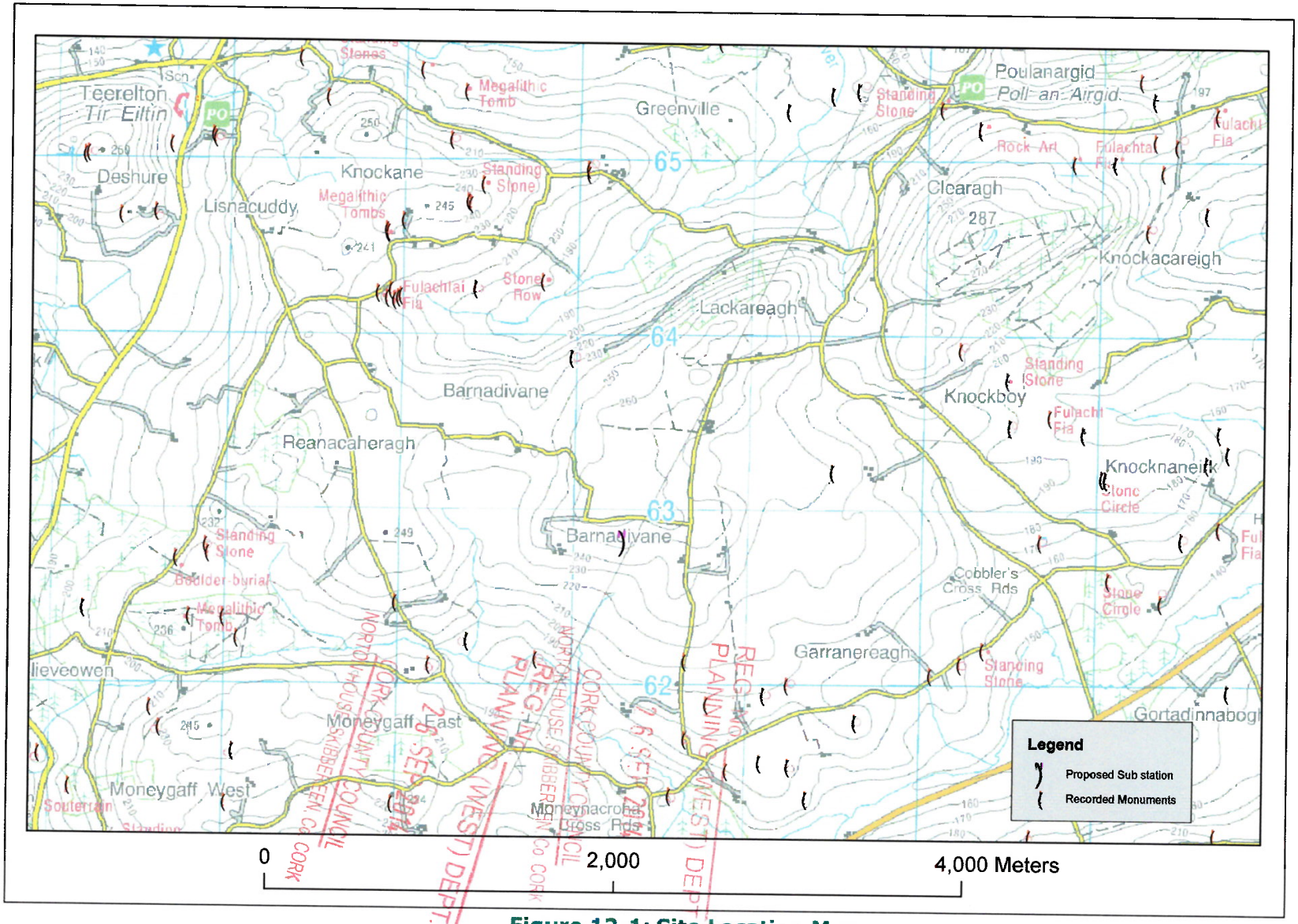

Figure 12-1: Site Location Map

12.2 Methodology

The assessment of the archaeology, architecture and cultural heritage of the proposed development area included desk-based research as well as field inspection. A desk-based study of the proposed development site was undertaken in order to assess the archaeological, architectural and cultural heritage potential of the area and to identify features of archaeological/architectural/cultural heritage significance within or near to the proposed development site. Field inspection of the study area was undertaken in July 2014 to determine if previously unrecorded archaeological/architectural or cultural heritage features were located in the area of the proposed development site and to assess any potential impacts on known or previously unrecorded sites or monuments.

12.2.1 Statutory context

Current Legislation

Archaeological monuments are safeguarded through national and international policy, which is designed to secure the protection of the cultural heritage resource. This is undertaken in accordance with the provisions of the European Convention on the Protection of the Archaeological Heritage (Valletta Convention). This was ratified by Ireland in 1997.

Both the National Monuments Acts 1930 to 2004 and relevant provisions of the Cultural Institutions Act 1997 are the primary means of ensuring protection of archaeological monuments, the latter of which includes all man-made structures of whatever form or date. There are a number of provisions under the National Monuments Acts which ensure protection of the archaeological resource. These include the Register of Historic Monuments (1997 Act) which means that any interference to a monument is illegal under that Act. All registered monuments are included on the Record of Monuments and Places (RMP).

The Record of Monuments and Places (RMP) was established under Section 12 (1) of the National Monuments (Amendment) Act 1994 and consists of a list of known archaeological monuments and accompanying maps. The Record of Monuments and Places affords some protection to the monuments entered therein. Section 12 (3) of the 1994 Amendment Act states that any person proposing to carry out work at or in relation to a recorded monument must give notice in writing to the Minister (Environment, Heritage and Local Government) and shall not commence the work for a period of two months after having given the notice. All proposed works, therefore, within or around any archaeological monument are subject to statutory protection and legislation (National Monuments Acts 1930-2004).

Under the Heritage Act (1995) **architectural heritage** is defined to include' *all structures, buildings, traditional and designed, and groups of buildings including street-scapes and urban vistas, which are of historical, archaeological, artistic, engineering, scientific, social or technical interest, together with their setting, attendant grounds, fixtures, fittings and contents...'*. A heritage building is also defined to include '*any building, or part thereof, which is of significance because of its intrinsic architectural or artistic quality or its setting or because of its association with the commercial, cultural, economic, industrial, military, political, social or religious history of the place where it is situated or of the country or generally*'.

The Planning and Development Act 2000 (as amended), sets out the legal framework for the protection of buildings/structures which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. Such protection is afforded through the mechanism of the Record of Protected Structures (RPS). In relation to a protected structure or proposed protected structure, the term 'structure' includes the interior of the structure, the land lying within the curtilage of the structure, any other structures lying within that curtilage and their interior, and all fixtures and features which form part of the interior or exterior of that structure. The protection also extends to any features specified as being in the attendant grounds. The DAHG have completed the National Inventory of Architectural Heritage (NIAH) for County Cork.

Policies of the Cork County Development Plan 2009-2015

The relevant sections of the Heritage and the Environment Chapter of the Cork County Development Plan 2009 – 2015 (CDP) are outlined below.

Section 7.3.4 (CDP 2009-2015, 282) notes that the qualities of archaeological or architectural interest are not mutually exclusive and certain structures can have both qualities. Some of the items listed in the Record of Monuments and Places are also Protected Structures (as set out in Volume 2 of the Plan), and are within the ambit of protection under the provisions of the National Monuments Acts 1930-2004.

Section 7.3.7 notes that '*Various types of development can have visual or physical impacts on archaeological heritage. It is important that this heritage be protected, in particular during a time of increasing development arising from our economic success. Previously unidentified archaeological sites may be uncovered during construction works including drainage schemes or road making. Archaeological deposits, which may be damaged by the development, must be investigated and recorded in great detail'.*

Section 7.3.10 notes that it is a requirement that a proposed development (due to location, size or nature) which may have archaeological implications for archaeological heritage be subject to an Archaeological Assessment. This includes areas close to archaeological monuments, extensive in area (half hectare or more) or length (1km or more) and developments that require an Environmental Impact Statement.

ENV 3-1 Sites, Features and Objects of Archaeological Interest

(a) It is an objective to safeguard sites, features and objects of archaeological interest generally.
(b) It is an objective of the Planning Authority to secure the preservation (i.e. preservation in situ or in exceptional cases preservation by record) of all archaeological monuments included in the Record or Monuments and Places as established under Section 12 of the National Monuments (Amendment) Act, 1994, and of sites, features and objects of archaeological and historical interest generally.

In securing such preservation, the planning authority will have regard to the advice and recommendations of the Department of the Environment, Heritage and Local Government.

ENV 3-2 Newly Discovered Archaeological Sites

It is an objective to protect and preserve archaeological sites discovered since the publication of the Record of Monuments and Places.

ENV 3-3 Zones of Archaeological Protection

It is an objective to protect the Zones of Archaeological Potential located within both urban and rural areas as identified in the Record of Monuments and Places.

ENV3-4

The Council will have regard to archaeological concerns when considering proposed service schemes (including electricity, sewerage, telecommunications, water supply) and proposed road works (both realignments and new roads) located in close proximity to Recorded Monuments and Places and the Zones of Archaeological Potential.

Draft County Development Plan 2015

A number of policies relevant to archaeology and architectural heritage are outlined below and are dealt with in Volume 1 of the Draft County Development Plan, Ch 12 Heritage.

Archaeological Heritage

HE 3-1: Protection of Archaeological Sites

a) Safeguard sites and settings, features and objects of archaeological interest generally.
b) Secure the preservation (i.e. preservation in situ or in exceptional cases preservation by record) of all archaeological monuments including the Sites and Monuments Record (SMR) (see www.archaeology.ie) and the Record or Monuments and Places as established under Section 12 of the National Monuments (Amendment) Act, 1994, as amended and of sites, features and objects of archaeological and historical interest generally. In securing such preservation, the planning authority will have regard to the advice and recommendations of the Department of Arts, Heritage and Gaeltacht as outlined in the Frameworks and Principles for the Protection of the Archaeological Heritage.

HE 3-3: Zones of Archaeological Potential
Protect the Zones of Archaeological Potential (ZAPs) located within historic towns and other urban areas and around archaeological monuments generally. Any development within the ZAPs will need to take cognisance of the potential for subsurface archaeology and if archaeology is demonstrated to be present appropriate mitigation (such as preservation in situ/buffer zones) will be required.

HE 3-4 Industrial and Post Medieval Archaeology
Protect and preserve the archaeological value of industrial and post medieval archaeology such as mills, limekilns, bridges, piers, harbours, penal chapels and dwellings. Proposals for refurbishment, works to or redevelopment/conversion of these sites should be subject to careful assessment.

HE 3-6: Archaeology and Infrastructure Schemes
Have regard to archaeological concerns when considering proposed service schemes (including electricity, sewerage, telecommunications, water supply) and proposed roadwork's (both realignments and new roads) located in close proximity to Recorded Monuments and Places and their known archaeological monuments.

Architectural Heritage

HE 4-1: Record of Protected Structures
a) The identification of structures for inclusion in the Record will be based on criteria set out in the Architectural Heritage Protection - Guidelines for Planning Authorities (2005).
b) Extend the Record of Protected Structures in order to provide a comprehensive schedule for the protection of structures of special importance in the County during the lifetime of the plan.
c) Seek the protection of all structures within the County, which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. In accordance with this objective, a Record of Protected Structures has been established and is set out in Volume 2 of the Plan.
d) Ensure the protection of all structures (or parts of structures) contained in the Record of Protected Structures.
e) Protect the curtilage and attendant grounds of all structures included in the Record of Protected Structures.
f) Ensure that development proposals are appropriate in terms of architectural treatment, character, scale and form to the existing protected structure and not detrimental to the special character and integrity of the protected structure and its setting.
g) Ensure high quality architectural design of all new developments relating to or which may impact on structures (and their settings) included in the Record of Protected Structures.
h) Promote and ensure best conservation practice through the use of specialist conservation professionals and craft persons.

HE 4-2: Protection of Structures on the NIAH
Give regard to and consideration of all structures which are included in the NIAH for County Cork, which are not currently included in the Record of Protected Structures, in development management functions.

Non-Structural Elements of Heritage

HE 4-3: Protection of Non- Structural Elements of Built Heritage
Protect important non-structural elements of the built heritage. These can include designed gardens/garden features, masonry walls, railings, follies, gates, bridges, and street furniture. The Council will promote awareness and best practice in relation to these elements.

Cultural Heritage

HE 5-1: Cultural Heritage
Protect and promote the cultural heritage of County Cork as an important economic asset.

HE 5-2: Naming of New Developments
Promote and preserve local place names, local heritage and the Irish language by ensuring the use of local place names or geographical or cultural names which reflect the history and landscape of their setting in the naming of new residential and other developments. Such an approach will be a requirement of planning permissions for new developments.

HE 5-3: Gaeltacht Areas
Protect the linguistic and cultural heritage of the Gaeltacht areas of Cork by:
a) Encouraging development within the Gaeltacht, which promotes, facilitates or complements the cultural heritage, including Irish language use;
b) Encouraging development within the Gaeltacht, which provides employment or social facilities, especially, but not exclusively, where these are of relevance to local young people;
c) Resisting development within the Gaeltacht, which would be likely to erode the cultural heritage (including the community use of Irish language), unless there are over-riding benefits for the long-term sustainability of the local community or for the proper planning and sustainable development of a wider area;
d) Ensuring that where the County Council erects signs within the Gaeltacht, these have Irish as their primary language, unless there are positive and over-riding reasons for doing otherwise;
e) Discouraging the exhibition of advertisements within the Gaeltacht which do not use Irish as their primary language;
f) Considering the desirability of demanding linguistic impact analyses with planning applications for particular major developments. These would be cases where the potential impact of the development on the use of Irish as the community language is not immediately apparent and pivotal in the determination of the application.

12.2.2 Desktop Assessment

A primary cartographic source and baseline data for this assessment was the consultation of the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) for County Cork. All known recorded archaeological monuments are indicated on 6 inch Ordnance Survey (OS) maps and are listed in this record. The 1st (1841-2) edition OS maps for the area as well as large scale high detail aerial photographs were also consulted.

The following sources were consulted for this assessment report:

- The Sites and Monuments Record (SMR)
- The Record of Monuments and Places (RMP)
- The Topographical Files of the National Museum of Ireland
- First edition Ordnance Survey maps (OSI.ie)
- Second edition Ordnance Survey maps (OSI.ie)
- Third edition Ordnance Survey Map (Record of Monuments and Places for County Cork in house)
- Aerial photographs (OSI.ie)
- Cork County Development Plan 2009-2014, Cork County Council
- Draft Cork County Development Plan 2015, Cork Co. Co.
- Excavations Bulletins
- National Inventory of Architectural Heritage (NIAH) – County Cork
- Record of Protected Structures, Cork County Council

Record of monuments and places

A primary cartographic source and base-line data for the assessment was the consultation of the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) for County Cork. All known recorded archaeological monuments are indicated on 6 inch Ordnance Survey (OS) maps and are listed in this record. The SMR/RMP is not a complete record of all monuments as newly discovered sites may not appear in the list or accompanying maps. In conjunction with the consultation of the SMR and RMP the electronic database of recorded monuments which may be accessed at www.archaeology.ie was also consulted.

Cartographic sources and aerial photography

The 1st edition (1841-2) and 2nd Edition (1900s) OS maps for the area were consulted as was OSI aerial photography on OSI.ie.

Topographical Files – National Museum of Ireland

Details relating to finds of archaeological material and monuments in numerous townlands in the country are contained in the topographical files held in the National Museum of Ireland. In order to establish if any new or previously unrecorded finds had been recovered from the study area these files were consulted for every townland within and adjacent to the study area.

Archaeological Inventory Series

Further information on archaeological sites may be obtained in the published County Archaeological Inventory series prepared by the Department of Arts, Heritage and the Gaeltacht (DoAHG). The archaeological inventories present summarised information on sites listed in the SMR/RMP and include detail such as the size and location of particular monuments as well as any associated folklore or local information pertaining to each site. The inventories, however, do not account for all sites or items of cultural heritage interest which are as yet undiscovered.

Cork County Development Plan 2009-2015 and Draft County Development Plan 2015

The Cork County Development Plan(2009 - 2015) was consulted for the schedule of buildings (RPS) and items of cultural, historical or archaeological interest which may be affected by the proposed wind farm development. The townlands within and surrounding the study area were entered into the database of protected structures in the development plan to assess the proximity and potential impact of the proposed development on such structures. The development plan also outlines policies and objectives relating to the protection of the archaeological, historical and architectural heritage landscape of County Cork (refer to Section 12.2.1 above).

Excavations Bulletins

Excavations' Bulletin is an annual account of all excavations carried out under license. The database is available on line at www.excavations.ie and includes excavations from 1970 to 2009. This database was consulted as part of the desktop research for this assessment to establish if any archaeological excavations had been carried out within or near to the proposed development area. No excavations which produced archaeologically positive results were undertaken within or in close proximity to the development site up to 2009.

National Inventory of Architectural Heritage (NIAH)

This source lists some of the architecturally significant buildings and items of cultural heritage and is compiled on a county by county basis by the Department of the Arts, Heritage and the Gaeltacht (DAHG). The NIAH database was consulted for all townlands within and adjacent to the study area. The NIAH for County Cork has been published therefore the NIAH sites are available for download on www.buildingsofireland.ie. The sites were downloaded on to the base mapping for this assessment.

12.2.3 Field Inspection

The site was inspected by *Tobar Archaeological Services* in July 2014. Field work was carried out by two qualified licensed archaeologists. Every effort was made to ensure that any potential features of archaeological or architectural (stone walls, piers, gateways, derelict buildings etc.) significance within the site were recorded. During the field site inspection in July 2014 a photographic record of the proposed development area was made.

12.3 Receiving Environment

12.3 1 Archaeological Heritage

For the purposes of this report archaeological heritage includes all recorded archaeological monuments listed in the RMP/SMR maps. All Recorded Monuments within close proximity to the proposed site are included here where both direct and indirect impacts are addressed. The nearest monuments to the proposed substation site are located approximately 845m and 771m to the south-west and south-east respectively (see Table 12-1 and Figure 12-2).

Table 12-1: Recorded Monuments

ITM E	ITM N	MONUMENT TYPE	RMP	TOWNLAND	DISTANCE TO PROPOSED SUB-STATION SITE
533760	562198	Ringfort - rath	CO095-001	MONEYGAFF EAST	845 METRES
534613	562191	Ringfort - rath	CO095-003	GARRANEREAGH	771 METRES

Ringfort CO095-001
This ringfort is located in a green field site in relatively low-lying ground. It may be viewed from certain areas immediately surrounding the monument but clear views of the monument are not possible from the proposed sub-station site mainly due to intervening boundaries and hedgerows. The monument is described in the *Archaeological Inventory of County Cork* as follows: '*On top of a natural rise, S of Bride River. Circular, heavily overgrown area (34.4m N-S; 33.1m E-W) enclosed by low earthen bank (max. H 1. 4m)*'.

Ringfort CO095-003
This ringfort is located along the public road in the townland of Garranereagh although very little now remains of the fort. Due to intervening boundaries and distance, this site will not be visible from the proposed sub-station site or vice-versa. It is described in the Archaeological Inventory of County Cork as follows: '*In pasture, on S-facing slope. Depicted as hachured circular enclosure (diam. c. 35m) bisected by roadway running N-S on 1842 OS 6-inch map; E half of enclosure indicated on 1904 OS 6-inch map. Arc (C 28.7m) formed by earthen bank (H 1.7m) survives on E side of roadway. Bank heavily overgrown. No visible surface trace of bank on W side of roadway; limekiln marked on 1842 OS 6-inch map inside SW bank also removed*'.

Ringforts and enclosures are the most numerous archaeological monuments in the Irish landscape. They consist of a circular or roughly circular area enclosed by an earthen bank formed by material thrown up from the digging of a concentric ditch on its outside. Ringforts are usually enclosed by a single bank (univallate) while bivallate or trivallate ringforts, i.e. those enclosed by double or triple rings of banks, are less common. The number of banks and ditches enclosing these monuments are considered to reflect the status of the site, rather than the strengthening of its defences. Sites enclosed by stone-built banks are known as cashels. Archaeological excavation has shown that the majority of ringforts functioned as enclosed farmsteads, built during the Early Christian period (5th – 9th century A.D.). Excavation within the interior of the monuments has traced the remains of circular and rectangular dwelling houses as well as smaller huts probably used to stall animals. The enclosing earthworks would also have protected domestic livestock from natural predators such as wolves and foxes.

The construction of a sub-station in this location will not result in any direct impacts as no recorded monuments are located within close proximity. Given the intervening boundaries and distance between the nearest recorded monuments (see above) and the proposed site, indirect impacts (visual) are unlikely.

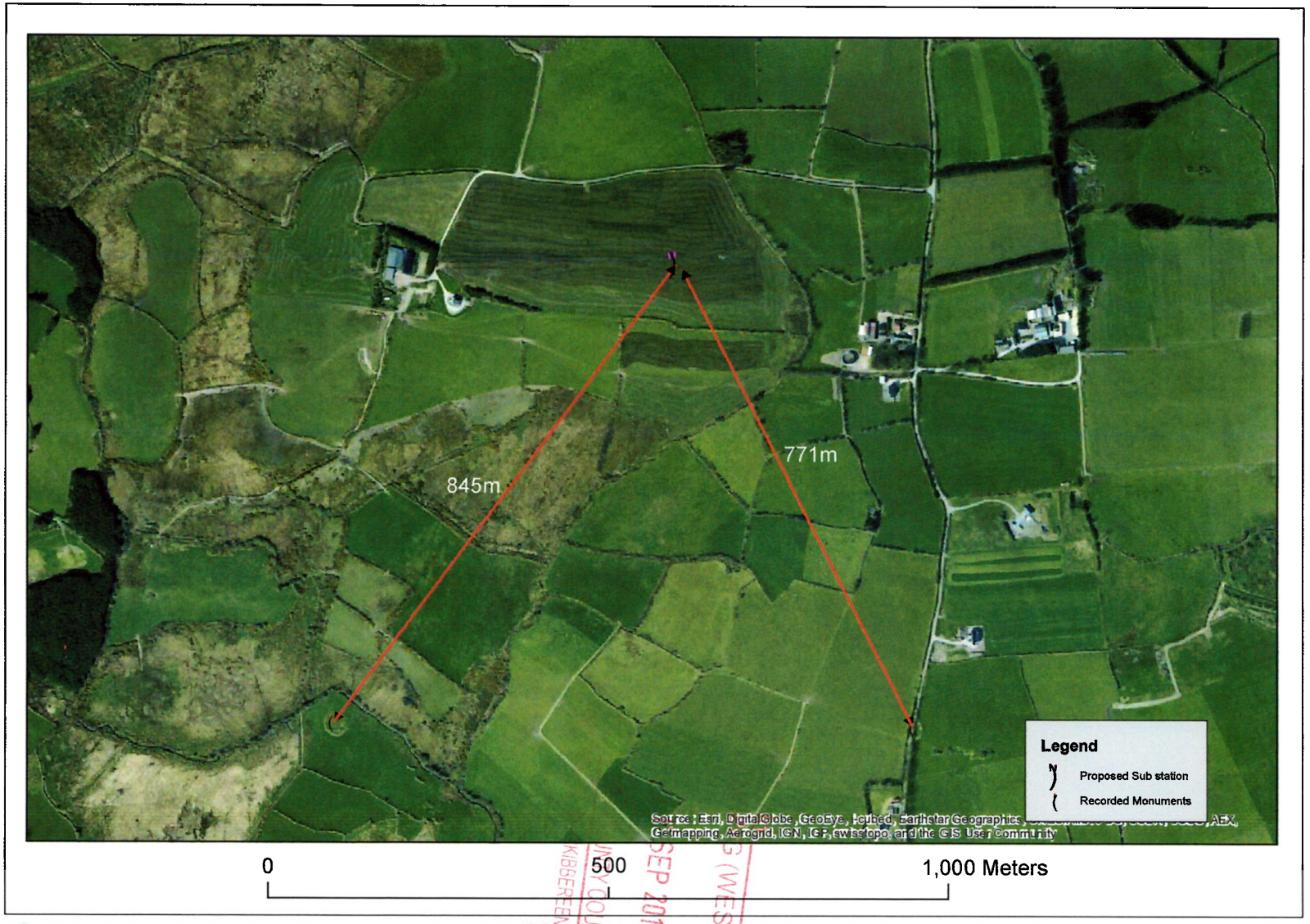

Figure 12-2: Nearest Recorded Monuments CO095-001 (to left) and 003 (to right) in relation to proposed sub-station site.

Plate 30: Ringfort CO083-078 looking west.

Plate 31: View south from ringfort towards T2.

Newly Recorded Monuments

No new sites or monuments of archaeological significance were detected during field inspection. The land is in use for grazing and intensively farmed.

Previous Excavations Undertaken near to EIA study area

The searchable database of Excavations (www.excavations.ie) was consulted for any licensed excavations that took place near to recorded monuments on development sites. Two such excavations were listed and were undertaken by the same author. Neither sites produced archaeologically positive results.

Cork
2003:335
Reanacaheragh
No archaeological significance

13296 06244
03E0154
The removal of topsoil and the excavation of foundation trenches for a dwelling-house at Reanacaheragh, Terelton, Co. Cork, were monitored. The house site was located beside SMR 94:35, a possible ringfort. No archaeological finds or features were uncovered during groundworks.
Annette Quinn, Archaeological Services Unit, University College Cork.

Garranereagh, Co. Cork
12E326
No archaeological significance
535405, 563228 (ITM)
Archaeological monitoring of topsoil removal associated with the construction of a 4 turbine wind farm commenced in November 2012. Topsoil was stripped from the area of the site compound and substation site. No archaeological finds, features or deposits were uncovered. The remainder of the topsoil removal will be archaeologically monitored in 2013.
Annette Quinn, *Tobar Archaeological Services, Saleen, Midleton, Cork.*

Statement of Significance of Archaeological Heritage

There is a notable gap in archaeological monuments surrounding the proposed sub-station site and this can be seen on Figure 12-3 below. The nearest recorded monuments are located between 771m and 845m and are described above. Only 2 monuments are located within 1km of the proposed sub-station site. There will be no direct impacts on any recorded monuments and indirect visual impacts are unlikely to occur due to the distance between such monuments and the proposed development site and also due to intervening boundaries and hedgerows.

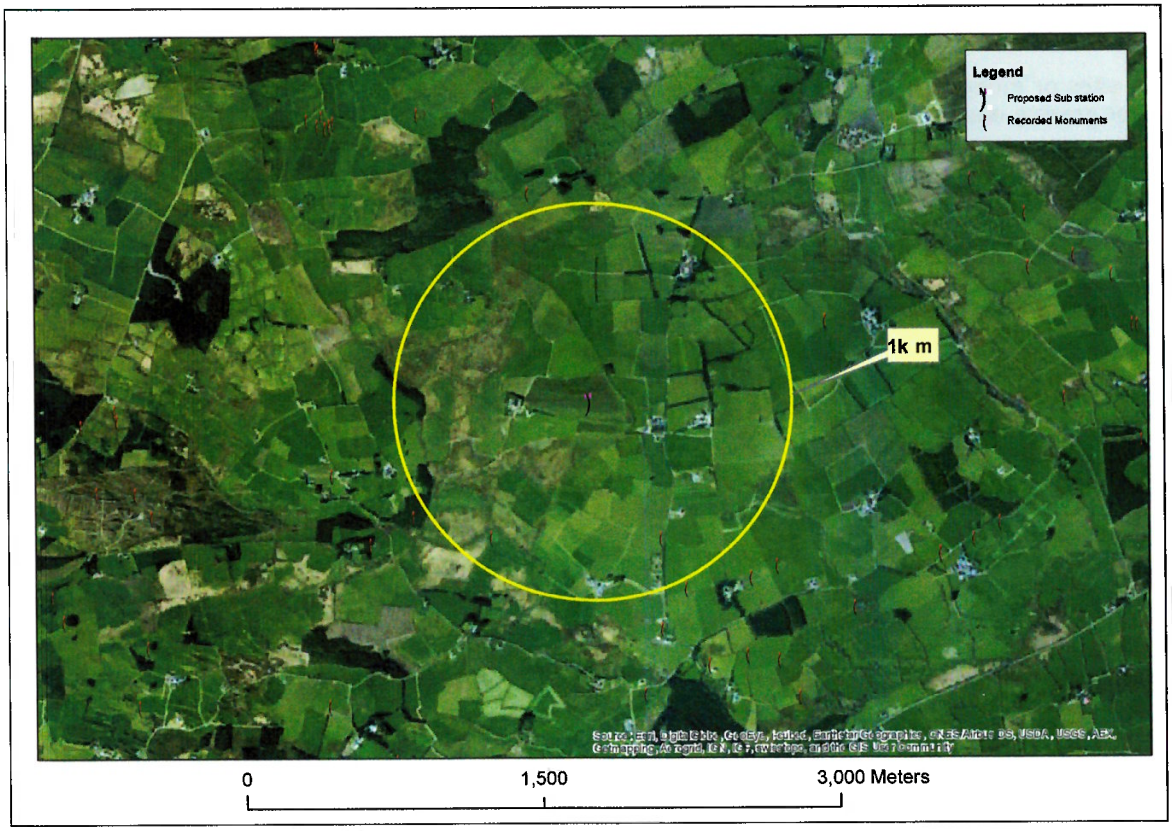

Figure 12-3: 1km zone around proposed sub-station site.

12.3.2 Architectural and Cultural Heritage

Documentary and Cartographic Evidence

A number of documentary and cartographic sources were utilised in order to ascertain the potential for the presence of architectural /cultural heritage features on or within the area of thepropo sed developme nt. Field inspection of the site also assisted in establishing the potential for the presence of architect ural/cultural heritage. Architectural and cultural heritage includes items such as buildings, farmhou ses, gates, bridges, piers, and stone field boundaries.

Items of potential architectural heritage noted on the 1st edition OS mapping

The 1st and 2nd edition maps were consulted as part of the proposed development. The area was largely enclosed with few settlements. The only surviving settlement is the farmyard at Barnadivane townland where a number of stone walls survive within the farm yard. The latter will not be impacted on by the proposed development.

In general the majority of field boundaries within the proposed development area are represented by earth and stone walls, all 19th century in date. The stones walls add to the character of the area and represent local cultural heritage and craftsmanship. Nineteenth century / early 20th century stone boundaries are apparent to the north of the proposed sub-station site and these should be preserved in situ where possible.

Protected Structures and NIAH sites

No protected structures or NIAH sites are located within 5km of the proposed sub-station site. No direct or indirect impacts on the known architectural or cultural heritage resource will occur therefore.

Place names
A townland name may indicate something about the past in relation to archaeology, history, land-use, or topography. Many place names had become anglicised by the time the Ordnance Survey had begun in the 1830s however. A number of sources were consulted to provide information on the possible origins of townland names in the proposed development site. The primary source is the Placenames Database of Ireland (www.logainm.ie), although several placename publications are also useful sources of information. No information which may yield archaeological or historical information was noted from any translation within the study area.

- Bharr na dTaobhán (Barnadivane) – no known meaning

12.4 Potential Impacts

Archaeological heritage is a non-renewable resource. The overall objective of this assessment of impacts of the proposed development is to ensure that where a potential impact has been identified, that it can be mitigated against to ensure that the archaeological heritage will be available for future generations. The potential impacts on the archaeological heritage, both recorded and newly detected sites, are assessed here.

Impact will be discussed according to the types of impacts that may occur during and after the project has been completed. The impacts on known Recorded Monuments, newly discovered sites and potential sub-surface deposits are addressed separately.

12.4.1 Potential Impacts on the Archaeological Heritage

The construction phase of the proposed development consists largely of earthmoving activities such as topsoil removal for the access road and the sub-station site itself. This may have a number of potential negative impacts on the known and unknown (sub-surface) archaeological heritage. These impacts are outlined below with the suggested mitigation measures outlined in Section 12.5. Consideration has been given to these monuments during the design and positioning of the sub-station site and known recorded monuments have been 'designed out' so as to avoid direct physical impact.

Potential Direct Impacts of Construction Traffic/Ground Works on Recorded Archaeological Monuments
Two recorded monuments occur at a distance of 771m and 845m to the proposed sub-station site. These are at a remove from all proposed site works associated with the sub-station and therefore no impacts will occur in this regard.

Potential Impact of Construction Traffic / Ground Works on Unknown Sub-surface Archaeological Features
A potential impact on the archaeological resource also lies in the uncovering of sub-surface archaeological features during topsoil removal associated with the construction of the proposed sub-station site. Buried archaeological sites which have no visible surface trace have the potential to occur within the proposed development site. Consequently, these sites are unrecorded and do not appear on any maps (SMR or RMP). Ground disturbance associated with the proposed development has the potential to uncover such monuments and associated artefacts, particularly in areas now covered by topsoil. Topsoil removal could potentially have an impact on unknown sub-surface archaeological deposits or features which have no above ground expression. It is essential that these features, if present, are identified at the earliest stage possible in the project so that they can be 'designed out' or avoided. Archaeological testing of the proposed sub-station site is therefore recommended.

Potential Indirect Impacts on Archaeological Features
Indirect impacts refer to impacts which may occur after the construction of the proposed sub-station (during the operational stage of the development) (i.e. secondary effects). Indirect impacts include potential impacts of a development on the overall character and setting of a monument or landscape. As no such monuments occur within close proximity to the proposed development site no indirect impacts are likely.

12.4.2 Potential Impacts on Architectural and Cultural Heritage

Potential Direct Impacts on Architectural and Cultural Heritage

No protected structures or NIAH buildings are located within close proximity to the proposed development site. No direct impacts will occur therefore.

Potential Indirect Impacts on Architectural and Cultural Heritage

No protected structures or NIAH structures are located within the proposed development site. No indirect (visual) impacts on this resource are therefore anticipated.

12.5 Mitigation Measures

The following mitigation measures are recommended:

- Archaeological testing under licence by a suitably qualified archaeologist of the sub-station site and associated access road. Should archaeological finds, features or deposits be uncovered during testing the DAHG should be consulted as to how best to proceed with the finds (i.e. preservation *in situ* or preservation by record).
- Archaeological monitoring of all ground works associated with the construction of the sub-station site should be carried out under licence by a suitably qualified archaeologist. A report on the findings should be furnished to the Planning Authority and the DAHG. If archaeological finds, features or deposits are uncovered during the course of monitoring all works at this location should be stopped pending a discussion with the relevant authorities as to how best to mitigate against impacting on the archaeology, if present.
- Stone field boundaries should be retained and preserved in situ where possible.

