1. Introduction

1.1 Introduction

Endesa Ireland Limited commissioned Mott MacDonald (Ireland) Limited and Environmental Resources Management to prepare an Environmental Impact Statement (EIS) and planning application for the proposed construction of a wholly privately owned Combined Cycle Gas Turbine (CCGT) power plant. The proposed development site is located in the townland of Great Island, Co. Wexford, (OS Grid Reference: E268907 N114574). The location of the proposed development is illustrated in Figure 1.1: Site Location.

1.2 Endesa Ireland Limited

Endesa Ireland Limited (Endesa) was registered on 8th January 2009, following Endesa's acquisition of certain generation assets from the Irish state utility, Electricity Supply Board (ESB). The sale, worth €450 million, was signed in Dublin following approval from the appropriate regulatory bodies.

The assets purchased comprised 1,068 MW of capacity divided up between four sites; Great Island in Wexford, Tarbert in Kerry, Rhode in Offaly and Tawnaghmore in Mayo. Endesa proposes to replace the existing plant at Great Island with a more efficient environmentally friendly generator. Detailed background information relating to Endesa and the acquisition of Great Island power plant is provided in Chapter 2 (Background to the Project).

1.3 Overview of the Proposed Development

The Great Island power plant currently operates on Heavy Fuel Oil (HFO) with a maximum electrical output capacity of 240 MW. The existing plant comprises three units, two 60 MW units and one 120 MW unit. All of the existing units are at the end of their useful life span.

Endesa proposes to construct a natural gas fired CCGT power plant with an electrical output capacity of 430 MW. The primary fuel source for the CCGT unit will be natural gas with distillate oil stored onsite as a back up fuel, as required by the Commission for Energy Regulation's (CER) Secondary Fuelling Obligation.

The development site is Brownfield and located within the confines of the existing operational power plant facility, formerly operated by ESB. The Great Island power plant occupies an area of approximately 58 hectares (143 acres). The proposed development site will occupy approximately 8 hectares (19 acres).

It is anticipated, that the new power plant will be commissioned in 2012. Once the CCGT plant becomes operational, the existing HFO fired power plant will be decommissioned.

1.4 Key Features of the Proposed Plant

A CCGT power plant works on the principle of optimising the efficiency of electricity generation. In a CCGT plant, a Gas Turbine (GT) generates electricity and the waste heat from the GT is then used to make superheated steam via a Heat Recovery Steam Generator (HRSG) to generate additional electrical power in a Steam Turbine (ST). Low pressure steam from the steam turbine is condensed back to water and fed back to the HRSG. Any hot gases remaining from the process are emitted to atmosphere via an exhaust gas stack.

Notes

1. ORDNANCE SURVEY IRELAND LICENCE NO. EN0034509
© ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND
2. ALL CO-ORDINATES SHOWN RELATE TO IRISH NATIONAL GRID CO-ORDINATES.
3. ALL SITE LEVELS REFER TO MEAN SEA LEVEL VERTICAL DATUM AT POOLBEG.
4. GENERAL SITE LEVEL IS +7.00M O.D.

Site Boundary (red line)

Property Boundary (blue line)

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	02/11/09	SK	For Information Only	DH	PK

Mott MacDonald

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South Block, Rockfield,
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endesa ireland

Endesa Ireland Ltd.
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Tel +353 (1) 552 8300
Fax +353 (1) 552 8301

Title

Combined Cycle Gas Turbine (CCGT)
Great Island, Co. Wexford

Site Location Plan

Designed	-		Eng.Chk.	-	
Drawn	S Kennedy		Coordination	D Hassett	
Dwg.Chk.	D Hassett		Approved	P Kelly	
Scale	1:10000	Project	257554	Status	INF
		CAD file	Figure 1.1		
Drawing No	Figure 1.1			Rev	P1

The proposed plant will utilise the existing cooling water intake and outlet systems to condense steam for use in the HRSG. High purity feed water, for use within the HRSG, will also be required. This water will be sourced from the mains supply operated by Wexford County Council.

The proposed exhaust stack will extend to 60 metres in height, which is significantly less than the existing two stacks, which each measure 137.5 metres.

Electrical power from the new plant will be exported to the existing 220 kV switchyard on site and exported to the regulated electricity market.

Natural gas, supplied from the Bord Gáis Networks (BGN) grid, will be the primary fuel source for the facility. To comply with the requirements of CER, a stock of distillate oil will be stored on site, in sufficient capacity to run the plant for five days in the event of an interruption to the natural gas supply. The volume of distillate oil required will be 11,000 m^3 and its sulphur content will be limited to 0.1% sulphur as per the requirements of *EU Directive 1999/32/EC, (relating to a reduction in the sulphur content of certain liquid fuels).*

Ancillary services will include a water treatment plant, water storage tanks, wastewater discharge tanks, one distillate storage tank, bulk chemical storage tanks (Sulphuric Acid and Sodium Hydroxide), an Aboveground Gas Installation, AGI (comprising gas compressor, gas metering, pressure reducing, heating and filtering skids) and minor ancillary buildings. Existing control and administration buildings, workshops, canteen and stores will be utilised.

In addition, the new CCGT power plant will require the construction of a gas pipeline connection to the AGI. Bord Gáis Network (BGN) and Gaslink (the systems operator with responsibility for operating, maintaining and developing the Irish gas transportation system) will be responsible for the routing and construction of the gas pipeline. The connection to the gas supply will be subject to a separate planning process.

A detailed description of the site and the proposed development is provided in Chapter 3 (Description of the Development).

1.5 Planning Application - Statutory Requirements

The *Planning and Development (Strategic Infrastructure) Act 2006* (the Act) came into effect on 1st January 2007. The Act, which amends the *Planning and Development Act 2000*, requires that planning applications for certain developments considered to be of strategic national and regional importance are made directly to An Bord Pleanála and not to the local planning authority.

Under Section 37B of the Act a prospective applicant must engage in pre-application consultations with An Bord Pleanála (the Board) to determine if the proposed development can be considered a strategic infrastructure development.

Following pre-application consultation meetings with An Bord Pleanála, on 24th June 2009, 1st October 2009 and 28th October 2009, it has been determined that the proposed development satisfies the conditions set out in Section 37A.-(1) and (2) (a) and (b) of the Act i.e. the development is specified under the Seventh Schedule (Section 37A.-(1)):

"A thermal power station or other combustion installation with a total energy output of 300 megawatts or more".

and, under Section 37A.-(2), the Board is satisfied that the proposed development, if carried out, would fall within the following categories:

(a) *"the development would be of strategic economic or social importance to the State or the region in which it would be situate*

(b) *the development would contribute substantially to the fulfilment of any of the objectives of the National Spatial Strategy or any regional planning guidelines in respect of the area or areas in which the development would be situate"*

In accordance with Section 37E.-(1) of the Act an application for permission for development, in respect of which a notice has been served by An Bord Pleanála confirming that it falls within one or more of paragraphs (a) to (c) of Section 37A.-(2), must be accompanied by an Environmental Impact Statement (EIS).

This is also in accordance with the European Directive 85/337/EEC (EIA Directive), as amended by Directive 97/11/EC, which also states that an EIS is required for "*Thermal power stations and other combustion installations with a heat output of 300 megawatts or more*".

In its document entitled *Guidelines on the Information to be Contained in Environmental Impact Statements (March, 2002)* the Environmental Protection Agency (EPA) has defined an Environmental Impact Assessment (EIA) as:

"*the process of examining the environmental effects of development – from consideration of environmental aspects at design stage through to preparation of an Environmental Impact Statement, evaluation of the EIS by a competent authority and the subsequent decision as to whether the development should be permitted to proceed, also encompassing public response to that decision"* .

In the same document, an EIS is defined as:

"A statement of the effects, if any, which the proposed development, if carried out, would have on the environment".

A copy of the notice served by An Bord Pleanála confirming that the development comes under the remit of the Strategic Infrastructure Act is included in Appendix 1.1 (Strategic Infrastructure Notification). Additional regulatory requirements are discussed in Chapter 4 (Legislation). Chapter 6 (Scoping and Consultation) discusses the public consultation process regarding applications made under the Act.

1.6 Structure of the EIS

The structure of this EIS is presented in Table 1.1 below, a description of the methodology followed in the preparation of this EIS is provided in Chapter 7 (EIA Methodology).

Table 1.1: Structure of the EIS

Chapter No.	EIS Section
1	Introduction
2	Background to the Project
3	Description of the Development
4	Legislation
5	Planning and Policy Context
6	Scoping and Consultation
7	EIA Methodology
8	Human Beings – Land Use
9	Human Beings – Socio -economics
10	Traffic
11	Human Beings– Noise & Vibration

Chapter No.	EIS Section
12	Flora and Fauna
13	Soils, Geology and Groundwater
14	Surface Water
15	Air Quality and Climate
16	Landscape and Visual
17	Material Assets (Archaeology, Architectural and Cultural Heritage and Utilities)
18	Interactions of the Foregoing
19	References

This EIS was prepared by Mott MacDonald (Ireland) Limited and Environmental Resources Management (ERM). In addition Aegis Archaeology Limited was engaged to undertake the Archaeology, Architecture and Cultural Heritage assessment.

A Non-Technical Summary (NTS) of this EIS has also been produced as a separate, stand-alone document providing a brief overview of the development and associated impacts and mitigation as described in this EIS.

2. Background to the Project

2.1 Introduction

This chapter of the EIS provides information on Endesa Ireland Limited, the background to the project; including the need for the development, acquisition of the site and the main technologies considered.

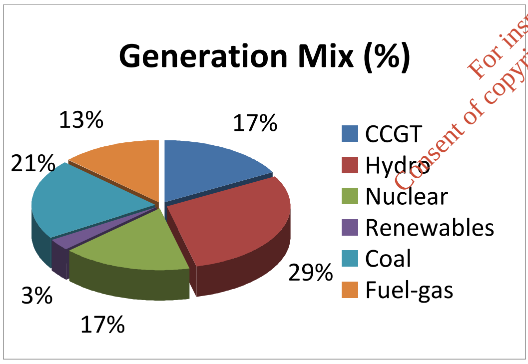
2.2 About Endesa

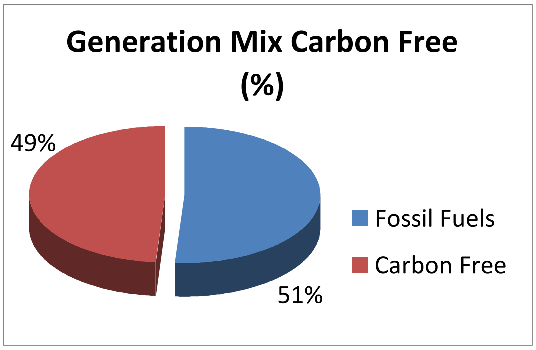
Endesa is the leading utility in the Spanish electricity system and the number one private electricity company in Latin America. It is a significant player in the energy sector of the European Mediterranean region. It also has a growing presence in the Spanish natural gas market and is advancing rapidly in the area of renewable energy.

The electricity companies controlled by Endesa had a total installed capacity of 39,656 MW at the end of 2008, with annual generation of 149,830 TWh and total electricity sales to 24.4 million customers, employing 27,000 people.

Endesa operates a range of generation technologies, from Renewable to Combined Cycle Gas Technology, as presented in Figure 2.1 below.

Figure 2.1: Endesa - Generation Mix





Source: Endesa Proforma Figures (2008)

2.2.1 Presence in Spain and Portugal

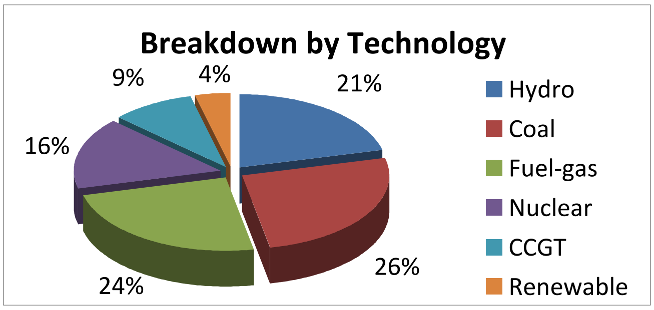
Endesa is one of the largest utilities in Spain and Portugal with an installed capacity of 22 GW in 2008 providing energy to over 12 million customers. Not only does it own actual generation stations / facilities it also maintains and operates a significant portion of the distribution system as described hereunder:

- 21,215 km of High Voltage Lines
- 115,118 km of Medium Voltage Lines
- 1,246 Substations

- 156, 956 Transformation Centres
- 135, 061 MVA

The technology used to generate electricity, and satisfy customer demand in Spain, is presented in Figure 2.2.

Figure 2.2: Endesa - Breakdown by Technology (Spain)



2.2.1.1 Gas Supply Business

Endesa are not only involved in pure electricity generation but are also key players in the gas market including areas such as: procurement, regasification & transport and distribution & supply. In terms of procurement Endesa is engaged with a number of contracts totalling over 6 Bm^3 (Billion cubic metres) per annum. The supply chain is geographically diversified across many countries in Europe and North Africa (i.e. Maghreb). Adopting and maintaining a similar strategy to electricity generation, Endesa is the owner / operator of various gas transmission assets including:

- 4,213 km of Distribution Network
- 530 km of Network Transmission
- Major Stakes in Regasification Plants

The holding in the regasification plants alone provides enough capacity to meet generation and supply demand. This demand comprises 40 TWh sold to liberalised customers, 7 TWh supplied to 397,000 regulated customers and 26 TWh consumed in generating stations. Endesa controls over 15% of the overall market share in Spain and Portugal.

2.2.2 Presence in Latin America

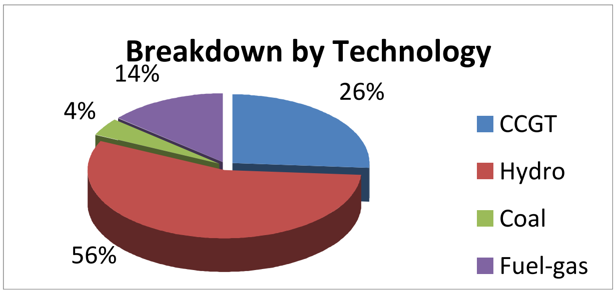
Endesa is the main private utility provider in Latin America. Total installed capacity exceeds 15 GW supplying over 12 million customers with a reliable supply of electricity; Endesa operates in the following countries in Latin America:

- Colombia: 2,895 MW, 2.3 million customers
- Brazil: 987 MW, 5.3 million customers
- Argentina: 4,522 MW, 2.3 million customers
- Chile: 5,283 MW, 1.5 million customers

- Peru: 1,597 MW, 1 million customers

The breakdown of technology used in electricity generation in Latin America is presented in Figure 2.3.

Figure 2.3: Endesa – Breakdown by Technology (Latin America)



Source: Endesa Proforma Figures (2008)

2.2.3 Presence in Other Countries

Endesa is committed to developing the company generation portfolio in a number of countries. Although Endesa is a major organisation in Spain and Latin America it has significant experience in developing other generation portfolios in various countries, currently operating in ten countries.

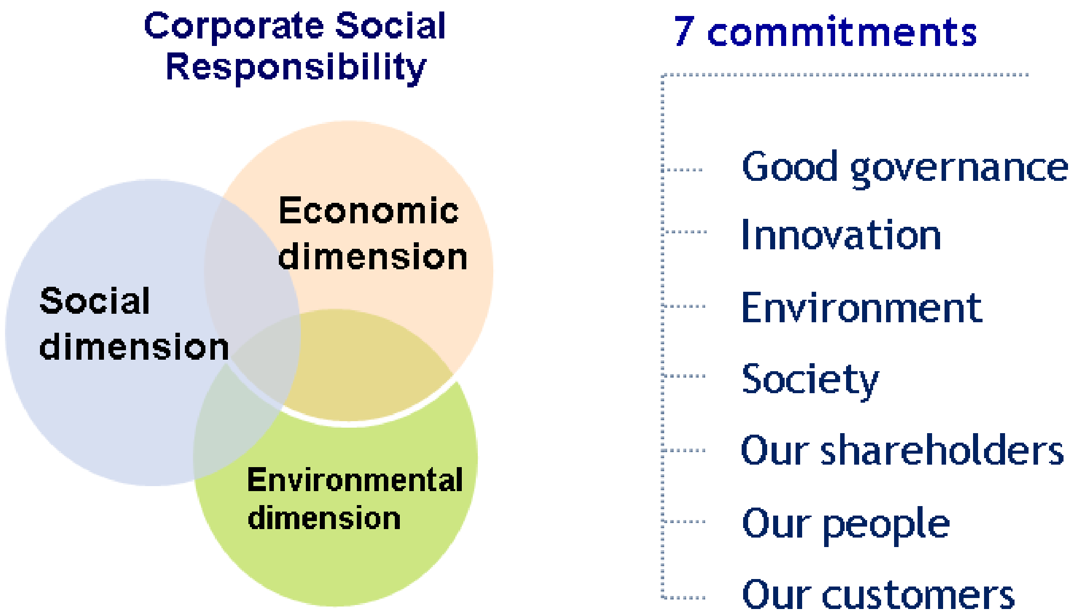
2.2.4 Corporate Social Responsibility

Endesa take a very proactive approach to Corporate Social Responsibility and it is a major element of the Endesa strategic plan.

Endesa recognises the challenges for the future in this area and are committed to endorsing a proactive approach to local government across all locations where Endesa have a presence and a drive for innovation in technology to promote a culture of continuous improvement towards climate change. To facilitate the positive impact on climate change various goals have been developed at corporate level across the organisation to identify innovative methods of integrated water management systems, implement state of the art environmental management systems, conserve and protect the natural environment and use, where appropriate, Best Available Techniques (BAT) technology.