12.6 Conclusion

No recorded monuments occur within close proximity to the proposed sub-station site and only 2 monuments occur within 1km (the nearest being 771m and 845m). No direct or indirect impacts are likely as a result of the proposed development.

No significant cultural heritage or architectural heritage features were identified within the area of the proposed development. Stone boundaries do occur in the general vicinity of the proposed development and should be retained and preserved in situ where possible.

12.6.1 Residual Impacts

The residual impacts are likely to be low if the recommended mitigation measures are implemented. Residual impacts are defined as the overall impact of the development on the archaeological, architectural and cultural heritage on the basis of implementing the mitigation measures recommended in this report.

Table 12-2: Summary of Residual Impacts

Potential impacts	Mitigation strategy	Residual impacts
Construction impacts		
Impact of ground works on Recorded Monuments - no monuments within proximity to sub-station site	No mitigation required	Negligible
Ground works (topsoil removal any other excavation works) and tracking machinery may have an impact on as yet undiscovered sub-surface features.	Licensed archaeological testing of sub-station site and associated access roads. Consultation with DAHG should archaeology be uncovered.	Unknown Potentially Low- Medium
Ground works (topsoil removal and any other excavation works) on sub-surface archaeological remains	Archaeological monitoring of ground works associated with the construction phase of the development. Consultation with DAHG should archaeology be uncovered.	Unknown potentially Low-medium

Potential impacts	Mitigation strategy	Residual impacts
Operational impacts		
Visual impact on recorded monuments	No Mitigation proposed	Low

12.7 References

Aalen, F.H.A. *et al.*, 1997, *Atlas of the Irish Rural Landscape*. Cork University Press, Cork.

Burnell, T, 2006, The anglicized words of Irish Placenames, Nonsuch publishing.

Clinton, M., 2001, *The Souterrains of Ireland*. Wordwell Ltd., Wicklow.

Department of the Environment, Heritage and Local Government, 2006, *Wind Energy Guidelines*, 2006.

Department of Arts, Heritage, Gaeltacht and the Islands,1999, Framework and Principles for the Protection of the Archaeological Heritage, 1999.

Guidelines on the information to be contained in Environmental Impact Statements, EPA 2002.

Cork County Development Plan 2009-2014, Cork County Council

Draft Cork County Development Plan 2015, Cork County Council

Other Sources
Record of Monuments and Places (RMP) for County Cork

1st Edition 6 inch OS maps (1842) – OSI.ie
2nd Edition OS maps (1900s) – OSI.ie

13 INTERACTION OF THE FOREGOING

Sections 3 to 13 describe the impacts of the proposed development on various aspects of the existing environment. The Environmental Impact Assessment Regulations require a description of the "interaction between any of the foregoing aspects". Interactions can occur when a predicted impact causes interaction or dependency with other environmental aspects. This section discusses the interactions between aspects and assesses them as positive, negative or neutral (as having no interaction or interdependency).

The design of the substation considered the potential design impacts and used the constraints associated with each aspect of the environment to identify the optimum site location.

Indirect and cumulative impacts were considered during the layout design to satisfy geotechnical, ecological, hydrology and water quality and visual impacts.

The remaining interactions after the optimisation of the layout design between the various aspects of the environment are discussed in each section and reproduced in summary in Section 13.1.

13.1 Potential Interactive Impacts

13.1.1 Human Beings and Amenity

Human beings are specifically addressed in Section 5, but are indirectly considered where amenity and quality of life are considered.

The impact on the human environment from landscape change is negligible. Minor negative noise and air quality impacts will occur during construction due to on-site activities and increased traffic. However, operational impacts will be largely positive with no local air/climate impacts and overall positive impacts by facilitating the generation of energy without combustion of by-products. Operational noise is likely to be insignificant, assuming that the achievable transformer noise emissions are adhered to.

13.1.2 Ecology

Interactions between ecology and other aspects will be limited to the construction phase. The construction noise could cause a negative impact on ecology through temporary disturbance. Interactions between ecology, water quality and geotechnical issues are fully described in Section 6 of this report. There should be no impact interactions during the operational phase.

13.1.3 Soils, Geology and Hydrogeology and Hydrology and Water Quality

Interactions between geology and water quality will also occur during the construction phase due to material excavation. This also has the potential for a knock-on negative impact on ecology. These interactions are fully discussed in Sections 7 and 8 of this report. There should be no impact interactions during the operational phase.

A table setting out the key interactions following the implementation of the mitigation measures recommended in this environmental report is shown in Table 13.1.

Table 13-1: Matrix of Impact Interactions

Cause	Ecology	Hydrology & Water Quality	Soils & Geology	Landscape	Human Environment	Known Archaeology & Cultural Heritage	Air & Climate
construction phase (short -term)							
a.traffic	I	I	I	-	S	-	I
b.excavations	I	S	I	I	-	S	I
c. noise & vibration	I	-	I	-	M	-	-
operational phase (long-term)							
d.noise	I	-	-	-	I	-	-
e.visual	I	-	-	S	S	-	-
f. energy output	-	-	-	-	P	-	P
g.drainage	I	I	I	-	I	I	-
h.traffic	-	-	-	-	I	-	I
i. geotechnical	-	-	-	-	-	-	-
j. change in land use	I	-	-	I	I	-	-

- = no interaction
P = slightly positive impact
I = imperceptible impact
S = slight impact
M = moderate impact
N = negative impact

13.2 Conclusion on Interactive Impacts

Based on the positive energy and climate impacts that will be facilitated by the proposed development and the slight visual, soils, ecology and water quality impacts, it is considered that the proposed site is a suitable site for the development of a substation and associated equipment and access track.

[1]Sustainable Energy Authority of Ireland, Energy in Ireland Report 1990-2012, 2013
[2]Directive 2009/28/EC of the European Parliament and of the Council OF 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC;http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF
[3]Irish Wind Energy Association, June 2014
[4]Guidelines on the Information to be contained in Environmental Impact Statements, March 2002. Advice Notes on Current Practice in the Preparation of Environmental Impact Statements, September 2003
[5] EU Directive on Promotion of the Use of Energy from Renewable Sources, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF
[6] Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources, 2008/0016 (COD), Council of the European Union, Brussels, December 2008; http://www.ewea.org/fileadmin/ewea_documents/documents/00_POLICY_document/RES-directive_consolidated.pdf
[7]SEAI Report - Energy in Ireland 1990 -2012, 2013 Report http://www.seai.ie/Publications/Statistics_Publications/Energy_in_Ireland/Energy_in_Ireland_1990_-_2012_Report.pdf
[8]White Paper 'Delivering a Sustainable Energy Future for Ireland' http://www.dcenr.gov.ie/NR/rdonlyres/54C78A1E-4E96-4E28-A77A-3226220DF2FC/27356/EnergyWhitePaper12March2007.pdf
[9]http://www.iwea.com/index.cfm?page=bycounty&county=cork; last updated: August 2014
[10]http://www.dcenr.gov.ie/NR/rdonlyres/C71495BB-DB3C-4FE9-A725-0C094FE19 BCA/0/2010NREAP.pdf
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[12] Central Statistics Office: Census 2011 Population Classified by Area,Table 1: Population of Province, County and City, actual and percentage change 2006-2011
[13] South West Regional Authority Planning Guidelines 2010-2022
[14] Fáilte Ireland - http://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/2_Regional_SurveysReports/Overseas_visitors_to_counties_2012.pdf?ext=.pdf
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[16] Information on Electric and Magnetic Fields, 2007, Eirgrid http://www.eirgrid.com/media/Electro%20Magnetic%20Fields%20-%20EMF.pdf
[17] Information on Electric and Magnetic Fields, 2007, Eirgrid http://www.eirgrid.com/media/Electro%20Magnetic%20Fields%20-%20EMF. pdf
[18]"Guidelines for the Preparation of Soils, Geology and Hydrogeology Sections of Environmental Impact Statements" Institute of Geologists of Ireland. 2012
[19]Groundwater Protection Schemes. EPA/GSI/DEHLG. 1999. Accessed via http://www.gsi.ie/Programmes/Groundwater/Projects/Protection+Schemes+Guidelines.htm
[20] Geology of South Cork. M. Pracht & A.G. Sleeman. Geological Survey of Ireland 1994.
[21]The General Soil Map of Ireland, second edition (Foras Taluntais National Soil Survey, 1980)
[22]A dataset prepared by the Office of Public Works identifying land that might benefit from the implementation of Arterial (Major) Drainage Schemes (under the Arterial Drainage Act 1945) and indicating areas of land subject to flooding or poor drainage.
[23]A dataset prepared on behalf of the Drainage Districts (Local Authorities with statutory responsibility for maintenance under the Arterial Drainage Act, 1925). These maps identify land that might benefit from the implementation of Arterial (Major) Drainage Schemes and indicate areas of land subject to flooding or poor drainage.
[24]Environmental Product Declaration - Power transformer TrafoStar 63 MVA, ABB Power Transmission
[25]O.J. No. L 152 of 11 June 2008
[26] Environmental Protection Agency, Ireland's National Greenhouse Gas Emissions Projections 2011- 2020, April 2012 http://www.epa.ie/downloads/pubs/air/airemissions/EPA_GHG_%20Emission_%20Proj_publication_2012_final_v1.pdf
[27] Environmental Protection Agency; 2012 – State of the Environment Report, Ireland's Environment – An Assessment http://www.epa.ie/downloads/pubs/indicators/00061_EPA_SoE_2012.pdf
*The baseline estimate for Ireland is calculated as the sum of carbon dioxide, methane and nitrous oxide emissions in 1990 and the contribution from fluorinated gases in 1995. The baseline value was established at 55.6 Mt CO2eq following in-

depth review of Ireland's 2007 submissions to the UNFCCC and results in total allowable emissions of 314.1 Mt CO2eq in the period 2008-2012 under the Kyoto Protocol, which equates to the average of 62.8 Mt CO2eq per annum (i.e., 13% above baseline estimate).

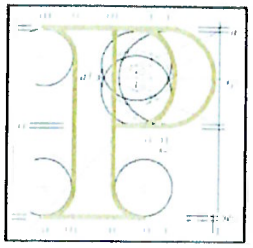
Appendix 1

Pre-Application Consultation with An Bord Pleanala

Our Ref: 04.VC0074

Your Ref: Q:/2014/LE14/702/01/LET001/MT

An Bord Pleanála



Clodagh O'Donovan
Fehily Timoney & Company
Core House
Pouladuff Road
Togher
Cork

27th August 2014

Re: Proposed 110kV Substation at Barnadivane,
Co. Cork

Dear Madam,

Please be advised that following consideration of the issues raised at the above consultation and having regard to the scale and nature of the proposed development An Bord Pleanála has concluded that the proposed development does not come within the scope of section 182A of the Planning and Development Act, 2000, as amended. Accordingly any application for planning consent for the proposed development should be made to the local planning authority for the area in accordance with the provisions of section 34 of the Planning and Development Act, 2000, as amended.

In accordance with section 146(3) of the Planning and Development Act, 2000, as amended, the Board will make available for inspection and purchase at its offices the documents relating to the decision within 3 working days following its decision. In addition, the Board will also make available the Board Direction on the decision on its website (www.pleanala.ie). This information is normally made available on the list of decided cases on the website on the Wednesday following the week in which the decision is made.

The attachment contains information in relation to challenges to the validity of a decision of An Bord Pleanála under the provisions of the Planning and Development Act, 2000, as amended.

In accordance with the fees payable to the Board and where not more than one pre-application meeting is held in the determination of a case, a refund of €3,500 is payable to the person who submitted the pre-application consultation fee. As only one meeting was required in this case, a refund of €3,500 will be sent to you in due course.

If you have any queries in relation to the matter please contact the undersigned officer of the Board. Please quote the above mentioned An Bord Pleanála reference number in any correspondence or telephone contact with the Board

Yours faithfully,

Kieran Doherty
Executive Officer
Direct Line:01-8737248

Encls.

AHC/VC74.01.LTR

64 Sráid Maoilbhríde,
Baile Átha Cliath 1.

Teil (01) 858 8100 Tel
Glao Áitiúil 1890 275 175 LoCall
Facs (01) 872 2684 Fax
Láithreán Gréasáin www.pleanala.ie Web
Ríomhphost bord@pleanala.ie Email

64 Marlborough Street,
Dublin 1.

Judicial review of An Bord Pleanála decisions under the provisions of the Planning and Development Act, 2000, as amended

A person wishing to challenge the validity of a Board decision may do so by way of judicial review only. Sections 50, 50A and 50B of the Planning and Development Act 2000 (as substituted by section 13 of the Planning and Development (Strategic Infrastructure) Act 2006, as amended/substituted by sections 32 and 33 of the Planning and Development (Amendment) Act 2010 and as amended by sections 20 and 21 of the Environment (Miscellaneous Provisions) Act 2011) contain provisions in relation to challenges to the validity of a decision of the Board.

The validity of a decision taken by the Board may only be questioned by making an application for judicial review under Order 84 of The Rules of the Superior Courts (S.I. No. 15 of 1986). Sub-section 50(6) of the Planning and Development Act 2000 requires that subject to any extension to the time period which may be allowed by the High Court in accordance with subsection 50(8), any application for judicial review must be made within 8 weeks of the decision of the Board. It should be noted that any challenge taken under section 50 may question only the validity of the decision and the Courts do not adjudicate on the merits of the development from the perspectives of the proper planning and sustainable development of the area and/or effects on the environment. Section 50A states that leave for judicial review shall not be granted unless the Court is satisfied that there are substantial grounds for contending that the decision is invalid or ought to be quashed and that the applicant has a sufficient interest in the matter which is the subject of the application or in cases involving environmental impact assessment is a body complying with specified criteria.

Section 50B contains provisions in relation to the cost of judicial review proceedings in the High Court relating to specified types of development (including proceedings relating to decisions or actions pursuant to a law of the state that gives effect to the public participation and access to justice provisions of Council Directive 85/337/EEC i.e. the EIA Directive and to the provisions of Directive 2001/12/EC i.e. Directive on the assessment of the effects on the environment of certain plans and programmes). The general provision contained in section 50B is that in such cases each party shall bear its own costs. The Court however may award costs against any party in specified circumstances. There is also provision for the Court to award the costs of proceedings or a portion of such costs to an applicant against a respondent or notice party where relief is obtained to the extent that the action or omission of the respondent or notice party contributed to the relief being obtained.

General information on judicial review procedures is contained on the following website, **www.citizensinformation.ie.**

Disclaimer: The above is intended for information purposes. It does not purport to be a legally binding interpretation of the relevant provisions and it would be advisable for persons contemplating legal action to seek legal advice.

FEHILY TIMONEY & COMPANY

CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES

IRELAND UNITED KINGDOM POLAND SAUDI ARABIA

Our Ref: Q:/2014/LE14/702/01/Let001/MT

The Secretary
An Bord Pleanála
64 Marlboro St
Dublin 2

03 April 2014

RE: Request seeking a determination from An Bord Pleanála as to the status of a proposed development comprising a 110kV Substation at Barnadivane, Co. Cork in relation to the Strategic Infrastructure Development Act under Section 182A / Section 37B of the Planning and Development Act, 2000, as amended by the Planning and Development (Strategic Infrastructure) Act, 2006.

Dear Sir/Madam

This document has been prepared by Fehily Timoney and Company and forms the pre-application consultation submission of Arran Windfarm Limited (herein after referred to as the applicant), for a proposed 110kV substation development at Barnadivane, Co. Cork, to serve a wind farm development. The following outlines the main elements of the proposed development and sets out the planning legislative context.

Introduction

The applicant intends to seek planning permission to construct a 110kV grid connection substation compound with associated control buildings, equipment plinths, bunds and fencing, oil interceptor, treated effluent storage tank and associated site development works at Barnadivane, Co. Cork. Barnadivane wind farm has been permitted under 05/5907 and PL04.219620 and a 5 year extension of planning permission was granted by Cork County Council under 11/06605. The requirement for a substation was anticipated in the planning application for the wind farm, and planning permission has been obtained for a 110 kV control building and switch station *"to ESB specifications"*.

However new Eirgrid requirements necessitate this application and the applicant is commencing pre-application discussions with An Bord Pleanála to determine whether this proposal constitutes "strategic infrastructure development" (SID).

Cont'd.....

Description of the Permitted Development, including a currently permitted 110kV substation

The Barnadivane Wind Farm was permitted by An Bord Pleanála on 30 June 2006, comprising of 14 no. turbines, with hub height up to 70m and rotor diameter of 70m, and base to blade-tip height of 105m, 14 no. associated transformers, a 70m meteorological mast, substation and switch station compounds, construction of internal tracks, turbine foundations, hardstands and associated works and a connection to the national grid.

An Environment Impact Statement accompanied the planning application. The requirement for a substation was anticipated in the planning application, which referred to the following development works:

- Control building and compound surrounded by a 2m high security fence adjacent to the local road on the eastern side of the site.

- An application for a power line connection to the national grid was submitted to the ESB at the time of the original application which necessitated the construction of a switch station which is located adjacent to the proposed substation on a 70m by 45m compound.

Details of the permitted substation are illustrated on the following drawings that accompanied the planning application which you will find enclosed in Appendix A:

- Drawing No. 2003-188-01-007: Plan and Elevation of Proposed Substation
- Drawing No. 2003-188-01-008: Plan and Section of Proposed ESB Switch Station Compound

The permitted 110kV substation arrangement was based on ESB requirements at the time of the planning application and is no longer in accordance with current Eirgrid requirements. Any wind farm electricity substation must meet the design, electrical and layout requirements of Eirgrid and/or ESB Networks, as the substation will form part of national electricity grid and will be taken in charge by Eirgrid or ESB Networks. In the case of the substation granted permission as part of the wind farm permitted under 05/5907 and PL04.219620, given the electrical rating of the substation at 110kV, the substation will be taken in charge by Eirgrid and, therefore, will have to meet current Eirgrid specifications and requirements.

In this regard, Eirgrid's current design standards for substations of this nature were issued in 2011 after the planning application was made.

Description of the Proposed Development

The proposed substation is based on current Eirgrid requirements as illustrated on the following, which you will find enclosed in Appendix B:

- Drawing No. LE14-702-01-001: Proposed Barnadivane Substation Schematic Layout

Cont'd.....

There is some design flexibility in the layout of the individual components, provided certain minimum separation distances and other requirements are met. The proposed substation layout shown in the enclosed drawings now takes account of the Eirgrid requirements, but gives rise to a larger development footprint than that of the permitted substation. This larger footprint necessitated it to be relocated.

The proposed development will comprise of a 110kV grid connection substation compound with associated control buildings, equipment plinths, bunds and fencing, oil interceptor, treated effluent storage tank and associated site development works. The proposed substation is situated approximately 500m southwest of the permitted substation location, just south of an existing local road, as indicated the following which you will find enclosed in Appendix B:

- Figure No. LE14-702-01: Barnadivane Substation Site Location Map 'Permitted vs Proposed'

The new location was selected to accommodate the increased compound area whilst maintaining an appropriate separation distance from the existing 110kV overhead line traversing the site and avoiding the need for 110 kV overhead lines.

The proposed development is not within, adjoining or in relative proximity to a Natura 2000 site. The nearest sites are Boylegrove Wood (NHA), approx 4km northwest, Killaneer House Glen (NHA), approximately 5km southeast and Gearagh (SAC/NHA/SPA and Nature Reserve), approximately 6km to the north of the study area.

Planning Legislative Context

Under Section 182(A) of the Planning and Development Act as inserted by Section 4 of the Planning and Development (Strategic Infrastructure) Act 2006 where an undertaker:

> *"...intends to carry out development comprising or for the purposes of electricity transmission the undertaker shall prepare, or cause to be prepared, an application for approval of development under section 182B and shall apply to the Board for such approval accordingly".*

Subsection 9 of 182A states that:
In this section 'transmission', in relation to electricity, shall be construed in accordance with section 2(1) of the Electricity Regulation Act 1999 but, for the purposes of this section, the foregoing expression, in relation to electricity, shall also be construed as meaning the transport of electricity by means of—

> *(a) a high voltage line where the voltage would be 110 kilovolts or more, or*
> *(b) an interconnector, whether ownership of the intercon nector will be vested in the undertaker or not.*

Cont'd.....

In section 2(1) of the Electricity Regulation Act, 1999, "transmission" is defined in relation to electricity as meaning "*the transport of electricity by means of a transmission system, that is to say a system which consists, wholly or mainly, of high voltage lines and electric plant and which is used for conveying electricity from a generating station to a substation, from one generating station to another, from one substation to another or to or from any interconnector or to final customers but shall not include any such lines which the Board may, from time to time, with the approval of the Commission, specify as being part of the distribution system but shall include any interconnector owned by the Board.*"

Subsection 9 of 182A sets a threshold of 110 kV in order for a high voltage electricity transmission line to be considered strategic infrastructure. No threshold is set in respect of a substation, therefore it is reasonable to refer directly to Section 37A(2) of the Planning and Development (Strategic Infrastructure) Act, 2006. Section 37A(2) sets out the criteria that a proposed development must meet before it can be deemed a Strategic infrastructure Development:

> *(a) the development would be of strategic economic or social importance to the State or the region in which it would be situated,*
>
> *(b) the development would contribute substantially to the fulfilment of any of the objectives in the National Spatial Strategy or in any regional planning guidelines in force in respect of the area or areas in which it would be situated,*
>
> *(c) the development would have a significant effect on the area ofmore than one planning authority.*"

Planning Legislative Assessment

The legislation explicitly sets a threshold of 110 kV in order for a high voltage electricity transmission line to be considered strategic infrastructu re. Howev er, no specific threshold is set in respect of a substatbn. Therefore , the applicant is commencing pre-application discussions with An Bord Reanála to determine whether this proposal constitutes "strategic infrastructu redevelopm ent".

Having regard to the nature and scale of the development, it is our opinion that the proposed development is not SID for the following reasons:

1. The permitted wind farm development at Barnadivane that the proposed substation will serve is not itself within the strategic infrastructure thresholds of more than 25 turbines or having a total output greater than 50 megawatts, as specified in the Seventh Schedule

2. The development will not make a significant contribution to the delivery of regional planning guidelines or the National Spatial Strategy

3. The development is entirely within the catchment of a single planning authority.

Cont'd.....

Planning Precedent

The applicant wishes to draw the attention of the Board to a number of previous decisions on similar cases:

- VC0069 - 110kV substation at Barnakyle, Grange Castle, Clondalkin, County Dublin.
- VC0061 - Redevelopment of existing 110kV electricity substation at Ardnacrusha, Co. Clare.
- PC0161 - Alterations to a permitted electrical substation serving Slievecallan Wind Farm. Co Clare
- VC0067 - Proposed extension to existing substation compound, removal, reconfiguration, replacement and new substation infrastructure and local realignment of part of existing 220 kV circuits and 2 no. supporting towers at existing Knockraha 220kV substation, Co Cork.
- VC0063 - Redevelopment of existing 220/110kV electricity substation at Killonan, Milltown, Ballysimon, Co. Limerick.
- VC0031 - Line bay in Corderry 110 kV station to facilitate connection of Garvagh Glebe Windfarm

It was the decision of the Board on all of these pre-SID applications that the proposed grid connection works did not fall within the meaning of Section 182A of the Act and that a planning application should be made in the first instance to the relevant Local Authority.

Conclusion

The requirement for a substation was anticipated in the planning application for the permitted wind farm and planning permission has been obtained for a 110 kV control building and switch station *"to ESB specifications"*. The proposed development is required to meet current Eirgrid standards in substation design and will replace the currently permitted substation that is not yet constructed.

Having regard to the nature and scale of the development, it is our opinion that the proposed development is not SID for the following reasons:

1. The permitted wind farm development at Barnadivane that the proposed substation will serve is not itself within the strategic infrastructure thresholds of more than 25 turbines or having a total output greater than 50 megawatts, as specified in the Seventh Schedule

2. The development will not make a significant contribution to the delivery of regional planning guidelines or the National Spatial Strategy

3. The development is entirely within the catchment of a single planning authority.

The applicant is seeking a determination from An Bord Pleanála as to whether the proposed development is considered SID within section 182A of the Act, having regard to the provisions of the legislation.

Cont'd.....

We enclose the statutory fee of €4,500 for the Board's determination of this case. We understand that €3,500 may be refunded if no more than one meeting with An Bord Pleanála is required.

We look forward to hearing from you on the matter.

Yours faithfully

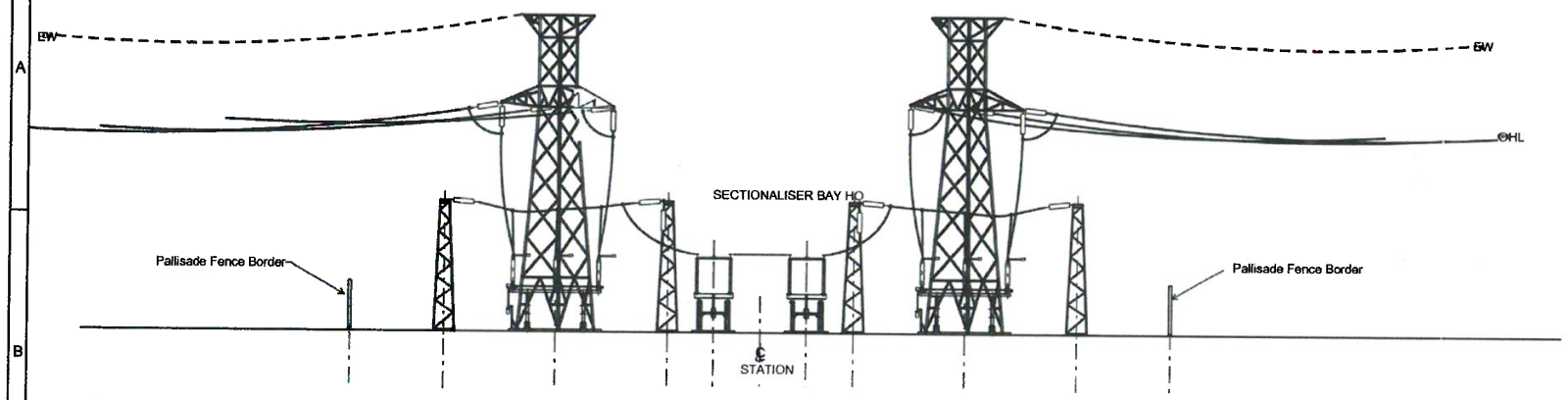
Paul O 'Brien
for and on behalf of **Fehily Timoney & Company**

APPENDIX A

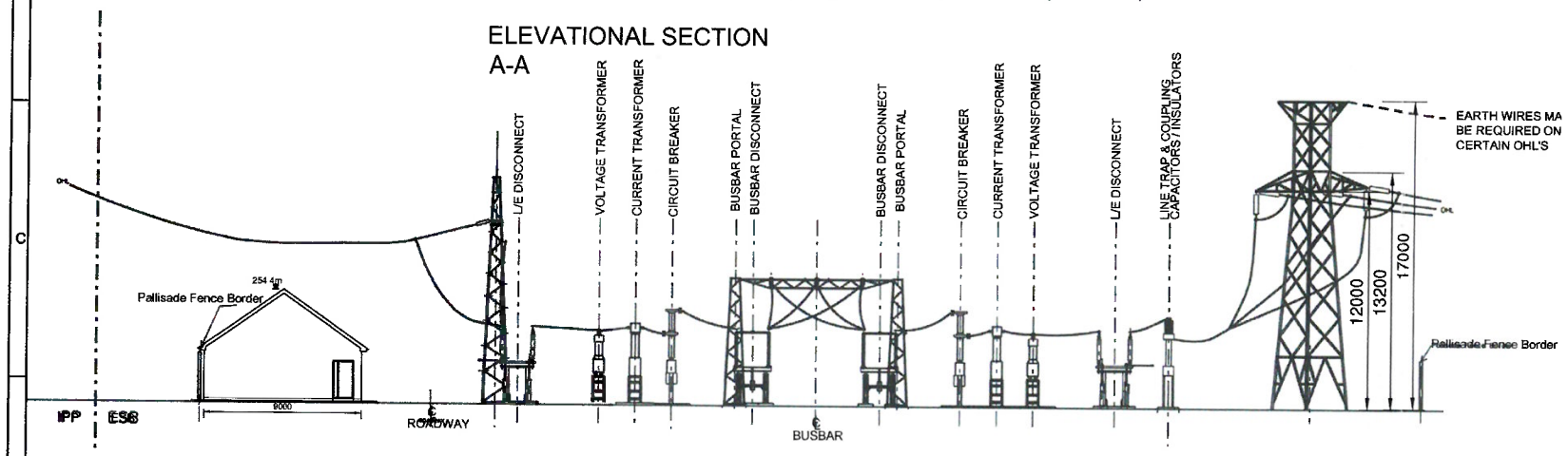
Drawings of Existing Development:

Plan and Elevation of Proposed Substation

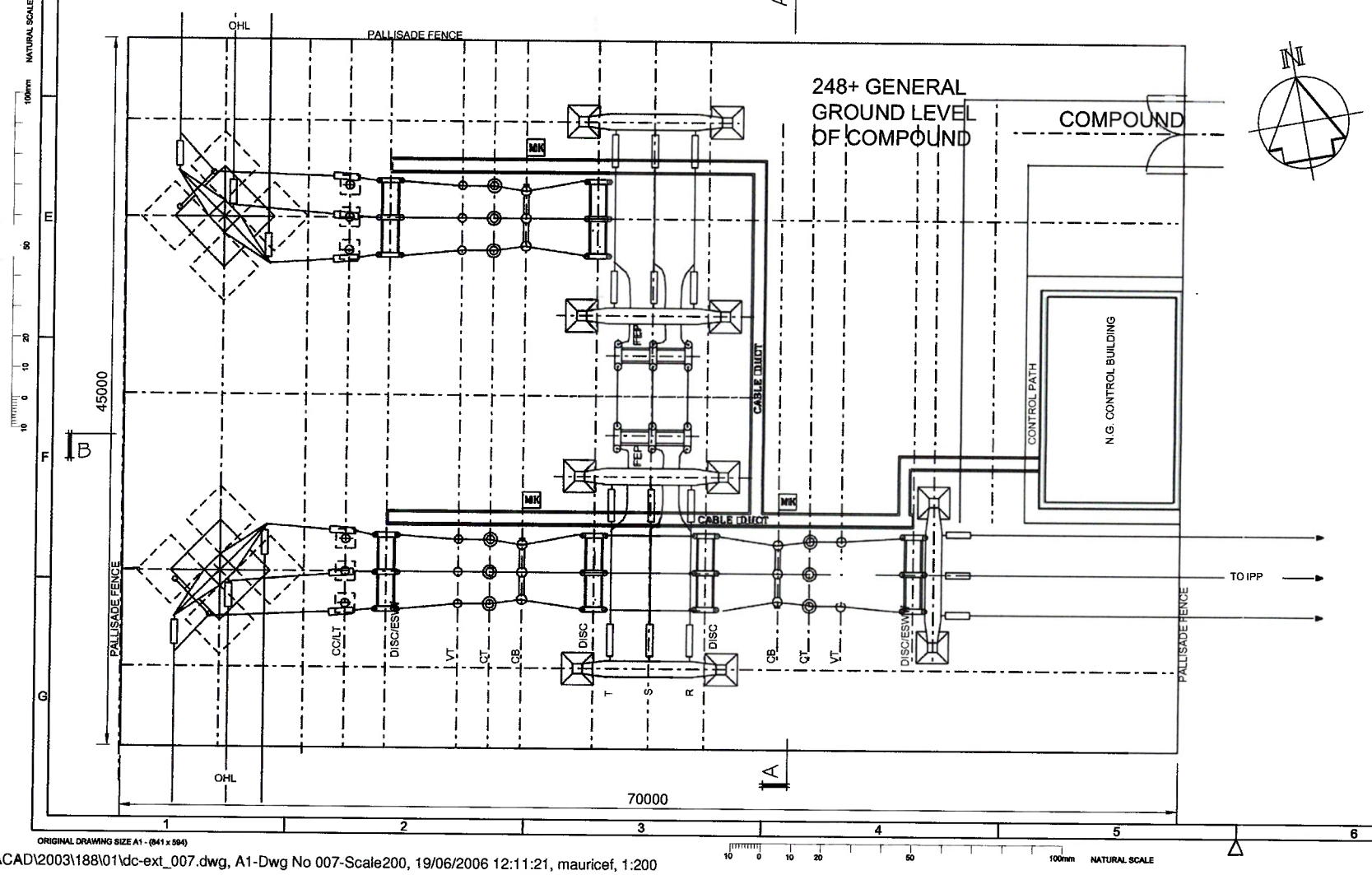
Plan and Section of Proposed ESB Switch Station Compound

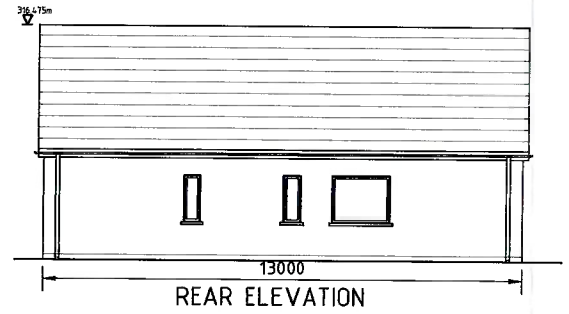


ELEVATIONAL SECTION
A-A

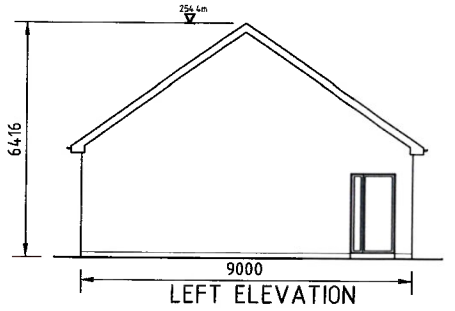


ELEVATIONAL SECTION B-B

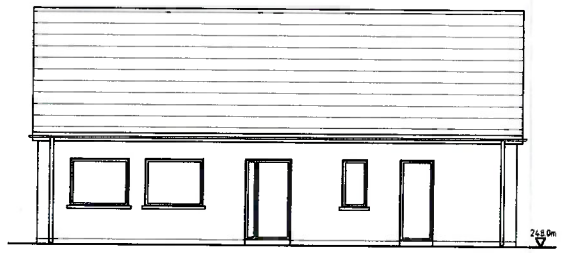




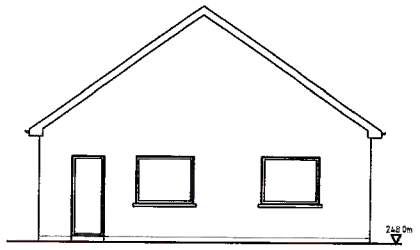
REAR ELEVATION



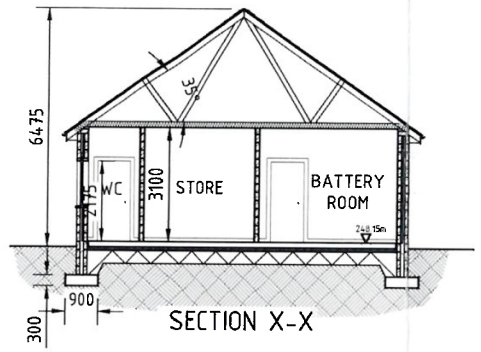
LEFT ELEVATION



FRONT ELEVATION



RIGHT ELEVATION



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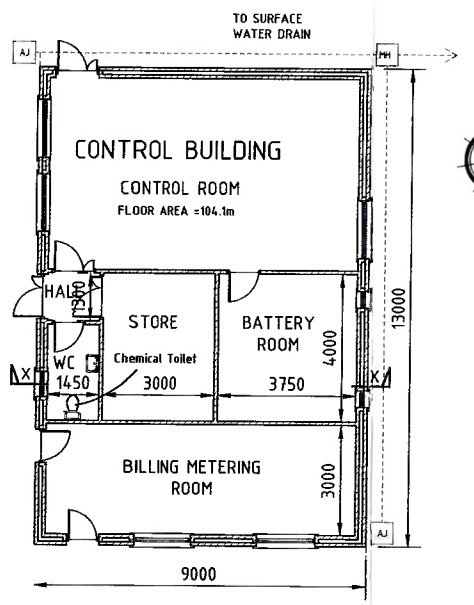


Rev.	Drawn	Chkd	Approd	Date	Description
B	MF	OK	FOR	16.06.2006	ISSUE FOR PLANNING APPLICATION
A	SR	HC	ET	15.06.2005	ISSUE FOR PLANNING APPLICATION

Name of Client
BARNA WIND ENERGY LTD.

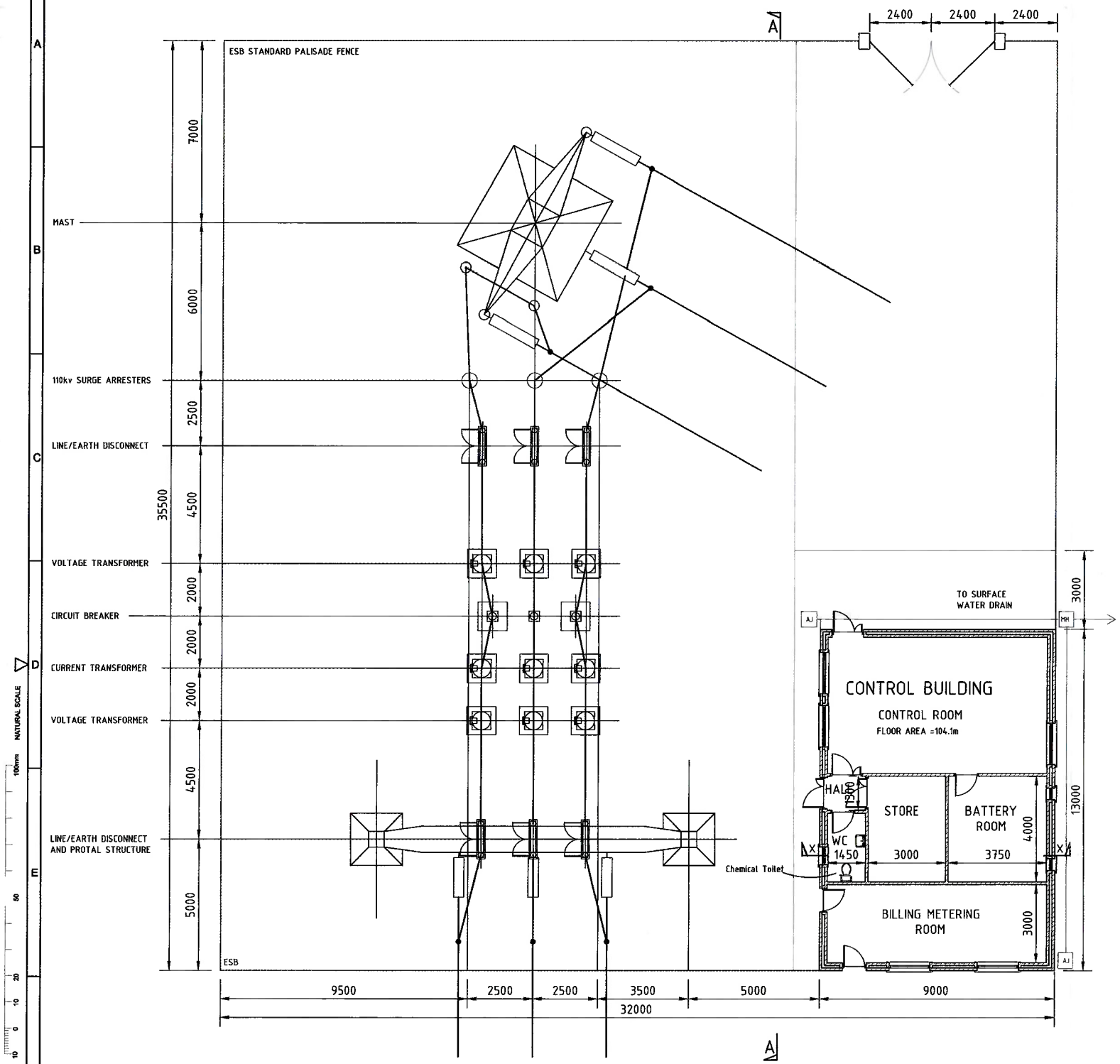
Name of Job
PROPOSED WIND FARM AT BARNADIVANE (KNEEVES), TERELTON, MACROOM, CO. CORK

Title of Drawing
1:200 PLAN & SECTION OF PROPOSED ESB SWITCH STATION COMPOUND

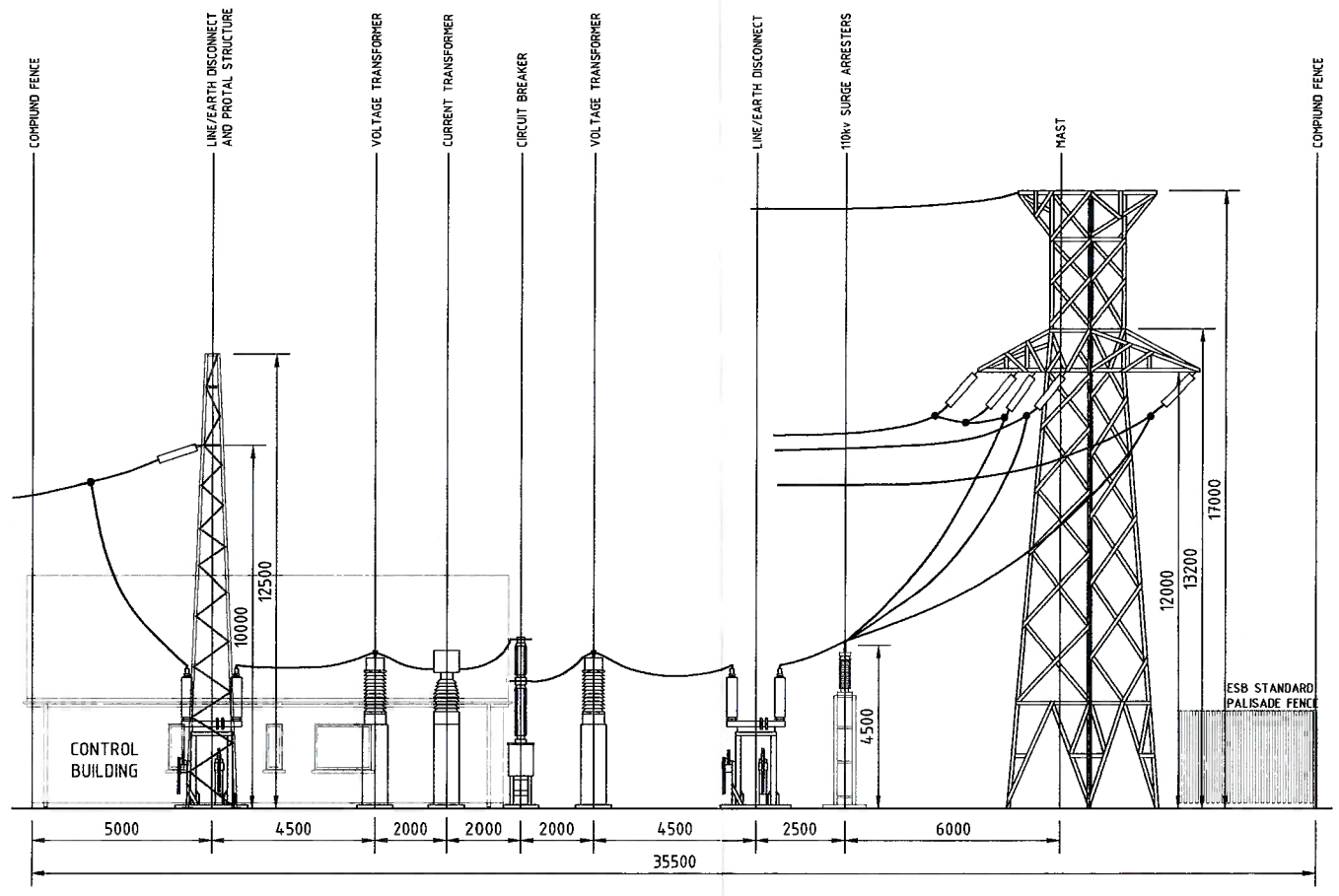
Scales Used
A1 1:200, 1:100

Dwg. No. 2003-188-01-007 — Rev. B

FEHILY TIMONEY & COMPANY
CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES
CORE HOUSE, POULADUFF Rd, CORK, IRELAND.
Phone: +353-21-4964133, Fax.:+353-21-4964464, Email: info@ftco.ie
WEB SITE: www.fehilytimoney.ie



LAYOUT PLAN



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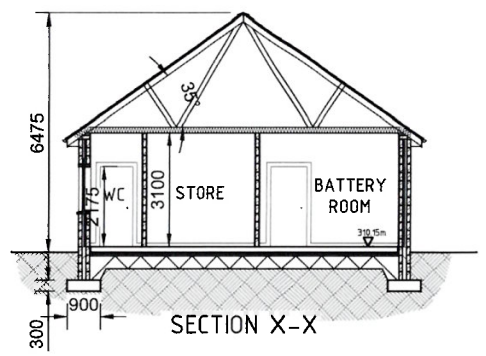

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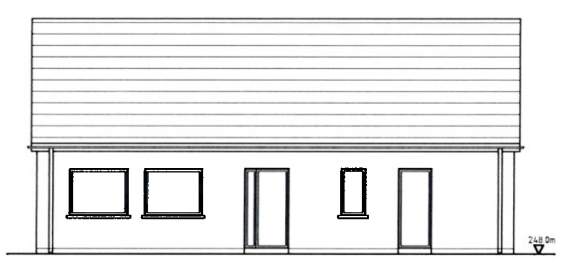

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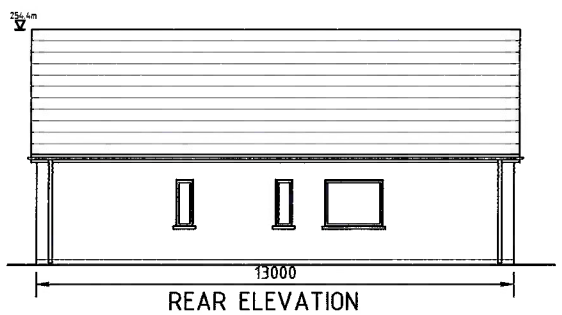
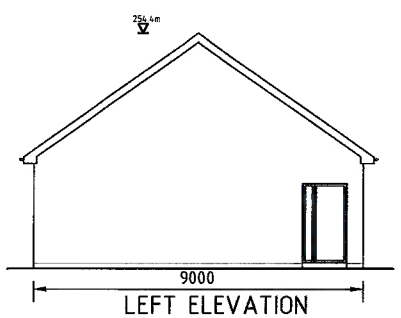
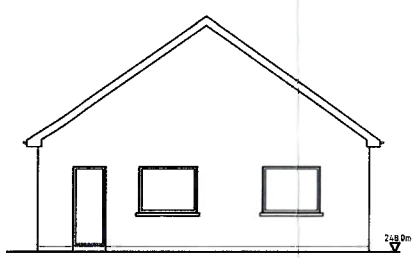


REAR ELEVATION



LEFT ELEVATION



RIGHT ELEVATION

Rev.	Drawn	Chkd	Appvd	Date	Description
B	MF	SR	KC	OK	FOR 16.06.2006	ISSUE FOR PLANNING APPLICATION
A	SR	KC		EI	15.08.2005	ISSUE FOR PLANNING APPLICATION

Name of Client
BARNA WIND ENERGY LTD.

Name of Job
PROPOSED WIND FARM AT BARNADIVANE (KNEEVES), TERELTON, MACROOM, CO. CORK

Title of Drawing
PLAN & ELEVATION OF PROPOSED ESB SUBSTATION

Scales Used
A1 1:100

Dwg. No. 2003-188-01-008 — Rev. B

FEHILY TIMONEY & COMPANY
CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES
CORE HOUSE, POULADUFF Rd, CORK, IRELAND.
Phone:+353-21-4964133, Fax.:+353-21-4964464, Email: info@ftco.ie
WEB SITE: www.fehilytimoney.ie

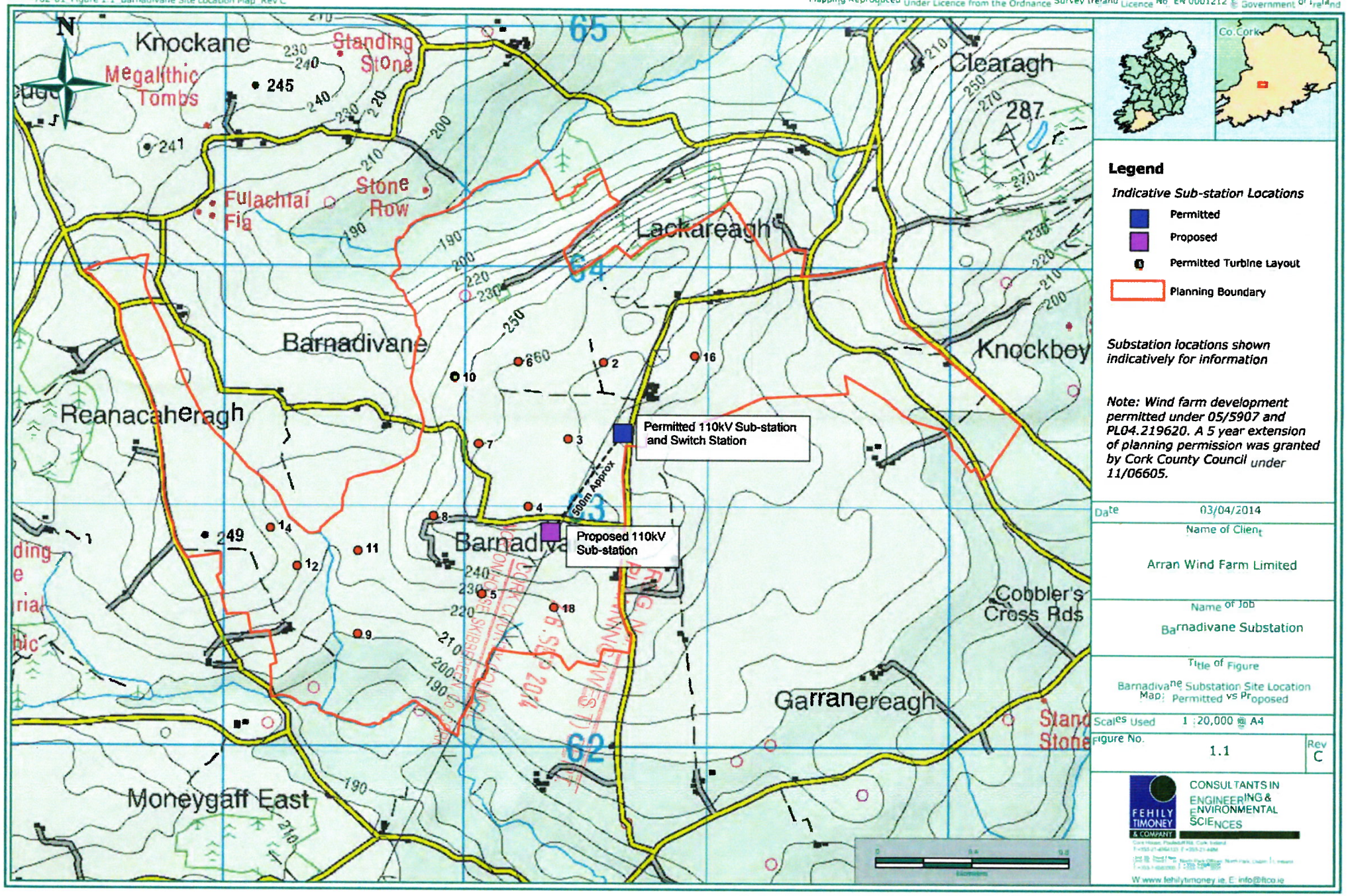
APPENDIX B

Drawings of Proposed Development:

Proposed Substation

Barnadivane Substation Site Location Map Permitted vs Proposed

R:\Map Production\2014\LE14\702\01\Workspace
LE14-702-01_Figure 1.1_Barnadivane Site Location Map_Rev C



Legend

Indicative Sub-station Locations

- Permitted
- Proposed
- Permitted Turbine Layout
- Planning Boundary

Substation locations shown indicatively for information

Note: Wind farm development permitted under 05/5907 and PL04.219620. A 5 year extension of planning permission was granted by Cork County Council under 11/06605.

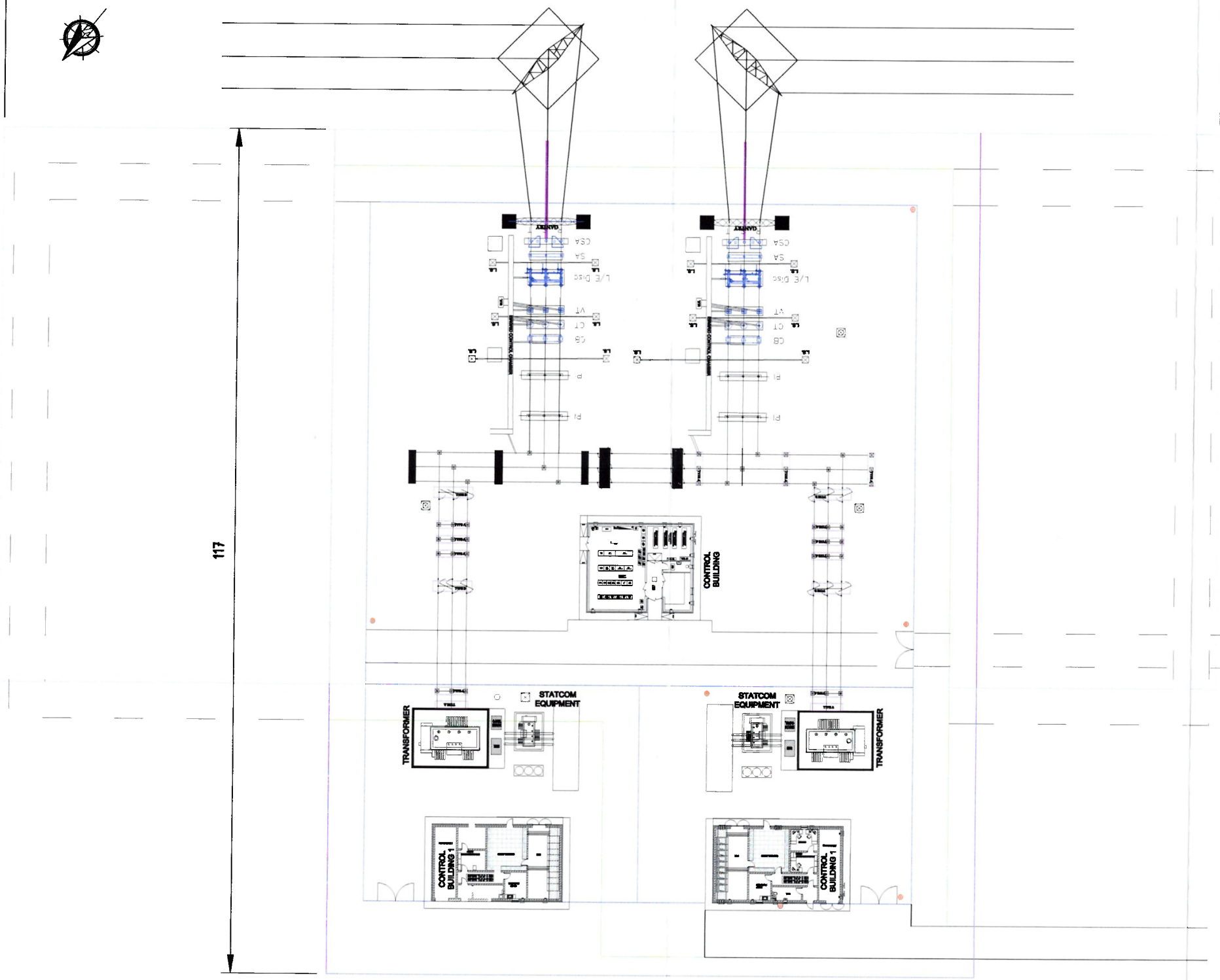
Date	03/04/2014
Name of Client	Arran Wind Farm Limited
Name of Job	Barnadivane Substation
Title of Figure	Barnadivane Substation Site Location Map: Permitted vs Proposed
Scales Used	1 : 20,000 @ A4
Figure No.	1.1
Rev	C

FEHILY TIMONEY & COMPANY
CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES
W www.fehilytimoney.ie E: info@ftco.ie

Note:
The proposed schematic substation layout takes account of the Eirgrid requirements as indicated on 110kV Station Design Standard, Dwg: 0020 KH-PPS-011. Substation layout extracted from Proposed Substation, Dwg: 004-001-01 received 03.04.2014.

The layout is subject to detailed design and there is some design flexibility in the layout of the individual components, provided Eirgrid requirements are met.

Dimensions in metres.



PLAN
Scale NTS

FEHILY TIMONEY & Company
DRAFT No: 1
PRIOR TO ISSUE: A
DRN BY: VALID ONLY ON:

Name of Client
ARRAN WINDFARM LIMITED

Name of Job
PROPOSED 110kV SUBSTATION

Title of Drawing
PROPOSED BARNADIVANE SUBSTATION
SCHEMATIC LAYOUT

Scales Used: NTS
This Drawing was printed to ISO Expand A1 (841.00 X 594.00 MM)

Dwg. No.: LE14-702-01-001
Rev.: A

FEHILY TIMONEY & COMPANY
CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES
Core House, Pouladuff Rd, Cork, Ireland.
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North Road, Dublin 11, Ireland
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ORIGINAL DRAWING SIZE A1 - 841 x 594
SCALE - VERTICAL
SCALE HORIZ.

LE14 - 702 - 01.

Our Ref: 04.VC0074

Your Ref: Q:/2014/LE14/702/01/LET001/MT

An Bord Pleanála

Paul O'Brien
Fehily Timoney & Company
Core House
Pouladuff Road
Togher
Cork

21/8/14.
21
PÓB

20th August 2014

Re: Proposed 110kV Substation at Barnadivane,
Co. Cork

Dear Sir,

I have been asked by An Bord Pleanála to refer further to the above mentioned pre-application consultation request.

Please find enclosed a copy of the written record of the meeting of the 15th of August, 2014.

If you have any queries in relation to the matter please contact the undersigned officer of the Board.

Please quote the above mentioned An Bord Pleanála reference number in any correspondence or telephone contact with the Board.

Yours faithfully,

Kieran Doherty
Executive Officer
Direct Line:01-8737248

Encls.

VC07.LTR

REG. NO.
PLANNING (WEST) DEPT.
26 SEP 2014
CORK COUNTY COUNCIL
NORTON HOUSE, SKIBBEREEN, Co. CORK

64 Sráid Maoilbhríde,
Baile Átha Cliath 1

Teil: (01) 858 8100 Tel
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Láithreán Gréasáin: www.pleanala.ie Web
Ríomhphost: bord@pleanala.ie Email

64 Marlborough Street
Dublin 1

Record Of Meeting

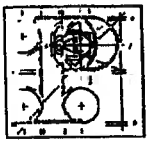
An Bord Pleanála

Case Reference/ Description	VC0074 - Proposed 110kV substation at Barnadivane, Co. Cork		
Case Type:	Section 182E of the Planning and Development Act 2000, as amended		
Meeting:	1st Meeting		
Date:	15th August 2014	**Start Time:**	11.00 a.m.
Location:	Conference Room, An Bord Pleanála	**End Time:**	11.45 a.m.
Chairperson:	Philip Green, Assistant Director of Planning	**Executive Officer:**	Kieran Doherty

Attendees:
Representing An Bord Pleanála
Philip Green, Assistant Director of Planning
Pauline Fitzpatrick, Senior Planning Inspector
Kieran Doherty, Executive Officer
Representing Prospective Applicant, Arran Wind Farm Limited
William O'Connor, Project Manager
Clodagh O'Donovan, Fehily Timony & Company Project Director
Paul O'Brien, Fehily Timony & Company Project Manager

Record Of Meeting

An Bord Pleanála



Introduction

The prospective applicant was welcomed and the teams were introduced.

The Board's representatives referred to the letter dated 3rd April 2014 received from the prospective applicant requesting pre-application consultations in accordance with section 182E of the Planning and Development Act 2000, as amended. Subsequently, the Board issued a letter which requested a site location map. The Board noted:

- The proposed development consists of a110 kV grid connection substation compound and associated buildings and works.
- The proposed development has a larger development footprint to that previously granted and is at a different location.
- The permitted wind farm development of 14 no. turbines was granted by the Board on 14th February 2007 under reference 04.219620 and an extension of the permission was granted by Cork County Council under 11/06605.

The prospective applicant was advised that this meeting is considered by the Board to be a preliminary meeting, the purpose of which is to obtain information in relation to the project and for the prospective applicant to seek advice from the Board. A further meeting or meetings may be held to give advice on matters relating to proper planning and sustainable development or the environment, which may have a bearing on the Board's decision. The Board may also consult with other persons or bodies during the pre-application consultation process to seek their views in respect of the project, and it may seek further information in relation to the proposed development from the prospective applicant.

The Board's representatives stated that it will keep a written record of the meeting which will be forwarded to the prospective applicant. The record will not be amended, however if the prospective applicant has any comments it wishes to make on same, such comments will be kept on file. The records, and any part of them, and the pre-application consultation file, will only become available to members of the public following formal closure of the pre-application consultation process.

When the pre-application consultation has concluded, the Board will notify the prospective applicant whether or not the proposed development is considered to be strategic infrastructure development. The prospective applicant was advised that the holding of consultations does not prejudice the Board in any way and cannot be relied upon in the formal planning process or in legal proceedings.

The Board's representatives stated that some other cases involving 110kV substations have been considered as strategic infrastructure development. In this case the issue of relocation makes the holding of a meeting prudent to allow the prospective applicant to expand on the view that the proposed development is not strategic infrastructure.

The Board's representatives stated that strategic infrastructure application procedures would be outlined at this meeting to expedite the planning application should the Board conclude that the proposed development is strategic infrastructure.

Prospective Applicant's Presentation

Introduction
The prospective applicant set out the location, site setting and planning history of the proposed development. Access to the site would be from a local road to the north and the land slopes down in a southerly direction, i.e. away from the road, which would reduce the visual impact of the substation. The site is within one field.

Project Overview
The substation that was permitted with the wind farm is not now suitable for the size of footprint required to meet EirGrid's current standards. Also, EirGrid requires space for potential future expansion; however, this is not part of the current proposed development.

The permitted development has not commenced; however, the need, precedent and decision for the presence of a substation in the general location are established.

Legislative Context

- 182(A) of the Planning and Development Act.
- Threshold of 110 kV in order for a high voltage electricity transmission line to be considered strategic infrastructure.
- Not specific in defining a threshold in respect of a substation.
- Due to lack of clarity in the interpretation of 182(A) refer to 37(A)(2).

Record Of Meeting

Proposed Development

- 110 kV substation (approx. 90 m x 117 m), to EirGrid specifications.
- 2 No. steel lattice masts connecting to overhead line traversing the site (approx. 18 m).
- Electrical Equipment (approx. 5 m to10 m).
- Lightning masts (approx. 15 m).
- Control buildings, max plan area: 185m2 , Max ridge height 6.2 m.
- Access track (approx. 200m).

The proposed development is approximately twice the size of the permitted substation (0.9 hectares as opposed to 0.5 hectares).

Site Selection

- Constraints Led:
- Sufficient land availability.
- Within the EIA boundary for the permitted wind farm.
- Proximity to 110 kV Macroom to Dunmanway overhead line.
- Away from sensitive environmental receptors.
- Proposed site is 500m SW of permitted substation location
- Proposed site most suitable in terms of Planning / Environment:
  - Nearest River (tributary of River Bride) c.500 m west
  - Nearest Archaeological Feature c.700m north
  - Nearest Dwelling c. 250 m east (contributory landowner)
- The prospective applicant provided a drawing and an aerial view showing the proposed substation site relative to that permitted.

Planning Legislative Assessment

- The permitted wind farm development at Barnadivane that the proposed substation will serve is not itself within the strategic infrastructure thresholds of more than 25 turbines or having a total output greater than 50 megawatts, as specified in the Seventh Schedule.
- The development will not make a significant contribution to the delivery of regional planning guidelines or the National Spatial Strategy.
- The development is entirely within the catchment of a single planning authority.

Concluding Points

- Complies with relevant plans and policies.
- Need, precedent and decision for the presence of a substation established per the existing permission. The proposed development is within the permitted development boundary. The permitted substation will not be constructed.
- No additional overhead transmission lines.
- Substation to operate at 110kV - only a connection point to the transmission grid for energy generated at Barnadivane Wind Farm, not transmission infrastructure.
- No significant environmental effects likely, within wind farm site already subject of EIA.
- Screening for AA/EIA will be carried out.

Other Issues

The proposed substation will not facilitate any other wind farm. The number of turbines will remain at 14 no. The output will depend on the turbine manufacturer but will not exceed 50 megawatts.

Site notices should be erected at the proposed site entrance from the access track and where the track meets the public road

Planning Application Procedures

See attached appendix 1

Conclusion

The Board's representatives will consult with the Strategic Infrastructure Division of the Board in relation to the matters raised and the prospective applicant will be informed of the Board's decision as to whether the proposed development constitutes strategic infrastructure or whether a further meeting may be required.

Philip Green

Philip Green
Assistant Director of Planning
19th August 2014

Appendix 1 Electricity Applications Procedures

- The application must be made by way of full completion of application form to An Bord Pleanála.

- The sequencing of the application process and the content of the public notice is as set out at section 182A of the Planning and Development Act, 2000, as amended.

- The Board requires as a minimum that the public notice of the application would be in two newspapers circulating in the area to which the proposed development relates, one of which should be a national newspaper (A template public notice is attached). A site notice may be required in certain circumstances in respect of structures such as sub-stations and, where required, should accord with the protocols set out in the Planning and Development Regulations 2001-2011. The date of the erection of the site notice is to be inserted; otherwise it should contain the same information as the newspaper notices and should remain in place for the duration of the period during which the public can make submissions to the Board.

- The documentation relating to the application is to be available for public inspection at the offices of the planning authority and the offices of An Bord Pleanála. In this regard the requirements in terms of the number of copies of the documentation to be lodged with the planning authority and the Board is as follows:

  - Planning Authority – 5 hard copies and 2 electronic copies.
  - An Bord Pleanála – 3 hard copies and 7 electronic copies.

- The Board also requires the prospective applicant to provide a stand-alone website containing all of the application documentation. The address of this website is to be included in the public notice.

- The public notice of the application is to indicate that the application documentation will be available for public inspection after the elapsment of at least 5 working days from the date of the publication of the notice so as to ensure that the documentation is in place for such inspection.

- The time period for the making of submissions by the public is to be at least seven weeks from the date the documents become available for inspection (not from the date of publication of the public notices). The Board requires that the public notice must indicate the deadline time and date for the making of submissions to the Board. The prospective applicant should advise the Board's administrative personnel in advance of the details of its proposed public notice and that any further definitive advice on same including confirmation of dates/times could be communicated at that stage.

- The service of notice of the application on any prescribed bodies must include a clear statement that the person served can make submissions to the Board by the same deadline as specified in the public notice (Sample letter to prescribed bodies is attached).

- The service letter on the planning authority with the necessary copies of the documents should be addressed to the County Manager and should also alert the authority to the Board's requirement that the application documentation be made available for public inspection/purchase by the planning authority in accordance with the terms of the public notice (copies of any newspaper/site notices should be provided to the planning authority). It is the Board's intention that all of the application documentation will remain available for public inspection during the currency of the application.

- The depositing of the application documentation and the making of the application to the Board should take place immediately after the publication of the notice and the completion of the service requirements. The application should include a list of the persons served with the application, the date of such service and a sample copy of the notice of service.