In terms of the approach to Corporate Social Responsibility there are three dimensions ranging across seven separate commitments as presented in Figure 2.4.

Figure 2.4: Endesa – Corporate Social Responsibility



In addition to the specific environmental improvements incorporated in facility technology, as outlined in the previous paragraph, Endesa is also committed to achieving various other goals by 2020. These goals include a 50% reduction in their carbon emission factor, promoting and developing renewable energies, leading Carbon Capture and Storage (CCS) technological developments, promoting electric vehicles and adopting a culture of promotion and continuous adoption of Clean Development Mechanism (CDM) projects.

The specific milestones set for 2009 are:

- 18% reduction in Carbon Dioxide (CO_2) emissions, when compared with 2008 figures
- 41 CDM projects in the portfolio
- 90% of energy produced under environmental certification
- 7 GW of generation in the pipeline
- Participation in various initiatives to reduce CO_2

Endesa, and their approach to corporate social responsibility, were recognised by the Dow Jones Sustainability World Index for the ninth year running in 2009. Endesa has been included, along with other leading utilities in the world, for its commitment to sustainability, in particular the areas of social action investment and occupational health and safety and social reporting. The index, regarded as the most important global benchmark for sustainability issues, selects the leading companies in different industries that stand out for their commitment to making sustainable development one of the corner stones of their business strategy. Specifically, the Dow Jones Sustainability World Index includes just 10% of the 2,500 companies that make up the Dow Jones Global Stock Index and nine of its 74 electric utilities.

2.2.5 Endesa Ireland

Endesa Ireland was established as an operating company on 8th January 2009, following Endesa's acquisition of certain generation assets from the Irish state utility, Electricity Supply Board (ESB). The sale, worth €450 million, was signed in Dublin following approval from the appropriate regulatory bodies.

The assets purchased comprise 1,068 MW divided up between four sites, Tarbert in Kerry, Great Island in Wexford, Rhode in Offaly and Tawnaghmore in Mayo.

This acquisition presents Endesa with the environmental challenge of improving the efficiency of current plants and the construction of new ones with cleaner generation technologies. Endesa are developing an industrial plan for repowering and improving the efficiency of the plants it has acquired.

The project assessed within this environmental impact statement involves constructing a new Combined Cycle Gas Turbine generating station on the existing generation site in Great Island, Co. Wexford, adjacent to the existing heavy fuel oil power station that is currently in operation. The new development will demonstrate significant improvements and a substantial increase in operating efficiency over the existing development. In order to assess the impact of this project Endesa Ireland has brought together a broad-based collaboration of highly skilled and experienced engineers and environmental consultants experienced in the permitting, licensing and engineering of power generation facilities of both in Ireland and abroad.

2.3 Need for the Development

2.3.1 General

The proposed development in Great Island is a CCGT generating station with an electrical output of circa 430 MW. This power plant, when developed, will be one of the most efficient CCGT generating stations on the all-Ireland grid. The development will use best available technology in defining and achieving such high levels of efficiency which will result in reducing environmental impacts and also optimising electricity generation for each unit of fuel used. The modernisation of Great Island power plant, and the introduction of Endesa in general, will promote the strategy of competition in the Irish energy market which will directly promote competitive energy prices. Achieving a reduction in the cost of energy absorbed by business in producing goods and services is critically important as Ireland competes on a global basis for economic survival, in terms of Ireland's domestic entrepreneurs and also in terms of attracting inward investment.

Figure 2.5 and 2.6 below illustrate market operation in the Irish electricity system. Figure 2.5, Typical Profile of Electricity Generation System, demonstrates the typical types of technologies that are used to satisfy the electricity demand. As the technologies move from left to right across the chart it becomes more expensive to produce electricity as the technology is older and / or less efficient, therefore the price of electricity is higher to the end user. This is termed the "merit order" of generation on the system.

Figure 2.6, Typical Profile of Electricity Generation System with New CCGT Entrant, demonstrates that new, more efficient technologies, with cheaper generation cost, push old and expensive technologies out of the primary market. The capacity surplus, i.e. the older technologies, typically remain for security of supply reasons as required in an island system, but competition and lower cost is brought by new technologies.

For example in both graphs the demand is constant and in Figure 2.5 the demand is being satisfied by a mix of generation including renewable, Combined Heat and Power (CHP), CCGT (new and old), coal boiler, gas boiler and fuel oil boiler, with open cycle distillate turbine in reserve for system back-up.

When the new CCGT plant is introduced in Figure 2.6 it is placed immediately after the renewable and CHP generation in the merit order therefore system demand (remaining constant) is now satisfied by renewable, CHP, CCGT (new and old), coal boiler, with gas boiler and fuel oil boiler being forced out of the primary market into reserve with open cycle distillate turbine for system back-up. In this instance the new CCGT is more efficient then older CCGT, gas boiler and fuel oil boiler therefore is dispatched by the market and has an overall positive impact on electricity price. This impact is also positive from an environmental perspective as older, less efficient, technologies are being forced out of the primary market. It should also be noted that a new CCGT will always be placed after renewable generation on the grid.

Figure 2.5: Typical Profile of Electricity Generating System

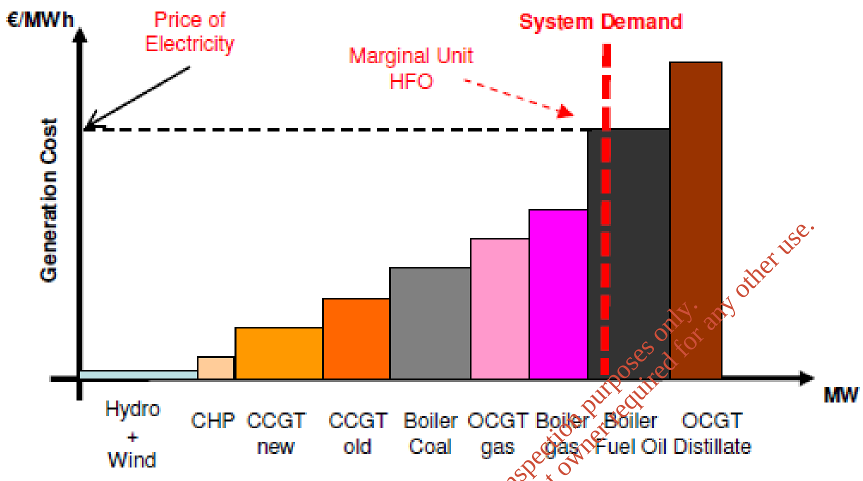
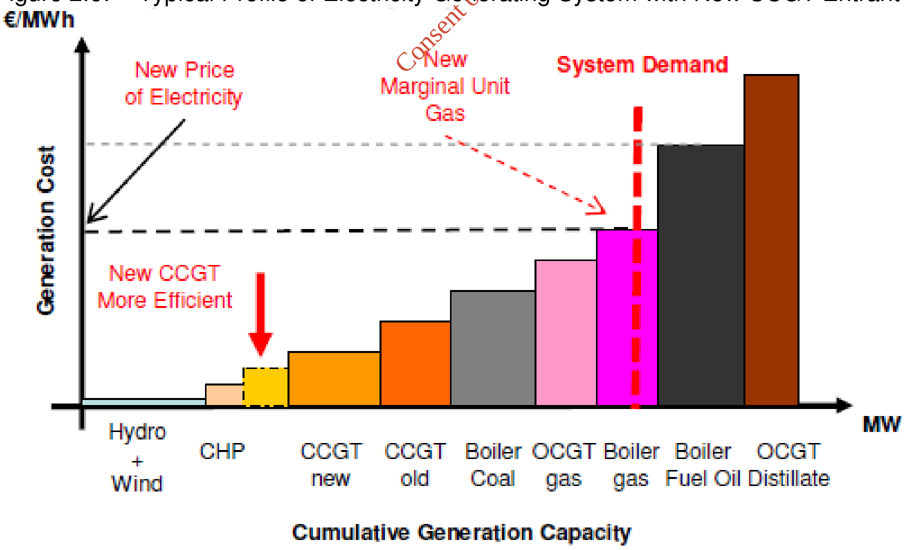


Figure 2.6: Typical Profile of Electricity Generating System with New CCGT Entrant



Maintaining "security of supply" and achieving the appropriate grid balance is critically important, not only to satisfy Ireland's own requirements but also to attract inward investment. It is essential that Ireland has a stable system with adequate capacity to meet demand when required thereby ensuring grid integrity and reducing / eliminating the possibility of grid outages. When improving the Irish electricity system it is therefore critical to ensure best in class technology is used to promote efficiency and reliability. The technology chosen for the development in Great Island will achieve these objectives

Recognising the importance of the integrity of the grid and maintaining Ireland's security of supply, EirGrid forwarded a letter to CER on October 31st, 2007 detailing the requirements of the grid in general and specifically in relation to the sites in the Asset Strategy Agreement. This letter, referenced *"EirGrid Input to ESB Asset Strategy"*, described the impact of new generation on the grid in the Great Island region as follows:

"In addition to the information contained in the Forecast Statement, EirGrid has previously carried out studies as to the effect upon the network should there be a plant closure, and no replacement, at Great Island. These studies showed that significant problems arise in the South East of the country which would necessitate large scale reinforcement in this area to resolve. Additional generation in the area, although is likely in itself to cause some need for reinforcement, is also likely to alleviate a portion (the scale dependent on size and location) of the aforementioned reinforcement needs in the South ease and reduce the overall needs in the area".

A copy of the letter is provided in Appendix 2.1 (EirGrid Input to ESB Asset Strategy).

2.3.2 Government Policy

As mentioned above security of electricity supply is identified as crucial for the economy and in the Government White Paper, entitled *Delivering a Sustainable Energy Future for Ireland* (*Energy Policy Framework 2007 – 2020)*, the need for robust electricity networks and electricity generating capacity to ensure consistent and competitive supply of energy is highlighted.

The above mentioned paper also highlights the need for additional electricity generating capacity and improved availability of existing generating stations with the following statement:

"*Achieving an adequate safety margin between electricity supply and demand requires additional generating capacity including flexible plant and significantly higher standards of generating plant availability, as well as more interconnection. We will ensure that the strategic network development approach is underpinned by coordinated local, regional and national approaches to issues, which balance local interests with the national imperative to deliver strategic energy infrastructure. This approach will be supported by the new arrangements provided for in the Planning and Development (Strategic Infrastructure) Act 2006*".

The paper further reinforces the need for additional capacity and the need to replace older technology with new more efficient technology, stating:

- *"We will oversee the transformation of the generation portfolio between 2007 and 2013 through the CER-ESB Agreement on planned divestment of 20% of the existing ESB conventional plant portfolio by 2010*
- *We will under the National Energy Efficiency Action Plan, introduce measures to further enhance the energy efficiency of the power generation sector which will contribute to demand management and security of supply*
- *We will need substantial new investment in conventional power generation of the order of at least 1,000 MW to 2013 to meet demand growth and the planned closure of older plants. However, the carbon intensity of electricity production will continue to be progressively reduced with greater penetration of renewable energy, co-firing with biomass, and the planned*

replacement of older generation plant with modern efficient power generation facilities to 2020. Gas fired power stations will continue to play a key role over the period".

CER decision paper "*Proposed Direction on Conventional Offer Issuance Criteria*" (July 2009), a paper that is specifically associated with Gate 3 connection direction, compliments the Government White Paper with the following statement in relation to the requirement for additional conventional generation:

"Consequently, in order to protect electricity security of supply, it is necessary to ensure that a mix of energy sources (other then wind on its own) is connected to the network. This means that conventional generation, which is a predictable form of generation output, is required in order to maintain security of supply, i.e. "keep the lights on". As noted in section 4, one of the Commission's statutory duties is to ensure that security of supply is protected by taking such measures as are necessary to do so. In accordance with this duty and the Commission's objectives for this process, the Commission considers that processing a number of conventional applications alongside renewable generation in Gate 3 is therefore required in order to protect long term security of supply".

2.3.3 The Need for Competition and Liberalisation of the Electricity Market

In order to try and develop a competitive market it is critical that there is competition, particularly in a traditionally monopolistic marketplace such as the Irish energy market. The Government's White Paper on energy, which sets out Ireland's energy policy framework to 2020, provides for the divestment and repowering of certain ESB generating plant. This is in order to aid security of supply, integration of renewable generation, liberalisation of the electricity market and the promotion of competition. The Government endorses the case for a process of structural change in the energy market. A key policy objective is the enabling of competition and delivery of consumer choice through this structural change.

In this vein the Asset Strategy Agreement (ASA) was entered into between CER and ESB in April 2007 for the sale of certain ESB power stations, with the objective to reduce ESB's dominant market share and promote competition for the benefit of the end customer.

The CERs statutory function to promote competition and security of supply is particularly served by enabling third parties to proceed with the grid connections previously allotted to ESB, otherwise acquisition of the sites would not have been commercially attractive and hence there would be no competition gains.

Part of the strategy to promote such competition is evident in the Gate 3 "*Proposed Direction on Conventional Offer Issuance Criteria*". In this paper the Commission states:

"in the Gate 3 direction, it would only "bring forward" projects for connection that were warranted on the grounds of their wide systemic/public benefit and where this could not have disproportionate impact on other applicants. This must be read in the context of the stated determination on the part of the Commission to take account of the overall objective of the Asset Strategy Agreement. This is because delivery in full on that Agreement is entirely consistent with Government Policy and the Commission's obligations under its statute to promote competition in the generation and supply of electricity. The forthcoming energisation of ESB's new Aghada plant was authorised by the Commission only as a quid pro quo for successful delivery of the divestment and repowering of the ESB plant such as was contained in the Asset Strategy Agreement. Therefore, if the Asset Strategy is not successful, the ESB's market share could in fact be increased, which would be contrary to Government policy and the Commission's duty to promote competition".

The market entry strategy of Endesa will increase levels of competition while the efficiency of the technology proposed will reduce environmental emissions and energy cost to the end user.

2.3.4 Generation Mix (Wind and Conventional)

While the increasing levels of wind penetration will make a valuable contribution to fuel diversity, sustainability and emissions reduction, there are issues surrounding the reliability of supply resulting from wind generated electricity and the amount of the actual wind generation i.e. capacity credit into the transmission system. The intermittent nature of wind means that the contribution of wind power to generation adequacy is significantly less than its installed capacity. EirGrid have classified this type of plant as non-fully-dispatchable i.e. they cannot be relied upon to generate electricity as and when required.

Generation adequacy is defined as the ability of all the generation units connected to the electrical power system to meet the total demand imposed on them at all times. The demand includes transmission and distribution losses in addition to customer demand. When considering the generation adequacy of wind as an energy source, wind is given a lower ‘capacity credit’ than conventional thermal generation, primarily because of its intermittent nature. This capacity credit is used by the system operator, EirGrid, when assessing the adequacy of overall generation capacity to meet the predicted demand. The capacity credit for Wind Power Generation (WPG) is predicted by EirGrid in the *Generation Adequacy Report 2009 – 2015* (GAR 2009 – 2015) to decrease from 19% in 2009 to 12% by 2015 as illustrated in Table 2.1: Wind Capacity Forecast and Associated Capacity Credit.

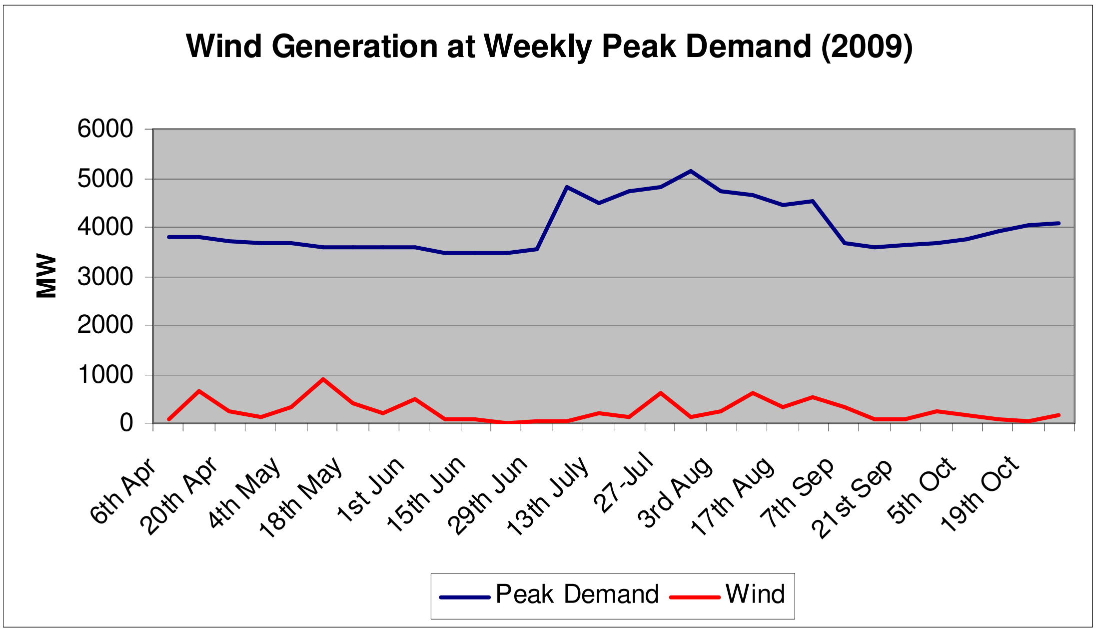
Table 2.1: Wind Capacity Forecast and Associated Capacity Credit

	2009	2010	2011	2012	2013	2014	2015
Installed Wind Capacity (MW)	1248	1429	1723	2017	2231	2606	2900
Capacity Credit (MW)	234	250	274	294	313	329	344
Capacity Credit as % of Installed Capacity	19%	17.5%	16%	14.5%	13.5%	12.5%	12%

Source: EirGrid Generation Adequacy Report 2009 – 2015 (February, 2009)

The following comment in the GAR 2009 – 2015 should also be noted *“Although the expected large growth of installed renewable capacity will increase portfolio diversity, it will only offer a limited contribution to generation adequacy.”* This is further illustrated in Figure 2.7 which presents the results of CER weekly generation reports for 2009 to date.