- The fee for lodging an application is €100,000. The fee for making a submission in respect of an application is €50 (except for certain prescribed bodies which are exempt from this fee). There is a provision in the Planning and Development (Amendment) Act 2010 enabling the Board to recover its costs for processing any application from the applicant. In addition it was pointed out that the legislation also enables the Board direct payment of costs or a contribution towards same to the planning authority and third parties.

Record Of Meeting

The sequencing of the making of the application was summarised as follows:

1. Publish newspaper notices.

2. Serve copy of relevant documents on bodies/persons required to be notified of the application. Deposit required number of copies with relevant planning authority.

3. Deposit required number of copies of application documentation with An Bord Pleanála and make an application to it.

Record Of Meeting

An Bord Pleanála

Guidelines for Electronic Copies of Applications

(Standalone Website & CD Copies)

1. Each document/drawing should be clearly labelled:
   - EIS and NIS chapters saved individually should be named with the number and title of the chapter e.g. Chapter 2: Ecology, Chapter 3: Human Beings etc., and not just the chapter number.
   - Document names cannot begin or end with a dot, cannot contain consecutive dots and cannot contain any of the following characters: ~ " # % & * : < >? / \ { | }.
   - Drawings should be saved with the drawing title and/or number, not just the drawing number.
   - Large documents to have 'contents' page e.g. EIS and to be paginated appropriately to allow ease of access to its various sections.

2. Documents/drawings should not be compressed e.g. not Winzipped, and should open directly.

3. Each document/drawing when opened should be clearly legible and any scaling of the drawing clearly and accurately indicated.

4. Each document/drawing when opened should be oriented in the appropriate way (portrait/landscape). It should also be possible to rotate the document/drawing.

5. The documents/drawings should be presented in the same sequence as they appear in the hard copy of the application, in order to make the electronic copy as accessible as possible.

6. All photographs/photomontages shall be in colour, not blurred and clearly legible.

7. All drawings/maps which rely on any colour interpretation e.g. red/blue edging, zoning etc. must be provided in colour.

Appendix 2

Appropriate Assessment Screening Report

APPROPRIATE ASSESSMENT SCREENING REPORT FOR A PROPOSED 110kV GRID CONNECTION SUBSTATION AT BARNADIVANE, CO. CORK

ARRAN WINDFARM LTD.

SEPTEMBER 2014

FEHILY TIMONEY & COMPANY

APPROPRIATE ASSESSMENT SCREENING REPORT FOR A PROPOSED 110kV GRID CONNECTION SUBSTATION AT BARNADIVANE, CO. CORK

User is Responsible for Checking the Revision Status of This Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
0	Issue to Client	AMC/MG	POB	COD	05.09.2014
1	Issue with Planning Application	AMC/MG	COD COD	COD COD.	25.09.2014

Client: Arran Windfarm Ltd.

Keywords: Stage One Screening Report, Article 6 of the Habitats Directive, Natura 2000 sites, 110kV substation, Barnadivane

Abstract: This document comprises the Appropriate Assessment Stage One Screening Report for a proposed 110kV substation at Barnadivane, Co. Cork. Appropriate Assessment is required under Article 6 (3) and (4) of the Habitats Directive for any project or plan that may give rise to significant effects on a Natura 2000 site. Stage one is the first stage in the Appropriate Assessment process. This assessment follows the methodological guidelines set out in the document 'Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites' (2001) and published guidelines from the Department of Environment, Heritage and Local Government (2009).

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1 INTRODUCTION

Fehily Timoney and Company (FTC) was commissioned by Arran Windfarm Ltd. to prepare an Appropriate Assessment (AA) Screening Report, for a proposed a 110kV grid connection substation at Barnadivane (Kneeves), Co. Cork. The site is located approximately in the midpoint of a triangle formed by Macroom, Dunmanway and Bandon.

Appropriate Assessment is required under the EU Habitats Directive (92/43/EEC) – 'on the conservation of natural habitats and of wild fauna and flora'. It is an assessment of the potential impacts of a proposed plan or project, on its own or in combination with other plans or projects, on one or more Natura 2000 sites [Special Protection Areas (SPAs) for birds, Special Areas of Conservation (SACs) for habitats and species].

Accordingly, AA screening for the proposed 110kV substation must be undertaken by the competent authority. This report has been prepared to assist the relevant authority in their assessment of the development.

The developer intends to seek permission for a new grid connection substation in the townland of Barnadivane (Kneeves), Co. Cork. The current substation application will replace a currently permitted substation that is not yet constructed. The proposed substation site is approximately 10 km south of Macroom.

This AA Screening Report assesses the potential impact(s) of the proposed substation, and associated infrastructure, on the Natura 2000 sites which lie within an approximate 10 km radius of the substation site boundary. The site boundary of the proposed substation does not lie within any designated nature conservation site. There are however three Natura 2000 sites within an approximate 10 km radius of the site (i.e. two cSACs and one SPA). The Gearagh cSAC (site code 000108) lies 6.7 km north of the proposed site boundary, and the Gearagh SPA (004109) lies 6.8 km to the north. The Bandon River cSAC (002171) lies 10.8 km southwest of the proposed site boundary.

1.1 Legislative Requirements

Appropriate Assessment is a requirement of Article 6(3) and 6(4) of the EU Habitats Directive which states:

6(3) Any plan or project not directly connected with or necessary to the management of the site (Natura 2000 sites) but likely to have significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the sites conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

6(4) If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.

The statutory agency responsible for Natura 2000 sites is the National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage and the Gaeltacht (DAHG). The European Court of Justice, on 13 December 2007, issued a judgement in a legal case against Ireland that found Ireland had failed in its statutory duty to confer adequate protection on designated areas. In December 2009 "Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities, Department of the Environment, Heritage and Local Government" was published. This guidance document was prepared jointly by the NPWS and Planning Divisions of the Department of Environment, Heritage and Local Government (DoEHLG), now DAHG, with input from local authorities.

The Habitats Directive formed a basis for the designation of Special Areas of Conservation (SACs). Similarly, Special Protection Areas are legislated for under the Birds Directive (Council Directive 79/409/EEC on the Conservation of Wild Birds).

1.2 Regulatory Context

In 1997, the Habitats Directive was transposed into Irish national law by the European Union (Natural Habitats) Regulations, SI 94/1997 (as amended by S.I. 233/1998 & S.I. 378/2005). The European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477/2011) consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005, and the European Communities (Birds and Natural Habitats) (Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in the Court of Justice of the European Union (CJEU) judgements. Following an additional amendment in 2013 (S.I. 499/2013) the regulation is now the European Communities (Birds and Natural Habitats) Regulations 2011 to 2013.

The Regulations have been amended to address several judgments of the CJEU against Ireland, notably cases C-418/04 and C-183/05, in respect of failure to transpose elements of the Birds Directive and the Habitats Directive into Irish law.

2 METHODOLOGY

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures to be addressed in the AA process. Firstly, a project should aim to avoid any negative impacts on Natura 2000 sites by identifying possible impacts early in the project, and should design the project in order to avoid such impacts.

2.1 Appropriate Assessment Methodology

There are four stages in an AA, as outlined in the European Commission Guidance document (2001). The following is a brief summary of these steps.

Stage One - Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 Site and considers whether it can be objectively concluded that these effects will not be significant.

Stage Two - Appropriate Assessment: In this stage, the impact of the project on the integrity of the Natura 2000 site is considered with respect to the conservation objectives of the site and to its structure and function. Mitigation measures should be applied to the point where no adverse impacts on the site(s) remain.

Stage Three - Assessment of Alternative Solutions: Should the Appropriate Assessment determine that adverse impacts are likely upon a Natura 2000 site, this stage examines alternative ways of implementing the project that, where possible, avoid these adverse impacts.

Stage Four - Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the Natura site will be necessary. European case law highlights that consideration must be given to alternatives outside the project area in carrying out the IROPI test. It is a rigorous test which projects are generally considered unlikely to pass.

In the preparation of this assessment therefore regard has been given to the EU Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations 2011, and with reference to the relevant guidance, in particular:

- *Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*, European Commission 2001.
- *Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC*, European Commission, 2000.
- *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin 2009.

In order to identify potential cumulative or 'In Combination Effects', other projects were identified for this area. The following data sources have been considered:

- Cork County Council Online Planning Enquiry System http://maps.corkcoco.ie/
- EPA Envision maps
- Water Framework Directive WaterMaps Viewer http://watermaps.wfdireland.ie/
- Cork County Development Plan

2.2 Impact Assessment

The first step in the screening process is to develop a list of Natura 2000 sites potentially affected by the proposed development. Each Natura 2000 site is reviewed to establish whether or not the proposed development is likely to have a significant effect on the integrity of the site, as defined by its structure and function, and its conservation objectives.

The qualifying interests of each Natura 2000 site are identified and the potential threats are summarised into the following categories for the screening process, and described within the screening matrix:

- Direct impacts refer to habitat loss or fragmentation arising from land-take requirements for development or agricultural purposes. Direct impacts can be as a result of a change in land use or management, such as the removal of agricultural practices that prevent scrub encroachment.

- Indirect and secondary impacts do not have a straight-line route between cause and effect, and it is potentially more challenging to ensure that all the possible indirect impacts of the plan (or project) – in combination with other plans and projects - have been established. These can arise when a development alters the hydrology of a catchment area, which in turn affects the movement of groundwater to a site, and the qualifying interests that rely on the maintenance of water levels. Deterioration in water quality can occur as an indirect consequence of development, which in turn changes the aquatic environment and reduces its capacity to support certain plants and animals. The introduction of invasive species can also be defined as an indirect impact, which results in increased movement of vectors (humans, fauna, surface water), and consequently the transfer of alien species from one area to another.

Disturbance to fauna can arise directly through the loss of habitat (e.g. bat roosts) or indirectly through noise, vibration and increased activity associated with construction and operation.

2.3 Statement of Authority

This report has been carried out by Dr. Alison McCarthy PhD, MSc, BSc, MCIEEM. Alison is a Project Ecologist with FTC. Alison holds a BSc, MSc and PhD in the fields of Zoology and Marine Ecology. Alison is a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM) and has over eight years' professional experience in ecological consultancy and research. Alison is experienced in managing and co-ordinating Ecological Impact Assessments and Appropriate Assessments for a wide range of projects, including pipelines, roads, wind farms, ports, landfill sites, housing and commercial developments. Alison received specialist training in Appropriate Assessment for Waste Water Treatment Plant licensing while working for the Environmental Protection Agency in 2008 and has regularly attended Appropriate Assessment workshops over the last number of years.

Alison is very experienced in flora and fauna survey techniques including specialised avian surveys, as well as surveys for bats, other mammals and habitat surveys. She has specialist knowledge of the aquatic environment, both coastal and freshwater, particularly in invertebrate taxonomy. She has guest lectured in University College Cork on the Diploma in Environmental Science and Social Policy, and has published research papers in several peer-reviewed international journals.

Alison attended the most recent Chartered Institute of Environment and Ecological Management (CIEEM) Irish conference on 'Protected Habitats and Species: A Best Practice Approach' held in Dublin in November 2013. She also attended the '6th Ornithological Research Conference' held in UCC in November 2013. Alison's full CV is attached in Appendix 1.

3 STAGE ONE – SCREENING

3.1 Brief Description of the Proposed Development Site

The developer intends to seek permission for a new grid connection substation in the townland of Barnadivane (Kneeves), Co. Cork. The current substation application will replace a permitted substation that is not yet constructed. The proposed substation is approximately 10 km south of Macroom.

Permission currently exists for a 110kV substation and switch station as part of a 14 turbine Barnadivane wind farm. The permitted development was granted by both the Planning Authority and An Bord Pleanála under planning reference numbers 05/5907 and PL 04.219620 respectively. An extension of duration was granted by Cork County Council under 11/6605.

The original wind farm planning application included for a substation but, since receiving the original planning consent, new Eirgrid standards require 110kV substations to have available land to facilitate future expansion. The permitted substation is constrained on the west by the existing 110kV overhead line and on the east by the local road. Accordingly, a new substation application is required to service Barnadivane Wind Farm. On that basis, a new site has been identified for the proposed substation within the study area of the permitted wind farm that meets the necessary criteria such as, capacity for accommodating Eirgrid requirements, proximity to transmission system, good access and visual screening.

The proposed 110kV grid connection substation will have a defined planning boundary which will include a 110kV grid connection substation compound with associated control buildings and electrical equipment as well as ancillary infrastructure such as internal access roads, oil interceptor and security fencing. The proposed substation development covers an area of approximately 2.95 ha, within the overall study boundary of the permitted wind farm which covers an area of 355 ha.

The 110 kV substation compound will cover an area of approximately 86m x 108m on plan including a buffer area to the perimeter. There will be three single storey control buildings on the site. The control buildings will be of standard masonry construction, rendered externally with a pitched roof. Finishes will be in keeping with the surrounding buildings. The maximum floor area of each building will be 185m^2 and the maximum height of the buildings will be approximately 6.2 m above finished ground level. The control buildings and electrical equipment will be enclosed by a 2.4m high perimeter fence encompassing an area of approximately 76m x 98m. The substation compound will be connected to the public road via a short access track approximately 200m long.

During the construction phase it will be necessary to provide temporary facilities for the workers. Such facilities will include:

- site office and canteen
- site compound
- toilet facilities
- bottled water for potable supply
- a water tanker to provide water for other purposes such as dust suppression
- diesel generator
- contractor lock-up facility
- employee parking.

Habitat, mammal and bat surveys of the proposed substation site boundary were carried out by FTC on the 11 June and 08 July 2014. The proposed site boundary lies within improved agricultural grassland (GA1) habitat, according to the Fossitt (2000) classification system, primarily used for cattle grazing and silage cutting. The field boundaries consist of hedgerows (WL1) primarily, with some earth banks (BL1) to the north, and a small treeline (WL2) on the eastern field boundary. No bat activity was recorded along the field boundaries, probably due to the exposed nature of the site. Foxes and rabbits were widespread in the surrounding farmland.

It is anticipated that construction for the proposed development will commence immediately following receipt of planning permission.

The substation site boundary is situated within the catchment of the River Bride. It lies within the SW_Lee228Bride_3Upper - IE_SW_19_1213 waterbody subcatchment (see Figure 3.2). Drainage from the site boundary is in a southeasterly direction, however there are no watercourses within the substation site boundary.

It should be is noted that the proposed substation site boundary is outside of the Bandon River Catchment which is a known Fresh Water Pearl Mussel catchment. This catchment is approximately 10 km to the southwest. The Bandon pearl mussel catchment is drained by the Bandon and Caha rivers and lies east of the Shehy Mountains. Freshwater Pearl Mussel distribution in the Bandon River is known to be widespread, with records from Cullenagh Lake to Bandon Town. The Caha and Blackwater Rivers also have wide distributions of the mussel. In the Bandon River main channel, the mussel is abundant in places, although the conservation status of the mussels in the catchment is unfavourable (NS 2, 2010).

3.2 Brief Description of the Natura 2000 Sites

The proposed substation does not lie within any Natura 2000 sites. There are three Natura 2000 sites (two cSACs[1] and one SPA) within an approximate 10 km radius of the substation. Figure 3.2 shows the locations of the Natura 2000 sites in relation to the proposed substation. The Gearagh cSAC (site code 000108) lies 6.7 km to the north of the proposed substation, and the Gearagh SPA (004109) lies 6.8 km to the north. The Bandon River cSAC (002171) lies 10.8 km southwest of the proposed substation.

Table 3.2 summarises the details of the Natura 2000 sites, including their qualifying interests, area, conservation objectives and the current threats. The following descriptions are extracted from the site synopses available on the NPWS website www.npws.ie.

The Mullaghanish to Musheramore Mountains SPA (004162) lies approximately 14.7 km north of the proposed substation. This extensive site is an SPA under the E.U. Birds Directive, of special conservation interest for Hen Harrier. During the breeding season, Hen Harriers forage over a large home range, and may feed (especially males) up to 10 km from a nest site (Hardey *et al.*, 2009).

As the proposed development site is greater than 14 km from the SPA, and outside of the typical foraging range for Hen Harriers from the SPA, it is not considered likely to impact on the conservation interests of the SPA. Furthermore, a winter season Vantage Point (VP) survey, following Scottish Natural Heritage (SNH, 2013) guidance was carried out in the townland of Barnadivane (Kneeves) as part of the ecological surveys. The VP surveys were carried out to assess the presence of Hen Harrier in the area, in additional to wintering birds of conservation concern such as Golden Plover, Whooper Swan and Lapwing. The surveys commenced in November 2013 and were completed in March 2014. Two VP locations were used during the survey and 36 hours of VP watches in total were completed per VP. Two Hen Harrier observations (both of males) were made during the entire 36 hours of survey time. The total Hen Harrier observation time was 187 seconds or 0.14% of the total survey time. The results of the VP surveys showed that the Barnadivane area is not an important site for Hen Harrier during the winter period, for roosting or foraging, and it is unlikely that there is any connection between the Barnadivane area and the Mullaghanish to Musheramore Mountains SPA. Therefore the SPA is not considered to be in the zone of potential impact of the substation, and it is not assessed further in this screening report.

[1] At present all SACs in Ireland are currently 'candidate' SACs, and referred to as cSACs. The relevant Statutory Instruments for the SACs in Ireland have not yet been put in place, though these sites must still be afforded protection in accordance with the EU Habitats Directive (92/43/EEC).

Table 3-1: Characteristics of the Natura 2000 Sites within approximately 10 km of the Proposed Substation

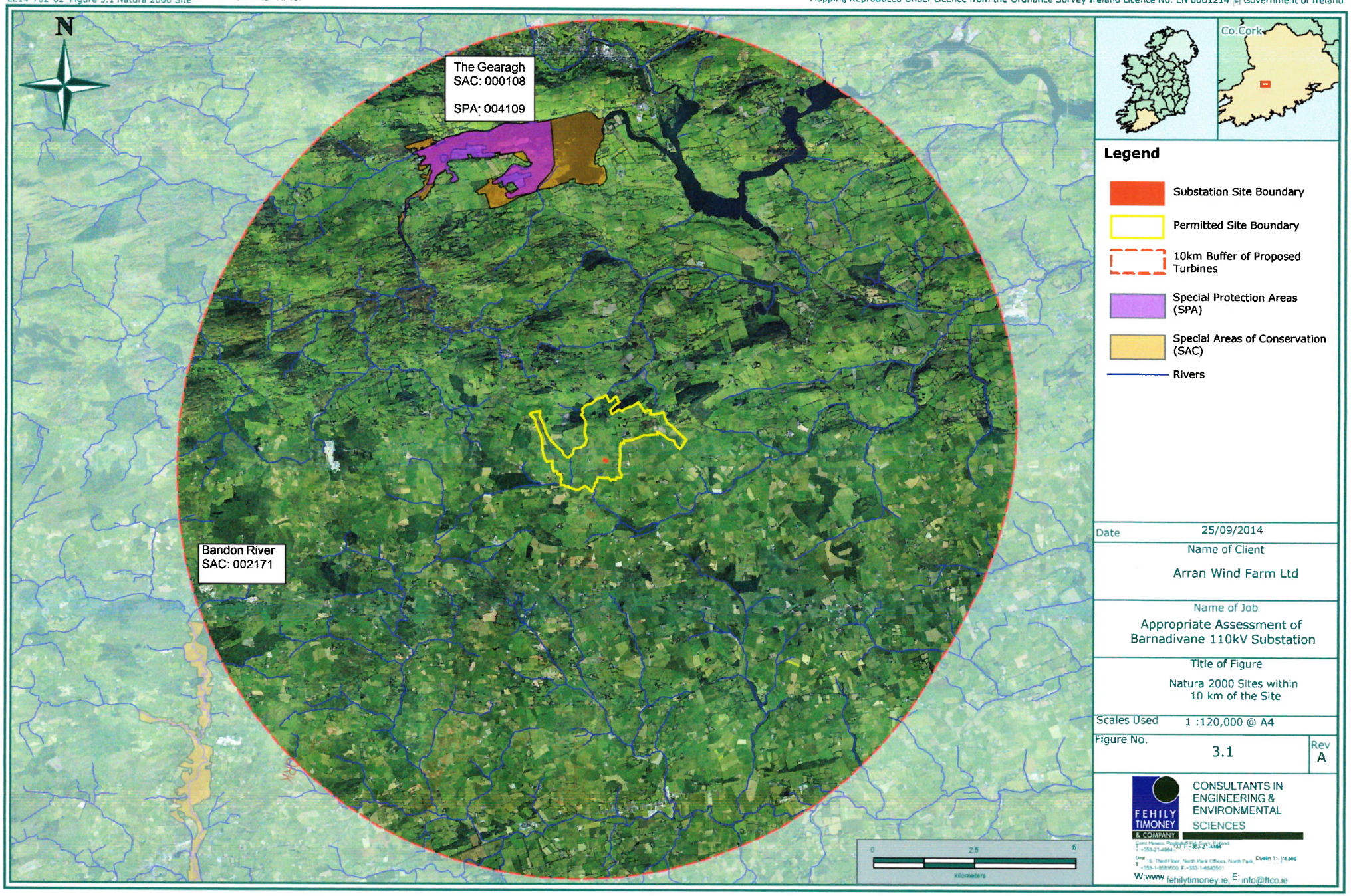
Site Name & Code	Site Summary & Qualifying Interests	Area	Conservation Objectives	Threats	Distance from Proposed Substation
The Gearagh cSAC (000108)	The site is a cSAC selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): **Qualifying Interests** [3260] Floating River Vegetation [91A0] Old Oak Woodlands [91E0] Alluvial Forests* [1355] Otter (*Lutra lutra*) This unusual area has formed where the River Lee breaks into a complex network of channels (2 to 6 m wide) weaving through a series of wooded islands. The alluvial woodland which remains today at the Gearagh is of unique scientific interest, and qualifies as a priority habitat under Annex I of the E.U. Habitats Directive. The islands in the Gearagh consist of rather dry alluvium, and support an almost closed canopy of Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Birch (*Betula* spp.). Within the heavily forested channels there is little or no aquatic vegetation, but in the more open areas the E.U. Habitat type 'floating river vegetation' occurs. An oakwood occurs just north of Toon Bridge. Otter, an Annex II species on the E.U. Habitats Directive, is frequent throughout the site. The Gearagh supports part of an important wintering bird population. At the Gearagh, Whooper Swans are regular (40-110, 1990's), as are Wigeon (640, average max.1992-1994), Teal (707, average max. 1992-94), Mallard (250 in January 1993) and Tufted Duck (154, average max. 1992-94).	557.95 Ha	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected.	There are no major threats to this site. Damage to marginal areas from drainage attempts and grazing/poaching by cattle may occur in some areas. Illegal removal of timber may occur from time to time. The aquatic communities could be adversely affected by eutrophication.	6.7 km to the north

Site Name & Code	Site Summary & Qualifying Interests	Area	Conservation Objectives	Threats	Distance from Proposed Substation
	Golden Plover utilise the site on occasions (e.g. 2,000 in January 1994), while there is a regular flock of Dunlin (100-200, 1990s), a species unusual at inland sites. A late summering flock of Mute Swan is regular, with numbers between 120 and 250 from 1992 to 1994. Great Crested Grebe and Tufted Duck breed in small numbers, while there is a feral flock of about 50 Greylag Goose. Despite the fact that about half the original area has been destroyed, the Gearagh still represents the only extensive alluvial woodland in Ireland or Britain, or indeed west of the Rhine in Europe. For this reason it is a unique site and has been designated also as a Statutory Nature Reserve. The international importance of the site is recognised by its designation both as a Ramsar site and as a Biogenetic Reserve. The reservoir is also a Wildfowl Sanctuary.				
The Gearagh SPA (004109)	This site, located c. 2 km south-west of Macroom, comprises a stretch of the River Lee that was dammed in the 1950s as part of a hydroelectric scheme. The valley formerly held an extensive area of alluvial forest but only part of the forest now survives. The SPA extends from Annahala bridge westwards to Toon bridge. The principal habitat is now a shallow lake which is fringed by wet woodland, scrub and grassland that is prone to flooding. At times of low water, a diverse ephemeral pioneering plant community develops on the mud. The site supports important populations of wintering waterfowl, including swans, dabbling duck, diving duck and some waders.	322.72 Ha	To maintain or restore the favourable conservation condition of the bird species listed as special conservation interests for this SPA.	There are no imminent threats to the wintering bird populations as the site is a Nature Reserve. However, some disturbance is caused to the birds by illegal shooting.	6.8 km to the north

Site Name & Code	Site Summary & Qualifying Interests	Area	Conservation Objectives	Threats	Distance from Proposed Substation
	Habitat quality is good and the site provides both feeding and roost sites for the birds. Six of the species have populations of national importance: Mute Swan (*Cygnus olor*), Wigeon (*Anas penelope*), Teal (*Anas crecca*), Northern shoveler (*Anas clypeata*), Coot (*Fulica atra*) and Golden plover (*Pluvialis apricaria*). Other species which occur regularly include Whooper Swan (*Cygnus cygnus*), Tufted duck (*Aythya fuligula*) and Lapwing (*Vanellus vanellus*). The site is a Nature Reserve, Ramsar site and Biogenetic Reserve. **Qualifying Interests:** [A052] Teal (*Anas crecca*) [A050] Wigeon (*Anas penelope*) [A053] Mallard (*Anas platyrhynchos*) [A125] Coot (*Fulica atra*) [A999] Wetlands				
Bandon River cSAC (002171)	The Bandon River cSAC consists of relatively short adjoining stretches of the Bandon and Caha Rivers. These rivers flow in a southerly direction to the east of Dunmanway, Co. Cork. The site is a cSAC selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): **Qualifying Interests** [3260] Floating River Vegetation [91E0] Alluvial Forests* [1029] Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1096] Brook Lamprey (*Lampetra planeri*)	321.26	To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the cSAC has been selected.	Water quality of the river is presently quite good. There is the threat of local enrichment from agricultural run-off. This will impact on Annex II animal species. There is a proposal to alleviate flooding of the River. It is not known whether this proposal will proceed. Forestry upstream poses a threat. Agricultural improvement/reclamation along entire stretch also poses a threat.	10.8 km southwest

Site Name & Code	Site Summary & Qualifying Interests	Area	Conservation Objectives	Threats	Distance from Proposed Substation
	Wet broadleaved semi-natural woodland is found in an undisturbed area of braided river channels and islands below Dunmanway. Floating river vegetation is found along the length of the river and is dominated by water-crowfoots (*Ranunculus* spp). Some small areas of woodland occur within the site north of Long Bridge. A population of Freshwater Pearl Mussel is found in the river. This species is listed on Annex II of the E.U. Habitats Directive. The river also supports populations of protected fish species, notably Brook Lamprey and Salmon (*Salmo salar*), both of which are also listed on Annex II of the E.U. Habitats Directive. This site contains good examples of two habitats listed on Annex I of the E.U. Habitats Directive - alluvial forest and floating river vegetation - and supports populations of four Annex II species - Otter, Salmon, Brook Lamprey and Freshwater Pearl Mussel. The presence of a number of Red Data Book plant and animal species adds further interest to the site.				

R:\Map Production\2014\LE14\702\02\Workspace\Substation Environmental Report
LE14_702_02_Figure 3.1 Natura 2000 Sites Within 10km Rev A.wor



Legend

- Substation Site Boundary
- Permitted Site Boundary
- 10km Buffer of Proposed Turbines
- Special Protection Areas (SPA)
- Special Areas of Conservation (SAC)
- Rivers

Date	25/09/2014
Name of Client	Arran Wind Farm Ltd
Name of Job	Appropriate Assessment of Barnadivane 110kV Substation
Title of Figure	Natura 2000 Sites within 10 km of the Site
Scales Used	1 :120,000 @ A4
Figure No.	3.1
Rev	A

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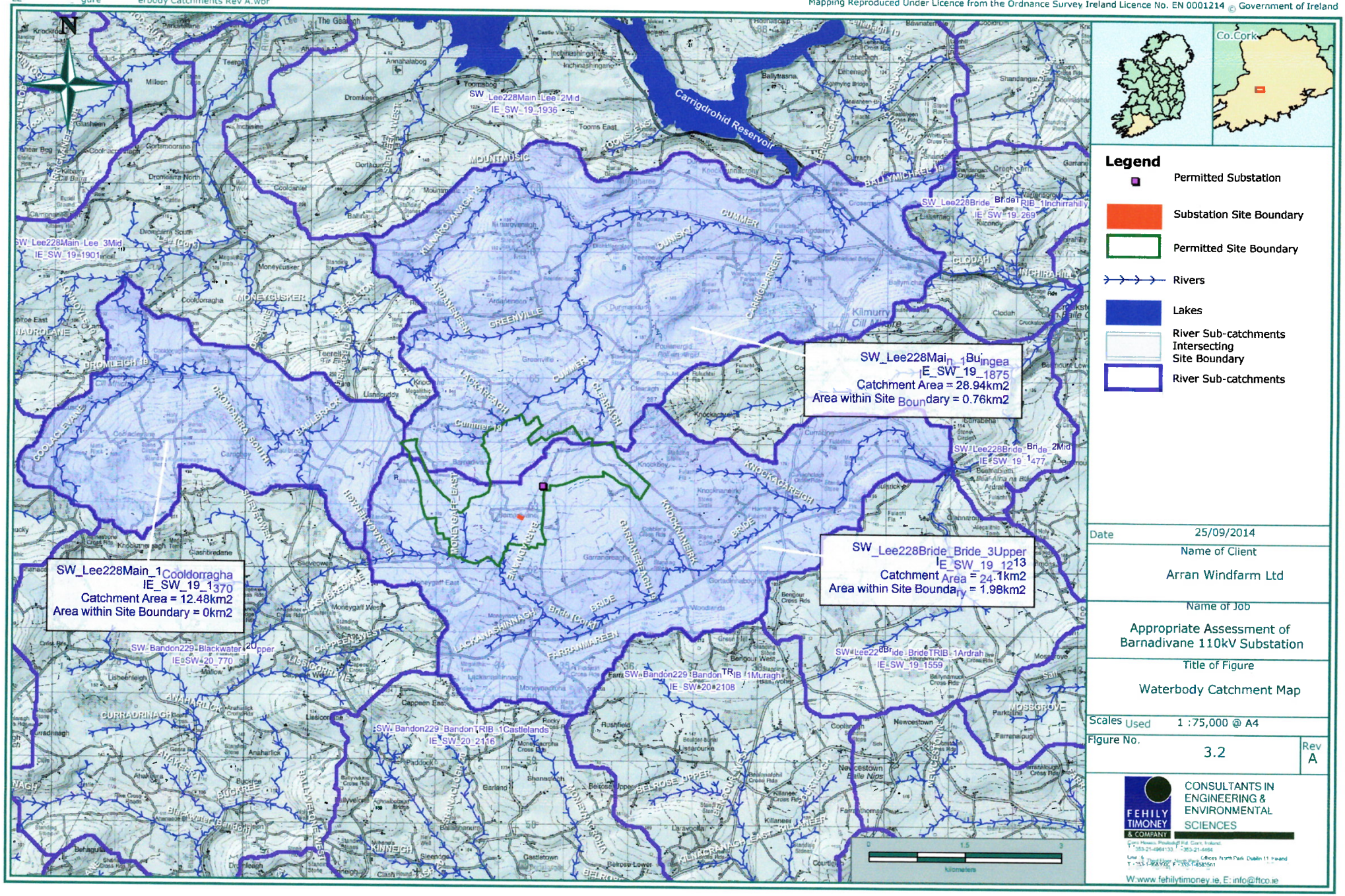
R:\Map Production\2014\LE14\702\02\Workspace\Substation AA LE14-702-02 Figure 3.2 Waterbody Catchments Rev A.wor



Date	25/09/2014
Name of Client	Arran Windfarm Ltd
Name of Job	Appropriate Assessment of Barnadivane 110kV Substation
Title of Figure	Waterbody Catchment Map
Scales Used	1 :75,000 @ A4
Figure No.	3.2
Rev	A

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3.3 Screening Assessment

The following screening assessment has been carried out in accordance with the guidance document *Assessment of Plans and Projects significantly affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*, European Commission 2001 and using the standard screening assessment form provided in Annex 2 of this document. The line items in italics are taken directly from this guidance document.

Assessment criteria	
Describe the individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites.	The individual elements of the proposed development that *could* give rise to impacts on the Natura 2000 sites are: • Siltation or pollution of watercourses during construction and operation of the substation leading to pollution of watercourses draining to the Gearagh cSAC and/or the Bandon River cSAC, and subsequent negative impacts on aquatic flora and fauna within the cSACs • Disturbance/displacement impacts on birds from the Gearagh SPA arising from construction of the substation.
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 site by virtue of: ▪ *Size and scale;* ▪ *Land-take;* ▪ *Distance from Natura 2000 site or key features of the site;* ▪ *Resource requirements;* ▪ *Emissions;* ▪ *Excavation requirements;* ▪ *Transportation requirements;* ▪ *Duration of construction, operation etc.;* ▪ *Other.*	**Size and scale, land-take and distance from Natura 2000 sites** The proposed substation site boundary, does not lie within any Natura 2000 site. The Gearagh cSAC lies 6.7 km north, and the Gearagh SPA (0004109) lies 6.8 km to the north. The Bandon River cSAC (002171) lies 10.8 km southwest of the substation site boundary. The proposed substation development covers an area of approximately 1.1 ha. There are no other Natura 2000 sites within an approximate 10 km radius of the proposed substation site boundary. Thus there will be no direct impact on the size and scale of any Natura 2000 site as a result of the proposed development. Similarly the proposed development will not result in any land-take from any Natura 2000 site. **Resource requirements and Excavation requirements** There will be no direct resource or excavation requirements from the Natura 2000 sites as a result of the proposed development. **Emissions** There will be no direct emissions, or disposal of material into any Natura 2000 site as a result of the proposed development. The site is situated within the catchment of the River Bride. There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed to soakaways or as overland flows via vegetation filters at a significant distance from the nearest natural watercourses. The River Bride rises at an elevation of 220 m OD between Moneygaff East and Barnadivane (Kneeves) over 1.5 km to the southwest of the site. The proposed development location is not within an area of 'benefitting lands' or 'drainage districts' and there are no reported incidents of flooding in the vicinity of the proposed development, as per national flood hazard mapping (www.floodmaps.ie).

Assessment criteria	
	As a result of the significant separation distance and construction best practice measures to be applied to the proposed development, the substation is expected to have a negligible impact on the receiving environment in terms of surface water. Taking into consideration the fact that the site boundary lies 6.7 km south of the Gearagh cSAC and 10.8 km northeast of the Bandon River cSAC, and that there will be no direct discharge to any watercourse from the development, it is not likely that there will be any negative impact on any Natura 2000 site, via hydrological links or indirect emissions via watercourses. **Transportation requirements, Duration of Construction and Operation** It is anticipated that construction for the proposed development will commence on site immediately after planning and take up to 12 months to complete. The site will be accessed from the south via a network of local public roads connected to the R585 regional road and therefore will not cross through or interfere with any of the Natura 2000 sites within 10 km of the proposed development.
Describe any likely changes to the site arising as a result of: ▪ *Reduction of habitat area;* ▪ *Disturbance of key species;* ▪ *Habitat or species fragmentation;* ▪ *Reduction in species density;* ▪ *Changes in key indicators of conservation value;* ▪ *Climate change.*	The proposed development site lies approximately 6.8 km south of the Gearagh SPA. Should birds from the SPA commute regularly over the proposed development site, indirect impacts could occur through disturbance or displacement during construction of the proposed development. The Gearagh SPA supports important populations of wintering waterfowl, including swans, dabbling duck, diving duck and some waders. The qualifying interests of the site are Teal, Wigeon, Mallard and Coot and wetland habitat. A winter bird Vantage Point (VP) survey following SNH (2013) guidelines, was carried out at the proposed development site from November 2013 to March 2014. Two fixed VPs overlooking the site and surrounding area were monitored for a total of 36 hours for bird activity over the site. In terms of the qualifying interests/species of the Gearagh SPA, only Mallard was recorded flying over the site, on one occasion in January 2014. Golden plover is not a qualifying species of the Gearagh SPA, but the SPA does support a population of national importance. A small flock of about 35 Golden plover were recorded flying in the vicinity of the proposed substation on one occasion in January 2014. No other qualifying species, or species of note, from the SPA were recorded. Taking into consideration the low levels of activity of wintering waterbirds recorded during VP watches, it is not likely that the construction of the substation will result in adverse impacts, or disturbance of key species from the Gearagh SPA. As discussed under 'Emissions' above, indirect adverse impacts on water quality and on aquatic flora and fauna in the Gearagh cSAC and the Bandon River cSAC have been considered unlikely to occur. Therefore, there will be no reduction in species density or disturbance of key species in these cSACs as a result of the proposed development. There will be no likely changes to any Natura 2000 site as a result of reduction in habitat area, disturbance of key species, habitat or species fragmentation, changes in key indicators of conservation value, or climate change from the proposed development.

Assessment criteria	
Describe any likely impacts on the Natura 2000 site as a whole in terms of: ▪ *Interference with the key relationships that define the structure of the site;* ▪ *Interference with key relationships that define the function of the site.*	It is not considered likely that there will be any long term impacts on the key relationships that define the structure or function of any Natura 2000 site as a result of the proposed development.
Provide indicators of significance as a result of the identification of effects set out above in terms of: ▪ *loss,* ▪ *fragmentation,* ▪ *disruption,* ▪ *disturbance,* ▪ *change to key elements of the site (e.g. water quality etc.).*	As above. It is not considered likely that there will be any impacts on any Natura 2000 site as a result of the proposed development.
Describe from the above those elements of the project or plan, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.	As above. It has been concluded that the proposed development is not likely to have adverse impacts on Natura 2000 site. Stage Two of the AA process is not required. A Finding of No Significant Effects Report is available in Section 3.4.

3.4 FONSE Report

Finding of No Significance Effects Report	
Name and location of the Natura 2000 sites	• The Gearagh cSAC (000108) – 6.7 km north of proposed substation site boundary • The Gearagh SPA (004109) – 6.8 km north of proposed substation site boundary • Bandon River cSAC (002171) – 10.8 km southwest of proposed substation site boundary Note: distances are approximate.
Description of the project or plan	The developer intends to seek permission for a new grid connection substation in the townland of Barnadivane (Kneeves), Co. Cork. The current substation application will replace a currently permitted substation that is not yet constructed. The proposed 110kV grid connection substation will have a defined planning boundary which will include a 110kV grid connection substation compound with associated control buildings and electrical equipment as well as ancillary infrastructure such as internal access roads, oil interceptor and security fencing. The proposed substation development covers an area of approximately 2.95 ha, within the overall study boundary of the permitted wind farm which covers an area of 355 ha. The 110 kV substation compound will cover an area of approximately 86 m x 108 m on plan including a buffer area to the perimeter. There will be three single storey control buildings on the site. The control buildings will be of standard masonry construction, rendered externally with a pitched roof. Finishes will be in keeping with the surrounding buildings. The maximum floor area of each building will be 185m^2 and the maximum height of the buildings will be approximately 6.2 m above finished ground level. The control buildings and electrical equipment will be enclosed by a 2.4m high perimeter fence encompassing an area of approximately 76m x 98m. The substation compound will be connected to the public road via a short access track approximately 200m long. The compound will contain assorted electrical equipment including transformers, switch gear including circuit breakers, metering transformers, busbars, post insulators, lightning protection masts, line gantries, etc., all in accordance with Eirgrid requirements.
Is the Project or Plan directly connected with or necessary to the management of the site (provide details)?	No
Are there other projects or plans that together with the project of plan being	No.

Finding of No Significance Effects Report	
assessed could affect the site (provide details)?	The existing permission on the site permitted the construction of a substation and wind farm concurrently and this impact has been already assessed in the EIS for the permitted development. Notwithstanding the slightly larger footprint, if the proposed substation development is constructed in parallel with Barnadivane Wind Farm the potential for cumulative impacts is considered slight. In addition, a construction phase environmental management plan (CEMP) will be put in place for the construction period. Therefore it is not considered likely that there will be cumulative or in-combination impacts on any Natura 2000 sites as a result of the proposed development.
The Assessment of Significant Effects	
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site	The proposed development is not likely to affect any Natura 2000 site.
Explain why these effects are not considered significant	The proposed development will not result in any significant impacts on any Natura 2000 site listed above, and there will not be any impacts on key species or habitats associated with the development.
Name of Agency or Body Consulted	**Summary of Response**
NPWS Divisional Ecologist Dr. Jervis Good, by phone on 01 November 2013	A number of consultations were carried out with the NPWS in relation to ecology at the site. NPWS Divisional Ecologist, Dr. Jervis Good was contacted by phone on 01 November 2013. Following discussions with Dr. Good, a winter bird vantage point survey, following best practice Scottish Natural Heritage (SNH, 2013) guidance was carried out at the site from November 2013 to March 2014.
NPWS staff Declan O'Donnell and Danny O'Keefe contacted by phone on 13 May 2014	With regard to the assessing the potential impact(s) of the proposed development on ecology, advice was given to screen for impacts on Hen Harrier, Golden Plover, Merlin, Barn Owl, Short-eared Owl, White-tailed Eagle, Red Grouse and Curlew, and also to address potential impacts on Freshwater Pearl Mussel.

Data Collected to Carry out the Assessment			
Who carried out the assessment	*Sources of Data*	*Level of assessment completed*	*Where can the full results of the assessment be accessed and viewed*
Fehily Timoney & Company	Cork County Council online planning enquiry system http://maps.corkcoco.ie/	Stage One Screening	Cork County Council

Finding of No Significance Effects Report			
	National Parks and Wildlife Service http://npws.ie/ Water Framework Directive WaterMaps Viewer http://watermaps.wfdireland.ie/		

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Hardy, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. 2009. Raptors: A Field Guide for Surveys and Monitoring. 2nd Edition. The Stationary Office: Edinburgh. 370pp.

NS 2, 2010. Freshwater Pearl Mussel Second Draft Bandon Sub-basin Management Plan. Produced by NS2, funded by Department of Environment, Heritage and Local Government.

SNH, 2013. Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage Guidance, August 2013.

Websites accessed:

Water Framework Directive WaterMaps Viewer http://watermaps.wfdireland.ie/ (accessed 03/07/2014).

OPW National Flood Hazard Mapping www.floodmaps.ie (accessed 13/08/2014).

APPENDIX 1

CV – Dr. Alison McCarthy

Dr. Alison McCarthy Project Ecologist

Current Position:
Project Ecologist

Qualifications:
BSc Zoology (1st Class Hons), University College Cork 2000.
MSc Marine Resource Development & Protection (Distinction), Heriot-Watt University, 2002.
PhD NUI, Galway. Irish Coastal and Deep-sea Cumacea (Crustacea: Peracarida) with particular emphasis on the family Pseudocumatidae 2007.

Professional Memberships:
Full Member of the Chartered Institute of Ecology and Environmental Management (MCIEEM).

Publications:
Gerken, S. & McCarthy, A.M. 2008. *Kerguelenica petrescui* (Crustacea: Cumacea), a new species from Australian waters. *Journal of Crustacean Biology*, 28, 3, 564–571.
McGrath, D., McCarthy, A., Minchin, D. & Molloy, J.P. 2008. The swimming crab *Polybius henslowii* Leach in Irish waters. *Irish Naturalists' Journal*, 29, 1, 55–56.
McCarthy, A.M., Gerken, S., McCormack, G.P. & McGrath, D. 2006. *Monopseudocuma* a new genus from the North East Atlantic and redescription of *Pseudocuma gilsoni* Băcescu, 1950 (Cumacea: Pseudocumatidae). *Zootaxa*, 1203, 39–56.
McCarthy, A.M., McGrath, D. & Allen, B.M. 2005. The grey swimming crab *Liocarcinus vernalis* (Risso, 1827) in western Irish coastal waters (Decapoda: Brachyura, Portunidae). *Irish Naturalists' Journal*, 28, 1, 20 -26.

Employment History
May 2011-Present, FTC, Cork.
2010-2011– Project Manager, Cetacean Observer Programme, UCC.
2008-2009 Environmental Consultancy Aquatic Services Unit, UCC.
2008 Licensing Inspector, EPA, Cork.
2006-2007 Bord Iascaigh Mhara, Project Manager for inshore fisheries research projects.

Key Data
Alison is a Project Ecologist with FTC and holds a PhD, MSc and BSc in Zoology and Marine Ecology. She is a Full Member of the Chartered Institute of Ecology and Environmental Management (MCIEEM) and has over eight years' professional experience in ecological consultancy and research. Alison is experienced in a range of ecological field survey techniques including specialist avian surveys, bat surveys, terrestrial mammal and habitat surveys. She is involved in EIA/EIS, environmental and ecological reporting for numerous developments including large-scale windfarm developments, overhead powerlines, underground cable routes, infrastructural projects, waste facilities and land-use plans.

Alison is experienced in preparing Appropriate Assessment Screening Reports and Natura Impact Statements for numerous projects. Alison has published research papers in several peer-reviewed international journals.

Role & Selected Relevant Projects

General Ecological Impact Assessments (EcIA): Constraints, EIA / EIS, ER, RFI, Monitoring, Compliance — Ongoing.
Project Ecologist role on numerous EcIAs. Duties include project management, desktop review, co-ordination of field surveys (avian, mammal, bats, habitats), consultation and meetings with relevant bodies (*e.g.* NPWS), data-handling & analysis of field data, interpretation of data, identification of ecological issues and concerns, advise on ecological mitigation / constraint measures to input into project design, and reporting.

Knockacummer and Glentanemacelligot Wind Farms, May 2011-September 2013. Managed annual breeding season surveys for Hen Harrier at Knockacummer Wind Farm (2011–2013) and Glentanemacelligot Wind Farm, Co. Cork (2012–2013). Undertook Vantage Point avian surveys following standard Scottish Natural Heritage methodology, data-handling & analysis of field data, toolbox talks for construction staff, interpretation of data, desktop review, consultation with NPWS, and project reporting.

Post-construction Monitoring at Dromada Wind Farm, Co. Limerick, May 2011-September 2013
Acted as Project Ecologist at Dromada Wind Farm in post-construction breeding Hen Harrier surveys. Duties included vantage point field surveys from May–Aug 2011, and April–July 2012, data handling & data analysis, desktop review, consultation with NPWS, compilation of GIS figures of flight lines and nesting area for Hen Harrier, and project reporting.

Appropriate Assessment (AA)—Screening and NIS, 2008-Ongoing
Experienced in AA process since 2008 where I attained specialist training in reviewing AAs for the Environmental Protection Agency. Currently work on AAs for a range of projects, including desktop review, consultation with relevant bodies (e.g. NPWS), identification of ecological issues & concerns, advise on ecological mitigation to input into project design, and reporting in accordance with the guidelines (*e.g.* DoEHLG 2009, EU guidance documents 2000 & 2001).

Environmental Monitoring and Aquatic Surveys, Ireland: 2008-2011
Biological water quality monitoring, including desktop review, design and implementation of water sampling strategy, macro-invertebrate taxa identification, data-handling and analysis of field data in accordance with standard methods (eg. SSRS) and reporting. Monthly freshwater monitoring at Inniscarra reservoir for Dissolved Oxygen, turbidity, temp-depth profile analysis etc. Coastal habitat and faunal surveys on mudflats and sandflats, sampling invertebrates, and sediment analysis. Underwater video survey of habitats at marine outfalls.

[i] Sustainable Energy Authority of Ireland, Energy in Ireland Report 1990-2012, 2013

[ii] Directive 2009/28/EC of the European Parliament and of the Council OF 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF

[iii] Irish Wind Energy Association, June 2014

Appendix 3

EIA Screening Report




ENVIRONMENTAL BALANCE IN DESIGN AND CONSTRUCTION

EIA SCREENING REPORT

110kV GRID CONNECTION SUBSTATION AT BARNADIVANE, CO. CORK

SEPTEMBER 2014

FEHILY TIMONEY & COMPANY

EIA SCREENING REPORT

110kV GRID CONNECTION SUBSTATION AT BARNADIVANE, CO. CORK

User is Responsible for Checking the Revision Status of this Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
0	Draft Issue to Client	POB/MG	COD	COD	14.08.2014
1	Issue to Client	POB/MG	COD COD	COD COD.	05.09.2014

Client: Arran Windfarm Limited

Keywords: EIA, screening, significant effects, environment, substation, wind farm

Abstract: This document presents an assessment of whether a proposed 110kV grid connection substation at Barnadivane, Co. Cork would or would not be likely to have significant effects on the environment, as per Schedule 7 of the Planning and Development Regulations 2001 to 2013.

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1. INTRODUCTION

Fehily Timoney and Company (FTC) was commissioned by Arran Windfarm Limited to prepare an EIA Screening Report, to determine if a proposed 110kV grid connection substation at Barnadivane (Kneeves), near Coppeen, Co. Cork, would or would not be likely to have significant effects on the environment. Arran Windfarm Limited is a specific purpose vehicle (SPV) company set up to develop the substation at Barnadivane.

The proposed 110kV substation will replace a currently permitted substation that is not yet constructed. The development does not fall within the mandatory requirements for the production of an EIS.

This screening report has been prepared to assist the competent authority in its evaluation of whether the project would or would not be likely to have significant effects on the environment, with reference to its scale, nature, location and context, and accordingly whether or not EIA is required.

The purpose of this report is to identify the considerations that may influence the decision of the competent authority in respect of its statutory obligation to make a 'screening' decision as to whether or not an Environmental Impact Assessment (EIA) should be undertaken for the proposed substation.

1.1 Project Overview

The developer intends to seek permission for a new grid connection substation in the townland of Barnadivane (Kneeves), near Coppeen, Co. Cork. A site location map is presented in Figure 1.1. The current substation application will replace a currently permitted substation that is not yet constructed.

Permission currently exists for a 110kV substation and switch station as part of a 14 turbine wind farm on the site. The permitted development was granted by both the Planning Authority and An Bord Pleanála under planning reference numbers 05/5907 and PL 04.219620 respectively, an extension of duration also being granted by Cork County Council under 11/6605. The permitted development is discussed further in Section 1.4.

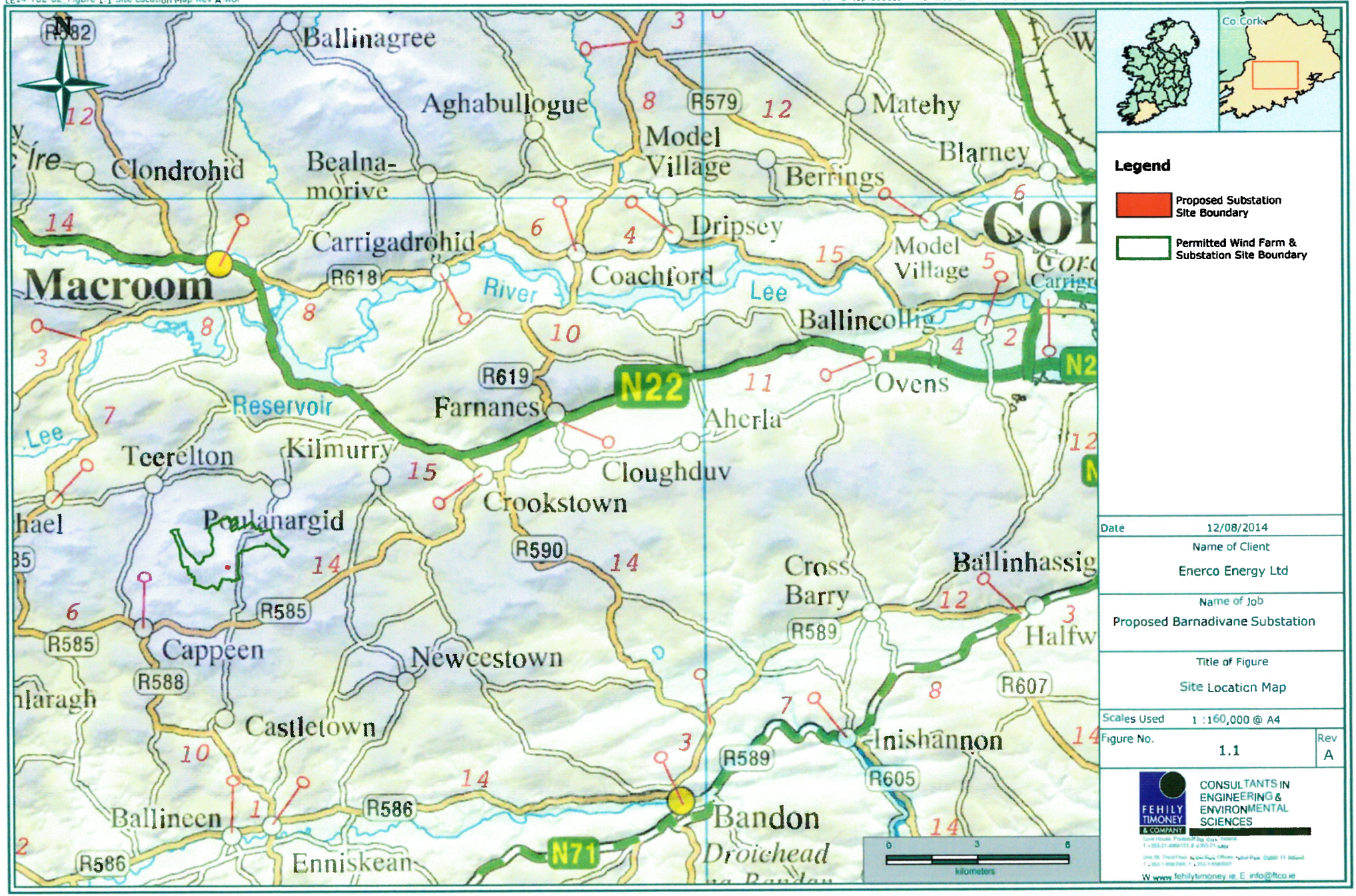
The permitted development has not yet commenced construction due to various reasons of a commercial, economic and technical nature that were outside the control of the Developer, including significant delays in securing a grid connection offer due to the grid connection moratorium as well as uncertainty regarding the REFIT tariff and Single Energy Market. For large electrical generators, the grid connection location, method and voltage is determined by Eirgrid and communicated by means of a grid connection offer. In 2010, Barna Wind Energy Ltd. secured a firm access agreement for connection to the transmission system within Gate 3 under Grid No. TG44. Barnadivane Wind Farm is scheduled for a connection national grid in 2015.

The original wind farm planning application included for a substation but, since receiving the original planning consent, new Eirgrid standards require 110kV substations to have available land to facilitate future expansion. Any wind farm electricity substation must meet the design, electrical and layout requirements of Eirgrid and/or ESB Networks, as the substation will form part of the national electricity grid and will be taken in charge by Eirgrid or ESB Networks. In this case, given the electrical rating of the substation at 110kV, the substation will be taken in charge by Eirgrid and, therefore, will have to meet current Eirgrid specifications and requirements. Eirgrid's current design standards for substations of this nature were issued in 2011 after the planning application was made. As a consequence, a new planning application is required for this substation.

The proposed substation layout now takes account of the Eirgrid requirements, but gives rise to a larger development footprint than that of the permitted substation. The permitted substation is constrained to the west by the existing 110kV overhead line and to the east by the local road. On that basis, a new site has been identified for the proposed substation within the study area of permitted wind farm that meets the necessary criteria such as, capacity for accommodating Eirgrid requirements, proximity to transmission system, good access and visual screening.

The proposed 110kV grid connection substation will have a defined planning boundary which will include a 110kV grid connection substation compound with associated control buildings and electrical equipment as well as ancillary infrastructure such as internal access roads, oil interceptor and security fencing. The proposed substation is discussed further in Section 1.5.

R:\Map Production\2014\LE14\702\02\Workspace\Substation Environmental Report
LE14-702-02_Figure 1.1 Site Location Map Rev A.wor



Legend

- Proposed Substation Site Boundary
- Permitted Wind Farm & Substation Site Boundary

Date	12/08/2014
Name of Client	Enerco Energy Ltd
Name of Job	Proposed Barnadivane Substation
Title of Figure	Site Location Map
Scales Used	1 :160,000 @ A4
Figure No.	1.1
Rev	A

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1.2 Relevant Planning History

The proposed substation is situated within the planning boundary of a permitted wind farm development which was granted by both the Planning Authority and An Bord Pleanála under planning reference numbers 05/5907 and PL 04.219620 respectively, with an extension of duration being subsequently granted by Cork County Council under 11/6605. The permitted application was accompanied by an Environmental Impact Statement and was subject to an Environmental Impact Assessment carried out by the Planning Authority and An Bord Pleanala.

The current proposed substation development is seeking to replace the permitted substation. This section sets out the relevant planning history for the site.

Planning Reference No: 03/2365

In May 2003, Barna Wind Energy Ltd. originally applied for planning permission for 26 wind turbines to Cork County Council. This layout was revised in August 2003 to one of 23 wind turbines. Planning Permission was granted by Cork County Council for 17 wind turbines. In March 2004, following third party and first party appeals, permission was refused by An Bord Pleanála (04.204928). The reason for refusal was primarily based on the adverse visual impact, the Bord considered the development excessively dominant and visually obtrusive in the landscape.

Planning Reference No: 05/5907

In August 2005, Barna Wind Energy Ltd. applied for planning permission for 18 wind turbines to Cork County Council (CCC). This layout was revised in June 2006 to one of 14 turbines, with a revised site boundary to exclude pockets of the site not being developed. In August 2006, planning permission was granted by Cork County Council for 12 wind turbines. In February 2007, following third party and first party appeals, permission was granted by An Bord Pleanála (ABP)(04.219620) for all 14 wind turbines. ABP was satisfied that the development, by virtue of its revised scale and turbine configuration, had addressed to a sufficient degree ABP's concern in relation to the previous wind farm proposal on this site.

Planning Reference No: 11/06605

In December 2011, Barna Wind Energy Ltd. applied to extend the duration of the appropriate period of Planning Permission 05/5907, under Section 42 of the 2000 Act, as amended. Cork County Council granted an extension for a period of 5 years due to considerations of a commercial, economic or technical nature beyond the control of the applicant.

1.3 Overview of the Permitted Development

An Environmental Impact Statement accompanied the planning application for the permitted development. For the purposes of that EIS, the study area covered approximately 355 ha within which the permitted development is located. The development footprint, comprising the area taken up by the turbines, transformers, hardstanding, site tracks, substation, switch station and wind monitoring mast occupies less than 2% of the study area.

The permitted development site is located in the townlands of Barnadivane (Kneeves), Knockboy, Garranereagh, Lackareagh and Reenacaheragh, near Terelton, Co. Cork. Within the study area elevation ranges from 170 m on the southern aspect to 270 m along the north eastern boundary. Access to the site is off the R585 at Moneynacroha Cross Roads approximately 3 km east of Coppeen. The nearest villages to the study area are Terelton, approximately 3.4 km to the north and Coppeen approximately 3.4 km to the south west. The town of Macroom lies approximately 9 km north of the study area boundary.

The study area consists mainly of pastureland. A number of streams rising in the south of the study area join the River Bride, which is a tributary of the River Lee. The Cummer River rises near the study area's northern boundary and also drains into the Lee.

The overall permitted development can be summarised as follows:

- **Turbines:** 14 no. wind turbines with a tip height of 105 m have been permitted. Each turbine consists of the following key components: a concrete foundation (or base), a tower, a nacelle and blades. Each turbine will have a transformer located adjacent to it or within the tower below the ground floor.
- **Turbine Hardstand Areas:** the permitted hardstanding area consists of an area approximately 40 m x 20 m beside each turbine, to accommodate a crane during the assembly of the turbine, and occasionally for maintenance.
- **Meteorological Masts** : the permitted mast will consist of a narrow lattice tower of approximately 70 m in height for gathering meteorological data.
- **Access Tracks:** the permitted tracks will be approximately 4.5 m wide along straight sections and wider at turns as per the layout on the planning drawings.
- **Drainage:** the permitted internal site drainage consists of open swales at the site track edge and 300 mm diameter pipe work at track crossings, with run-off from the site discharging to streams via sediment traps to the north and south of the site.
- **110kV Substation and Switching Station:** the permitted development consists of a substation and associated control house, switching station and associated control house, within a compound covering approximately 0.43 ha that includes masts, electrical equipment and security fencing all in accordance with ESB requirements at the time. A two-metre high security fence has been permitted surrounding the compound.
- **Underground Cables:** underground electrical and communication cables linking the turbines with the permitted onsite sub-station
- **All related site works and ancillary development**

The proposed substation which is the subject of this application is located centrally within the study area of the permitted development. Figure 1.2 illustrates the proposed substation location in the context of the permitted development.

1.4 Overview of the Proposed Development

The developer is seeking permission for a new 110kV grid connection substation that meets current Eirgrid standards, in place of the permitted 110kV substation and switch station.

The original wind farm planning application included for a substation but, since receiving the original planning consent, new Eirgrid standards require 110kV substations to have available land to facilitate future expansion. A planning application to increase the size of the permitted substation location was initially considered however the permitted site is situated between the local road and the existing 110kV overhead line which constrained the site. On that basis, it was decided to consider other sites within the wind farm EIA study boundary where the construction costs, environmental impact and planning risks might be reduced.

The proposed substation site is situated underneath the existing 110 kV Macroom to Dunmanway overhead line, within the EIA boundary for the permitted wind farm, approximately 500m southwest of the permitted substation location. The proposed site is situated within undulating improved grassland used for agricultural grazing on a south facing plateau. An existing local public road forms the northern boundary of the site and provides good accessibility. Proposed ground levels within the substation compound will be set approximately 8m below road level. Natural topography and mature tree screening to the north reduces the visual impact from the designated scenic route (S36), which is approximately 2km northwest of the proposed development.

Following review of a number of potential substation sites, the proposed site was considered the most suitable for the following reasons:

- takes advantage of natural topography and mature tree screening minimising visibility from the scenic route to the north
- underneath the existing ESB overhead line removing the need for additional 110 kV overhead lines while minimising the size of the substation
- located centrally within the permitted wind farm minimising the distance of the underground cable connection between the turbines and the substation
- not located close to dwellings, being over 250 metres from the nearest house (which is owned by a contributory land owner associated with Barnadivane Wind Farm)
- not located close to ecologically sensitive areas such as natura 2000 sites, rivers or woodland areas

The siting of the proposed substation away from sensitive environmental receptors such as residential areas, single dwellings, or environmentally vulnerable sites will result in little or no impact in terms of noise, pollution or any other potential nuisances.

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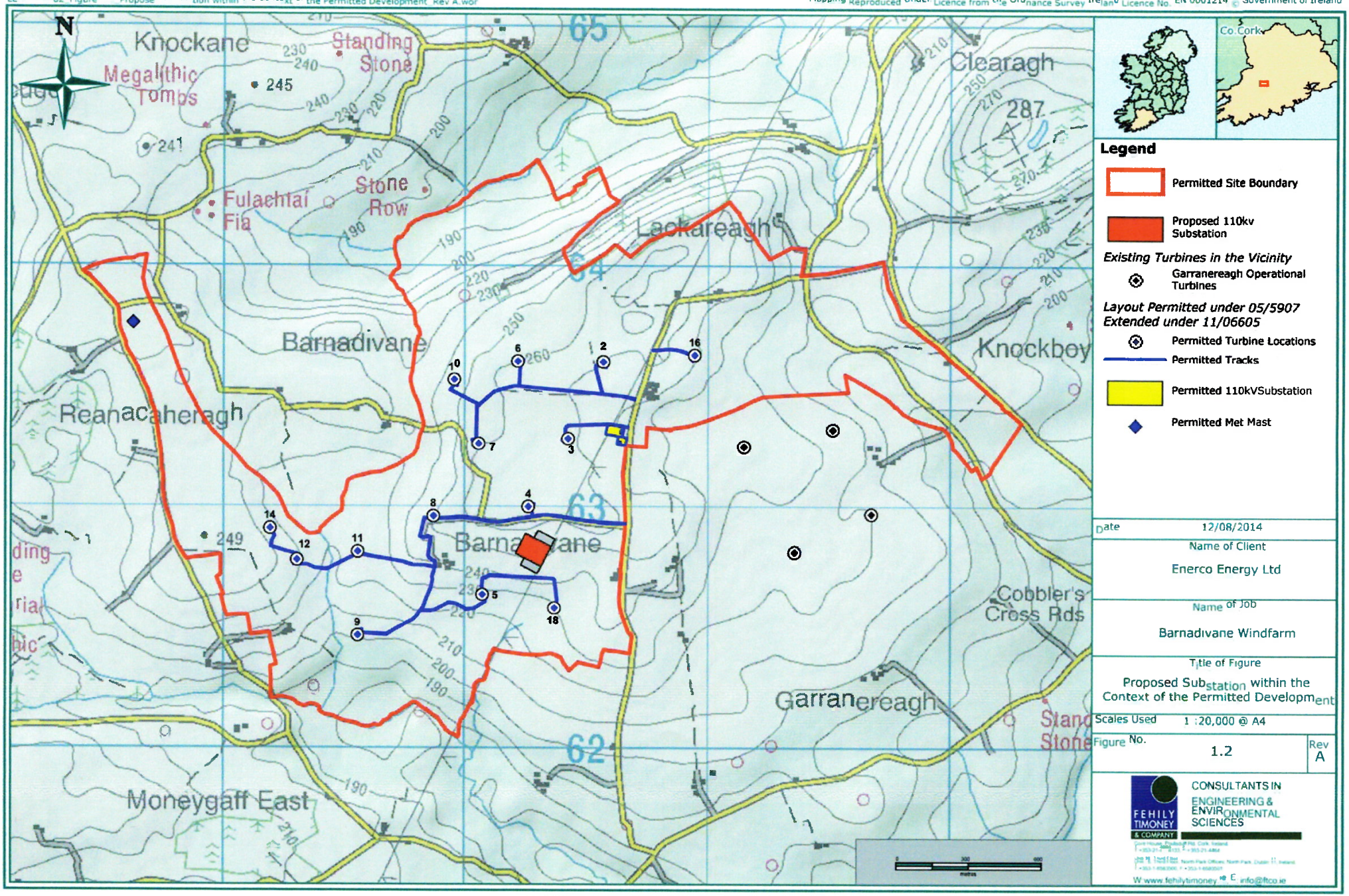
LE14-702-02_Figure 1.2_Proposed Substation within the Context of the Permitted Development_Rev A.wor



Legend

- Permitted Site Boundary
- Proposed 110kv Substation

Existing Turbines in the Vicinity

- Garranereagh Operational Turbines

Layout Permitted under 05/5907
Extended under 11/06605

- Permitted Turbine Locations
- Permitted Tracks
- Permitted 110kVSubstation
- Permitted Met Mast

Date	12/08/2014
Name of Client	Enerco Energy Ltd
Name of Job	Barnadivane Windfarm
Title of Figure	Proposed Substation within the Context of the Permitted Development
Scales Used	1 :20,000 @ A4
Figure No.	1.2
Rev	A

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1.5 Need for the Proposed Development

It is necessary to find a suitable location to connect the electricity to be generated from Barnadivane Wind Farm to the national grid. The original wind farm planning application included for a substation. However, the proposed new substation is necessitated in order to meet current Eirgrid standards in substation design and will replace the currently permitted substation that is not yet constructed.

The proposed substation will facilitate the connection of Barnadivane Wind Farm to the national grid, thereby facilitating Ireland in meeting its renewable energy targets. The proposed substation will facilitate the connection of renewable energy to the national grid which will help to achieve the national targets as set out below.

The need for the renewable energy generated at Barnadivane is driven by the following:

- urgent need for increased capacity to generate electricity
- national renewable energy targets
- increasing national energy security
- commitment to limit greenhouse gas emissions under the Kyoto protocol
- provision of energy price stability
- provision of cost-effective power production

Ireland is one of the most energy import-dependent countries in the European Union, importing 85% of its fuel in 2012[i]. This makes Ireland particularly vulnerable to future energy crises and fluctuations given its location on the periphery of Europe. The international fossil fuel market is growing increasingly expensive and is increasingly affected by international politics. Any steps to reduce dependence on imported fossil fuels will add to financial autonomy and stability in Ireland.

The burning of fossil fuels for energy creates greenhouse gases, which contributes significantly to climate change. These and other emissions also create acid rain and air pollution. Sources of renewable energy that are utilised locally with minimal impact on the environment are necessary to meet the challenges of the future.