Figure 2.7: Wind Generation at Weekly Peak Demand (2009)



Source: CER Weekly Generation Reports (www.cer.ie)

As a consequence, even though up to approximately 6,000 MW of non-fully-dispatchable wind capacity may be installed on the grid by 2020, a considerable amount of fully-dispatchable conventional thermal generating plant will also be required. This is necessary to provide system reserve and backup capacity for periods of low output from wind generators and for retirement and non-availability of the existing fully-dispatchable plant, in order to maintain an adequate security of supply standard.

In the CER proposed direction on Gate 3 offers *"Proposed Direction on Conventional Offer Issuance Criteria"* CER also assessed the strategy of Endesa in terms of the impact on renewable generation stating:

".. the Endesa re-powering connection applications are not expected to have a material adverse impact on the level of constraints borne by wind farms already connected or contracted to connect or due to receive a connection offer under Gate 3".

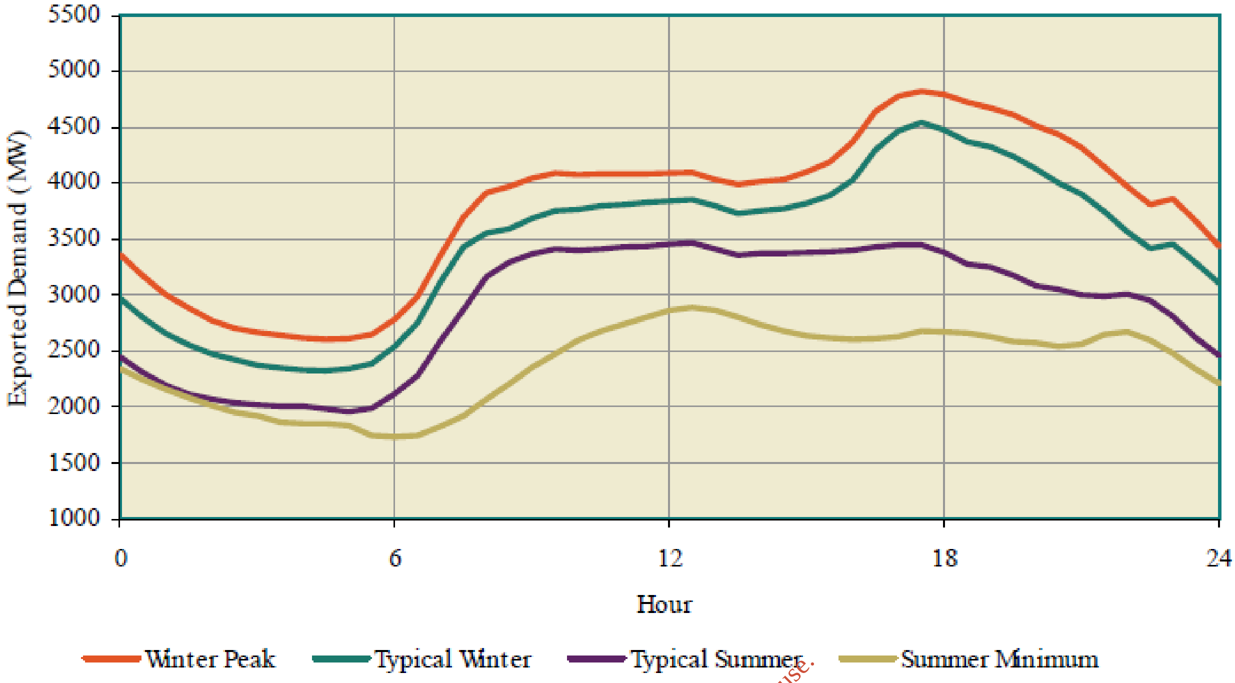
The proposed development at Great Island will satisfy the need for fully-dispatchable conventional thermal plant, will not have an effect on constraints borne by wind farms, will be one of the most efficient and reliable CCGT on the grid and will help reduce national environmental emissions by replacing older technology with new. The proposed CCGT power plant in Great Island will have a nominal capacity of 430 MW, and will therefore provide a significant contribution to the estimated future peak demand in Ireland from 2013.

2.3.5 Generation Requirements

2.3.5.1 Demand Profile

The typical demand profile on the Irish transmission system varies throughout the year. An example of the variation in daily electricity demand is illustrated in Figure 2.8 below.

Figure 2.8: Typical Daily Demand Patterns (2007)



Source: EirGrid Generation Adequacy Report 2009 – 2015 (February, 2009)

It can be seen from Figure 2.8 that the level of demand can vary within a 24 hour period from a low of approximately 1,750 MW to a peak of almost 5,000 MW. The typical base load requirement, of approximately 2,250 MW in winter and approximately 2,000 MW in summer, is generally provided by coal, peat and established CCGT units. Additional demand during daytime periods is met by CCGT, oil, hydro and Open Cycle Gas Turbine (OCGT). This mode of operation is commonly referred to as 'mid-merit' or two-shift operation. Peak demand and replacement reserves are met mainly by OCGT, pumped storage, hydro-electrical and a supply of electricity via the existing 450 MW capacity HV interconnector from Northern Ireland.

CER, in its document entitled *Criteria for Gate 3 Renewable Generator Offers & Related Matters: Direction to the System Operators* (16th December 2008) proposed the type of conventional power generation capacity and interconnection portfolio needed by 2025 to support a high level of wind penetration, as presented in Table 2.2.

Table 2.2: All Island 2025 Portfolio

Generation Type	Size (MW)	Number	Total (MW)
Base	500	8	4,000
Mid Merit	350	8	2,800
Peaking	100	16	1,600
CHP	100	4	400
Interconnectors [1]	450-500	3	1,450

Note: (1) The new North-South and East-West Interconnectors are due to be commissioned in 2012 / 2013.

2.3.5.2 Future Requirements and Generation Mix

GAR 2009 - 2015 outlines the predicted electricity demands for the island as a whole for the years 2013, 2014 and 2015. It was estimated that the electricity demand for 2013 would be in the region of

43 TWh, with a peak demand of approximately 7,571 MW. A slight increase in demand was expected between 2013 and 2015 with the electricity demand for 2015 estimated at 45 TWh and peak demand of approximately 7,946 MW. This was subsequently updated in July 2009 when EirGrid revised their demand forecasts and reassessed their original base case adequacy assessment due to the deteriorating economic situation in Ireland and the reduction in electricity demand since January 2009. EirGrid anticipates that demand is to recover slowly to 2008 levels by 2012 – 2014 with the system above security of supply standard for all years up to 2015.

A comparison of alternative portfolios with different mixes of CCGT units and OCGT units was examined by the Department of Communications, Energy and Natural Resources (DCENR) in the *All Island Grid Study (January 2008)*. Part of this study compared the generation dispatch patterns and associated costs and carbon emissions to meet “all island” demand in 2020 for these alternative portfolios. The study concluded that the portfolio with the larger proportion of OCGT units had higher operating costs and also higher carbon emissions owing to the lower efficiency of the OCGT units. Therefore it is essential that the portfolio of units on the grid has a sufficient number of reliable CCGT units in order to increase efficiency of the overall system, reduce the impact on the environment and also reduce the cost of energy to the end user. With this in mind the proposed development in Great Island will be an important contribution to the Grid.

2.4 Site Selection

2.4.1 Market Entry and Site Selection

Site selection is a critical factor in any large development but is particularly critical in terms of power generation as there are essential ancillary requirements and grid connection that are only present in select locations. It is very important therefore that a robust site selection process is followed by a developer or, in this case, by a market entrant to ensure minimum environmental impact of the actual development and ancillary services (e.g. additional overhead power lines). Such impacts need critical consideration in terms of “Greenfield” sites versus “Brownfield” sites.

According the Department of Environment, Heritage and Local Government document *Guidelines for Planning Authorities on Residential Density, 1999*, a “Greenfield” site, as the name suggests is “*Potential development land on the periphery of urban settlements having no previous building on it*” whereas a “Brownfield” site is defined as “*Any land which has been subjected to building, engineering or other operations, excluding temporary uses or urban green spaces*”.

Endesa set key criteria to acquire regulated Brownfield sites, with a history of environmental compliance, that are suited to continued use, consistent with their established use as power generation facilities. This not only reduces the environmental impact of developing a Greenfield site but also ensures the ongoing monitoring and maintenance of the Brownfield site. The possibility of acquiring a Brownfield site is considered beneficial to a market entrant in terms of mitigating against the environmental impact of a development. This is reinforced by the level of interest displayed by potential market entrants as part of the Asset Strategy Agreement, including four global energy organisations (currently not present in Ireland), involved in the public tender / acquisition process of the divested ESB sites.

The environmental and public interest impacts / benefits associated with re-powering an existing “Brownfield” site as opposed to developing a “Greenfield” site is recognised by CER in their Gate 3 proposed offer paper *Proposed Direction on Conventional Offer Issuance Criteria* which states:

“The environmental and public interests benefits from re-powering an existing “brownfield” site as opposed to developing a new “Greenfield” site must be taken into account by the Commission in light of its statutory duties. The transferability of existing capacity at Great Island and Tarbert is also

consistent with the encouragement of the efficient use of production of electricity by the Commission. As Endesa's connections at Great Island and Tarbert are not "Greenfield connections", connection of the proposed new stations current capacity would not result in significant additional network capacity requirements as the necessary infrastructure for the current capacity rights is already in situ".

As mentioned previously Endesa were successful in acquiring a number of Brownfield sites as part of the Asset Strategy Agreement and are now committed to developing clean, efficient and reliable technology on these sites using the existing infrastructure that is currently in place.

Part of the formal legal agreement of the Asset Strategy Agreement (which included the Great Island site), dated 27th April 2007, directed ESB to sell sites with export capacity:

"The Sale Sites shall each have Export Capacity and such capacity shall be subject to the final approval of the Commission", therefore reducing the requirement for additional overhead lines".

Also as part of this agreement the acquired sites could only be purchased for the purpose of energy generation for the future:

"The Conditions of Sale in respect of each of the Sale Sites shall include a condition in the Approved Form that the relevant Sale Site shall only be used for the Use. The Commission shall be entitled to require that the said condition include a direct covenant from the proposed purchaser to the Commission that the Sale Site will be used only for the Use".

The objectives of the Asset Strategy Agreement are further reinforced in the agreement as follows:

"The Parties hereby acknowledge and confirm that one of the Commission's primary objectives of this Agreement is that:

12.2.1 the ESB has ceased and reduced its electricity generating capacity by 1500 MW on a phased basis.

12.2.2 new electricity generation capacity has been created on the market amounting to 1000 MW (or such lesser amount of MW acceptable to the Commission) on a phased basis and is being commercially operated by third parties, independent of ESB.

The proposed plant in Great Island will be a CCGT plant, will replace the existing Heavy Fuel Oil units and will continue the use of power generation on the site. This change in technology will result in significant improvements in efficiencies and environmental impacts. There will be a substantial reduction in greenhouse gas emissions and general water requirements, which is in accordance with the strategic goals outlined in the Government White Paper.

2.4.2 Available Infrastructure

The development of the existing Great Island power plant offers a number of advantages as outlined below.

- The site is located at the Barrow Estuary. The estuary provides a readily available supply of water for the purposes of once through cooling, which is considered to be the most energy efficient cooling system available for this type of plant. The infrastructure and abstraction methods for this cooling water are already in place and being used by the existing facility.

- The plant is currently regulated by the EPA under IPPC Licence Number P0606-02 and has an established record of compliance with the environmental regulatory authorities.

- Much of the existing infrastructure can be utilised, including but not limited to the existing cooling water inlet and outlet systems, process water reservoir, distillate storage, administration building, etc, thereby negating the need to undertake extensive refurbishment works as part of this project.

- The site is Brownfield and the development site of the CCGT plant will not require the acquisition or permanent development of any Greenfield areas.

- Great Island power plant became operational over 40 years ago. As such the site has a long history of power generation and an established infrastructure network, including connection to the 220 kV high voltage systems. As the necessary transmission infrastructure is already in place and available to take the electricity generated, it is not anticipated that there will be any requirement for works to upgrade the transmission infrastructure in the area.

In terms of grid integrity and maintaining a grid that supports the needs and demand of the country, it is important that the proposed power generation is located in an area where the national grid can accommodate such a connection and a location that reinforces areas of the grid that are deemed to require such reinforcement. With this in mind the *EirGrid Transmission Forecast Statement 2008 - 2014* provides the following guidelines for new connections:

"Connection of a large generator at any of the locations analysed is likely to require deep reinforcement of the transmission network to allow it full grid access. The results from the analyses do however indicate that in 2013 between 250MW and 400MW of generation can be accommodated at Arklow in Wicklow, Cashla in Galway and Great Island in Co Wexford".

In order to determine the capability of the grid to accommodate changes in generation and the opportunity for generation at various parts of the network, EirGrid performed an "Incremental Transfer Capability (ITC) analysis as outlined in the aforementioned EirGrid's document (2008). The purpose of the studies is to indicate the level of generation opportunity that exists at a comprehensive range of locations across the gird i.e. the capacity available for greater use of the grid without the need for upgrades beyond those already planned. In terms of connecting large generators, the appropriate stations are in the 220 kV and 400 kV categories. Of the total stations on the grid there are twenty-five 220/110 kV stations and four 400/220 kV stations. Of these twenty-nine stations, fourteen 220 kV stations and one 400 kV station were selected for the ITC analysis. The stations were then classified as follows to identify the level of availability at each station:

- *Very High – more then 400 MW*

- *High – between 250 – 400 MW*

- *Medium – between 100 – 250 MW*

- *Low – less then 100 MW*

The Forecast Statements presented the following transfer capability results from Great Island in 2010:

- *Dublin – "Very High"*

- *Northern Ireland – "Low"*

- *South – "Very High"*

- *West – "Very High"*

The 2013 transfer capability results from Great Island were detailed as follows:

- *Dublin – "High"*
- *Northern Ireland – "High"*
- *South – "high"*
- *West – "High"*

As referenced in Section 2.3 (Need for the Development), a letter between EirGrid and the CER, entitled *EirGrid Input to ESB Asset Strategy* details the requirements of the grid in general and specifically in relation to the sites in the Asset Strategy Agreement. Part of this letter assesses Great Island in terms of its suitability as a site for future development and generation capacity. The letter is favourable towards Great Island stating:

In general terms EirGrid can advise the Commission that Great Island is likely to be a good location on the network to connect a new base load generating station. The recently published Forecast Statement, although prepared upon a basis different to the type of analysis necessary for connection studies, identifies 250-400 MW of available generation capacity for connection at Great Island...."

2.5 Main Alternative Technologies Considered

As discussed, the development of a base load plant was determined to be the optimum choice for Great Island in light of EirGrid's input to the Asset Strategy Agreement.

The potential plant configurations that were considered for this role included:

- Combined Cycle Gas Turbine (CCGT) plant
- Open Cycle Gas Turbine (OCGT) plant
- Conversion of the existing Units
- Large Scale Combined Heat and Power (CHP) plant

2.5.1 Combined Cycle Gas Turbine Plant

CCGT technology has been in operation in Ireland for many years with continual technological improvements in design, efficiency and reliability. Over the past 10 years there has been a significant increase in such technology in Ireland e.g. Huntstown Phases 1 and 2, Tynagh, Poolbeg and Ringsend with two such plants currently under construction at Aghada and Whitegate and further plant planned for a site in Louth, amongst others.

The key benefit of this technology is that it is the most efficient method of generating electricity from a primary fuel source such as natural gas. This means, that it also has the lowest greenhouse gas intensity of any such power plant type. This fact has meant that CCGT plants have traditionally fulfilled a base load running profile in electricity markets as they generate the cheapest electricity.

2.5.1.1 Combined Cycle Gas Turbine Plant with Air Cooled Condenser

The purpose of an Air Cooled Condenser (ACC) in terms of combined cycle technology is to provide plant cooling where there is no source of water cooling. The ACC is a considerable sized structure and is also a large generator of noise emissions. The ACC is also intensive on potable water use thereby resulting in larger requirements from the local regional water system then those required for a water-cooled plant. CCGT plants using ACC rather then once through cooling water (as per existing operations at Great Island) also have lower efficiency ratings. Furthermore, the re-use of the existing cooling water system at Great Island complies with the principles outlined in the *Integrated Pollution Prevention and Control (IPPC) Reference Document on the application of Best Available Techniques to Industrial Cooling Systems, December 2001* as discussed in Chapter 14 (Surface Water).

2.5.2 Open Cycle Gas Turbine Peaking Plant

OCGT technology (which does not utilise waste heat content in the gas turbine exhaust gases for steam generation) can offer great flexibility but with high associated generating costs. As a result OCGT's are generally considered more suited to peaking plant operation. With the projected significant increase in wind power generation in Ireland up to 2020, and beyond, it is expected that there will be a substantial increase in such peaking plant development in areas of high wind penetration to cater for the intermittent nature of wind generated electricity. A detailed description of the open cycle process is provided in Section 3.12 (Combined Cycle Gas Process).

2.5.3 Conversion of Existing Units

The existing units on the Great Island site are all approaching the end of their useful life cycle. Technical and financial assessments on the conversion of the existing units from Heavy Fuel Oil (HFO) operation to operation on natural gas have determined that it is neither technically nor economically feasible.

2.5.4 Large Scale Combined Heat and Power Plant

In such plant, the waste heat content in the gas turbine exhaust gases is used to produce process heat in the form of steam and / or hot water which is then used for another industrial purpose, such as drying or curing. The by-product electrical power is then exported onto the local electrical grid. For example, such a plant exists at the Aughinish Alumina facility whereby approximately 150 MW of electrical power is exported onto the local networks system.