The EU has adopted a Directive (2009/28/EC)[ii] on the Promotion of the Use of Energy from Renewable Sources in April 2009 which includes a common EU framework for the promotion of energy from renewable sources. The Directive sets a mandatory national target for the overall share of energy from renewable sources for each Member State. This package is designed to achieve the EU's overall 20:20:20 environmental target, which consists of a 20% reduction in greenhouse gases, a 20% share of renewable energy in the EU's total energy consumption and a 20% increase in energy efficiency by 2020. To ensure that the mandatory national targets are achieved, Member States must follow an indicative trajectory towards the achievement of their target.

Ireland's mandatory national target is to supply 16% of its overall energy needs from renewable sources by 2020. This target covers energy in the form of electricity, heat and transport fuels. For electricity alone, Ireland's national target is 40% by 2020. Government policies identify the development of renewable energy, including wind energy, as a primary strategy in implementing national energy policy.

Currently over 2,600MW of installed wind generating capacity is connected to the system on the island Ireland[iii]. It is estimated that approximately 4,000MW of wind generating capacity will be required to meet the 40% target.

1.6 Strategic Infrastructural Development

The Developer commenced pre-application consultations with An Bord Pleanála in April 2014, in order to seek a determination as to whether the substation project is adjudged to be 'strategic infrastructure' under the Act, as amended. A copy of this correspondence is included in Appendix 1.

Under Section 182(A) of the Planning and Development Act where an undertaker:

> "...*intends to carry out development comprising or for the purposes of electricity transmission the undertaker shall prepare, or cause to be prepared, an application for approval of development under section 182B and shall apply to the Board for such approval accordingly*".

Subsection 9 of 182A states that:

In this section 'transmission', in relation to electricity, shall be construed in accordance with section 2(1) of the Electricity Regulation Act 1999 but, for the purposes of this section, the foregoing expression, in relation to electricity, shall also be construed as meaning the transport of electricity by means of—

> *(a) a high voltage line where the voltage would be 110 kilovolts or more, or*
> *(b) an interconnector, whether ownership of the interconnector will be vested in the undertaker or not.*

In section 2(1) of the Electricity Regulation Act, 1999, "transmission" is defined in relation to electricity as meaning "*the transport of electricity by means of a transmission system, that is to say a system which consists, wholly or mainly, of high voltage lines and electric plant and which is used for conveying electricity from a generating station to a substation, from one generating station to another, from one substation to another or to or from any interconnector or to final customers but shall not include any such lines which the Board may, from time to time, with the approval of the Commission, specify as being part of the distribution system but shall include any interconnector owned by the Board.*"

Subsection 9 of 182A sets a threshold of 110 kV in order for a high voltage electricity transmission line to be considered strategic infrastructure. No threshold is set in respect of a substation, therefore it is reasonable to refer directly to Section 37A(2) of the Planning and Development (Strategic Infrastructure) Act, 2006. Section 37A(2) sets out the criteria that a proposed development must meet before it can be deemed a Strategic infrastructure Development:

> *(c) the development would be of strategic economic or social importance to the State or the region in which it would be situated,*
>
> *(b) the development would contribute substantially to the fulfilment of any of the objectives in the National Spatial Strategy or in any regional planning guidelines in force in respect of the area or areas in which it would be situated,*
>
> *(c) the development would have a significant effect on the area of more than one planning authority.*"

The legislation explicitly sets a threshold of 110 kV in order for a high voltage electricity transmission line to be considered strategic infrastructure. However, as included above, no specific threshold is set in respect of a substation.

Having regard to the nature and scale of the development, it is our opinion that the proposed development is not SID for the following reasons:

1. The permitted wind farm development at Barnadivane to be served by the proposed substation is not itself within the strategic infrastructure threshold s of more than 25 turbines or having a total output greater than 50 megawatts, as specified in the Seventh Schedule
2. The development will not make a significant contribution to the delivery of regional planning guidelines or the National Spatial Strategy
3. The development is entirely within the catchment of a single planning authority.

Environmental Impact Statement

Under section 182A(2) of the Act, an EIS is required to be prepared for development which belongs to a class of development identified as requiring assessment for the purposes of Section 176 of the Act. The relevant classes of development are set out in Schedule 5 of the *Planning and Development Regulations 2001 – 2013*.

The proposed 110kV substation development does not fall within the class of development in Schedule 5.

1.7 Appropriate Assessment Requirements

Appropriate Assessment is required under the EU Habitats Directive (92/43/EEC) – 'on the conservation of natural habitats and of wild fauna and flora'. It is an assessment of the potential impacts of a proposed plan or project, on its own or in combination with other plans or projects, on one or more Natura 2000 sites [Special Protection Areas (SPA) for birds, Special Areas of Conservation (SAC) for habitats and species].

Fehily Timoney and Company (FTC) was commissioned by Barna Wind Energy Ltd. to prepare an Appropriate Assessment (AA) Screening Report, for the proposed 110 kV substation at Barnadivane, near Coppeen, Co. Cork. The AA Screening Report indicates that based on the objective scientific evidence provided, significant effects can be excluded and as such a full Appropriate Assessment is not required in this instance.

The findings of this assessment will be taken into account by the relevant competent authority to inform its assessment of the proposed development. A copy of the screening report is included in Appendix 2.

1.8 EIA Requirements

The European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, requires member states to ensure that a competent authority carries out an assessment of the environmental impacts of certain types of project, as listed in the Directive, prior to development consent being given for the project.

The requirement for the Environmental Impact Assessment of various types of developments are transposed into Irish Legislation under the *Planning and Development Acts 2000 – 2014* and the *Planning and Development Regulations 2001 – 2013.* EIS is compulsory for projects falling within classes of development prescribed by article 93 of, and Schedule 5 to, the *Planning and Development Regulations 2001 – 2013*. When a development does not fall within a class or is below the thresholds (sub-threshold) of Schedule 5, an EIS is may still be required if the development is associated with *'significant effects on the environment'* (ref, Articles 103 the Planning and Development Regulations).

Screening is the first stage in the EIA process, whereby a decision is made on whether or not EIA is required. This Screening Assessment was undertaken with regard to the following legislation and guidance:

- *Planning and Development Acts 2001 - 2014*
- *Planning and Development Regulations 2001 - 2013*
- *Guidance on EIA, Screening, European Commission, 2001*
- *EIA, Guidance for Consent Authorities regarding Sub-threshold Development, DoEHLG, 2003*
- *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009.*

The proposed 110kV substation development does not fall within the mandatory requirements for the production of an EIS. Accordingly, EIA screening for the proposed 110kV substation must be undertaken by the competent authority. This report has been prepared to assist the relevant authority in their assessment of the development.

1.9 Report Structure

This report considers whether the project would or would not be likely to have significant effects on the environment, with reference to its scale, nature, location and context.

The following chapters of this report will be structured as follows:

- Chapter 2 - Existing Site Setting
- Chapter 3 – Proposed Development
- Chapter 4 – Planning and Policy Context
- Chapter 5 – Schedule 7 Criteria
- Chapter 6 – Checklist Criteria for Evaluating the Significance of Effects
- Chapter 7 – Conclusion

1.9.1 Chapter 2 - Existing Site Setting

This section provides a general overview of the receiving site and surrounding area in terms of landuse, topography, geology, landform, heritage etc.

1.9.2 Chapter 3 – Proposed Development

This section outlines in detail the main characteristics of the proposed substation in terms of the construction, operation and decommissioning stages of the project.

1.9.3 Chapter 4 – Planning and Policy Context

Prior to examining the characteristics of the proposed development, this section examines the proposed development in terms of its compliance with relevant plans and policies.

1.9.4 Chapter 5 – Schedule 7 Criteria

This section examines the individual criteria identified in Schedule 7 in terms of the characteristics of the proposed development.

1.9.5 Chapter 6 – Checklist Criteria for Evaluating the Significance of Effects

The Department of Environment, Heritage and Local Government published *'Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-threshold Development'* to assist the consenting authority in deciding if significant effects on the environment are likely to arise regarding developments below the mandatory EIA thresholds. Chapter 6 addresses each of the questions listed to assist the consenting authority in their assessment of this proposal.

1.9.6 Chapter 7 – Conclusion

Chapter 7 provides an overall summary of the screening assessment and concluding statements.

2. EXISTING SITE SETTING

The proposed substation is located in the townland of Barnadivane (Kneeves), approximately 3.4 km northeast of Coppeen and 10 km south of Macroom. The nearest village is Terelton, approximately 3.4 km to the north.

The substation is situated within the planning boundary of a currently permitted wind farm, granted by both the Planning Authority and An Bord Pleanála under planning reference numbers 05/5907 and PL 04.219620 respectively. An extension of duration was granted by Cork County Council under 11/6605. The proposed substation development covers an area of approximately 1.1 ha, within the overall study boundary of the permitted wind farm which covers an area of 355 ha.

There is a good network of local roads accessing the site. The nearest national route, the N22, is the main arterial route for traffic commuting between Cork and Killarney and is located approximately 5 km to the north at its closest. The nearest regional route, the R585 between Cork and Bantry, passes 1 km to the south of the site.

The proposed substation is located on a south-facing plateau within the Bride River valley approximately 500m south west of the permitted substation. The proposed substation site ranges in elevation from 250 m on the southern boundary to 260 m along the northern boundary. The land to the south slopes downwards towards the River Bride and low-lying rolling farmland. To the north, the land slopes to the River Lee, which lies at approximately 70 m OD. The land to the east of the study area drops to below 200 m OD, with hills separated by river valleys. To the west of the site there is a series of hills with peaks in the region of 220 m OD to 240 m OD. An aerial view encompassing the permitted and proposed sites is presented in Figure 2.1.

The proposed site is currently used for agricultural grazing. The field boundaries are defined both by the hedgerows and sod and stone banks. There are a number of occupied dwellings within 1km of the site, with the closest being over 250m from the proposed substation. Dwellings within 1km of the substation are presented in Figure 2.2. The site is privately owned by a contributory landowner associated with Barnadivane Wind Farm and is currently utilised for agriculture. There are no operating hospitals, schools, hotels or guesthouses within 1 km of the site. There are no recreational activities associated with this site. The nearest watercourse is a tributary of the River Bride over 500m west of the site.

The landform reflects the underlying geology of the region which is dominated by east-west anticlines and synclines. The anticlines form the hills with sandstone dominated bedrock and the synclines form the main river valleys (Lee, Bride and Bandon Rivers) which are underlain by limestone.

The proposed site does not lie within any Natura 2000 sites. There are three Natura 2000 sites (two cSACs[1] and one SPA) within a 10 km radius. The Gearagh cSAC (site code 000108) and the Gearagh SPA (004109) lie over 6.5 km to the north. The Bandon River cSAC (002171) lies over 9.5 km southwest of the proposed development site.

No recorded monuments occur within close proximity to the proposed sub-station site and only 2 monuments occur within 1km, the nearest being a ringfort situated over 770m from the proposed substation.

Existing land use in the area surrounding the site is predominately agricultural. There are a number of existing and permitted wind farm developments nearby. There is an existing wind farm, namely Garranereagh Wind Farm with 4 operational turbines adjacent to the site. The nearest turbine is approximately 1 km from the proposed substation. This development, along with any other planned or permitted wind farms in the vicinity, will be considered in the environmental assessment to evaluate any cumulative impacts that may arise.

[1] At present all SACs in Ireland are currently 'candidate' SACs, and referred to as cSACs. The relevant Statutory Instruments for the SACs in Ireland have not yet been put in place, though these sites must still be afforded protection in accordance with the EU Habitats Directive (92/43/EEC).

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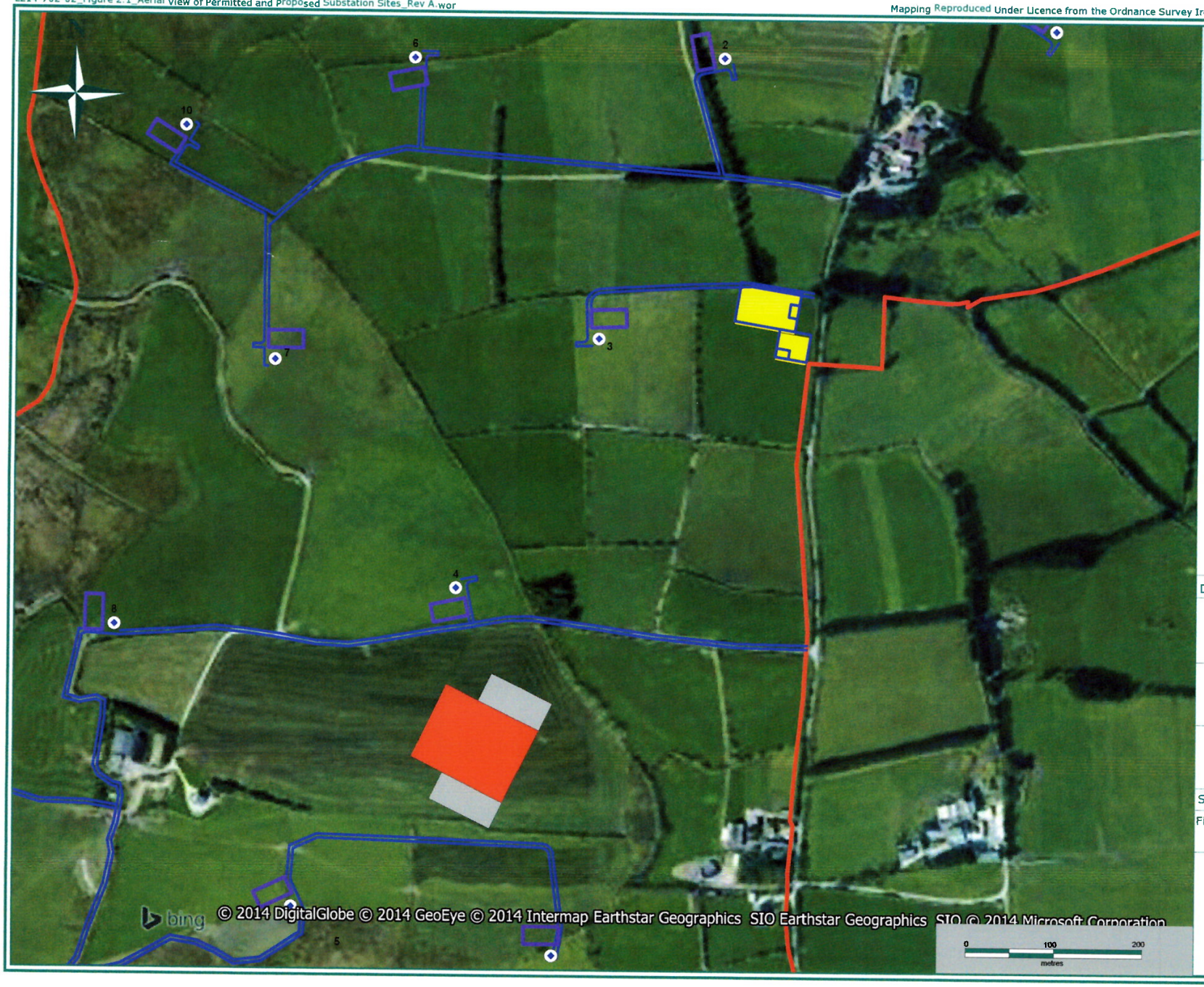
LE14-702-02_Figure 2.1_Aerial View of Permitted and proposed Substation Sites_Rev A.wor



Legend

- Permitted Site Boundary
- Proposed 110kv Substation

Existing Turbines in the Vicinity

- Garranereagh Operational Turbines

Layout Permitted under 05/5907 Extended under 11/06605

- Permitted Turbine Locations
- Permitted Tracks
- Permitted 110kVSubstation and Switch Station
- Permitted Hardstand Areas

Date	12/08/2014
Name of Client	Enerco Energy Ltd
Name of Job	Barnadivane Windfarm
Title of Figure	Aerial View of Permitted and Proposed Substation Sites
Scales Used	1 : 6,000 @ A4
Figure No.	2.1
Rev	A

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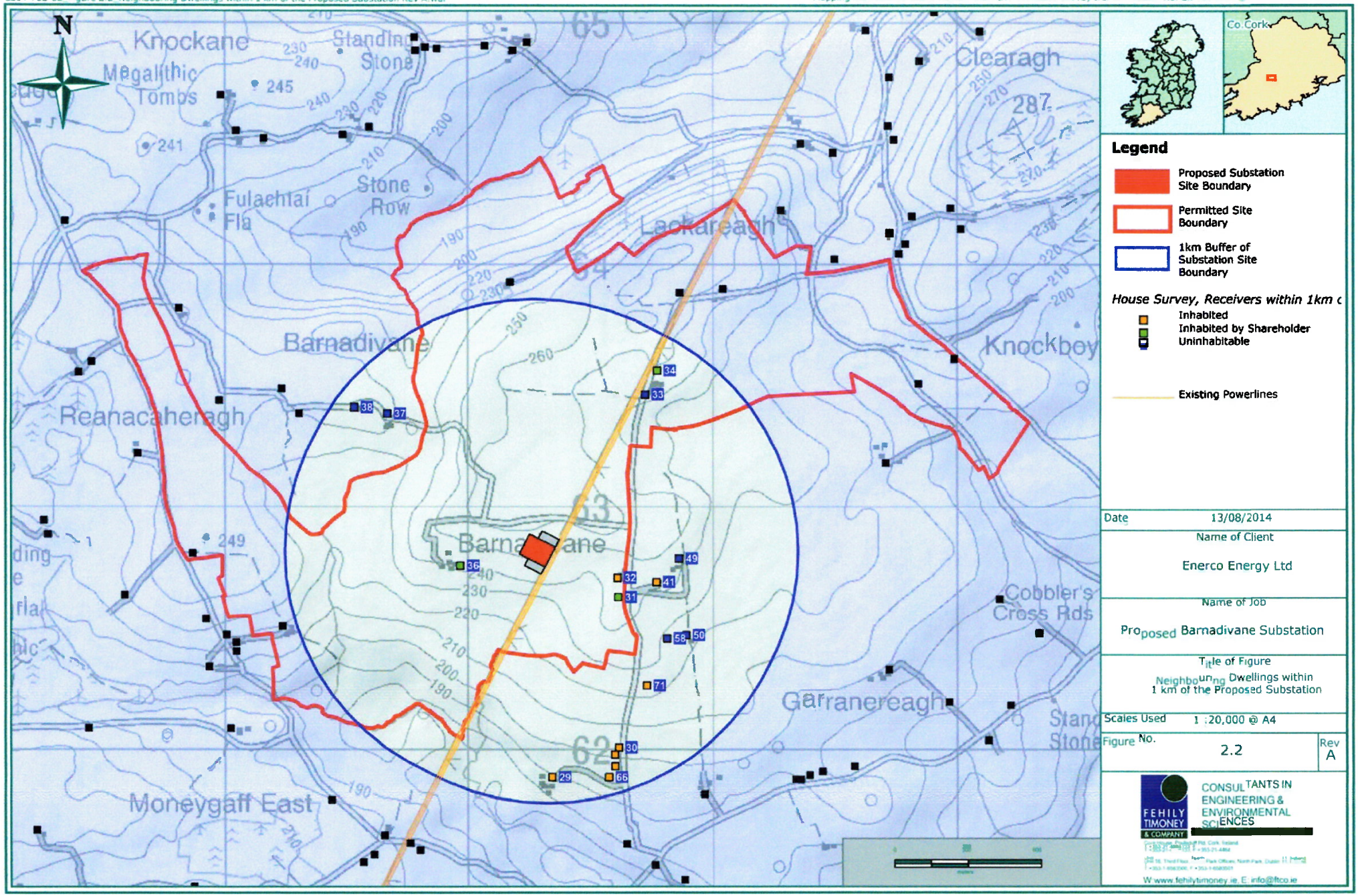
R:\Map Production\2014\LE14\702\02\Workspace\Substation Environmental Report
LE14-702-02 Figure 2.2 Neighbouring Dwellings within 1 km of the Proposed Substation Rev A.wor



3. PROPOSED DEVELOPMENT

The 110 kV substation compound will cover an area of approximately 90 m x 117 m on plan including a security fence. There will be three single storey control buildings on the site. The control buildings will be of standard masonry construction, rendered externally with a pitched roof. Finishes will be in keeping with the surrounding buildings. The maximum floor area of each building will be 185m^2 and the maximum height of the buildings will be approximately 6.2 m above finished ground level. The substation compound will be connected to the public road via a short access track approximately 200m long. An image of a typical 110kV substation layout is shown in Figure 3.1.

The compound will contain assorted electrical equipment including transformers, switch gear including circuit breakers, metering transformers, busbars, post insulators, lightning protection masts, line gantries, etc., all in accordance with Eirgrid requirements.

Two steel lattice mast structures will be located approximately 10 m from the edge of the 110 kV compound and directly underneath the line of the existing 110 kV overhead line. They will have a maximum height of approximately 18 m.

Although not permanently staffed, maintenance personnel will visit the substation on average three to four times a week. Any general office waste will be regularly disposed of to a licensed facility.

The substation compound will be bounded by a 2.4 m high steel palisade fence painted green.

Construction Phase

The land area requirement for the proposed development is approximately 1.1 ha. The construction of the substation will be carefully managed. All earthworks required on site will be carried out by an experienced contractor in accordance with current best practice.

During the construction phase it will be necessary to provide temporary facilities for the workers. Such facilities will include:

- site office and canteen
- site compound
- toilet facilities
- bottled water for potable supply
- a water tanker to provide water for other purposes such as dust suppression
- diesel generator
- contractor lock-up facility
- employee parking.

Construction material for the fill and hardstanding areas at the substation and for the access track to the substation will be reclaimed site won fill or sourced locally. It is likely that the total stone fill requirement will be in the order of 4,000 m^3, it is estimated that 50% will be site won with 50% being imported from local quarries.

Other building materials required include the following:

- blocks, sand and cement, roofing material, etc., for the control house
- electrical equipment
- 2.4 m high security fencing (around the 110 kV substation compound).

Construction materials will be brought on-site as required. A temporary site compound will be provided during the construction phase to store construction materials. Typical plant associated with the construction phase would include track excavator, tractor, roller, paver, water bowsers etc.

Figure 3-1: Representative 110kV Substation

Photograph taken at Mount Lucas Wind Farm, courtesy of Bord Na Mona

Operational Phase

Most operation and monitoring activities will be carried out remotely with the aid of computers connected via a telephone broadband link. However, some visits (an average of three to four per week) will be necessary to carry out routine inspection and preventative maintenance.

The following sections of this report assess the proposed development against the Schedule 7 criteria identified previously.

4. PLANNING POLICY CONTEXT

4.1.1 Introduction

Prior to examining the characteristics of the proposed development, this section examines the proposed development in terms of its compliance with relevant plans and policies.

4.1.2 Regional Planning Guidelines for the South West Region 2010 - 2022

The Regional Planning Guidelines for the South West Region were first adopted in 2004. It is acknowledged in the guidelines that *"The south west has considerable potential for the generation of electricity from sustainable renewable resources such as wind and wave."* The objectives (RTS-09) for the South West Region relating to Energy and Renewable Energy are described below:

- *It is an objective to facilitate the sustainable development of additional electricity generation capacity throughout the region and to support the sustainable expansion of the network.* ***National grid expansion is important in terms of ensuring adequacy of regional connectivity as well as facilitating the development and connectivity of sustainable renewable energy resources.***
- *It is an objective to ensure that future strategies and plans for the promotion of renewable energy development and associated infrastructure development in the Region will promote the development of renewable energy resources in a sustainable manner. In particular, development of wind farms shall be subject to:*
    - *the Wind Energy Planning Guidelines*
    - *consistency with proper planning and sustainable development*
    - *criteria such as design and landscape planning, natural heritage, environmental and amenity considerations,*
- *It is an objective of the guidelines to promote the sustainable provision of renewable energy from tidal, wave and pumped storage developments together with bioenergy resources, as critical elements of the long-term secure energy supply throughout the region.*

4.1.3 Cork County Development Plan 2009 - 2015

The planning objectives for County Cork are set out in the Cork County Development Plan 2009-2015. The objectives of the Authority on renewable energy development are contained in Chapter 6 of the Plan. Those policies which are considered the most relevant are summarised in Table 4.1.

Table 4.1: Extracts from the Cork County Development Plan 2009

Policy	Description
Objective INF 7-3 *Renewable Energy Production*	It is an objective generally to encourage the production of energy from renewable sources, including in particular that from biomass, waste material, solar, wave, micro hydro power and wind energy, subject to normal proper planning considerations, including in particular the impact on areas of environmental or landscape sensitivity.
Objective INF 7-4 *Wind Energy Projects*	(a) It is an objective to encourage prospective wind energy businesses and industries. In assessing potentially suitable locations for projects, potential wind farm developers should focus on the strategic search areas identified in the Plan and generally avoid wind energy projects in the strategically unsuitable areas identified in this Plan. (b) It is an objective to support existing and established businesses and industries who wish to use wind energy to serve their own needs subject to proper planning and sustainable development.

Policy	Description
	(c) It is an objective in the strategic search areas (and in those areas that are identified as neither strategic search areas nor strategically unsuitable areas), to consider new, or the expansion of existing, wind energy projects on their merits having regard to normal planning criteria including, in particular, the following: • The sensitivity of the landscape and of adjoining landscapes to wind energy projects; • The scale, size and layout of the project, any cumulative effects due to other projects, and the degree to which impacts are highly visible over vast areas; • The visual impact of the project on protected views and prospects, and designated scenic landscapes as well as local visual impacts; • The impact of the project on nature conservation, archaeology and historic structures; • Local environmental impacts including noise and shadow flicker; • The visual and environmental impacts of associated development such as access roads, plant, grid connections etc. • The proximity and sensitivity of a recognised settlement, • The impact of the project on archaeology and historic structures, • The impact of nature conservation, in particular avoiding designated and proposed European sites. (d) Similar criteria would be taken into account in the strategically unsuitable areas except that suitable projects will generally be on a smaller scale and on very special, carefully chosen sites.

The Council has prepared a renewable energy strategy for the County in Section 6.7.12 of the County Development Plan 2009-2015. The Council's Wind Energy Strategy identifies two classifications for wind farm development:

- *"**STRATEGIC SEARCH AREAS**: Areas which have both relatively high wind speeds and relatively low landscape sensitivity to wind projects. These could be considered to be strategic 'search areas' for wind farm development. Prospective developers would be encouraged generally to focus on these areas when searching for potentially suitable sites in County Cork. While not all locations within these areas would be suitable for wind projects..., they do give a strategic representation of generally preferred areas.*

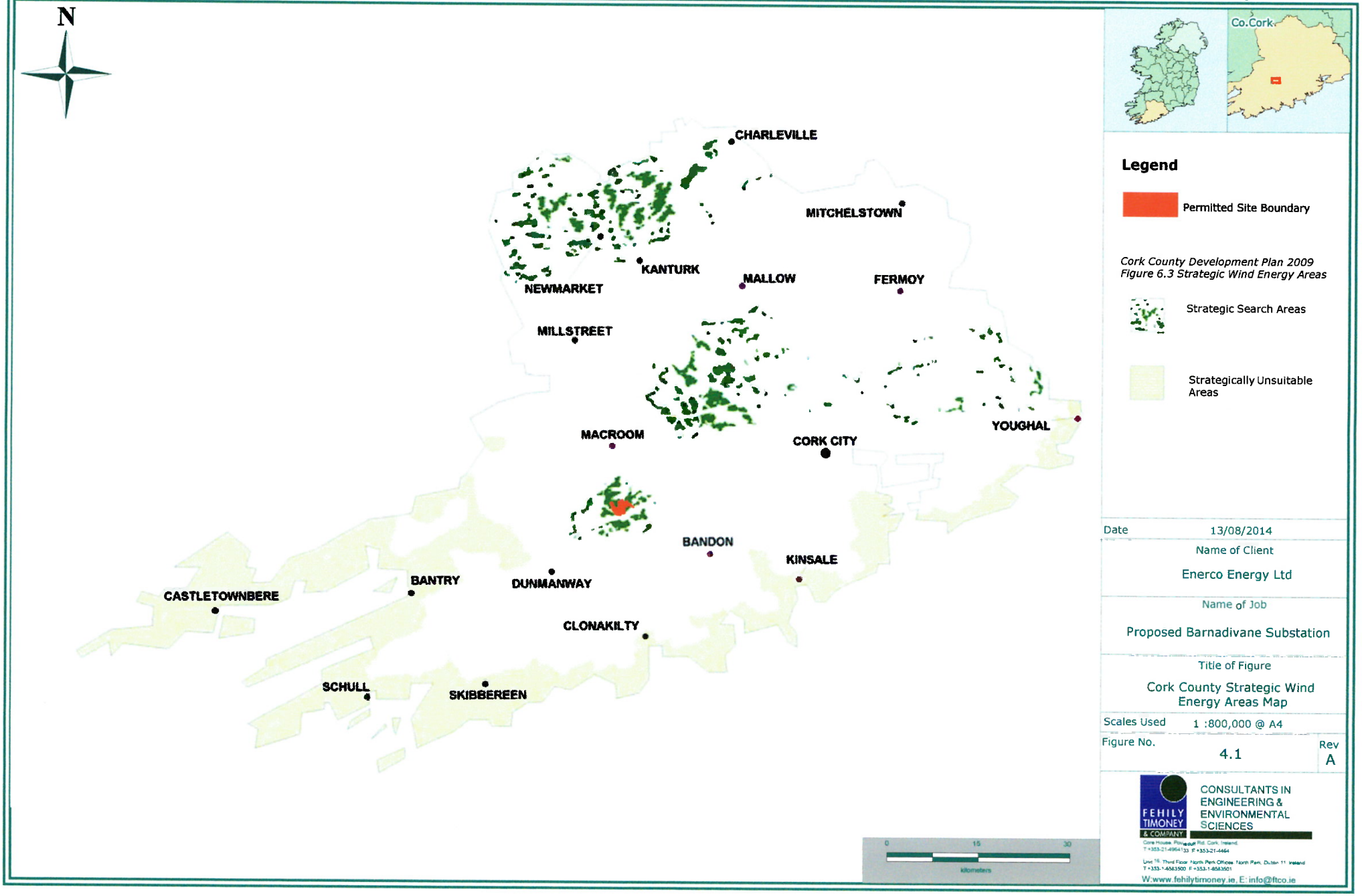
- ***STRATEGICALLY UNSUITABLE AREAS**: Areas which, because of high landscape sensitivity, are considered generally to be unsuitable for wind energy projects. While there may be a small number of locations within these areas with limited potential for small-scale wind projects, their contribution to any significant reduction in greenhouse gas emissions would be negligible. Except on a small scale and at particularly suitable locations, wind projects would normally be discouraged in these areas."*

The proposed site is located in a 'strategic search area' on Figure 6.3 of the County Development Plan as indicated on Figure 4.1. The proposed substation development is ideally located within the footprint of a permitted wind farm and in close proximity to an existing 110kV overhead transmission line which allows the energy generated at the wind farm to connect directly to the national grid, avoiding the need for additional overhead cables and minimising electrical losses.

4.1.4 Cumulative impact of proposed development on CDP

We are not aware of strategic areas in the vicinity of the development that would be prevented from being developed as a result of this proposed substation.

R:\Map Production\2014\LE14\702\02\Workspace
\LE13-702-02_Figure 4.1_Cork County Strategic Wind Energy Areas Map_Rev A.wor



Legend

Permitted Site Boundary

Cork County Development Plan 2009
Figure 6.3 Strategic Wind Energy Areas

Strategic Search Areas

Strategically Unsuitable Areas

Date	13/08/2014
Name of Client	Enerco Energy Ltd
Name of Job	Proposed Barnadivane Substation
Title of Figure	Cork County Strategic Wind Energy Areas Map
Scales Used	1 :800,000 @ A4
Figure No.	4.1
Rev	A

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4.1.5 Overall Compliance with Relevant Plans and Policies

It is considered that the proposed development is in keeping with relevant plans and policies for the region in terms of strategic search areas, the provisions of renewable energy infrastructure and contribution to renewable energy targets.

By virtue of the existing permission, the principle of this type of development has already been established in the vicinity. The substation is required to facilitate the connection of electrical energy generated at Barnadivane Wind Farm to the national grid.

5. SCHEDULE 7 CRITERIA

The following criteria are laid down in Schedule 7 of the Planning and Development Regulations 2001 – 2013 for the purposes of assessing if a proposed development would or would not be likely to have significant effects on the environment:

1. *Characteristics of proposed development*

   The characteristics of proposed development, in particular:

   - *the size of the proposed development*
   - *the cumulation with other proposed development*
   - *the nature of any associated demolition works*
   - *the use of natural resources*
   - *the production of waste*
   - *pollution and nuisances*
   - *the risk of accident, having regard to substances or technologies used.*

2. *Location of proposed development*

   The environmental sensitivity of geographical areas likely to be affected by proposed development, having regard in particular to:

   - *The existing land use*
   - *The relative abundance, quality and regenerative capacity of natural resources in the area*
   - *The adsorption capacity of the natural environment, paying particular attention to the following areas:*
     - *wetlands*
     - *coastal zones*
     - *mountain and forest areas*
     - *nature reserves and parks*
     - *areas classified or protected under legislation, including special protection areas designated pursuant to Directive 79/409/EEC and 92/43/EEC*
     - *areas in which the environmental quality standards laid down in legislation of the EU have already been exceeded*
     - *densely populated areas*
     - *landscape of historical, cultural or archaeological significance*

3. *Characteristics of potential impacts*

   The potential significant effects of proposed development in relation to criteria set out under paragraphs 1 & 2 above and having regards in particular to:

   - *the extent of the impact (geographical area and size of the affected population)*
   - *the transfrontier nature of the impact*
   - *the magnitude and complexity of the impact*
   - *the probability of the impact*
   - *the duration, frequency and reversibility of the impact*

5.1 Characteristics of the proposed development

This section examines the individual criteria identified in Schedule 7 in terms of the characteristics of the proposed development. As previously identified, Schedule 7 of the Planning and Development Regulations 2001 – 2013 requires the assessment of:

The characteristics of proposed development, in particular:

- *the size of the proposed development*
- *the cumulation with other proposed development*
- *the nature of any associated demolition works*
- *the use of natural resources*
- *the production of waste*
- *pollution and nuisances*
- *the risk of accident, having regard to substances or technologies used.*

5.1.1 The Size of the Proposed Development

The 110 kV substation compound will cover an area of approximately 90 m x 117 m on plan including a security fence. The overall development including roads and hardstanding areas will cover approximately 1.1 ha, within the overall study boundary of the permitted wind farm which covers an area of 355 ha. The proposed substation will replace a permitted substation and switch station on a 32 m by 35.5 m compound and 70 m by 45 m compound respectively. The proposed substation site is within private lands in the ownership of a contributory landowner associated with Barnadivane Wind Farm.

5.1.2 The Cumulation with Other Proposed Development

The proposed substation is required to facilitate the connection of energy generated at Barnadivane Wind Farm to the National Grid. The proposed substation location is approximately 500m southwest of the permitted substation, within the planning boundary of the permitted wind farm which was subject to an EIA by both Cork County Council and An Bord Pleanála.

There are a number of existing and permitted wind farm developments nearby. There is an existing neighbouring wind farm with 4 operational turbines and a substation, namely Garranereagh Wind Farm. The nearest turbine is approximately 1km from the proposed substation. This development, along with any other planned or permitted wind farms in the vicinity, has been considered in the environmental assessment for the relevant wind farms.

The proposed substation is in place of a permitted substation. Notwithstanding the larger footprint, the cumulative effects of the development are not considered to be a significant issue.

5.1.3 The Nature of Any Associated Demolition Works

There are no demolition works associated with the proposed substation development.

5.1.4 The Use of Natural Resources

The use of natural resources in relation to the proposed development is not considered to be a significant issue. The development is required to facilitate the connection of renewable energy to the national grid. In addition, the production of energy from a renewable source offsets the production of energy from fossil fuels.

In terms of use of natural resources at the proposed development, resources such as granular construction materials, cementitious materials, water etc. will all be used during the construction phase. Granular construction material will be sourced locally. During operations, fuel oil will be used in the facility vehicles and other oils and similar consumables will be used as part of operations.

5.1.5 The Production of Waste

Construction Waste

The wastes/spoils likely to be generated during the construction phase will include the following:

- Excavated material arising from the cut for the foundations. This will be used on site for the new site tracks, the hardstanding areas and embankments where possible.
- Cut-offs from construction material. This will be taken off site for re-use (where appropriate), recycled (in the case of metal cut-offs), or taken to a licensed landfill facility.
- Domestic type waste generated by contractors. This material will be collected on site, stored in an enclosed skip and disposed of at a licensed landfill facility.

All wastes will be collected at the end of the construction phase, taken off site, and reused, recycled and disposed of according to industry best practices at an authorised facility.

Operation/Maintenance Waste

All waste arising as a result of servicing and maintenance (e.g. lubricating oils, cooling oils, packaging from spare parts or equipment, unused paint, etc.) will be removed from the site and reused, recycled or disposed of in accordance with best practice in an authorised facility. The production of waste in relation to the proposed development will be managed in accordance with best practice and is not considered to be a significant issue.

5.1.6 Pollution and Nuisances

The proposed substation location has been selected on the basis that it is away from sensitive environmental receptors such as residential areas, single dwellings, or environmentally vulnerable sites and no significant environmental impacts are anticipated once the substation is operational.

As with any development of this nature, the following environmental impacts have the potential to be realised during construction:

- Noise generation
- Impact on surface water
- Impact on groundwater
- Impact on air quality
- Traffic congestion

Noise Generation

During the construction phase, noise generation potential is likely but expected to be intermittent and short term. A construction phase environmental management plan (CEMP) will be put in place for the construction period which will specify noise emission limits during construction.

During the operational phase of the development, potential for noise generation is not considered significant.

Impact on Surface Water

The site is situated within the catchment of the River Bride. There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed to soakaways or as overland flows via vegetation filters at a significant distance from the nearest natural watercourses. The River Bride rises at an elevation of 220 m OD between Moneygaff East and Barnadivane (Kneeves) over 1.5km to the southwest of the site.

The proposed development location is not within an area of 'benefitting lands' or 'drainage districts' and there are no reported incidents of flooding in the vicinity of the proposed development, as per national flood hazard mapping (www.floodmaps.ie).

As a result of the significant separation distance and construction best practice measures to be applied to the proposed development, the substation is expected to have a negligible impact on the receiving environment in terms of surface water.

Impact on Groundwater

The groundwater section of the GSI website classifies the bedrock underlying the site as a 'Locally Important Aquifer (Ll)', with bedrock which is 'moderately productive only in localised zones'.

As a result of the construction best practice measures to be applied to the proposed development, the substation is expected to have a negligible impact on the receiving environment in terms of ground water.

Impacts on Air Quality

Construction phase air quality impacts will be in relation to potential dust generation. As a result of the construction best practice measures to be applied to the proposed development, the substation is expected to have a negligible impact on the receiving environment in terms of air quality.

Traffic Congestion

The site is accessed via a local road running east west serving a number of one off dwellings and farms between Barnadivane and Terelton.

Traffic associated with the grid connection will include deliveries of a limited quantity of imported material, construction materials and electrical infrastructure for the proposed substation and workers entering and leaving the site. Most of the deliveries will be spread over the duration of the construction works. Nearly all loads will be normal truck deliveries with the exception of the transformer which will be a heavy load of approximately 96 tons with dimensions 7 m by 5 m by 5.5 m in height. The transportation vehicle for the transformer will have sufficient axles such that the load per axle does not exceed the normal limits.

Due to the relatively low volume of heavy loads anticipated for the construction of the substation, the impact of construction traffic on the condition of the local roads is considered to be slight.

The construction duration for the proposed substation is not expected to exceed 12 months, however the majority of the construction traffic will be concentrated over a shorter period of time.

Operational traffic will be very low and potential impacts will be insignificant.

Consideration of Cumulative Potential Pollution and Nuisance Parameters

The existing permission on the site permitted the construction of a substation and wind farm concurrently and this impact has been already assessed in the EIS for the permitted development. Notwithstanding the slightly larger footprint, if the proposed substation development is constructed in parallel with Barnadivane Wind Farm the potential for cumulative traffic impacts and nuisance is considered slight. In addition, a construction phase environmental management plan (CEMP) and traffic management plan (TMP) will be put in place for the construction period which will monitor and control these impacts during construction.

5.1.7 The Risk of Accident, having regard to Substances or Technologies Used

The risk of accident associated with technologies and substances used is considered low, as evidenced by the safe construction and operations of many such substations across the county by EirGrid, ESB and their contractors.

5.1.8 Consideration of the Characteristics of the Proposed Development

In terms of the characteristics of the proposed development, it is considered that:

- The proposed development is in compliance with relevant plans and policies
- There will be no significant demolition works associated with the proposed development

- Usage of natural resources will be limited to those used during construction and as consumable materials during operations.
- The siting of the proposed substation away from sensitive environmental receptors such as residential areas, single dwellings, or environmentally vulnerable sites will result in little or no impacts in terms of noise, pollution or any other potential nuisances.

5.2 Location of the proposed development

This section examines the individual criteria identified in Schedule 7 in terms of the location of proposed development of the proposed development. As previously identified, Schedule 7, identifies that regard must be given to:

The environmental sensitivity of geographical areas likely to be affected by proposed development, having regard in particular to:

- *The existing land use*
- *The relative abundance, quality and regenerative capacity of natural resources in the area*
- *The adsorption capacity of the natural environment, paying particular attention to the following areas:*
    - *wetlands*
    - *coastal zones*
    - *mountain and forest areas*
    - *nature reserves and parks*
    - *areas classified or protected under legislation, including special protection areas designated pursuant to Directive 79/409/EEC and 92/43/EEC i.e. the Habitats Directive*
    - *areas in which the environmental quality standards laid down in legislation of the EU have already been exceeded*
    - *densely populated areas*
    - *landscape of historical, cultural or archaeological significance*

5.2.1 Existing Land Use

The site primarily consists of improved agricultural grassland, which is cattle or sheep grazed. Hedgerows and earth banks bound the site. Vehicular access to the proposed site is via a local road serving a number of houses and farms.

The proposed substation location is approximately 500m southwest of the permitted substation, within the planning boundary of the permitted wind farm which was subject to an EIA by both Cork County Council and An Bord Pleanála. Accordingly, this area is deemed suitable for a development of this nature.

The proposed substation location is within a strategic search area for a wind farm, strategic search areas have been identified by Cork County Council as the most suitable areas for wind farm development in the county, including associated infrastructure.

5.2.2 Relative Abundance, Quality and Regenerative Capacity of Natural Resources in the Area

It is not considered that the proposed development will impact on the abundance, quality and regenerative capacity of natural resources of the area. It is not proposed to abstract ground or surface waters for the development, nor is the mining of minerals proposed.

The only natural resources considered relevant to the proposed development are minerals that will be used during construction which will be sourced from local suppliers. Quantities will not be significant and will not impact on the abundance of such materials in the locality.

5.2.3 Adsorption Capacity of the Natural Environment

The adsorption capacity of the natural environment is considered to be a measure of the ability of the proposed development to 'fit in' with the locality.

In visual terms this proposal consists of two steel lattice structures, approximately 18m high, that lie outside the substation compound but within the site boundary and connect the existing 110kV electricity line into the sub-station. The lines will connect to a gantry with a height of approximately 10 m. At ground level the substation plant consists of a series of transformers, circuit breakers and post insulators which are all vertical structures between approximately 5 m and 10 m in height. Lightning masts of approximately 15 m height are also located within the compound. Also contained within the substation compound are three single storey control buildings and associated car parking areas. The substation site is approximately 90 m x 117 m in area and will be surrounded by a 2.4 m high security fence.

The proposed substation site is within a landscape type defined as *Fissured Fertile Middle Ground* in the County Development Plan known as Type 10(a) as shown in Map 14 of the Landscape maps in Volume 3 of the Cork County Development Plan 2009 - 2015.

The draft landscape strategy for County Cork classifies the landscape value of each landscape type within the county from very low to very high. The landscape value of each area was derived from an assessment of the natural, scenic and cultural value as determined within that area. Generally, Landscape value represents aesthetic, ecological, historical, socio-cultural, religious and other characteristics of the LCA. Landscape Character Sensitivity identifies the landscapes ability to accommodate change without adverse impact on its character.

The draft strategy states that landscape Type 10(a) – Fissured Fertile Middle Ground has a landscape value of **"low",** a landscape sensitivity of **"low"** and a landscape importance of **"local"**. The nearest designated scenic route is located on a third class road near the village of Terelton approximately 2km northwest of the proposed substation.

As a general comment, it is considered that the locality for the proposed development has the ability to absorb the proposed development on the following basis:

- The draft strategy defines low value landscapes as *"monotonous landscapes without particular scenic quality, local level of natural or cultural heritage"* and low sensitivity landscapes as *"robust landscapes, which are tolerant to change, and which have the ability to accommodate development pressure".*
- The proposed substation location is approximately 500m southwest of the permitted substation, within the planning boundary of the permitted wind farm which was subject to an EIA by both Cork County Council and An Bord Pleanála. Accordingly, this area is deemed suitable for a development of this nature.
- Proposed location within a strategic search area for a wind farm, strategic search areas have been identified by Cork County Council as the most suitable areas for wind farm development in the county, including associated infrastructure.
- Proposed location is further from the scenic route than the permitted substation location, and the natural topography and mature tree screening to the north will offer natural screening from the scenic route.
- An existing 110kV overhead electricity line supported on double timber poles traversing the site creates a thematic association with the proposed substation development in terms of technological image.

As per the requirements of Schedule 7, the following table explores the individual area to be assessed in more detail.

Table 5-1: Individual Criteria Examined

Area	Description	Potential Impact
Wetlands	The Gearagh SPA (004109) is located approximately 6km to the north of the proposed development. This site is identified as a SPA (Special Protection Area). The site synopsis indicates that principal habitat is now a shallow lake which is fringed by wet woodland, scrub and grassland that is prone to flooding.	It is not considered that the proposed development will impact on this site. There will be no direct emissions, or disposal of material into any Natura 2000 site as a result of the proposed development. Taking into consideration the fact that the development works are not hydrologically linked to the SPA, there will be any adverse impacts on these wetlands.
Coastal Zones	The proposed development is located over 30 km from a coastal area.	At this distance, it is not considered that the proposed development has any potential to impact on coastal zones
Mountains and Forest area	The nearest mountain ranges are the Boggeragh/Mushera Mountains to the north and the Shehy Mountain Range located approximately 25 km west of the proposed development location.	It is not considered that the proposed development will impact on these areas, given the distance.
Areas classified under Habitats Directive	The proposed wind farm site does not lie within any Natura 2000 sites. There are three Natura 2000 sites (two cSACs[2] and one SPA) within a 10 km radius. The Gearagh cSAC (site code 000108) lies over 6.5 km north of the proposed development site, and the Gearagh SPA (004109) lies over 6km to the north. The Bandon River cSAC (002171) lies over 9.5 km southwest of the proposed development site. The Mullaghanish to Musheramore Mountains SPA (004162) lies over 13 km north of the proposed development site.	The potential for 'significant effects' on these sites will be determined through the Appropriate Assessment process. Refer to Appendix A for a copy of the screening assessment that concludes significant effects are not likely.

[2] At present all SACs in Ireland are currently 'candidate' SACs, and referred to as cSACs. The relevant Statutory Instruments for the SACs in Ireland have not yet been put in place, though these sites must still be afforded protection in accordance with the EU Habitats Directive (92/43/EEC).

Area	Description	Potential Impact
Areas in which environmental quality standards have been exceeded	It is considered that this refers to exceedances in the locality of relevant parameters in relation to, *inter alia,* surface and groundwater, noise and air quality.	Many similar developments are operating throughout the country without exceeding environmental quality standards. All works will be carried out in accordance with relevant best practice. It is considered unlikely that environmental quality standards could be exceeded.
Densely populated areas	The closest settlements are Terelton, (approx. 3.4km to the north west) and Coppeen (approx. 3.4km to Southwest) of the site.	It is considered that the potential to impact on these settlements can be considered minimal, given the distance.
Landscape of historical, cultural or archaeological significance	No recorded monuments occur within close proximity to the proposed sub-station site and only 2 monuments (ringforts) occur within 1km (the nearest being 771m and 845m). No direct or indirect impacts are likely as a result of the proposed development.	With no further development proposed beyond the current site boundary, it is considered that the proposed development will not impact on any of the sites of interest identified.

5.2.4 Consideration of the Location of the Proposed Development

In terms of the location of the proposed development, it is considered that:

- The proposed site, identified as a 'Wind Energy Strategic Search Area' as per the Cork County Development Plan 2009-2014, is considered suitable for this type of development
- The proposed development will have negligible impact on the natural resources in terms of their abundance, regenerative capacity and quality
- The substation will connect to an existing 110kV overhead line traversing the site. The existing feature comprise of wooden pole sets, with some steel angle masts, supporting three electrical conductors. The location of the substation will avoid the need for overhead cables to connect a permitted wind farm to the national grid.
- In general, the proposed development is well absorbed by the proposed location, subject to screening for appropriate assessment and the assessment of potential environmental impacts as part of the planning process.

5.3 Characteristics of potential impacts

Schedule 7 of the Planning and Development Regulation 2001 to 2013 requires a holistic assessment of the effects of the potential development, as follows:

The potential significant effects of proposed development in relation to criteria set out under paragraphs 1 & 2 above and having regards in particular to:

- *the extent of the impact (geographical area and size of the affected population)*
- *the transfrontier nature of the impact*
- *the magnitude and complexity of the impact*
- *the probability of the impact*
- *the duration, frequency and reversibility of the impact*

5.3.1 Potential Significant Effects of the Proposed Development

The potential significant effects in relation to the proposed development are considered to be as follows:

1. Environmental Impacts during the construction stage
2. Additional traffic generation during the construction stage
3. Absorption capacity of the natural environment, with regard to visual impact

These significant effects are examined in Table 5-2 with regard to the individual criteria identified above.

Table 5-2: Potential Significant Effect versus Individual Criteria

Potential Significant Effect	Extent of the Impact	Transfrontier nature of the impact	Magnitude and complexity of the impact	Probability of the Impact	Duration, frequency and reversibility of the impact
General Environmental Effects (Construction Stage)	Impact would be considered localised in nature	Impact would not be considered transfrontier in nature	Magnitude of the impact will be minimised by the implementation of a Construction Environmental Management Plan (CEMP). Considered a relatively un-complicated impact	The probability of the impact being significant can be considered low. Low probability is dependent on the implementation of an appropriate TMP.	Duration and frequency can be considered short and infrequent; reversibility of an ongoing event is facilitated through the elimination of the source
Generation of traffic (Construction Stage)	Impact would be considered localised in nature	Impact would not be considered transfrontier in nature	Magnitude of the impact will be minimised by the implementation of a traffic management plan (TMP). Considered a relatively un-complicated impact	Additional traffic will be generated during the construction phase, but the probability of the impact being significant can be considered low. Low probability is dependent on the implementation of an appropriate TMP.	Duration and frequency can be considered short and infrequent; reversibility of an ongoing event is facilitated through the elimination of the source
Visual Impact	Impact would be considered localised in nature	Impact would not be considered transfrontier in nature	As with any structure or building, the residual visual impact will be continuous and will extend over the lifetime of the project. This will be a localised impact that is mitigated by distance and natural screening. Considered a relatively un-complicated impact	As with any structure or building, the residual visual impact is unavoidable, but has been mitigated by careful design.	Duration and frequency can be considered continuous; reversibility is facilitated through decommissioning of the substation

6. CHECKLIST OF CRITERIA FOR EVALUATING THE SIGNIFICANCE OF ENVIRONMENTAL EFFECTS

The Department of Environment, Heritage and Local Government published *'Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-threshold Development'* to assist the consenting authority in deciding if significant effects on the environment are likely to arise regarding developments below the mandatory EIA thresholds.

This document includes the following checklist to aid consenting authorities in the decision process:

1. Will there be a large change in environmental conditions?
2. Will new features be out-of-scale with the existing environment?
3. Will the effect be particularly complex?
4. Will the effect extend over a large area?
5. Will there be any potential for transfrontier impact?
6. Will many people be affected?
7. Will many receptors of other types (fauna and flora, businesses, facilities) be affected?
8. Will valuable or scarce features or resources be affected?
9. Is there a risk that environmental standards will be breached?
10. Is there a risk that protected sites, areas, features will be affected?
11. Is there a high probability of the effect occurring?
12. Will the effect continue for a long time?
13. Will the effect be permanent rather than temporary?
14. Will the impact be continuous rather than intermittent?
15. If it is intermittent will it be frequent rather than rare?
16. Will the impact be irreversible?
17. Will it be difficult to avoid, or reduce or repair or compensate for the effect?

Each of the questions listed above is addressed in the following section to assist the consenting authority in their assessment of this proposal.

6.1.1 Will there be a large change in environmental conditions?

It is unlikely there will be any large change to baseline environmental conditions as a result of the proposed development. The proposed substation location has been selected to minimise adverse impacts on sensitive environmental receptors. The new 110kV substation will represent a new visual feature in the environment, however the proposed substation will replace an already permitted substation.

6.1.2 Will new features be out-of-scale with the existing environment?

The substation will connect to an existing 110kV overhead line traversing the site. The existing feature comprises wooden pole sets, with some steel angle masts, supporting three electrical conductors. The existing overhead electricity line creates a thematic association with the proposed substation development in terms of technological image. The proposed substation has been sited to minimise any potential visual and other environmental impacts that could arise.

6.1.3 Will the effect be particularly complex?

The effects are reasonably predictable as there are many substations throughout the country. There are no new or complex technologies proposed.

6.1.4 Will the effect extend over a large area?

The development footprint is approximately 1.1 ha comprising two steel lattice structures, approximately 18m high with electrical lines connected to a gantry with a height of approximately 10 m. At ground level the substation plant consists of a series of transformers, circuit breakers and post insulators which are all vertical structures between approximately 5 m and 10 m in height. Lightning masts of approximately 15 m height are also located within the compound. Also contained within the substation compound are three single storey control buildings and associated car parking areas. The substation site is approximately 90 m x 117 m in area and will be surrounded by a 2.4 m high security fence. Access to the substation will be from the local public road running along the northern boundary of the site, a short section of new access track approximately 200m long will also be constructed.

6.1.5 Will there be any potential for transfrontier impact?

There is no potential for transfrontier impact.

6.1.6 Will many people be affected?

The proposed substation will directly affect one consenting landowner, by virtue of development on private land. Development is being proposed with the land owners consent. Once constructed the asset will be transferred to the Transmission Operator, Eirgrid. The nearest dwelling is approximately 250m away and this property is owned by a contributory landowner associated with Barnadivane Wind Farm. There are 11 inhabited dwellings within 1 km of the substation as indicated on Figure 2.2.

With regard to the operational impact of the development, the likely effects for people relate primarily to visual effects. The significance of effect will vary depending on the location of the receptor in relation to the structure.

6.1.7 Will many receptors of other types (fauna and flora, businesses, facilities) be affected?

The proposed substation has been carefully selected to avoid sensitive receptors. The proposed substation is located within improved grassland habitat that is of low ecological importance, outside of and removed from designated Natura 2000 sites.

There is potential risk to water quality during the construction phase through pollution or siltation. During construction works there is also potential for direct short term disturbance and nuisance in the vicinity of the proposed works. An Environmental Report and Screening Report for Appropriate Assessment will accompany the planning application. As a result of the construction best practice measures to be applied to the proposed development, the substation is expected to have a negligible impact on the receiving environment.

6.1.8 Will valuable or scarce features or resources be affected?

The proposed substation has been carefully selected to avoid sensitive areas. The site is not located within close proximity to any valuable or scarce features or resources, or any Natura 2000 site. Accordingly, it is not considered likely that these will be affected. A Screening Report for Appropriate Assessment, included in Appendix 2, considers Natura sites within 10km of the proposed substation.

6.1.9 Is there a risk that enviro mental standards will be breached?

Environmental standards can be measured and controlled to ensure the project is constructed and operated within the relevant guidelines and statutory requirements. There are many substations operating successfully throughout the county without breaching environmental standards. Adverse impacts are not anticipated as a result of the proposed development. An Environmental Report and Screening Report for Appropriate Assessment will accompany the planning application. Mitigation measures will be implemented as appropriate to minimise all potential impacts identified during the assessment process and to ensure environmental standards are not breached.

Any wind farm electricity substation must meet the requirements of Eirgrid and/or ESB Networks, as the substation will form part of national electricity grid and will be taken in charge by Eirgrid or ESB Networks. ESB and Eirgrid have a proven track record in operating similar developments.

6.1.10 Is there a risk that protected sites, areas, features will be affected?

The siting of the proposed substation and the selection has been cognisant of risks with regard to potential effects upon protected sites, areas and features and has been selected and designed to avoid sensitive environmental receptors (including sites, areas and features).

6.1.11 Is there a high probability of the effect occurring?

With regard to the residual effects of the development during operation, the likely effects for people relate primarily to visual effects. The significance of effect will vary depending on the location of the receptor in relation to the structure. Construction effects will be controlled by appropriated mitigation and construction best practice.

6.1.12 Will the effect continue for a long time?

The residual visual effects of the substation will extend over the lifetime of the project. The potential impacts associated with the construction phase of the proposed development are likely to be short lived in nature.

6.1.13 Will the effect be permanent rather than temporary?

The local visual impact will be permanent. This will be a localised impact that is mitigated by distance and natural screening from a dense network of hedgerows.

6.1.14 Will the impact be continuous rather than intermittent?

The construction period will be temporary, accordingly any associated impacts will also be temporary.

With regard to the operational impact of the development, the likely effects primarily relate to visual impacts. As with any structure or building, the residual visual impact will be continuous and will extend over the lifetime of the project. This will be a localised impact that is mitigated by distance and natural screening.

6.1.15 If it is intermittent will it be frequent rather than rare?

The construction period will be temporary, accordingly any associated impacts can be considered short and infrequent.

6.1.16 Will the impact be irreversible?

Generally reversibility of an ongoing event is facilitated through the elimination of the source or upon decommissioning of the substation. It is not considered likely that there would be significant irreversible effects.

6.1.17 Will it be difficult to avoid, or reduce or repair or compensate for the effect?

The proposed substation has been carefully selected to avoid sensitive receptors. An Environmental Report and Screening Report for Appropriate Assessment will accompany the planning application, both documents will recommend appropriate mitigation measures to ensure no likely significant impact on environmental receptors.

7. CONCLUSION

Following an examination of the Schedule 7 criteria to determine whether the proposed development would or would not be likely to have significant effects on the environment, as per the Planning and Development Regulations 2001 to 2013, the following statements are made:

- The proposed development is in compliance with relevant plans and policies in relation to the development and renewable energy.
- The primary reason for this application is to meet current Eirgrid standards in substation design and the proposed development will replace the currently permitted substation that is not yet constructed. No significant demolition works are associated with the proposed development.
- Abundance, quality and nature of natural resources in the area will not be impacted to any significant degree as a result of the proposed development.
- No impact on wetlands, coastal zones, mountain and forest areas or historical/cultural heritage will be realised
- The siting of the proposed substation away from sensitive environmental receptors such as residential areas, single dwellings, or environmentally vulnerable sites will result in little or no impacts in terms of noise, pollution or any other potential nuisances.
- Potential effects from the proposed development would be considered to be localised in nature and non-transfrontier. The magnitude of the impacts will be minimised by design or appropriate mitigation. Potential for negative effects does exist during construction, but this potential is considered low as the magnitude of these impacts will minimised or avoided by the implementation of a Construction Environmental Management Plan (CEMP).

In light of the above, it is considered that potential significant effects are not considered likely.

Appendix 1

Correspondence to ABP

FEHILY TIMONEY & COMPANY

CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES

IRELAND UNITED KINGDOM POLAND SAUDI ARABIA

Our Ref: Q:/2014/LE14/702/01/Let001/MT

The Secretary
An Bord Pleanála
64 Marlboro St
Dublin 2

03 April 2014

RE: Request seeking a determination from An Bord Pleanála as to the status of a proposed development comprising a 110kV Substation at Barnadivane, Co. Cork in relation to the Strategic Infrastructure Development Act under Section 182A / Section 37B of the Planning and Development Act, 2000, as amended by the Planning and Development (Strategic Infrastructure) Act, 2006.

Dear Sir/Madam

This document has been prepared by Fehily Timoney and Company and forms the pre-application consultation submission of Arran Windfarm Limited (herein after referred to as the applicant), for a proposed 110kV substation development at Barnadivane, Co. Cork, to serve a wind farm development. The following outlines the main elements of the proposed development and sets out the planning legislative context.

Introduction

The applicant intends to seek planning permission to construct a 110kV grid connection substation compound with associated control buildings, equipment plinths, bunds and fencing, oil interceptor, treated effluent storage tank and associated site development works at Barnadivane, Co. Cork. Barnadivane wind farm has been permitted under 05/5907 and PL04.219620 and a 5 year extension of planning permission was granted by Cork County Council under 11/06605. The requirement for a substation was anticipated in the planning application for the wind farm, and planning permission has been obtained for a 110 kV control building and switch station "*to ESB specifications*".

However new Eirgrid requirements necessitate this application and the applicant is commencing pre-application discussions with An Bord Pleanála to determine whether this proposal constitutes "strategic infrastructure development" (SID).

Cont'd.....

Description of the Permitted Development, including a currently permitted 110kV substation

The Barnadivane Wind Farm was permitted by An Bord Pleanála on 30 June 2006, comprising of 14 no. turbines, with hub height up to 70m and rotor diameter of 70m, and base to blade-tip height of 105m, 14 no. associated transformers, a 70m meteorological mast, substation and switch station compounds, construction of internal tracks, turbine foundations, hardstands and associated works and a connection to the national grid.

An Environment Impact Statement accompanied the planning application. The requirement for a substation was anticipated in the planning application, which referred to the following development works:

- Control building and compound surrounded by a 2m high security fence adjacent to the local road on the eastern side of the site.

- An application for a power line connection to the national grid was submitted to the ESB at the time of the original application which necessitated the construction of a switch station which is located adjacent to the proposed substation on a 70m by 45m compound.

Details of the permitted substation are illustrated on the following drawings that accompanied the planning application which you will find enclosed in Appendix A:

- Drawing No. 2003-188-01-007: Plan and Elevation of Proposed Substation
- Drawing No. 2003-188-01-008: Plan and Section of Proposed ESB Switch Station Compound

The permitted 110kV substation arrangement was based on ESB requirements at the time of the planning application and is no longer in accordance with current Eirgrid requirements. Any wind farm electricity substation must meet the design, electrical and layout requirements of Eirgrid and/or ESB Networks, as the substation will form part of national electricity grid and will be taken in charge by Eirgrid or ESB Networks. In the case of the substation granted permission as part of the wind farm permitted under 05/5907 and PL04.219620, given the electrical rating of the substation at 110kV, the substation will be taken in charge by Eirgrid and, therefore, will have to meet current Eirgrid specifications and requirements.

In this regard, Eirgrid's current design standards for substations of this nature were issued in 2011 after the planning application was made.

Description of the Proposed Development

The proposed substation is based on current Eirgrid requirements as illustrated on the following, which you will find enclosed in Appendix B:

- Drawing No. LE14-702-01-001: Proposed Barnadivane Substation Schematic Layout

Cont'd.....

There is some design flexibility in the layout of the individual components, provided certain minimum separation distances and other requirements are met. The proposed substation layout shown in the enclosed drawings now takes account of the Eirgrid requirements, but gives rise to a larger development footprint than that of the permitted substation. This larger footprint necessitated it to be relocated.

The proposed development will comprise of a 110kV grid connection substation compound with associated control buildings, equipment plinths, bunds and fencing, oil interceptor, treated effluent storage tank and associated site development works. The proposed substation is situated approximately 500m southwest of the permitted substation location, just south of an existing local road, as indicated the following which you will find enclosed in Appendix B:

- Figure No. LE14-702-01: Barnadivane Substation Site Location Map 'Permitted vs Proposed'

The new location was selected to accommodate the increased compound area whilst maintaining an appropriate separation distance from the existing 110kV overhead line traversing the site and avoiding the need for 110 kV overhead lines.

The proposed development is not within, adjoining or in relative proximity to a Natura 2000 site. The nearest sites are Boylegrove Wood (NHA), approx 4km northwest, Killaneer House Glen (NHA), approximately 5km southeast and Gearagh (SAC/NHA/SPA and Nature Reserve), approximately 6km to the north of the study area.

Planning Legislative Context

Under Section 182(A) of the Planning and Development Act as inserted by Section 4 of the Planning and Development (Strategic Infrastructure) Act 2006 where an undertaker:

> *"...intends to carry out development comprising or for the purposes of electricity transmission the undertaker shall prepare, or cause to be prepared, an application for approval of development under section 182B and shall apply to the Board for such approval accordingly".*

Subsection 9 of 182A states that:
In this section 'transmission', in relation to electricity, shall be construed in accordance with section 2(1) of the Electricity Regulation Act 1999 but, for the purposes of this section, the foregoing expression, in relation to electricity, shall also be construed as meaning the transport of electricity by means of—

> *(a) a high voltage line where the voltage would be 110 kilovolts or more, or*
> *(b) an interconnector, whether ownership of the interconnector will be vested in the undertaker or not.*

Cont'd.....

In section 2(1) of the Electricity Regulation Act, 1999, "transmission" is defined in relation to electricity as meaning *"the transport of electricity by means of a transmission system, that is to say a system which consists, wholly or mainly, of high voltage lines and electric plant and which is used for conveying electricity from a generating station to a substation, from one generating station to another, from one substation to another or to or from any interconnector or to final customers but shall not include any such lines which the Board may, from time to time, with the approval of the Commission, specify as being part of the distribution system but shall include any interconnector owned by the Board."*

Subsection 9 of 182A sets a threshold of 110 kV in order for a high voltage electricity transmission line to be considered strategic infrastructure. No threshold is set in respect of a substation, therefore it is reasonable to refer directly to Section 37A(2) of the Planning and Development (Strategic Infrastructure) Act, 2006. Section 37A(2) sets out the criteria that a proposed development must meet before it can be deemed a Strategic infrastructure Development:

> *(a) the development would be of strategic economic or social importance to the State or the region in which it would be situated,*
>
> *(b) the development would contribute substantially to the fulfilment of any of the objectives in the National Spatial Strategy or in any regional planning guidelines in force in respect of the area or areas in which it would be situated,*
>
> *(c) the development would have a significant effect on the area of more than one planning authority."*

Planning Legislative Assessment

The legislation explicitly sets a threshold of 110 kV in order for a high voltage electricity transmission line to be considered strategic infrastructure. However, no specific threshold is set in respect of a substation. Therefore, the applicant is commencing pre-application discussions with An Bord Pleanála to determine whether this proposal constitutes "strategic infrastructure development".

Having regard to the nature and scale of the development, it is our opinion that the proposed development is not SID for the following reasons:

1. The permitted wind farm development at Barnadivane that the proposed substation will serve is not itself within the strategic infrastructure thresholds of more than 25 turbines or having a total output greater than 50 megawatts, as specified in the Seventh Schedule

2. The development will not make a significant contribution to the delivery of regional planning guidelines or the National Spatial Strategy

3. The development is entirely within the catchment of a single planning authority.

Cont'd.....

Planning Precedent

The applicant wishes to draw the attention of the Board to a number of previous decisions on similar cases:

- VC0069 - 110kV substation at Barnakyle, Grange Castle, Clondalkin, County Dublin.
- VC0061 - Redevelopment of existing 110kV electricity substation at Ardnacrusha, Co. Clare.
- PC0161 - Alterations to a permitted electrical substation serving Slievecallan Wind Farm. Co Clare
- VC0067 - Proposed extension to existing substation compound, removal, reconfiguration, replacement and new substation infrastructure and local realignment of part of existing 220 kV circuits and 2 no. supporting towers at existing Knockraha 220kV substation, Co Cork.
- VC0063 - Redevelopment of existing 220/110kV electricity substation at Killonan, Milltown, Ballysimon, Co. Limerick.
- VC0031 - Line bay in Corderry 110 kV station to facilitate connection of Garvagh Glebe Windfarm

It was the decision of the Board on all of these pre-SID applications that the proposed grid connection works did not fall within the meaning of Section 182A of the Act and that a planning application should be made in the first instance to the relevant Local Authority.