In the much colder climates of Northern and Central Europe, CHP technology is also frequently used to provide heat for municipal district heating schemes in densely populated towns and cities. No such system exists in Ireland although there is one being considered for the Ringsend area of Dublin which will produce waste heat from a planned waste incinerator. Carbon neutral fuels, such as biomass or waste streams, may also be used to fire the boiler and a typical example of this is the BALCAS facility at Enniskillen, County Fermanagh in Northern Ireland.

CHP technology is not suitable for the development at Great Island as there are no complementary industrial or district heating loads in the vicinity of the site that could consume the heat output from the size of gas turbine generator envisaged for the site.

2.6 Alternative Fuels Considered

When considering the optimum fuel type for the operation of a baseload plant a number of factors need to be considered namely;

- Environmental Impacts
- Investment Costs

- Operational Efficiencies and Unit Size
- Site Footprint
- Security of Supply

Solid fuels, such as coal and peat, present significant investment costs in relation to emissions control, environmental monitoring and fuel handling and delivery. The efficiencies of such facilities are inherently low requiring large unit sizes and development footprints in order to meet the baseload requirements for the scale of plant proposed at Great Island. While the proposed CCGT can operate on distillate oil it is not considered economically viable, in addition, such full load operation of the plant would necessitate fuel oil deliveries in the order of 730,000 tonnes per annum.

Natural gas is a clean fuel with negligible sulphur and particulate matter content. The fuel can be piped directly to the site negating the requirement for transportation of a primary fuel source by road. Operation of a 430 MW plant at full load firing on natural gas will also result in significant reductions in Carbon Dioxide (CO_2) emissions. The emissions intensity of the proposed power plant (assuming natural gas as the primary fuel) has been estimated and compared to other types of combustion plant. Based upon normal operating conditions, the emissions intensity of the plant are:

- CCGT at Great Island: 0.3429 tCO_2 / MW;
- Coal fired power station: 0.8505 tCO_2 / MW;
- Modern coal fired power station: 0.7560 tCO_2 / MW; and
- Oil fired power station: 0.6957 tCO_2 / MW.

Modern gas combustion plant in CCGT operation is widely recognised as being the most carbon efficient combustion technology and has been widely deployed throughout Europe.

Gas must be brought from the main Bord Gáis Networks gas main, although the gas line project is not part of this application Endesa are required to provide the financial support for delivery of the gas to site. It is envisaged the length of the line will be approximately 40 kilometres, Gaslink and Bord Gáis Networks are responsible for delivering gas to site and are currently in the process of developing a planning application under the *Planning and Development (Strategic Infrastructure) Act, 2006* in relation to the required connection. As part of the Asset Strategy Agreement the ESB have committed to providing part payment of the gas line to Great Island. It is also considered that the gas connection will encourage much needed critical infrastructure to the south east region.

Endesa therefore considers the optimum choice for the Great Island development to be a base load natural gas fired CCGT plant.

2.7 Do Nothing Scenario

As detailed in Section 2.4.1 (Market Entry and Site Selection) the formal legal agreement regarding the sale of ESB assets stipulated that the acquired sites could only be purchased for the purpose of energy generation for the future.

The existing generation facility at Great Island has been operational for over 40 years and includes an existing 220 kV substation, an established infrastructural network and a readily available supply of water. As such it is not considered probable that electricity generation at the Great Island site would cease, should the proposed development of a CCGT power plant not proceed. In effect, it is planned to develop the site for future power generation. However, as a base load CCGT power plant has been determined to be the optimum choice of plant for the scale proposed at Great Island it is not possible to present probable alternative proposals at this stage, should the proposed development not proceed.

Although the cessation of power generation activities at Great Island is not considered to be reasonably foreseeable, in the unlikely event of cessation of electricity generation activities at Great Island the likely consequences would include loss of full-time permanent employment and the requirement for significant reinforcement works of the transmission network to facilitate full grid access and meet demand in the south east, as described in the letter *"EirGrid Input to ESB Asset Strategy"*:

"EirGrid has previously carried out studies as to the effect upon the network should there be plant closure, and no replacement, at Great Island. These studies showed that significant problems arise in the south east of the county which would necessitate large scale reinforcement in this area to resolve. Additional generation in the area, although is likely in itself to cause some need for reinforcement, is also likely to alleviate a portion (the scale is dependant on size and location) of the aforementioned reinforcement needs in the south east and reduce the overall needs in the area".

3. Description of the Development

3.1 Introduction

This chapter of the EIS provides the background to the proposed development and details the principal elements of the power plant. A description of the development site and surrounding area and the technology of the proposed development are provided. The principal plant components, processes and materials consumed are identified. Construction and operational management of the plant are described The provisions for decommissioning of the existing and proposed plants are also discussed.

3.2 Proposed Development

The existing power generation plant comprises the Units described in Table 3.1 hereunder;

Table 3.1: Existing Power Plant Units

Unit No.	Electrical Rating (MW)	Year Commissioned
1	60	1967 / 1968
2	60	1967 / 1968
3	120	1972

It is proposed to construct a 430 MW natural gas fired Combined Cycle Gas Turbine (CCGT) power plant within the confines of the existing site. Subject to planning permission being granted the proposed development will be commissioned in 2012.

The existing Heavy Fuel Oil (HFO) fired power plant will continue to operate until the new CCGT becomes operational and will then be decommissioned.

The primary fuel to be used will be natural gas, as provided by BGE Networks. The secondary or back-up fuel will be distillate fuel oil. The distillate oil will be limited to 0.1% sulphur as per the requirements of *EU Directive 1999/32/EC, (relating to a reduction in the sulphur content of certain liquid fuels).*

3.3 Demolition of the Existing Plant

Endesa will apply for planning permission to Wexford County Council for the demolition of the existing generation plant within six months of decommissioning of the existing power plant. The application will be accompanied by an environmental assessment, as required by the planning authority and relevant stakeholders.

Under the terms of the approved IPPC licence (Registration Number P0606-02) for the existing facility; following termination or planned cessation for a period greater than twelve months of use or involvement of all or part of the site in the licensed activity, Endesa is obliged to decommission, render safe or remove any soil, subsoil's, buildings, plant or equipment, or any waste materials or substances or other matter contained therein or thereon, that may result in environmental pollution.

A Residuals Management Plan (RMP) for the existing plant has been approved by the Environmental Protection Agency (EPA), outlining the activities to be undertaken during the decommissioning of the existing Units as required under the IPPC licensing regime. Demolition of the existing Units, and their associated stacks, will be subject to further consultation with EPA, and the conditions outlined in the RMP, a copy of which is provided in Appendix 3.1 (Residuals Management Plan).

A validation report will be submitted to the EPA for approval within three months of completion of the RMP. The report will address the following:

- Disposal of materials
- Decontamination of items of plant and equipment
- Decommissioning of plant and equipment
- Results of monitoring and testing
- The need for ongoing monitoring and investigation

Although Endesa is not seeking planning permission for demolition of the existing Units as part of this planning application, following consultation with members of the local community, it is considered that the provision of additional information, in support of the approved RMP, would be of benefit in informing local stakeholders of the potential environmental effects associated with demolition of the existing Units and proposed mitigation measures that are considered appropriate at this stage of the process.

This assessment, which includes cumulative effects where predicted, is provided in Appendix 3.2 (Preliminary Demolition Environmental Assessment) and includes a brief overview of environmental considerations only. It is not possible to undertake a comprehensive assessment of all environmental factors at this stage for the following reasons:

- A detailed programme for demolition of the existing Units will require agreement between the Commission for Energy Regulation (CER), ESB Networks / EirGrid and Endesa
- The existing turbine hall contains certain network assets (i.e. control and protection equipment for the 110 and 220 kV compounds) which are controlled by EirGrid, the national transmission system operator. The scheduling for decommissioning and demolition of this building will therefore require agreement between EirGrid and Endesa
- Demolition of the existing Units will require careful consideration of the environmental and engineering considerations associated with demolition of the existing Units in proximity to the proposed CCGT, which will be fully operational during the demolition phase of the existing Units
- It is not possible to comprehensively identify all the elements of the existing development as this would require destructive testing on the current available and operational equipment and sub-ground level investigation under the existing units

Once definitive timelines can be agreed, after decommissioning of the existing facility, a comprehensive assessment of engineering and environmental considerations will be developed by Endesa and agreed in full and open consultation with members of the local community, Wexford County Council, EirGrid, CER and other appropriate statutory stakeholders, including National Parks and Wildlife Service (NPWS). As detailed previously, Endesa is committed to applying for planning permission for the demolition of the existing Units within six months of decommissioning of the existing power station and is obliged to undertake comprehensive assessments under the conditions of the

IPPC licensing regime. In addition, the appropriate financial provision has been included in the annual financial report for Endesa to cater for the eventual demolition exercise.

3.4 Operational Regime of the Proposed New Plant

The CCGT Plant will operate principally as a base load plant, with a high annual capacity factor, at or near 100% load during weekday daytime hours and reduced load or shut down during the night and at weekends, when necessary, in accordance with the operational criteria outlined in Table 3.2.

Table 3.2: Operational Regime of Proposed New Plant

Operational Mode	Operational Regime
Base load	Full base load Base load - 5 days Base load 8,000 hrs
Shift operation	2 shifting 4000 to 6000 hrs per year 5 days 16 hours 180 stop/starts

The operational requirements of the proposed power plant will be set down by the Transmission System Operator (TSO) i.e. EirGrid. Refer to Chapter 4 (Legislation).

3.5 Site Location

The Great Island site is an existing power generating plant located in the townland of Great Island, Co. Wexford, (OS Grid Reference: E 268907, N 114574). Refer to Figure 3.1: Site Location.

The development site is Brownfield and located within the confines of the existing operational power plant facility, formerly operated by ESB. The Great Island power plant occupies an area of approximately 58 hectares (143 acres). The proposed development site will occupy approximately 8 hectares (19 acres). Refer to Figure 3.2: Proposed Development Site.

The topography of the development site is generally flat, approximately 7.0 metres Above Ordnance Datum (AOD) Poolbeg. The ground profile changes to the north of the development site rising to approximately 36 metres before sloping downwards to approximately 10 metres. It is proposed that the area to the north of the development site will be utilised as a construction laydown area. The area is currently under planted tree cover. It is proposed to clear an area of approximately 2.26 hectares (5.6 acres) and level the area in question. As the area is under cover it is not possible at this stage to obtain accurate topographical data, the references provided above are based on mapping from the 1970's which cannot be verified until the area is cleared.

The surrounding area is predominantly characterised by agricultural lands. The Waterford to Wexford railway line runs under the site access road immediately north of Great Island power plant. Agricultural lands are located further north of the site and to the east. The site is located at the confluence of the River Suir and River Barrow, on the shores of Waterford Harbour. The Barrow River Estuary is a proposed Natural Heritage Area (pNHA – the basic designation for wildlife). The River Barrow, River Nore and Lower River Suir are designated Special Areas of Conservation (SAC – the prime wildlife conservation designation). Refer to Figure 3.3: Designated Conservation Sites and Chapter 12 (Flora and Fauna).

Access to the site is gained via a local road, the L8072, which connects the site to the R733, located approximately 5 kilometres to the east of the development site. The R733 connects with the N25, approximately 11 kilometres to the north east. During the construction phase it is intended to utilise a

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3. ALL SITE LEVELS REFER TO MEAN SEA LEVEL VERTICAL DATUM AT POOLBEG.
4. GENERAL SITE LEVEL IS +7.00M O.D.

Site Boundary

Property Boundary

Rev	Date	Drawn	Description	Ch'k'd	App'd
P5	05/11/09	AV	Issued with Planning Application	KMc	DMc
P4	27/10/09	AV	Revised as per Endesa Comments	KMc	DMc
P3	23/10/09	AV	Revised as per Endesa Comments	KMc	DMc
P2	30/09/09	AV	Revised as per Endesa Comments	KMc	DMc
P1	30/07/09	VF	Issued for Approval	KMc	DMc

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Title

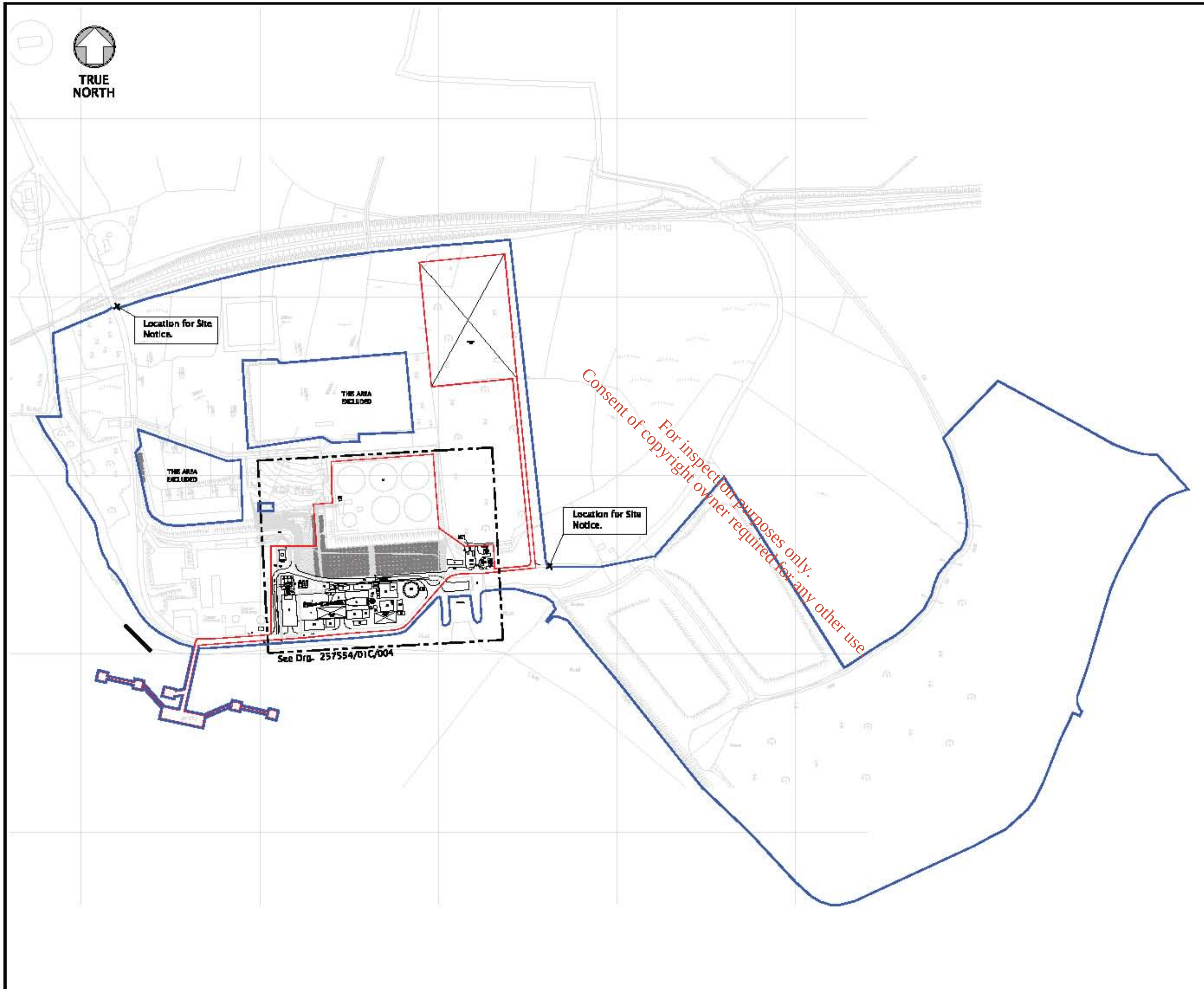
Combined Cycle Gas Turbine (CCGT)
Great Island, Co. Wexford

Site Location

Designed	.		Eng.Chk.	B.Kinsella	
Drawn	V.Farrell		Coordination	B.Kinsella	
Dwg.Chk.	V.Farrell		Approved	B.Kinsella	

Scale 1:10000 | Project 257554 | CAD file Figure 3.1 | Status APR

Drawing No Figure 3.1 | Rev P5



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3. ALL SITE LEVELS REFER TO MEAN SEA LEVEL VERTICAL DATUM AT POOLBEG.
4. GENERAL SITE LEVEL IS +7.05M O.D.

Legend

Site Boundary
Property Boundary

Scale

1:2500 — 0 — 125m — 250m

Rev	Date	Drawn	Description	Ch'kd	App'd
P7	11/11/08	AV	Issued with Planning Application	KMcC	DMcR
P6	03/11/08	AV	Revised as per Endesa Comments	KMcC	DMcR
P5	13/10/08	AV	Revised as per Endesa Comments	KMcC	DMcR
P4	22/10/08	AV	Revised as per Endesa Comments	KMcC	DMcR
P3	30/09/08	AV	Revised as per Endesa Comments	DC	DMcR
P2	26/08/08	AV	Issued for Approval	DC	DMcR
P1	30/07/08	VF	Issued for Approval	DC	DMcR

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Title

Combined Cycle Gas Turbine Great Island, Co. Wexford

Proposed Development Site

Designed	D. McDonald	Eng. Chk.	D. Carr
Drawn	C. Cunningham	Coordination	D. McDonald
Dwg. Chk.	C. Cunningham	Approved	D. McDonald

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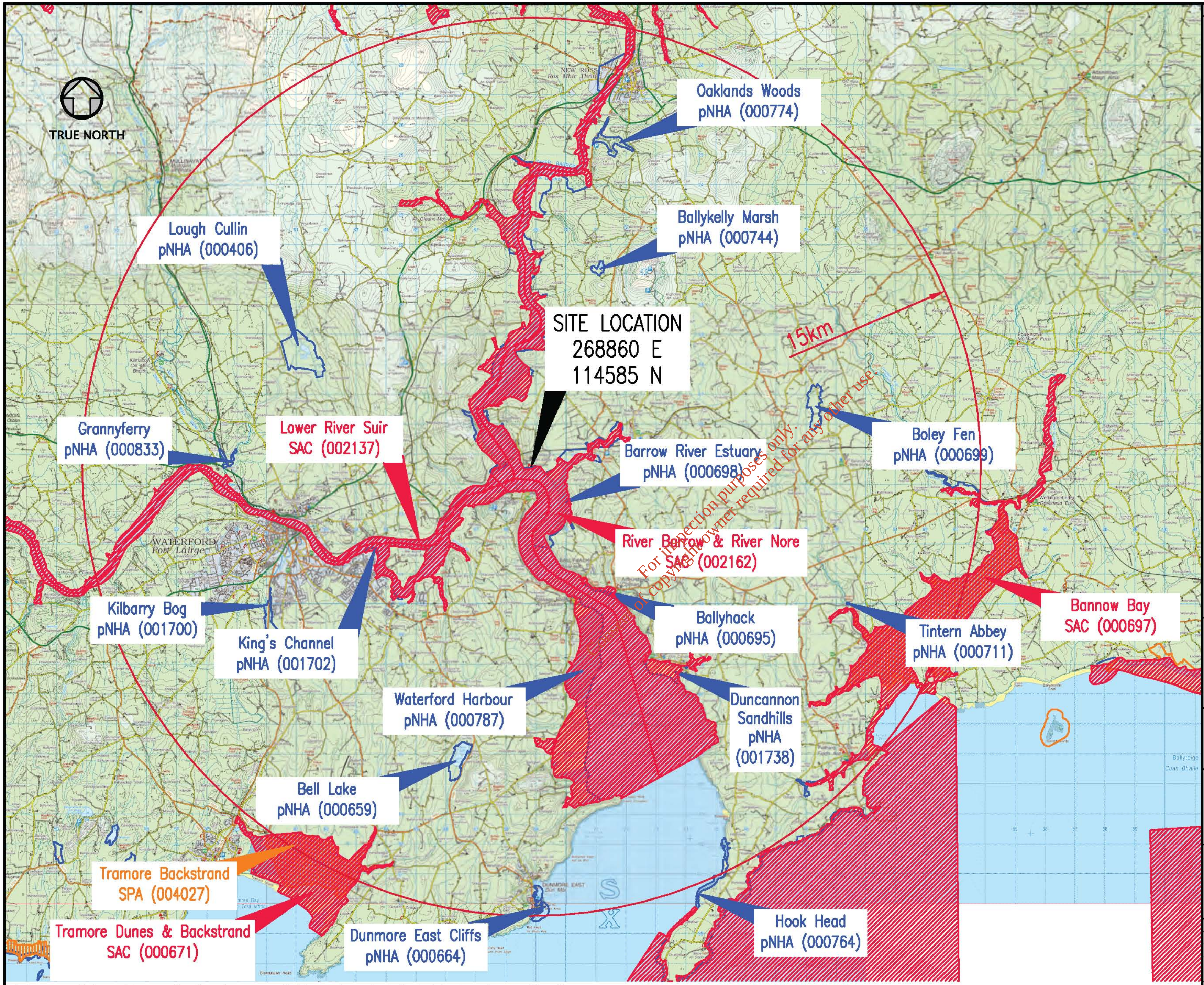

Notes

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2. All co-ordinates shown in metres to Irish National Grid

Natural Heritage Area (NHA)
Proposed Natural Heritage Area (pNHA)
Special Area of Conservation (SAC)
Special Protection Area (SPA)

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	02/11/09	SK	For Information Only	BK	PK

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Title

Combined Cycle Gas Turbine (CCGT)
Great Island, Co. Wexford
Designated Conservation Sites

Designed	SK	Eng.Chk.	-
Drawn	SK	Coordination	BK
Dwg.Chk.	DH	Approved	PK

Scale	Project	Status
NTS	257554	INF
	CAD file: Figure 3.3	
Drawing No: Figure 3.3		Rev: P1

Filename: Figure 3.3.dwg, Plotted by ken49363, on Nov 25, 2009 - 1:05pm temporary parking bay for HGV access adjacent to the L8072, in proximity to the R733 junction, as illustrated in Figure 3.1. Traffic impacts associated with the proposed development are discussed in Chapter 10 (Traffic).

The nearest area of settlement is at Cheekpoint, Co. Waterford, located approximately 700 metres to the south of the site. In County Wexford, the nearest significant area of settlement is Campile, located approximately 3.75 kilometres to the east. A number of one-off houses are located in proximity to the site boundary, the nearest occupied dwelling is located approximately 450 metres to the northwest of the actual development site. There are no schools, hospitals or churches located within a 1 kilometre radius of the development. The nearest school is located approximately 5 kilometres to the north east.

The proposed development site and the existing operating units are wholly owned by Endesa Ireland Limited.

3.6 Existing Site Layout

The existing power plant site includes the main elements as illustrated in Figure 3.4: Existing Site Layout. It is intended to re-use as much of the existing infrastructure as possible, however, the following equipment and facilities will have to be removed to allow the new plant to be constructed.

- Underground HFO Waste Store
- Underground Light Oil Waste Store
- Fuel Pump House
- Sewage Treatment Plant

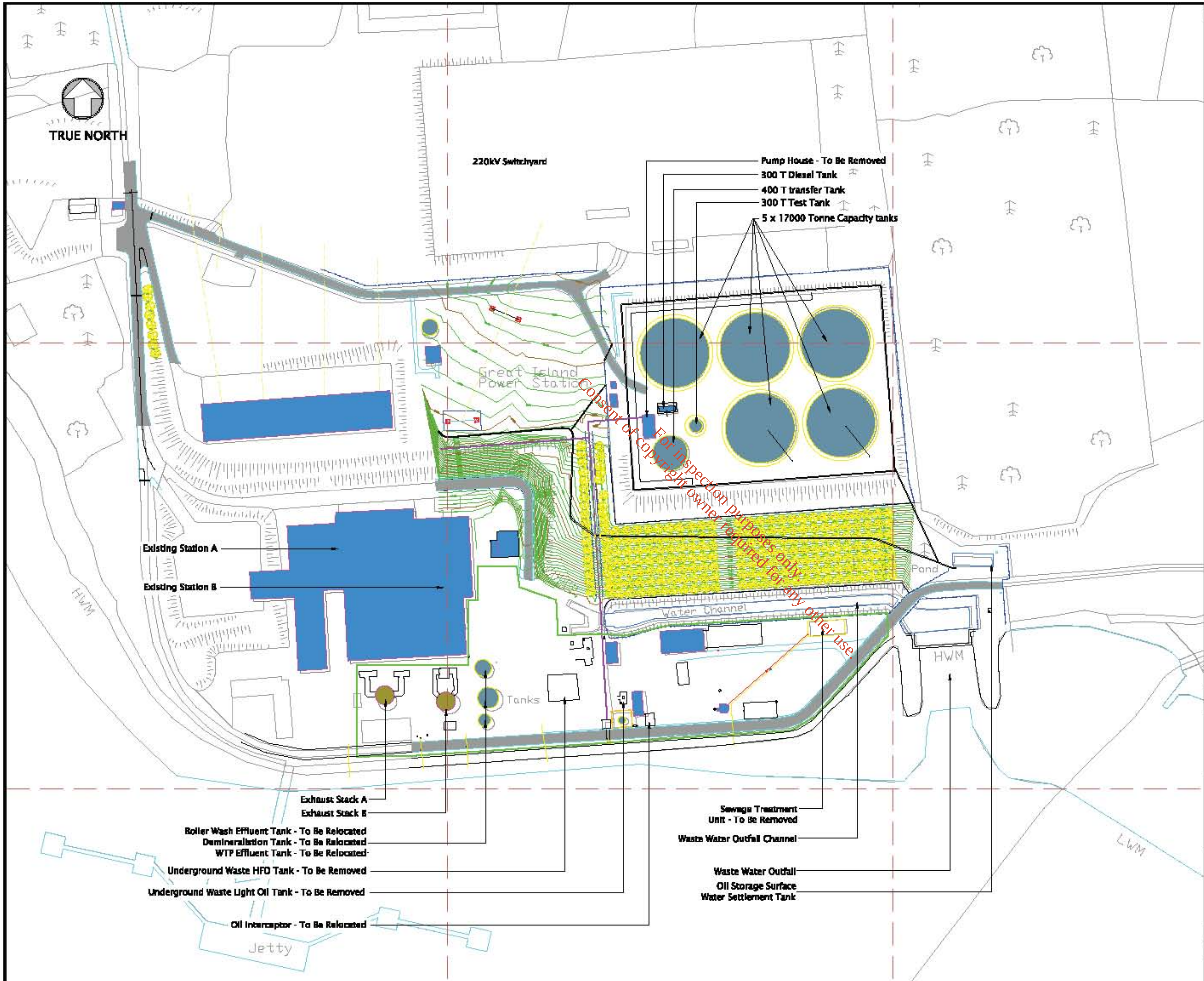
The removal of the above facilities and equipment will be incorporated into the Construction and Demolition Waste Management Plan and will be undertaken, in agreement with the EPA, in accordance with the conditions outlined in the Residuals Management Plan.

The following elements will require relocation to accommodate the drainage system of the new plant:

- Boiler Wash Effluent Tank
- Demineralisation Water Tank
- Water Treatment Plant Effluent Tank
- Process Waste Water Discharge Point SW13
- Oil Interceptor
- Stripping Tank
- Oil Spill Material Store

3.7 Requirement for Distillate Fuel Oil

Five days continuous operating capacity of distillate oil will be stored on site equating to approximately 11,000m^3 as required by the Secondary Fuelling Obligation, under CERs Decision Paper *CER/09/001*, *Secondary Fuel Obligations on Licensed Generation Capacity in the Republic of Ireland*. To comply



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Notes

1. Ordnance survey Ireland licence no. en0094509 © ordnance survey Ireland/government of Ireland
2. All co-ordinates shown relate to Irish national grid co-ordinates.
3. All site levels refer to mean sea level vertical datum at Poolbeg.
4. General site level is +6.60m o.d.

Site Boundary
Property Boundary

1:1000 0 50m 100m

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	05/10/09	SK	For Information Only	DH	PK

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Title

Combined Cycle Gas Turbine (CCGT)
Great Island, Co. Wexford

Existing Site Layout

Designed	-	Eng Chk	-
Drawn	S Kennedy	Coordination	D Hewett
Dwg.Chk.	D Hewett	Approved	P Kelly
Scale	1:1000	Project	257554
		CAD File	Figure 3.4
Status	PRE		
Drawing No	Figure 3.4	Rev	P1

with this requirement, it is intended to refurbish one of the existing 5 x 17,000 tonne capacity HFO storage tanks for the storage of distillate oil.

The tank will be completely drained and cleaned with all internal traces of HFO removed. A thorough NDT (Non-Destructive Testing) inspection will be undertaken and any necessary repair works will be carried out. The existing earthen bund and concrete lining will be refurbished. This work will be subject to detailed method statements which will be developed and agreed with Wexford County Council and EPA prior to any refurbishment works taking place.

Due to the volume of distillate oil required to be stored on site the proposed development has been accorded a lower-tier Seveso rating under the *European Communities (Control of Major Accident Hazards Involving Dangerous Substances), Regulations, 2006, (S.I. No. 74 of 2006)*. As such an assessment of containment measures for distillate fuel oil has been undertaken, in accordance with the requirements of the Health and Safety Authority (HSA). Based on this assessment it is proposed to increased the height of the existing bund wall by 2 metres and maintain the slope of the embankment at 60 degrees to the south, east and west sides of the storage area. A copy of the full assessment is included in Appendix 3.3 (Quantitative Risk Assessment – Land Use Planning Report). The requirements of the Seveso regulations are discussed in detail in Chapter 4 (Legislation).

3.8 Principal Design Objectives

The primary objectives of the proposed development are to:

- Comply with Government Policy in relation to generation requirements
- Meet the projected requirement for new electrical generation plant
- Reduce the proportion of greenhouse gas emissions per MWh of electricity generated by the use of high efficiency plant, thus contributing to Ireland's objectives in complying with its obligations under the Kyoto protocol
- Generate a commercial rate of return for Endesa Ireland Limited
- Enhance competition in the electricity generation market

3.9 Best Available Technology

The proposed plant design has been developed in accordance with *Reference Document on Best Available Techniques for Large Combustion Plants, (adopted July 2006), BAT Guidance Note on Best Available Techniques for the Energy Sector (Large Combustion Plants Sector), 2008.* Utilisation of the existing cooling water system also complies with the principles outlined in *Reference Document on the Application of Best Available Techniques to Industrial Cooling Systems, (December 2001)*, as discussed in Chapter 14 (Surface Water).

The development will employ Best Available Technique (BAT) technology recognised as being the most advanced for power production at the scale proposed. The high overall efficiency of the CCGT Unit will lead to lower specific emissions to the environment generally compared to any other form of conventional thermal power plant.

3.10 Grid Application

Endesa has submitted a grid application to EirGrid for a 431MW connection at Great Island 220 kV substation. EirGrid deemed the application to be complete as of 17th September 2009 and has communicated this to Endesa. Endesa's connection application is in the Gate 3 offers awaiting outcomes of the ITC process. As described in Chapter 2 (Background to the Project), EirGrid has previously advised CER of available generation capacity for connection at Great Island.

3.11 Manufacture of the Proposed Power Plant

The tendering process to supply and construct the new CCGT plant will be subject to the requirements of the Utilities Directive (*Directive 2004/17/EC*), requiring Endesa to publish a tender notice in the Official Journal of the European Union (which is published on the e-Tenders website). The exact plant output and layout cannot therefore be specified at this stage without prejudice or favour to a particular supplier but will be within the figures quoted for output and efficiency throughout this EIS. The layout of the proposed plant as shown in the accompanying planning drawings is based upon a typical plant layout for the electrical ratings considered.

The performance of the chosen plant will be required to comply with the environmental objectives as presented in this EIS in order to ensure a minimal negative impact on the receiving environment. Consideration of the environmental impacts as presented in this EIS is on the basis of the largest size (and hence maximum emissions) of plant envisaged for the site.

3.12 Combined Cycle Gas Process

The combined cycle process consists of two thermodynamic cycles, the *Brayton Cycle for the gas turbine* and the *Rankine* Cycle for the steam turbine working simultaneously to produce electricity as efficiently as possible, hence the name Combined Cycle Gas Turbine.

The *Brayton* cycle comprises a gas turbine and an electrical generator which rotate at high speed (3,000RPM). The gas turbine consists of a compressor section, a combustion chamber and a turbine section. Air is drawn in through an intake filter, compressed and fed into the combustion chamber where fuel is injected and ignited. The resulting hot combustion gases (approximately 1,428°C) passing through the turbine section rotate the shaft driving the compressor and the electrical generator to produce the rated electrical power output. The expansion of the hot gases through the turbine, and the extraction of mechanical work from them, via the turbine, reduces the temperature of the gases to approximately 600°C at the exit of the gas turbine.

Operation of a gas turbine alone is referred to as open or simple cycle mode and has an overall cycle efficiency in the region of 38%. It is possible to generate approximately 50% more electricity without the need to use additional fuel by extracting the high degree of heat in the hot exhaust gases by using them to produce steam. The steam is generated by passing the hot gases through a Heat Recovery Steam Generator (HRSG), where the heat is transferred to water flowing in the HRSG wall tubes. This process reduces the temperature of the exhaust gases down to approximately 100°C on exiting the HRSG. The gases are discharged to the atmosphere via an exhaust gas stack.

The high pressure steam produced in the HRSG is supplied through inter-connecting pipework to the steam turbine which is coupled to an electrical generator.

The steam is expanded in the steam turbine down to vacuum conditions to extract as much energy as possible and is then fed to a seawater cooled condenser where it is condensed back to water and fed back to the HRSG to generate more steam thus conserving water in the closed cycle. This is the Rankine thermodynamic cycle.

The electricity generated is fed to a transformer where the voltage is stepped up to the existing 220kV transmission voltage.

The proposed CCGT is a single-shaft arrangement i.e. the gas turbine and steam turbine operate on the same generator. A schematic of the proposed "Single-shaft" arrangement is provided in Figure 3.5: Single-Shaft CCGT Cycle Flow Schematic.