Conclusion

The requirement for a substation was anticipated in the planning application for the permitted wind farm and planning permission has been obtained for a 110 kV control building and switch station *"to ESB specifications"*. The proposed development is required to meet current Eirgrid standards in substation design and will replace the currently permitted substation that is not yet constructed.

Having regard to the nature and scale of the development, it is our opinion that the proposed development is not SID for the following reasons:

1. The permitted wind farm development at Barnadivane that the proposed substation will serve is not itself within the strategic infrastructure thresholds of more than 25 turbines or having a total output greater than 50 megawatts, as specified in the Seventh Schedule

2. The development will not make a significant contribution to the delivery of regional planning guidelines or the National Spatial Strategy

3. The development is entirely within the catchment of a single planning authority.

The applicant is seeking a determination from An Bord Pleanála as to whether the proposed development is considered SID within section 182A of the Act, having regard to the provisions of the legislation.

Cont'd.....

We enclose the statutory fee of €4,500 for the Board's determination of this case. We understand that €3,500 may be refunded if no more than one meeting with An Bord Pleanála is required.

We look forward to hearing from you on the matter.

Yours faithfully

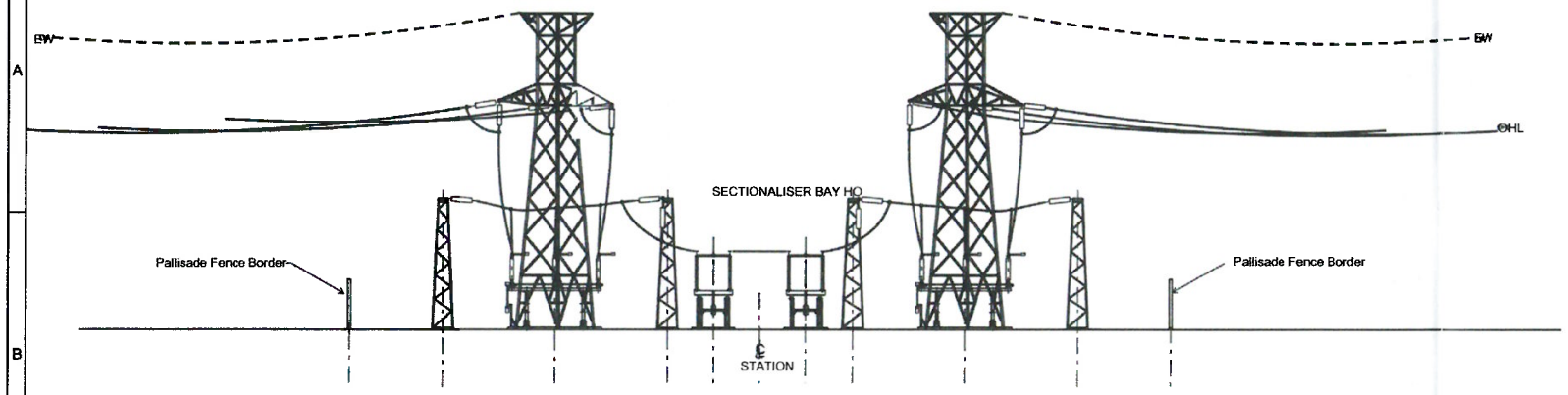
Paul O'Brien
for and on behalf of **Fehily Timoney & Company**

APPENDIX A

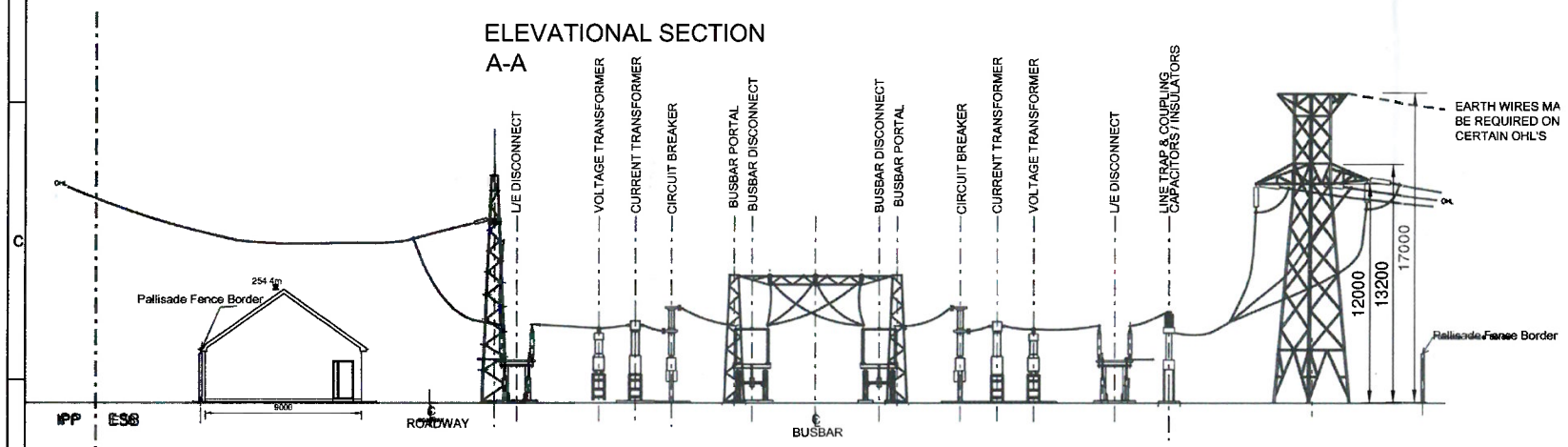
Drawings of Existing Development:

Plan and Elevation of Proposed Substation

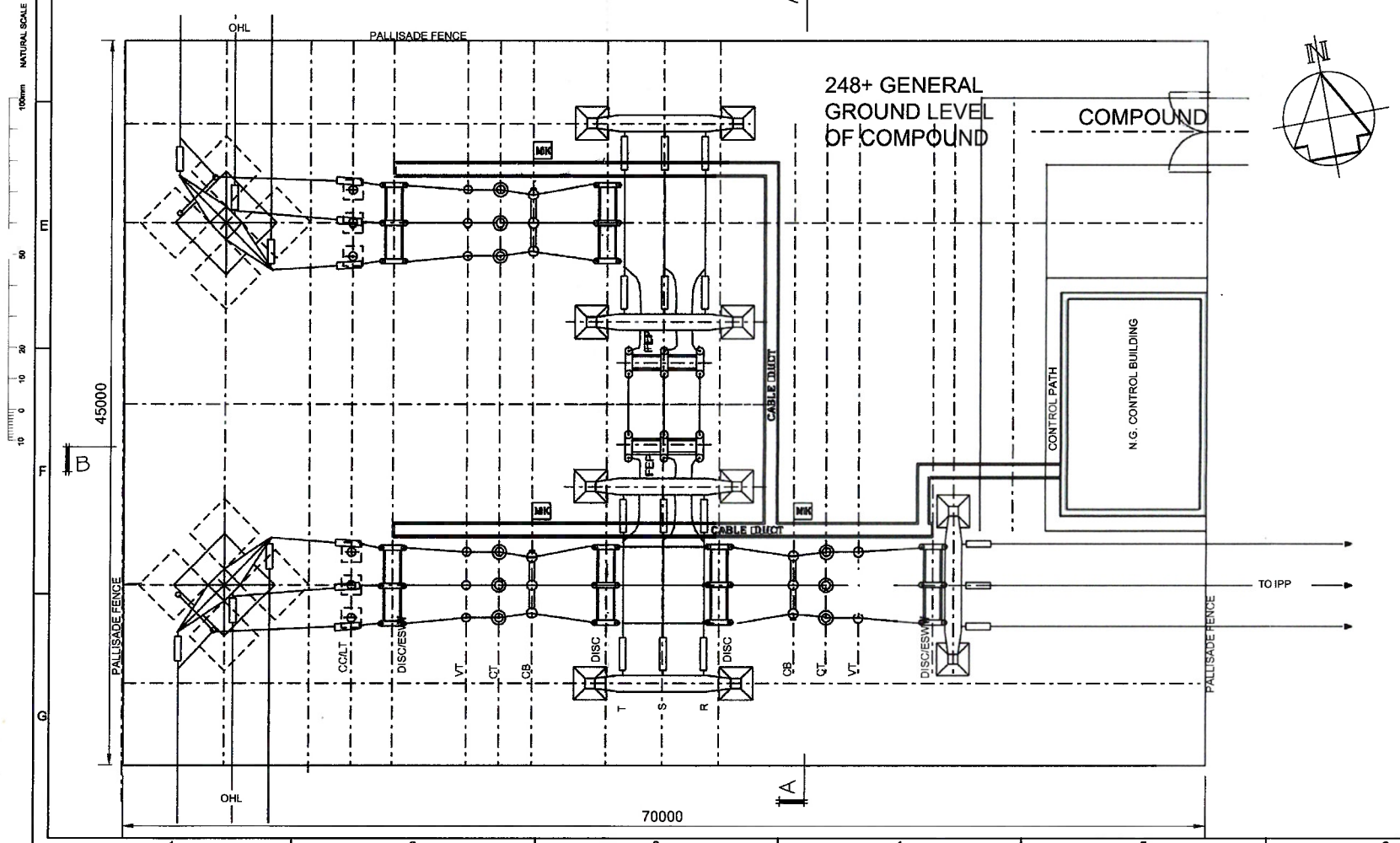
Plan and Section of Proposed ESB Switch Station Compound

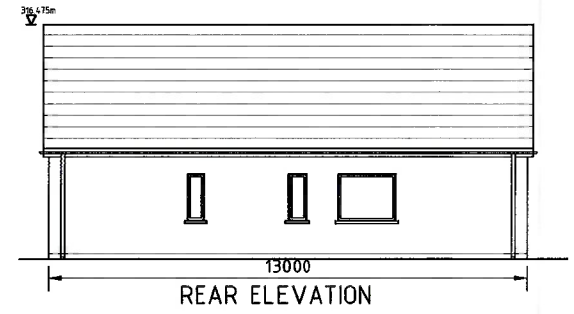


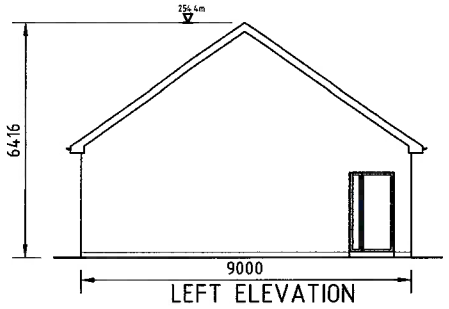
ELEVATIONAL SECTION
A-A

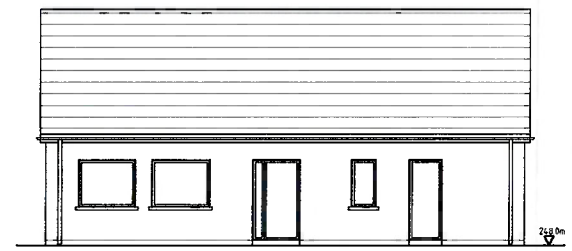


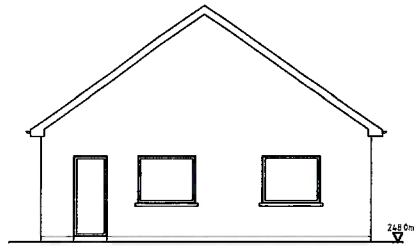
ELEVATIONAL SECTION B-B

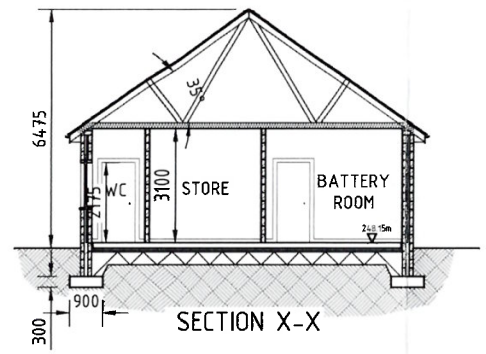


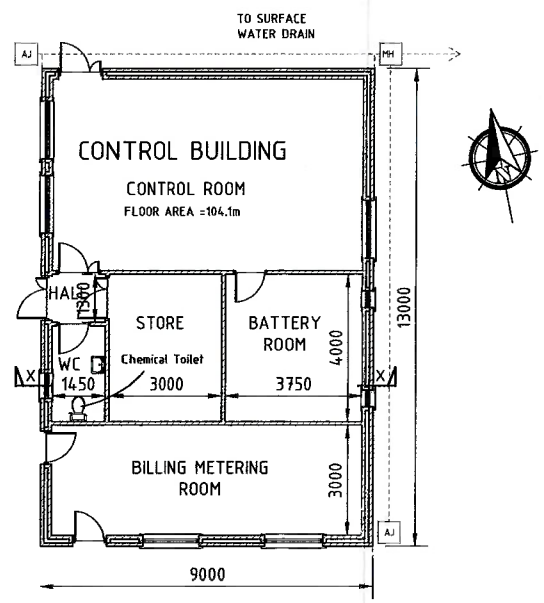












Rev.	Drawn	Chkd	Apprvd	Date	Description
B	MF	OK	FOR	16.06.2006	ISSUE FOR PLANNING APPLICATION
A	SR	KC	ET	15.08.2005	ISSUE FOR PLANNING APPLICATION

Name of Client
BARNA WIND ENERGY LTD.

Name of Job
PROPOSED WIND FARM AT BARNADIVANE (KNEEVES), TERELTON, MACROOM, CO. CORK

Title of Drawing
1:200 PLAN & SECTION OF PROPOSED ESB SWITCH STATION COMPOUND

Scales Used
A1 1:200, 1:100

Dwg. No. 2003-188-01-007 — Rev. B

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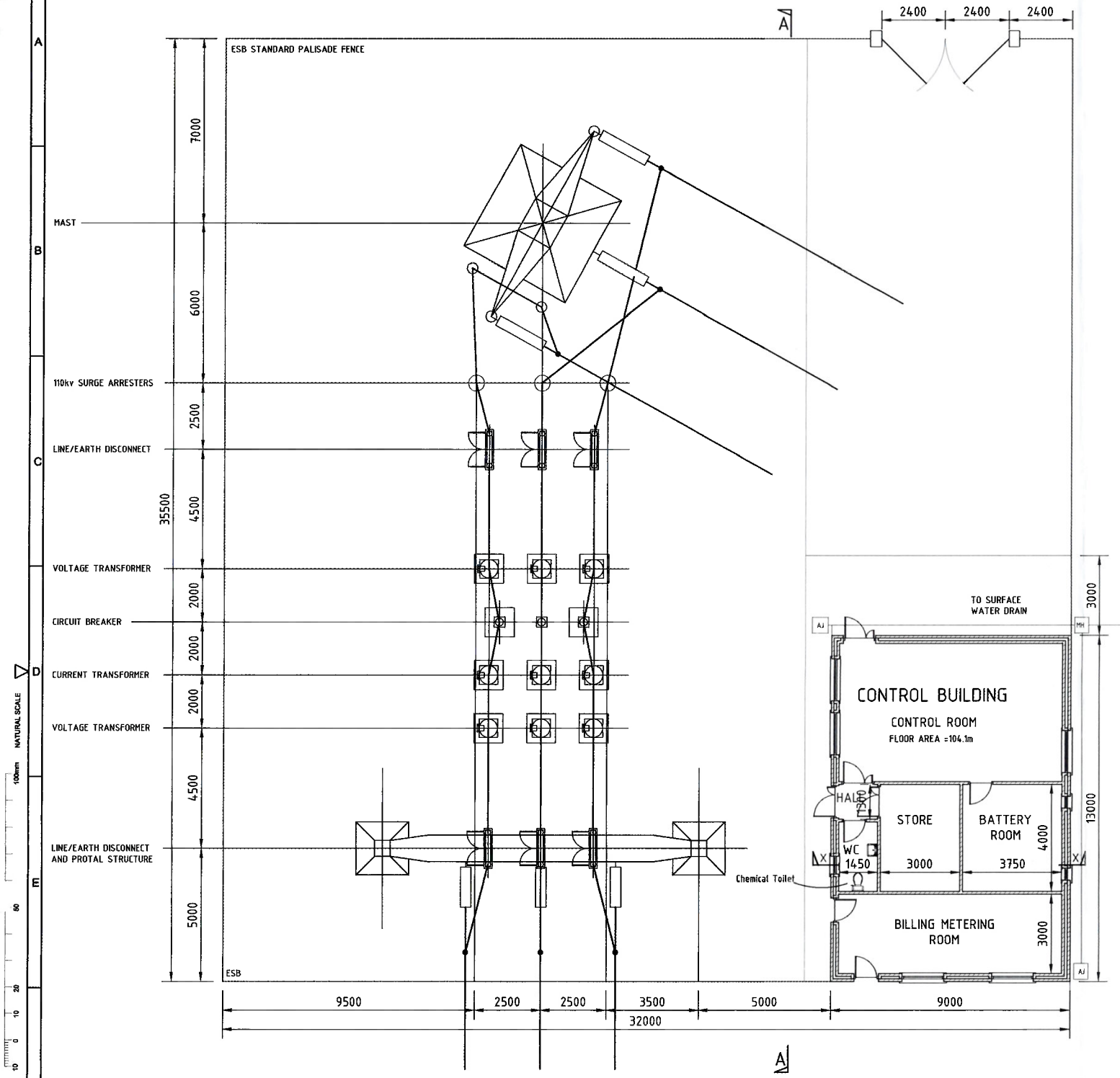
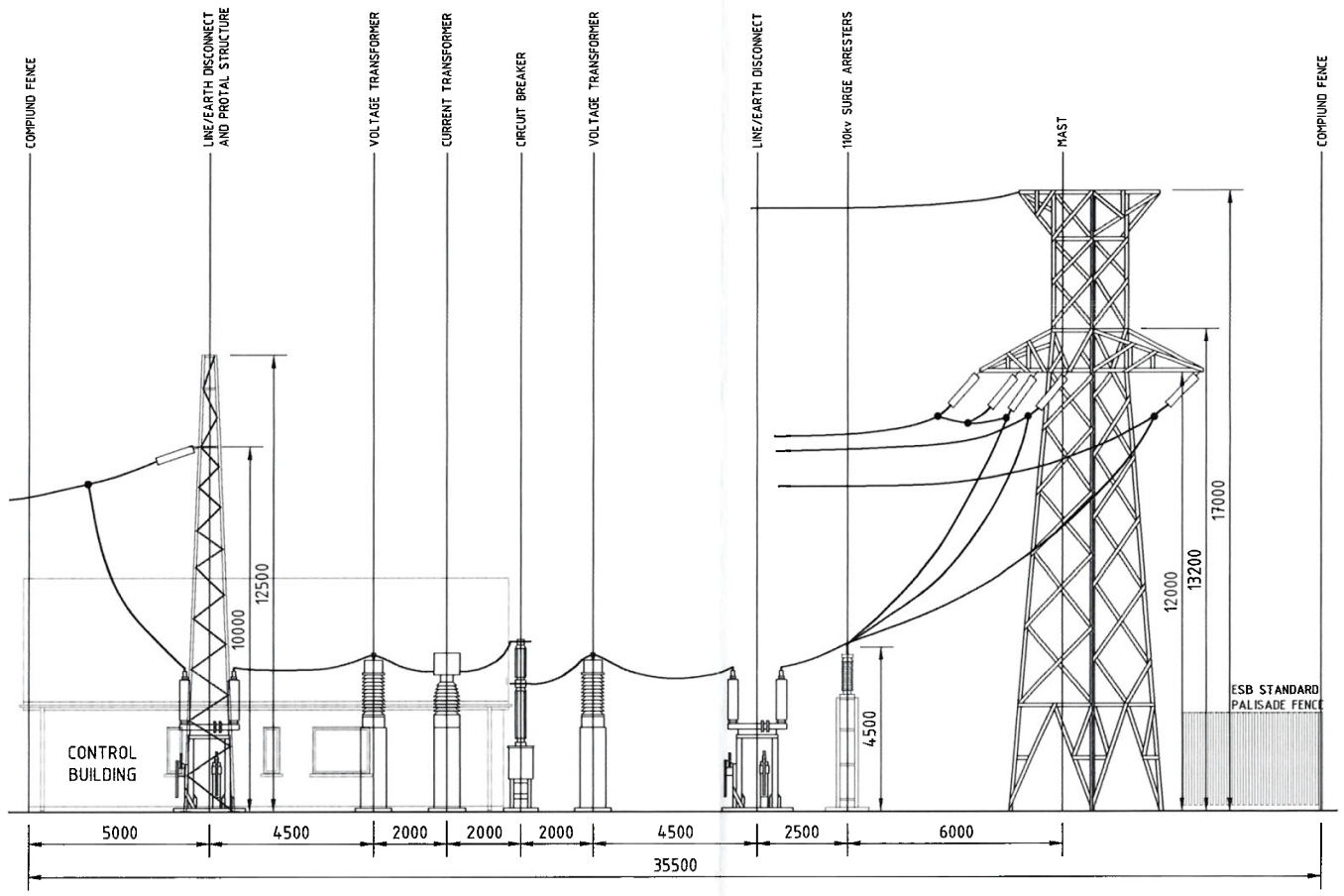
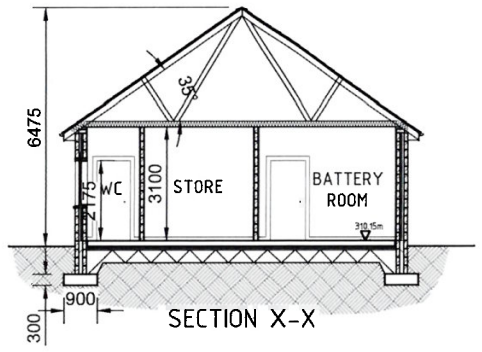
WEB SITE: www.fehilytimoney.ie



LAYOUT PLAN



SECTION A-A



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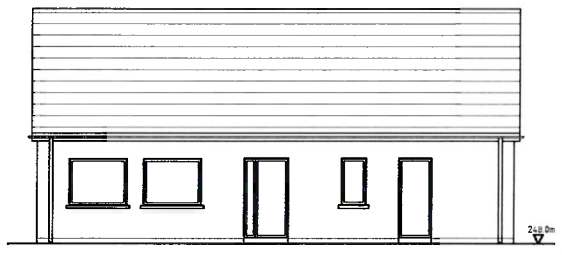
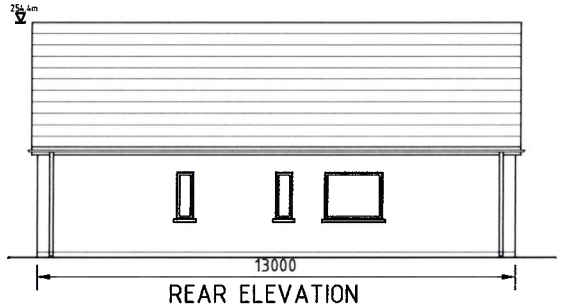
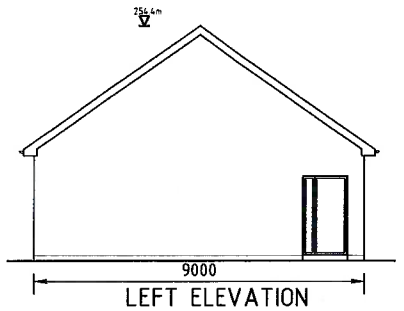


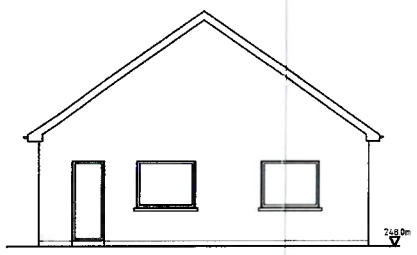
FRONT ELEVATION



REAR ELEVATION



LEFT ELEVATION



RIGHT ELEVATION

Rev.	Drawn	Chkd	Approvd	Date	Description
B	MF	SR	KC	ET	FOR 16.06.2006 ISSUE FOR PLANNING APPLICATION
A					15.08.2005 ISSUE FOR PLANNING APPLICATION

Name of Client
BARNA WIND ENERGY LTD.

Name of Job
PROPOSED WIND FARM AT
BARNADIVANE (KNEEVES), TERELTON,
MACROOM, CO. CORK

Title of Drawing
PLAN & ELEVATION OF PROPOSED
ESB SUBSTATION

Scales Used
A1 1:100

Dwg. No. 2003-188-01-008 Rev. B

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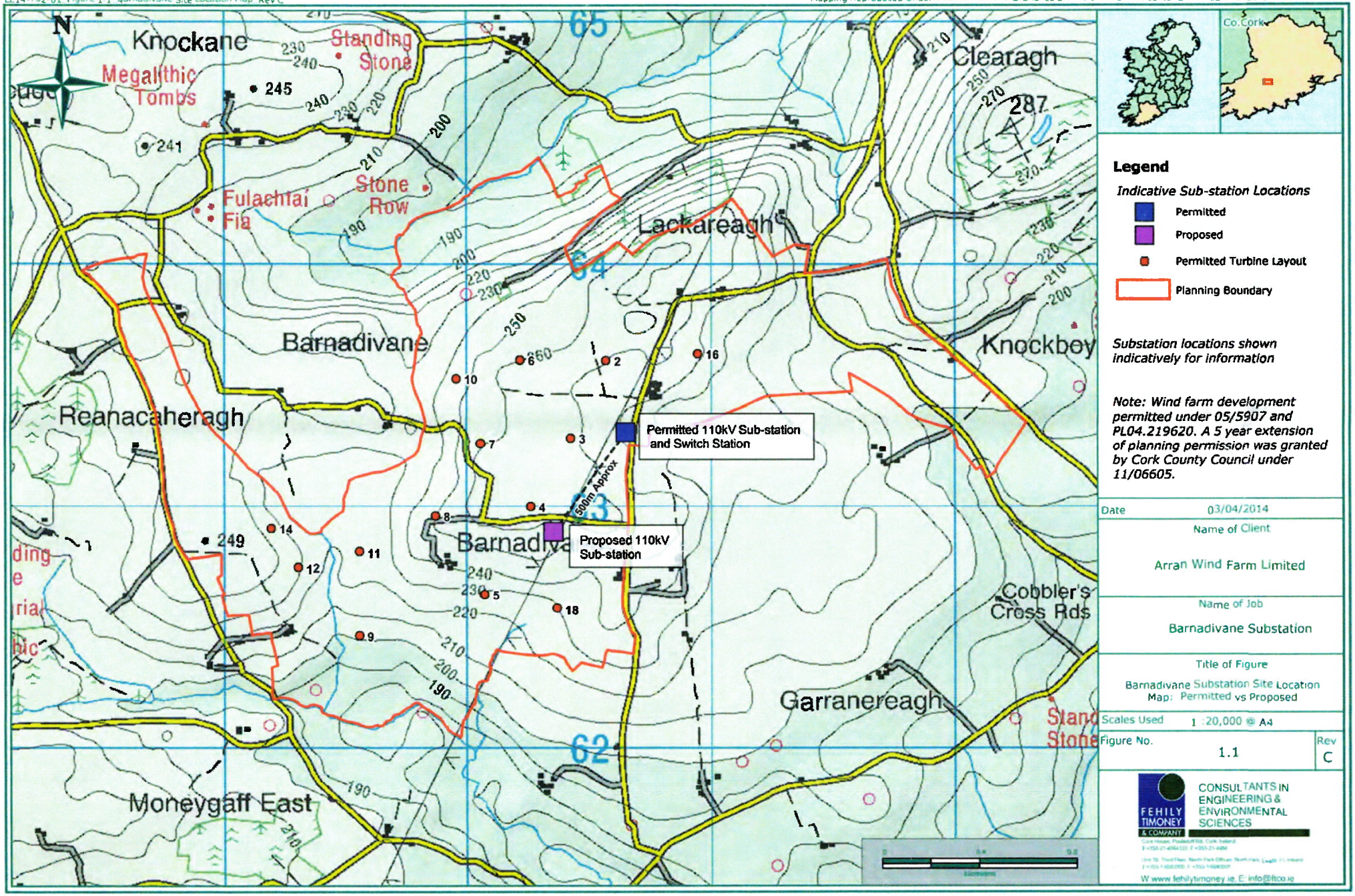
APPENDIX B

Drawings of Proposed Development:

Proposed Substation

Barnadivane Substation Site Location Map Permitted vs Proposed

R:\Map Production\2014\LE14\702\01\Workspace
LE14-702-01_Figure 1.1_Barnadivane Site Location Map_Rev C



Legend

Indicative Sub-station Locations

- Permitted
- Proposed
- Permitted Turbine Layout
- Planning Boundary

Substation locations shown indicatively for information

Note: Wind farm development permitted under 05/5907 and PL04.219620. A 5 year extension of planning permission was granted by Cork County Council under 11/06605.

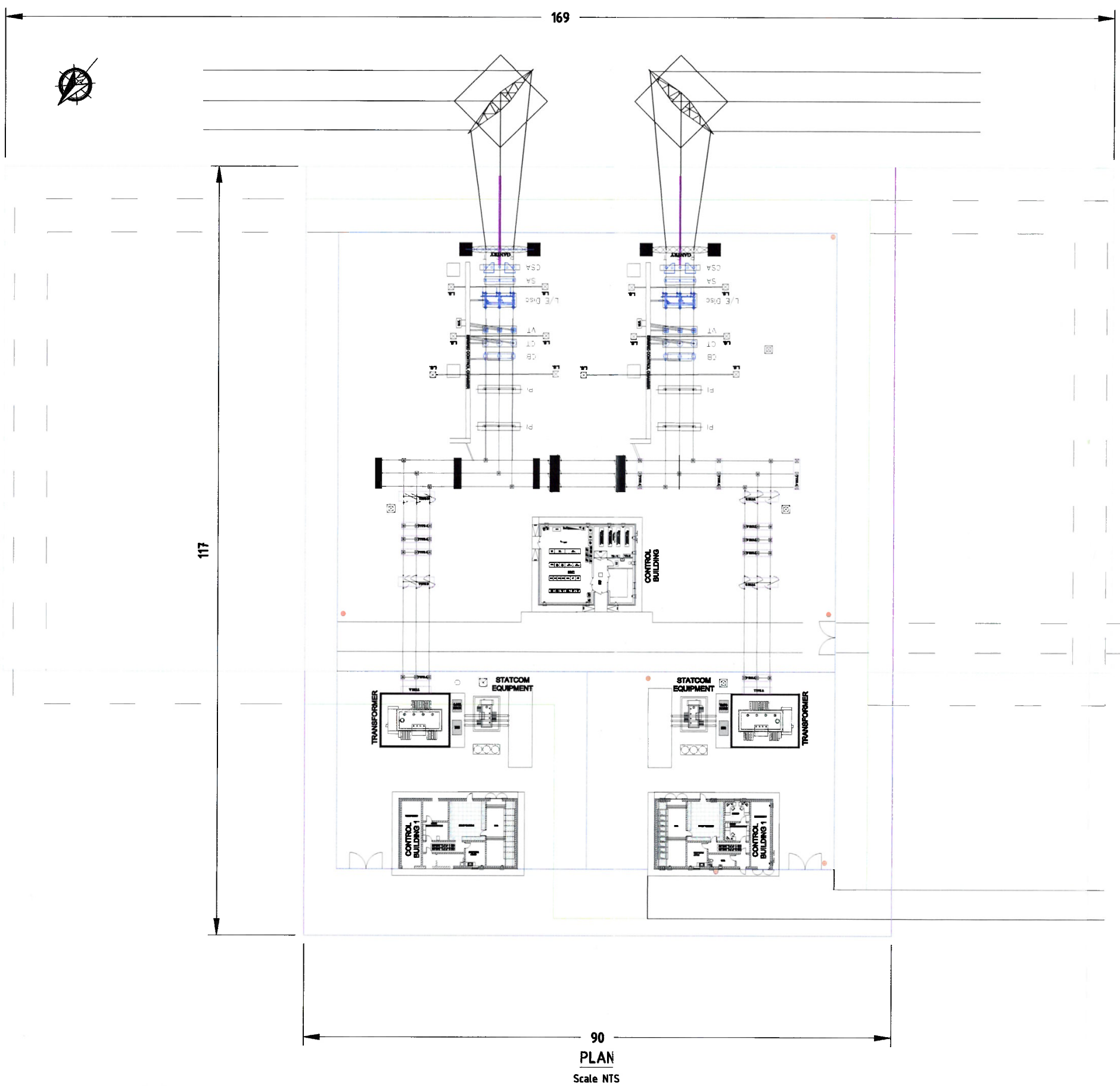
Date	03/04/2014
Name of Client	Arran Wind Farm Limited
Name of Job	Barnadivane Substation
Title of Figure	Barnadivane Substation Site Location Map: Permitted vs Proposed
Scales Used	1 :20,000 @ A4
Figure No.	1.1
Rev	C

FEHILY TIMONEY & COMPANY
CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES
W www.fehilytimoney.ie E: info@ftco.ie

Note:
The proposed schematic substation layout takes account of the Eirgrid requirements as indicated on 110kV Station Design Standard, Dwg: 0020 KH-PPS-011. Substation layout extracted from Proposed Substation, Dwg: 004-001-01 received 03.04.2014.

The layout is subject to detailed design and there is some design flexibility in the layout of the individual components, provided Eirgrid requirements are met.

Dimensions in metres.



PLAN
Scale NTS

FEHILY TIMONEY & Company
DRAFT No: 1
PRIOR TO ISSUE: A
DRN BY: VALID ONLY ON: 03.04.14
Rev. Drawn

Name of Client
ARRAN WINDFARM LIMITED

Name of Job
PROPOSED 110kV SUBSTATION

Title of Drawing
PROPOSED BARNADIVANE SUBSTATION
SCHEMATIC LAYOUT

Scales Used: NTS
This Drawing was printed to ISO Expand A1 (841.00 X 594.00 MM)

Dwg. No.: LE14-702-01-001
Rev.: A

FEHILY TIMONEY & COMPANY
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Appendix 4

Details of Silt Fencing