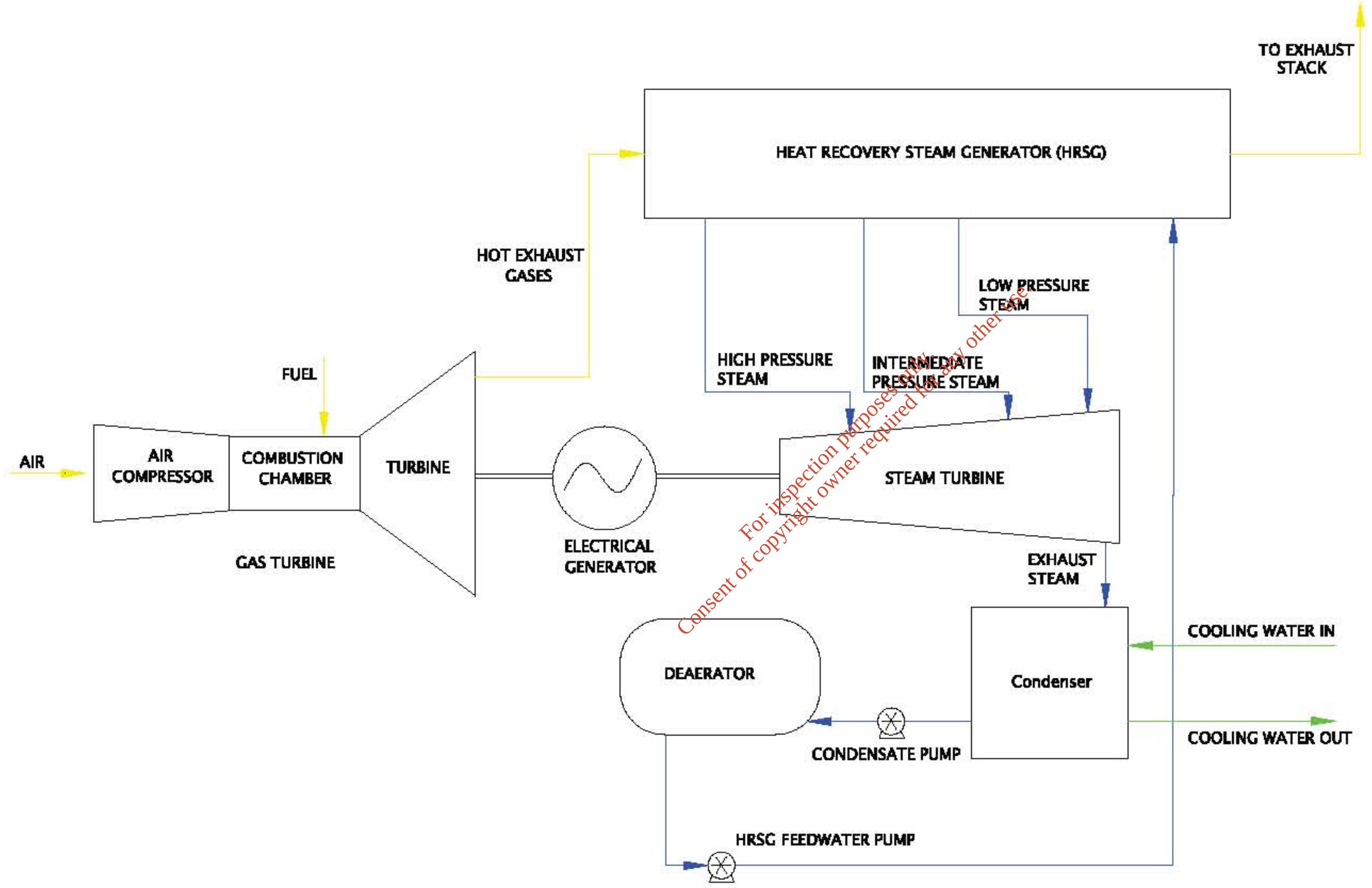
3.13 Plant Efficiency

The efficiency of a power plant is defined as the proportion of primary energy input which is converted to electricity. Total electricity output for the CCGT will be up to approximately 430 MW during optimum conditions. The overall generation efficiency is approximately 58%, this equates to a thermal input of 741 MWth. Most of the low grade heat loss for the CCGT unit will be via the seawater condensing system and from emissions to the exhaust stack. The remainder of the overall cycle losses can be accounted for as both mechanical and electrical losses within the plants.

Energy efficiency is integral to optimising the overall design of a CCGT plant. CCGT technology is the most efficient form of conventional thermal power generation. The plant will operate on an advanced computerised control system which will support optimisation of generation efficiency thereby minimising heat loss due to unburned gases. The steam cycle will be optimised by achieving the highest possible steam pressure and temperature. The supplier's contract will detail plant specific energy balance data providing guarantees for heat rate and power output thereby guaranteeing an overall plant efficiency.

3.14 Plant Items

The principal components in this project will include the items listed below. The locations of each item are detailed by reference to Figure 3.6: Site Layout.



Notes

Legend

Scale

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	30.09.09	AV	Issued with Planning Application	KMc	DMc
P1	27/05/08	AV	Issued for information	AV	DC

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Title

Combined Cycle Gas Turbine
Great Island, Co. Wexford

Single Shaft CCGT Cycle Flow Schematic

Designed	D. Carr		Eng.Chk.	D. Carr	
Drawn	A. Vaughan		Coordination	D. Carr	
Dwg.Chk.	D. Carr		Approved	D. Carr	

Scale	Project 257554	Status
NTS	CAD file Figure 3.5	PRE

Drawing No **Figure 3.5** Rev **P2**

1. Gas Turbine and Steam Turbine Building
2. Gas Turbine
3. Steam Turbine
4. Air Inlet Filter to Gas Turbine
5. Electrical Annex and Control Room
6. Heat Recovery Steam Generator (HRSG)
7. CCW Skid
8. Oil Separator (Relocated)
9. Gas Fuel Treatment Skid
10. Demineralised Water Supply Pumps (NO_x Abatement)
11. Generator Transformer
12. Unit Auxiliary Transformer
13. Natural Gas Compound AGI
14. Distillate Oil Storage Tank
15. Gas Compressor
16. Demin Water Storage Tank (1 x 6,000m^3)
17. Water treatment Plant Building
18. Main Stack
19. Fire Pump House (inside existing building)
20. Distillate Fuel Oil Forwarding Pump skid
21. CW Culvert
22. Over Ground Gas Main
23. Boiler Feed Water Pumps
24. Fin Fan Cooler
25. Rails in road for Transformer Removal
26. Chemical Injection Skid
27. Caustic Storage Tank with Bund
28. Acid Storage Tank with Bund
29. Gas Turbine Oily Water Drain Tank
30. Starting Transformer
31. Excitation Transformer
32. Auxiliary Transformer
33. Sewage Treatment Plant
34. Boiler Waste Water Drain Tank
35. N_2/H_2/CO_2 STORAGE
36. Process Water Discharge Pit
37. Blowdown Vessel
38. Auxiliary Boiler
39. Auxiliary Boiler Flue Stack
40. Continuous Emission Monitoring (CEM) System
41. Condensate Polisher
42. Distillate Oil Supply Pipe to Generator
43. HFO Filling Pipe in Concrete Trench
44. Distillate Oil Filling Pipe in Concrete Trench

3.15 Connections to the National Grid and Gas Network

Connection to the national grid and connection to the gas network will be undertaken by EirGrid and Gaslink / BGE Networks respectively as outlined hereunder.

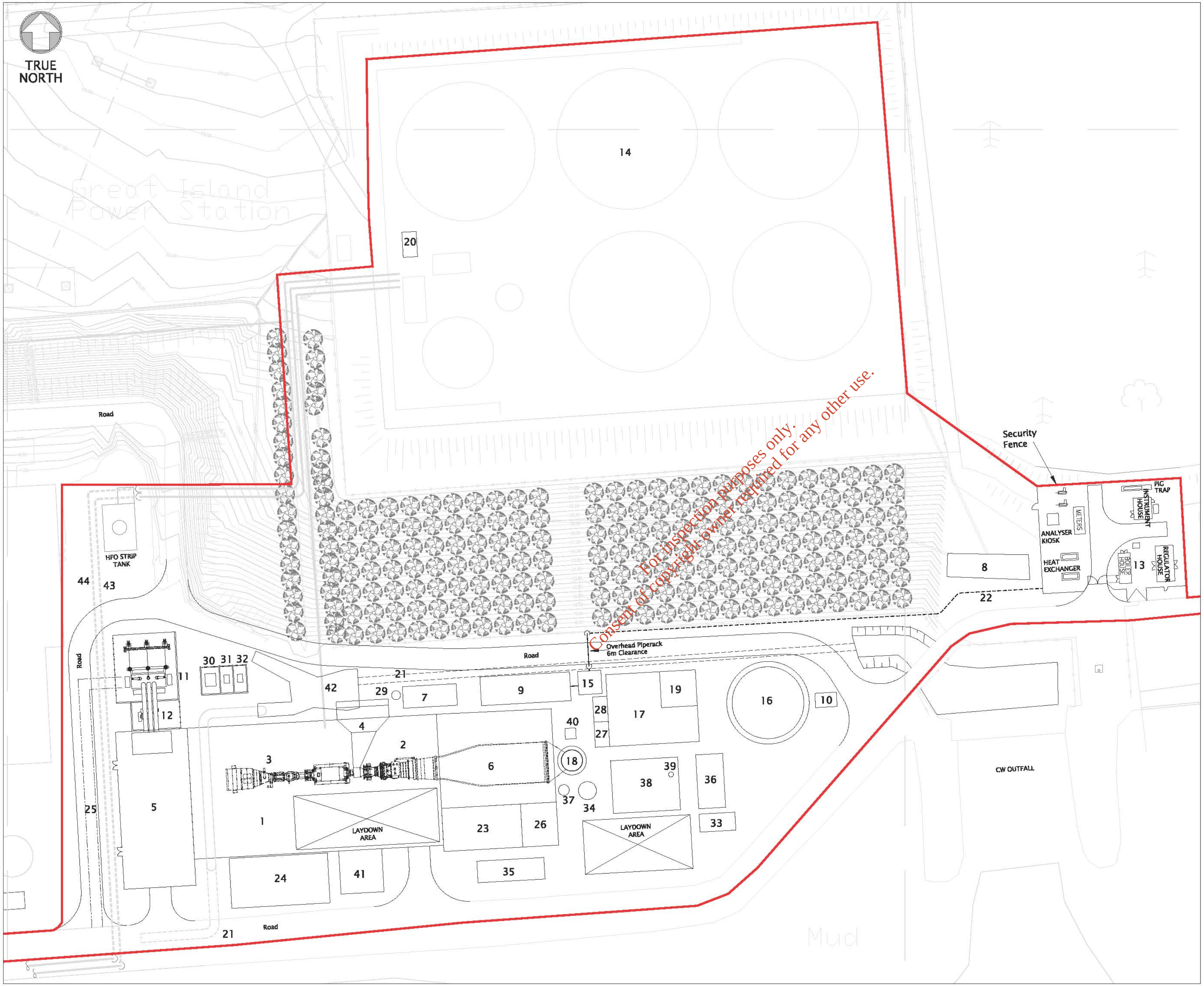
3.15.1 Connection to the National Grid

The new power plant will be connected to the existing National Grid at the existing 220 kV substation at Great Island.

Reinforcement works, if required, on the existing 220kV system will be undertaken by EirGrid as part of a separate project. The exact technical requirements for these works will be determined by EirGrid after detailed electrical engineering studies have been completed.

3.15.2 Connection to the Gas Network

Endesa is working closely with BGN and Gaslink regarding the development of a gas connection to the site. The gas connection (the routing and construction of which will be undertaken by BGN /



Notes

1. ORDNANCE SURVEY IRELAND LICENCE NO. EN0034509 © ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND
2. ALL CO-ORDINATES SHOWN RELATE TO IRISH NATIONAL GRID CO-ORDINATES.
3. ALL SITE LEVELS REFER TO MEAN SEA LEVEL VERTICAL DATUM AT POOLBEG.
4. GENERAL SITE LEVEL IS +7.00M O.D.

Legend:

Boundary for New Power Station

1 GAS TURBINE AND STEAM TURBINE BUILDING
2 GAS TURBINE
3 STEAM TURBINE
4 AIR INLET FILTER TO GAS TURBINE
5 ELECTRICAL ANNEX & CONTROL ROOM
6 HEAT RECOVERY STEAM GENERATOR (HSRG)
7 CCW SKID
8 OIL SEPERATOR (RELOCATED)
9 GAS FUEL TREATMENT SKID
10 DEMINERALISED WATER SUPPLY PUMPS (NOX ABATEMENT)
11 GENERATOR TRANSFORMER
12 UNIT AUXILIARY TRANSFORMER
13 NATURAL GAS COMPOUND AGI
14 DISTILLATE OIL STORAGE TANK
15 GAS COMPRESSOR
16 DEMIN WATER STORAGE TANK (1 x 6,000m³)
17 WATER TREATMENT PLANT BUILDING
18 MAIN STACK
19 FIRE PUMP HOUSE (INSIDE EXISTING BUILDING)
20 DISTILLATE FUEL OIL FORWARDING PUMP SKID
21 CW CULVERT
22 GAS MAIN
23 BOILER FEED WATER PUMPS
24 FIN FAN COOLER
25 RAILS IN ROAD FOR TRANSFORMER REMOVAL
26 CHEMICAL INJECTION SKID
27 CAUSTIC STORAGE TANK WITH BUND
28 ACID STORAGE TANK WITH BUND
29 GAS TURBINE OILY WATER DRAIN TANK
30 STARTING TRANSFORMER
31 EXCITATION TRANSFORMER
32 AUXILIARY TRANSFORMER
33 SEWAGE TREATMENT PLANT
34 BOILER WASTE WATER DRAIN TANK
35 N2/H2/CO2 STORAGE
36 PROCESS WATER DISCHARGE PIT
37 BLOWDOWN VESSEL
38 AUXILIARY BOILER
39 AUXILIARY BOILER FLUE STACK
40 CONTINUOUS EMMISSION MONITORING (CEM) SYSTEM
41 CONDENSATE POLISHER
42 DISTILLATE OIL SUPPLY PIPE TO GENERATOR
43 HFO FILLING PIPE IN CONCRETE TRENCH
44 DISTILLATE OIL FILLING PIPE IN CONCRETE TRENCH

0 25m 50m

Scale 1:500

Rev	Date	Drawn	Description	Ch'k'd	App'd
P8	05/11/09	AV	Issued with Planning Application	KMc	DMc
P7	23/10/09	AV	Revised as per Endesa Comments	KMc	DMc
P6	30/09/09	AV	Revised as per Endesa Comments	KMc	DMc
P5	28/08/09	AV	Issued For Approval	KMc	DMc
P4	30/07/09	CHC	Issued For Approval	KMc	DMc
P3	17/07/09	CHC	Issued for Approval	KMc	DMc
P2	14/07/09	CHC	Issued for Approval	KMc	DMc
P1	13/07/09	CHC	Issued for Approval	KMc	DMc

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Title

Combined Cycle Gas Turbine
Great Island, Co. Wexford

Site Layout

Designed	D. McRandal	Eng.Chk.	K. McGarvey
Drawn	C. Cunningham	Coordination	D. McRandal
Dwg.Chk.	K. McGarvey	Approved	D. McRandal
Scale 1:500	Project 257554	CAD file Figure 3.6	Status APR
Drawing No	Figure 3.6	Rev	P8

Gaslink) will be subject to a regulated process. The development will require the granting of a licence to construct from CER, which will include an environmental appraisal of the impact of the pipeline development. The projected schedule for the entire process of environmental assessment, receipt of the required permit, acquiring wayleaves along the route and construction is estimated to take 24 months. The associated planning application to construct the new gas supply pipeline and associated Above Ground Installation (AGI) will be made by Gaslink/BGE Networks. The application will be applied for under the *Planning and Development (Strategic Infrastructure) Act, 2006*. At the time of writing this report Gaslink/BGE Networks had engaged in pre-application consultation with An Bord Pleanála regarding the application.

3.16 Basis of the Site Layout

The site layout has been determined to take into consideration the following criteria:

- To allow for the demolition of the existing buildings, equipment and stacks
- To minimise the routing of the 220 kV cables to the existing 220 kV substation
- To minimise the routing of the cooling water intake and discharge pipework
- To minimise the requirement for access roads
- To allow for ease of construction and access to the proposed laydown area
- To minimise the length required for the supply of gas pipework to the AGI station
- To maximise the use of existing services e.g. effluent discharge, surface water drains
- To maximise the use of existing buildings and structures e.g. cooling water pump house and associated culverts
- To provide suitable access for future maintenance and removal of plant and equipment
- To minimise environmental impacts

3.17 Main Components of the Combined Cycle Plant

The main components of the proposed plant, which are designed in accordance with Best Available Technology, are described hereunder.

3.17.1 Above Ground Installation (by Gaslink/BGE Networks)

Under normal operating conditions the plant will be fired on natural gas. It is anticipated that the CCGT plant will utilise approximately 500 x 10^6 Nm^3 per annum of natural gas.

The gas will be supplied to the site from the Bord Gáis Network (BGN) at a minimum guaranteed pressure of 19 barg and 15ºC. The maximum operating pressure of the BGN gas pipeline is 70 barg. Depending on the turbine selected, the pressure required will in the range of 35 to 50 barg.

The gas will be filtered, pre-heated, metered and pressure reduced prior to supply to the gas turbine, as required. The AGI asset will be owned by Bord Gáis and operated and maintained by Gaslink, an independent system operator with responsibility for operating and maintaining gas transportation systems within Ireland. Specifications for gas supply and operation and maintenance of the AGI will be stipulated in the contracts with Bord Gáis and Gaslink.

3.17.2 Distillate Oil Storage

As described in Section 3.7 (Requirement for Distillate Fuel Oil), it is intended to refurbish one of the existing 5 x 17,000 tonne capacity HFO storage tanks for the storage of distillate oil and increase the height of the existing bund wall by 2 metres. In accordance with the requirements of CER approximately 11,000 m^3 of distillate oil will be required to be stored.

The tank will be completely drained and cleaned with all internal traces of HFO removed. A thorough NDT (Non-Destructive Testing) inspection will be undertaken and any necessary repair works will be carried out. This work will be subject to detailed method statements which will be developed and agreed with Wexford County Council and EPA prior to any refurbishment works taking place.

3.17.3 Turbine Hall

The turbine hall building will house the condenser, steam turbine, generators, gas turbine and auxiliaries such as the compressed air system, overhead cranes, condensate pumps, air intake silencer, gas turbine exhaust silencer, gas / steam turbine auxiliary skids and electrical annex.

3.17.4 Gas Turbine Generator

The Gas Turbine Generator (GTG) will comprise a multi-stage axial-flow compressor section with movable inlet guide vanes, a combustion chamber with several burners, and a multi-stage axial-flow turbine section. Fuel will be combusted using air from the air compressor. The hot gases will pass through the turbine blades. Mechanical energy will then be converted to electrical energy in the electrical generator coupled to the gas turbine.

3.17.5 Heat Recovery Steam Generator

The heat content in the hot exhaust gases from the gas turbine will be used to produce the high-pressure steam which will be supplied to the steam turbine. The cooler exhaust gas will then be expelled to the atmosphere via an exhaust stack (main exhaust stack). The Heat Recovery Steam Generator (HRSG) is typically of a multi-pressure type, which allows the maximum mechanical energy to be extracted from the steam in the steam turbine. The HRSG will comprise high pressure (HP), intermediate pressure (IP), low pressure (LP) and reheat (RH) sections. The conceptual design site layout is based on an outdoor triple pressure horizontal type HRSG.

3.17.6 Main Exhaust Stack

The main exhaust stack will measure 60 metres in height and will be fabricated from painted carbon steel.

Continuous local and remote monitoring (CEM) equipment will be provided to allow measurement of Nitrogen Oxides (NO_x), Sulphur Dioxide (SO_2), Carbon Dioxide (CO_2) and Carbon Monoxide (CO) emissions. The impacts of emissions from the exhaust stack, and the stack height determination, are discussed in Chapter 15 (Air Quality and Climate).

3.17.7 Steam Turbine Generator

The Steam Turbine Generator (STG) will be of a multiple cylinder type suitable for direct coupling to the two-pole generator for power generation at 50 Hz. The thermal energy of the steam generated by the HRSG will be converted to mechanical energy in order to drive a generator to produce electrical power. The low-pressure exhaust steam will flow radially out of the steam turbine to the seawater cooled condenser.

3.17.8 Dry Low NO_x Burners for Natural Gas Firing

Combustion in gas turbines has traditionally employed a diffusion flame where fuel is sprayed into the centre of an air stream. Fuel mixes with the air by turbulent diffusion. Hot combustion gases, approximately 1,428°C, are cooled by dilution with excess air to temperatures acceptable to the combustor walls and turbine blading.

Natural gas is a clean fuel resulting in negligible emissions of Particulate Matter (PM) and Sulphur Dioxide (SO_2), the main atmospheric pollutants of concern are therefore Nitrogen Oxides. Nitrogen Oxides (NO_x) are formed at high temperature by the dissociation of the Oxygen (O_2) molecule and the action of the monoxide (O) radical on molecules of Nitrogen. NO_x, referred to as *Thermal* NO_x, are formed during the combustion process at temperatures above 1,400°C, from nitrogen in the air.

Initial attempts to reduce NO_x introduced a heat sink in the flame by injecting water, with the aim of reducing average combustion temperature to below the threshold for thermal NO_x formation. However, the process required large quantities of pure water to avoid corrosion of the turbine blading or deposition and blocking of cooling air holes by impurities.

The high costs of the systems detailed above provided the incentive for equipment suppliers to explore the use of non-stoichiometric mixtures to reduce flame temperature in so-called Dry Low NO_x (DLN) Burners. The combustion temperature, and therefore the NO_x formed, is a function of the Fuel / Air ratio when fuel and air are mixed prior to combustion in a "*pre-mix flame*". As a consequence the rate of NO_x formation can be significantly reduced by using a lean Fuel / Air mix.

Therefore, in order to ensure stable and efficient combustion, a pilot flame and various geometric arrangements are employed to maintain ignition of the main Fuel / Air mix. Dry Low NO_x Burners optimise the Fuel / Air ratio producing a uniform low temperature flame in the combustion chamber to minimise the production of NO_x

This technology will be used for the proposed development.

3.17.9 NO_x Abatement when Firing On Distillate Fuel Oil

The limitation on NO_x emissions from the CCGT plant, when firing on distillate oil, is set out in the Large Combustion Plant Directive (2001/80/EC) and is 120mg/Nm^3 @ 15% O_2 v/v. To comply with this emission level high quality demineralised water injection directly into the combustion chamber is employed. The evaporation of water requires heat which is then not available to heat the flame decreasing the flame temperature and reducing the amount of NO_x produced. A maximum demineralised water flow rate of 94 tonnes per hour (TPH) will be required in the combustion chamber of the gas turbine, as required, for water injection.

3.17.10 Auxiliary Boiler

Certain plant suppliers require the use of an auxiliary boiler, with a rating of approximately 5 MWth, to provide heat to the plant during start up periods from cold conditions. If an auxiliary boiler is required, frequency of use will be limited to 1 or 2 events per month and will last for a short duration, typically 2 to 3 hours. The auxiliary boiler stack will measure approximately 30 metres in height, in order to clear the height of adjacent buildings.

3.17.11 Water Treatment Plant

An on site water treatment plant will be required, where water for use in the HRSG will be demineralised to achieve a high purity. The water treatment process will consist of filtration, and a resin based treatment system. Approximately 0.5m^3 per hour of wastewater, generated by the regeneration process of the resins in the water treatment plant, will be discharged to the Process Water Discharge Pit as discussed in Section 3.19. Wastewater from the demineralisation plant comprises water containing the salts removed from the raw water or neutralised backwash of the resins from the demineralisation process. The pH of the wastewater will be maintained by acid or alkali addition, as required.

The raw feedwater to the water treatment plant, which is of drinking water quality, will continue to be supplied from the existing 9,500m^3 reservoir which in turn is supplied from the Wexford County Council supply.

The feedwater used in the HRSG will be thermally de-aerated to remove oxygen and chemically treated to prevent corrosion of the tubes and components of the water / steam cycle. Chemical dosing for pH control essentially alters the pH of the boiler water to a pH that prevents corrosion reactions. Oxygen scavenging and de-aeration combine to remove the dissolved oxygen from the boiler water which again prohibits corrosion.

A range of specialist chemical treatment options are available for boiler feedwater as follows;

- **Oxygen Scavenging**: Dilute Carbohydrazide ($CO(NHNH_2)_2$) or Hydrazine(N_2H_4)
- **pH Control**: Aqueous ammonia (NH_3)
- **Scale Inhibition**: Tri-sodium Phosphate(Na_3PO_4)

Waste water discharges are discussed in detail in Chapter 14 (Surface Water).

3.17.12 Electrical Transformer

The electrical power produced in the generating plant will be fed to a generator transformer where the voltage will be stepped up to 220 kV before being passed, via a buried underground cable, to the existing EirGrid switchyard. The electrical transformer is an outdoor, three phase unit of the oil immersed design. It is bunded and blast protected with a deluge system for fire protection. Power flows from the transformer to the existing transmission line network and onto the national grid.

The existing 220kV switchyard is currently operated, owned and maintained by EirGrid.

3.17.13 Emergency Diesel Generator

An emergency diesel generator will be provided to supply electricity to essential users in the event of an interruption to power supply. The generator will not operate under normal conditions, other than for short duration testing for a maximum period of 30 minutes per week.

3.18 Aqueous Discharges

The operation of the power plant is anticipated to produce the following waste water streams, all of which will be appropriately treated, as required in accordance with the revised IPPC licence, prior to discharge into the Barrow Estuary via a number of existing outfalls;

- Process Wastewater
- Surface water drainage
- Domestic sewage
- Cooling Water

Waste water discharges are discussed in detail in Chapter 14 (Surface Water).

3.18.1 Process Waste Flow Rates

The arrangement of the proposed water discharge system is provided in Figure 3.7: Site Drainage Plan and it is also outlined below.

3.18.1.1 Blowdown

In order to reduce the build up of salts in the HRSG drum, which remain in the drum once the water has evaporated off, it is necessary to continually "blow-down" approximately 1% of the total 500m^3/hr of circulating water (i.e. 5 m^3/hr).

Boiler blow-down will undergo the following processes:

- Release from the boiler to a flash vessel
- Release to a collection sump
- Collection in the process wastewater discharge pit. Refer to Section 3.19 (Process Water Discharge Pit)

On occasion there may be a requirement to increase the blowdown rate from the HRSG. This is an intermittent operation and last for a very short period of time, a typical flow rate is in the order of 45.5m^3/hr.

3.18.1.2 Water Treatment Plant Effluent Discharge

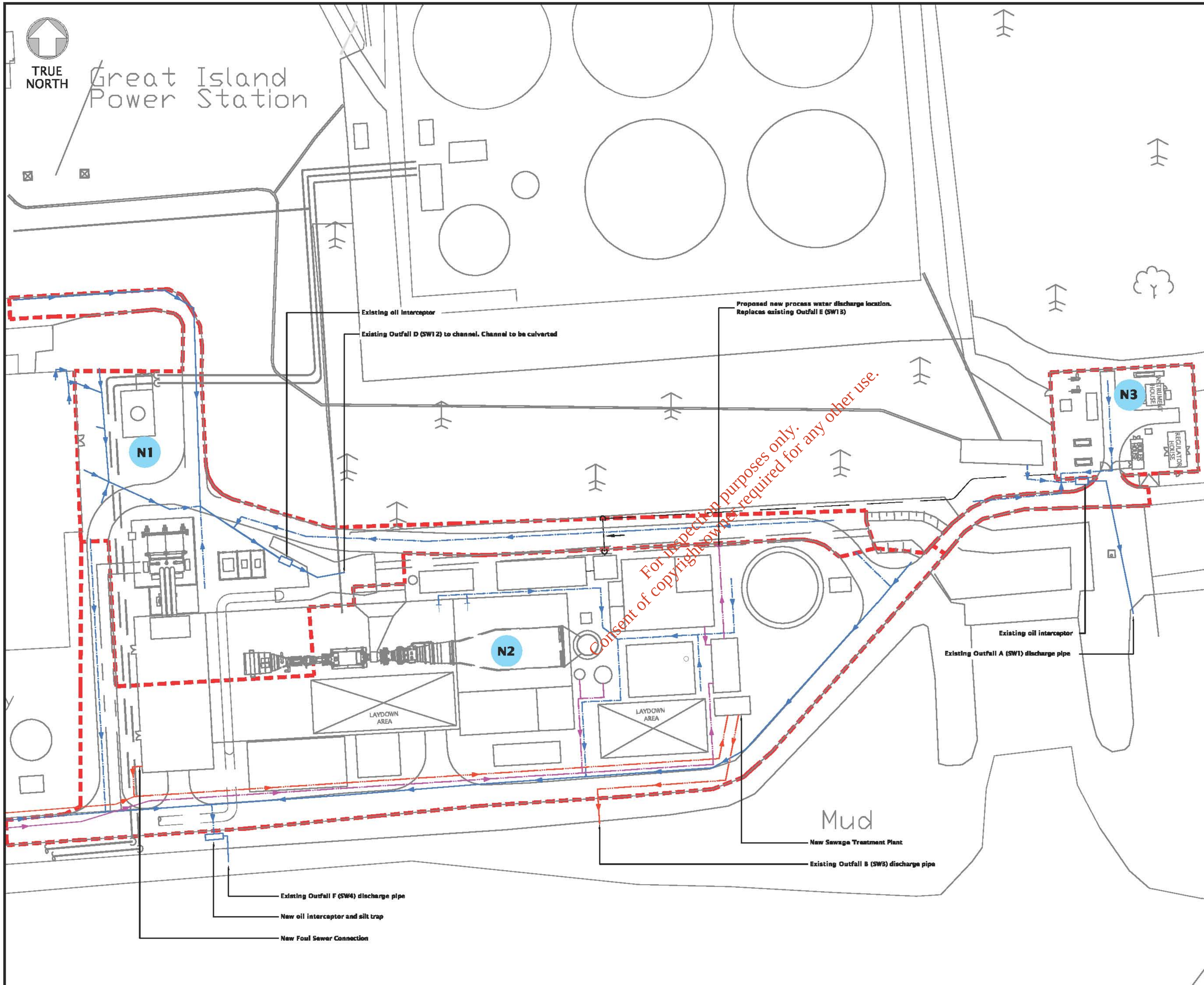
During the regeneration process approximately 0.5m^3/hr of effluent water is discharged from the water treatment plant which will be collected in the process water discharge tank.

3.18.1.3 Leaks and Sampling

Although not a normal flow rate, on occasion there will be some additional process discharges from the system to account for leaks and for boiler water sampling. A typical flow rate for this will be 1.05m^3/hr.

3.18.2 Surface Water Drainage

Surface water runoff will consist mostly of storm rainwater but with an allowance for spillages and wash water. Since this may become contaminated with oily substances in some areas, oil interceptors will be included at the downstream ends of proposed collection systems. The oil interceptors will also include a silt trap unit which will remove any excess silt or grit which may become entrained in the surface water. Once oils and silts have been removed, surface runoff will be discharged via existing outfalls. At conceptual design stage, it is assumed that the existing drainage system will be re-utilised



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Notes

1. ORDNANCE SURVEY IRELAND LICENCE NO. EN0034509
   © ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND
2. ALL CO-ORDINATES SHOWN RELATE TO IRISH NATIONAL GRID CO-ORDINATES.
3. ALL SITE LEVELS REFER TO MEAN SEA LEVEL VERTICAL DATUM AT POOLBEG.
4. GENERAL SITE LEVEL IS +7.00M O.D.
5. THE DRAINAGE LAYOUT SHOWN IS SUBJECT TO CONFIRMATION OF INVERT LEVELS AND CAPACITIES OF THE EXISTING COLLECTION AND OUTFALL PIPES.
6. WHERE POSSIBLE, EXISTING COLLECTION SEWERS AND OUTFALLS WILL BE RE-UTILISED BY ADOPTING THEM INTO THE COLLECTION SYSTEM FOR THE PROPOSED NEW PLANT.
7. FOR CLARITY, ONLY EXISTING SEWERS WHICH ARE PROPOSED TO BE ADOPTED OR ALTERED ARE SHOWN. EXISTING COLLECTION SYSTEMS WHICH WILL NOT BE ALTERED HAVE BEEN OMITTED.
8. TEMPORARY DIVERSION SEWERS MAY BE REQUIRED IN ORDER TO MAINTAIN EXISTING PROCESS AND WASTE FLOWS DURING THE CONSTRUCTION AND PERIOD FOR THE PROPOSED PLANT.

Legend:

Drainage Key.

- Existing Surface Water Drainage
- Proposed Surface Water Drainage
- Existing Foul Drainage
- Proposed Foul Drainage Diversion
- Area Boundary
- Surface Water Drainage Catchment Reference — N
- Direction of Flow
- Existing Process Water Drainage
- Proposed Process Water Drainage Diversion

0 25m 50m

Scale 1:500

Rev	Date	Drawn	Description	Ch'k'd	App'd
P5	05/11/09	AV	Issued with Planning Application	KMc	DMc
P4	23/10/09	AV	Revised as per Endesa Comments	KMc	DMc
P3	30/09/09	AV	Revised as per Endesa Comments	KMc	DMc
P2	28/08/09	AV	Issued for Approval	KMc	DMc
P1	11/08/09	SK	Issued for Approval	MB	DMc

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Title

Combined Cycle Gas Turbine
Great Island, Co. Wexford

Site Drainage Plan

Designed	D. Murphy		Eng.Chk.	M. Bouchouat
Drawn	S.Kennedy		Coordination	K. McGarvey
Dwg.Chk.	K. McGarvey		Approved	D. McRandal

Scale 1:500	Project 257554 / CAD file Figure 3.7	Status APR
Drawing No Figure 3.7		Rev P5

as much as possible and that the existing invert levels and pipe capacities will allow this. When pipe capacities and levels are confirmed, it may become apparent that some re-design of the current proposal will be required.

3.18.2.1 CCGT Area

The CCGT area will use a new collection system to convey water to the existing system. The surface water will be treated via an oil interceptor and silt trap unit, before discharging to the estuary via an existing outfall.

3.18.2.2 AGI Area

Surface water runoff from the AGI area, and its access road, will also be conveyed by a new collection system and treated via a silt trap unit and bypass oil interceptor prior to discharge to the estuary via an existing outfall.

3.18.2.3 General Spillages and Washings

Cleaning products will be of a water based biodegradable nature, wherever possible, general plant washings will be discharged to the estuary via a hydrocarbon interceptor and silt trap. Compressor cleaning washings, which require the use of hazardous detergents, will be removed from site by an appropriately authorised waste contractor.

3.18.3 Foul Water System

There will be a domestic sewage flow element from the CCGT area but not the AGI site. A new collection system, separate from the surface water system, will be required to connect this to the existing foul collection system. A new sewage treatment system is proposed. As there will be no net increase in the number of persons employed at the Great Island site over the present manpower levels, it is not anticipated that flow rates will increase from those currently generated in the existing facility. Flows will be treated to a quality that will comply with allowable discharge standards prior to discharge to the estuary via an existing outfall.

3.19 Process Water Discharge Pit

The volumetric capacity of the new process water discharge pit will take into consideration the volumes associated with each of the following operational scenarios;

1. Holding the complete volume of water in the HRSG after a full hydro test - **500m^3**

2. Holding the complete volume of water from the HRSG when drained after prolonged operation and required for maintenance - **200m^3**

3. Holding the complete volume of water for normal continuous blowdown (5TPH) and intermittent blowdown (45TPH) and effluent discharge from the WTP (0.5TPH) for a period of 4h - **200m^3**

4. Holding the complete volume of water for normal continuous blowdown (5TPH) and effluent discharge from the WTP (0.5TPH) for a period of 36h -**198m^3**

It is considered that item 1 above would not be a valid basis to determine the volume of this pit as after the HRSG has initially been commissioned it should never again be subject to a full hydro test.

Therefore, from the above analysis it is proposed that the volume of the process discharge pit be a nominal **200m^3**.

The process waste water will be collected and treated in the below ground concrete discharge pit where the discharge will be pumped to outfall SW13. It will be necessary to relocate SW13 approximately 100 metres east of its current location to facilitate the proposed development.

3.20 Seawater Cooling System

A continuous flow of cooling water will be required to absorb heat from the steam turbine condenser and, depending upon the final design of the plant, from other heat exchangers associated with the proposed CCGT plant. Cooling water will be abstracted from the Barrow Estuary, in accordance with existing operations, utilising the existing water intake and outfall systems.

Cooling water will be screened by a mechanical screening system through a series of fixed, coarse screens and travelling fine screens, in order to remove debris from the cooling water prior to entering the pump chambers in the existing cooling water pumphouse.

The screened material will be washed periodically from the screens and collected, the washwater will be returned to the estuary.

The screened cooling water will be routed from the cooling water pumphouse to the steam turbine condenser and to the coolers of the closed cooling water system via a new culvert. The cooling water will then return to the estuary via the existing discharge channel.

Cooling water will be chlorinated by direct injection of Sodium Hypochlorite solution, as required, in order to control biological fouling of, and damage to, the condensers, principally by mussels which thrive in the conditions of fast flow encountered in cooling water systems. Chlorine concentrations in the cooling water discharge will be maintained at a maximum concentration of 0.5 mg/l Chlorine. It should be noted that use of biocides is currently very infrequent and this situation is unlikely to alter with the new CCGT plant.

3.21 Plant Structures

The development will include the new structures listed in Table 3.3 below. The dimensions provided are regarded as the maximum likely dimensions and may be reduced depending on the plant and equipment specification of the successful Tender.

Table 3.3: Dimensions of Main Structures

Name	Length (m)	Width (m)	Height (m)
Turbine Building	69.3	36.5	22.66
Heat Recovery Steam Generator	31.0	26.4	30.88
Electrical / Control Building	43.7	20.1	13.09
Main Stack	-	6.0 (I.D)	60
Auxiliary Boiler Building	18.7	14.7	16
Auxiliary Stack	-	-	30
Demineralised Water Storage Tanks	-	20 (I.D)	20.5
Water Treatment Plant	25.6	20.5	7.35
Acid and Alkali Storage Tanks	16	4	3.5
Gas Fuel Treatment Building	25.6	8.6	4.0

The structural design of the buildings will generally be of a structural steel framed design clad with profiled steel sheet wall and roof cladding. The sheeting will be of double skinned insulated construction. Internal walling of masonry will be adopted except where specific load carrying requirements necessitate the use of reinforced concrete walls. Where applicable the existing buildings will be completely refurbished and modified to suit the new plant.

For the main turbine building the wall cladding will be installed above a masonry dado wall, approximately two metres high.

Areas where spillage of chemicals, oil, or other corrosive material is likely will be provided with protective treatment / finish to prevent damage to the works.

The colour proposed for the principal structures has been selected to minimise visual impact, taking into account the colour of the existing power plant. In addition, a horizontal band detail, applied in a slightly contrasting colour to that used on the main power plant, is proposed to be applied to the larger structures. This will visually enhance the proposal by breaking up the overall mass of the larger structures associated with the power plant.

Hard finishes will be provided for the majority of floor areas throughout the power plant. These will provide durable surfaces that enhance the building environment and are easy to clean. Protective floor finishing will be provided to plant areas, switchrooms and ceramic tiling to toilets, kitchen areas and lockers / changing rooms. Areas where chemical or oil spillage may occur will be finished with chemical / oil-resistant materials. Industrial claddings will be factory finished according to the manufacturer's recommendations and specifications.

Roofs will be constructed of profiled metal decking on purlins spanning between rafters and will be flat or shallow pitched. Buildings will be single or two storeys with access gantries and walkways for access to plant and equipment. These will be constructed of stainless / galvanised steel open grating type flooring supported on steel beams and columns. The stack will be fabricated from painted insulated carbon steel.

External doors and escape doors will generally comprise metal flush doors and mild steel frames. Fire doors will comply with *BS 476-22:1987 - Fire tests on building materials and structures*.

3.22 Raw Materials Used

3.22.1 Primary Raw Materials

Primary raw materials for use in the proposed power plant include natural gas, distillate oil and water.

Natural gas is a clean fuel resulting in negligible emissions of Particulate Matter and Sulphur Dioxide. The main atmospheric pollutants relating to natural gas firing are therefore Nitrogen Oxides (NO_x).

Although the CCGT will normally be fuelled by natural gas, distillate oil storage and pumping facilities will also be provided. Distillate oil will be limited to a Sulphur content of 0.1%. The plant will only operate on distillate in the event of an interruption to gas supply and for short duration testing, estimated at approximately three hours per annum.

Raw untreated water, sourced from the Wexford County Council mains supply, will be stored in the existing 9,500m^3 service reservoir prior to treatment in the water treatment plant. The reservoir also holds capacity for fire fighting purposes, approximately 1,140m^3. An additional 500m^3 will be provided from the existing fire water storage tank. This volume is considered sufficient to meet the requirements of the National Fire Protection Association guidelines - NFPA 850: *Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations.*

During normal operations the CCGT plant will require 6.5m^3/hr of raw feedwater when operating on natural gas. Where necessary, supply of water from the mains supply will take place during low demand periods in order to minimise any potential impacts on water supply in the area.

High purity demineralised water, used as feed water for the HRSG / Steam Turbine water-steam cycle, will be produced in the water treatment plant, and stored in a 6,000m^3 capacity on-site demineralised water storage tank prior to use. This capacity is sufficient to provide for 94m^3/hr injection water to the gas turbines for NO_x emissions control purposes while firing on distillate.

Cooling water, for condensing steam, will be abstracted from the Barrow Estuary, in accordance with existing operations, utilising the existing water intake and outfall systems. However the overall demand will be significantly reduced from the current maximum demand of 50,170/hr to approximately 20,000m^3/hr, when the CCGT is fully operation.

Water usage and waste water discharge are discussed in detail in Chapter 14 (Surface Water).

3.22.2 Secondary Raw Materials

Secondary raw materials include conditioning and seawater injection chemicals, coolants, laboratory smalls, cleaning products and oils and greases.

The use of conditioning chemicals will be optimised through controlled dosing. Conditioning and laboratory chemicals will be stored in a chemical store within the water treatment plant. The storage room will be provided with appropriate ventilation and temperature control. Drums and IBC's will be stored on drip trays / spill pallets. The store will be enclosed fully containing any spills within. A spill kit will be located in close proximity to the chemical store.

As required, conditioning chemicals will be transferred from the water treatment plant to replenish the dosing tanks located within the turbine hall. The transfer route will be kept clear of all obstacles to allow the safe transfer of chemicals. Dosing tanks will be fitted with level indicators and located within bunds. The contents of the drums will be transferred to the dosing tanks using dedicated filling pumps.

Sulphuric Acid (H_2SO_4) and Sodium Hydroxide (NaOH), for use in the water treatment plant, will be stored in 33m^3 bunded bulk chemical storage tanks. The Sulphuric Acid tank will be fitted with a vapour trap. Gases will vent through the trap media and exit the tank via a vent.

Oils and greases used for the lubrication of the main mechanical components will be stored in a designated bunded area within the stores building.

The generator will be filled with Hydrogen as a closed circuit cooling medium. The hydrogen will be topped up by small amounts using a bottle storage system, as required. Stocks of Hydrogen will be stored in an enclosed designated storage area in UN approved cylinders. The hydrogen system will be earthed and connections will be carried out by trained personnel only. Carbon Dioxide will be used on site for purging the generator of Hydrogen. The cylinders will be fitted with corrosion resistant leak proof valves. Leaks of gases and the ingress of air into the generator cooling system will be prevented through the use of seal oil at a pressure higher than that of the relevant gases.

A Nitrogen blanketing system will be employed to protect the internal surfaces of the HRSG from corrosion and to allow maintenance works to be carried out.

The use and selection of laboratory chemicals will be determined by the on-site monitoring requirements, however their use will be minimised, wherever possible. Cleaning products will be of a water based biodegradable nature, wherever possible. A hazardous detergent is however required for compressor cleaning. Hazardous compressor cleaning products will be segregated in a locked cabinet with limited access to prevent misuse. Compressor cleaning waste water will be disposed of off-site as hazardous waste.

All chemicals stored on site will be subject to a COSHH (Control of Substances Hazardous to Health) assessment and compliance with the requirements of REACH, i.e. *EC Regulation 1907/2006 for the Regulation, Evaluation, Authorisation and Restriction of Chemicals*. Chemicals will be managed in accordance with the HSA guidance document *Guidance for Downstream Users – Guidance for the Implementation of REACH, January 2008*. Final selection of bulk chemicals will be subject to an assessment of trace elements to ensure that they are within acceptable limits.

3.23 Construction Phase

3.23.1 Construction Phase Activities

Subject to planning permission being granted it is anticipated that construction will commence in the fourth quarter of 2010. Civil, mechanical, electrical works and commissioning of plant are expected to last for approximately 30 months. Construction activities are expected to peak between March 2011 and February 2012.

Construction activities will gradually phase over from predominantly civil activities to predominantly mechanical and electrical installation activities.

Construction phase activities will comprise the following main elements:

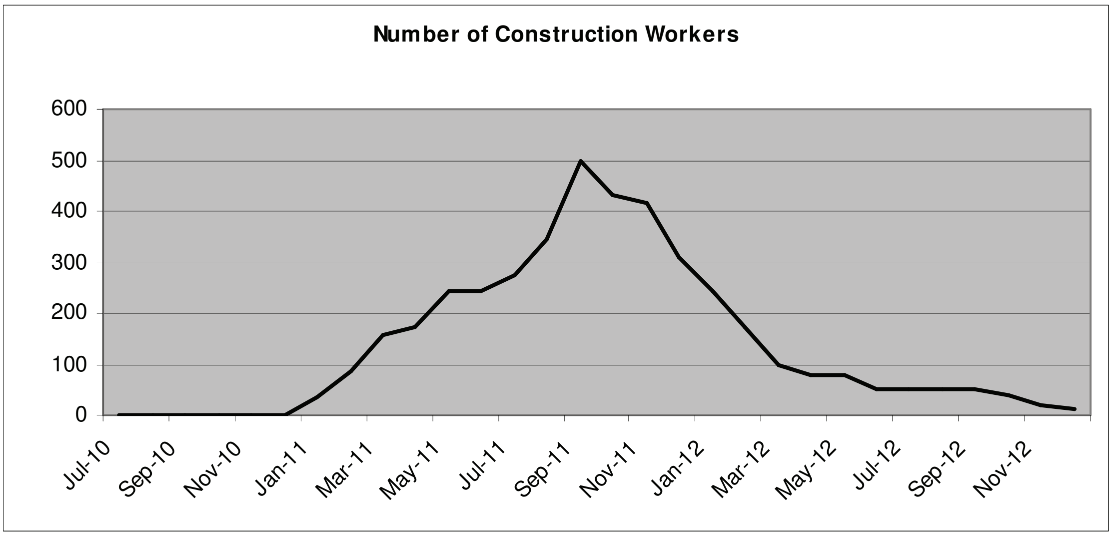
- Security Fencing and Access Control and Signage
- Site Survey and Geotechnical Investigation, as required
- Relocation / Removal of Existing Structures / Installations
- Site Preparation, Grading and Levelling
- Construction of all buildings, structures and equipment

3.23.2 Construction Staff and Facilities

It is anticipated that a maximum of 500 construction workers will be employed during the peak construction period. Temporary facilities will be provided within the proposed construction laydown area, which will measure approximately 2.26 hectares (5.6 acres) and will include portacabins, welfare facilities and laydown areas.

Figure 3.8 below illustrates the estimated peak construction period from March 2011 to February 2012.

Figure 3.8 Peak Construction Period



Normal working hours during the construction period are expected to be Monday to Friday 08:00 to 20:00 and Saturday 08:00 to 17:00. During certain stages of the construction phase it is expected that some work will have to be carried out outside of normal working hours, however this will be kept to a minimum. Construction works with a significant noise impact will be avoided outside of normal working hours.

Endesa proposes to utilise the existing functional jetty at the power plant, which is currently used for the delivery of bulk Heavy Fuel Oil, to deliver selected items of plant and equipment during the construction phase. These deliveries will not require any works on the foreshore. Heavy Goods Vehicles (HGVs) will access the site via the local road network. Due to the restrictive widths on the local road leading to the site it is proposed to implement traffic control measures, including the provision of a parking bay to restrict HGV movements to one-way traffic only. The proposed area is located in proximity to the junction with the R733 and has been leased by Endesa for the duration of the construction phase. The area extends approximately 110 metres in length and 4.5 metres in width. A stacking area for HGVs is also proposed within the boundaries of the existing power plant. The proposed parking bay is discussed in detail in Chapter 10 (Traffic).

3.23.3 Site Preparation

Prior to the commencement of construction activities the area for development will be fenced off. As the site is an existing operational power generation plant, and the topography of the site is relatively level, site clearance works will be minimal.

The topsoil layer will be cleared across the development site, as required. Where possible this material will be reused on site. If the material is considered unsuitable for reuse on site an outlet for off site reuse will be sought. If reuse is not possible the material will be removed to a licensed facility by licensed waste contractors for recycling or disposal, as appropriate.

Bulk soil, sub-soils or other material will be stored in designated areas only. Only uncontaminated material will be used onsite for the purpose of fill and site levelling, if required. During the civil construction works, the site boundary will be clearly marked with high visibility tape and the appointed contractor will not be permitted to use any areas outside the identified site boundary for any activity relating to construction.

In order to mitigate against the contamination of water by soil and sediment run-off it is proposed that a sediment trap will be installed on site during the construction phase. Water from the sediment trap will be discharged to the estuary via the existing drainage network.

A Construction and Demolition Waste Management Plan will be prepared and implemented in accordance with the *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects, Department of the Environment Heritage and Local Government (2006).* Impacts associated with soils, geology and groundwater during the construction phase of the development are discussed in Chapter 13 (Soils, Geology and Groundwater).

3.23.4 Construction Phase Site Management

Endesa will ultimately be responsible for the management of all commercial, operational and regulatory issues associated with the site during both the construction and operational phases of the development.

Endesa will employ a technically competent Contractor who will have responsibility for all aspects of day to day operations on site during construction. Construction activities have the potential to create a nuisance and cause disruption. In order to minimise the disruption caused, a Construction Environmental Management Plan (CEMP) will be developed and implemented. The CEMP will provide a framework for the management and implementation of construction activities incorporating the mitigation measures identified in the relevant chapters of this EIS, including dust and traffic control measures, a Construction and Demolition Waste Management Plan, a Sediment Management Plan and a Pest Control Programme. The CEMP will be reviewed regularly, and revised as necessary, to ensure that the measures implemented are effective.

3.24 Operational Phase

3.24.1 Operational Phase Site Management

Endesa will operate the proposed plant and will have responsibility for the day to day operation and maintenance of the plant as well as environmental monitoring and reporting. Endesa will have ultimate responsibility for all health, safety and environmental issues relating to the operation of the facility.

Existing staff will be maintained and trained in the operation of a CCGT plant. All major items of power generating plant will be covered by long term service agreements to ensure safe and efficient plant operations

As stated previously in this EIS, Endesa are a major utility in Latin America, Spain and Portugal with a combined output of 39GW. Of this 39GW, 16% is provided by CCGT technology. The company therefore has extensive experience in operating and maintaining this technology and also has experience in working with all of the manufacturers currently in the market. This experience ensures that Endesa have the appropriate knowledge in operation, environmental and safety systems thereby reassuring that the Great Island facility will operate in accordance with best practice.

3.24.2 Regulatory Control of the Facility

The facility will be regulated by the following authorities during the operational phase of the development:

- Environmental Protection Agency (EPA)
- Health and Safety Authority (HSA)

- Commission for Electricity Regulation (CER)

The facility will also have to operate within the provisions of a number of codes applicable to the electricity sector, such as the Transmission System Grid Code and Single Electricity Market Trading and Settlement Code. Legislative requirements are discussed in detail in Chapter 4 (Legislation).

3.25 Decommissioning of the Proposed Plant

Subject to the granting of planning permission it is anticipated that operations at the facility will commence in 2012, the plant is expected to be operational for 25 years. Upon cessation of activities the plant will either be redeveloped as a power generation facility or be redeveloped in an alternative form. Given the fact that the site includes an existing 220 kV substation and a water supply, and will be connected to a national gas supply, it is envisaged that the site will remain a power generating facility.

The following detail provides an indicative programme of works that will be implemented in the event of plant decommissioning to prevent environmental pollution:

- All plant equipment and machinery will be emptied, dismantled and stored under appropriate conditions until it can be sold. If a buyer cannot be found the material will be recovered or disposed of through appropriately authorised waste contractors and hauliers

- Plant services, including pipelines and cabling, will be decommissioned and disconnected to the boundary of the installation

- If plant, machinery and services are required to be cleaned on site prior to removal all necessary measures will be implemented to prevent the release of polluting substances

- All chemicals, fuel and waste will be removed from the facility. Unused chemicals will be returned to the supplier, where possible

- Waste will be recycled wherever possible. All waste movements, recycling and disposal operations will be controlled by appropriately authorised waste contractors

- The site and all associated buildings will be secured. All structures and plant will be removed and the site returned to a condition as close as possible to a Greenfield site. If buildings are to be retained, a maintenance programme will be implemented to ensure they do not decay or present an unacceptable health and safety risk

- All associated licences and permits will be surrendered

- An Aftercare Management Plan will be developed and implemented in agreement with the EPA and Wexford County Council

A revised detailed Residuals Management Plan will be developed and submitted to the EPA within six months of commencement of operations of the proposed development, or as otherwise agreed with the EPA, in accordance with *Guidance on Environmental Liability, Risk Assessment, Residuals Management Plans and Financial Provision, EPA (2006).* The plan will be reviewed annually as part of the Annual Environmental Report (AER). The Residuals Management Plan will include details of costings for the plan and a description of how these costs will be underwritten.