



DUBLIN WASTE TO ENERGY PROJECT



ENVIRONMENTAL IMPACT STATEMENT

www.DUBLINWASTETOENERGY.IE

Non-Technical Summary

June 2006



PREFACE

The Environmental Impact Statement (EIS) for the Dublin Waste to Energy facility (the Dublin WtE facility) consists of the following documents:

Non-technical summary

Volume 1	Non-Technical Summary, Main Text and Drawings
Volume 2	Appendices 1-10
Volume 3	Appendices 11-21

ACKNOWLEDGMENTS

The EIS was prepared on behalf of Dublin City Council by Elsam Dublin Waste to Energy Ltd. with Arup Consulting Engineers (Arup) as their main consultant.

Specialist technical contribution was provided in Landscape and Visual Impact assessment by Brady Shipman Martin, David Slattery Conservation Architect and Friis and Moltke Architects; Traffic assessment by RPS Group and ILTP Ltd., Material Assets assessment by RPS Group Ltd.; Air Quality and Climate assessment by AWN Consulting Ltd.; Noise and Vibration Impact assessment by AWN Consulting and Elsam Engineering; Water assessment by Danish Hydraulics Institute and University College Cork; Human Beings assessment by RPS Group Ltd., Prof. Dr. Dr. Dieter Schrenk Universitaet Kaiserslautern and Arup; Terrestrial Ecology assessment by Biosphere Environmental Services; Estuarine Ecology assessment by Ecological Consultancy Services (EcoServe) Limited; and Archaeology, Architectural and Cultural Heritage assessment by Margaret Gowan & Co. Ltd.

The assistance of all organisations and individuals consulted during the preparation of the EIS and the contribution of local residents over the course of the assessment is gratefully acknowledged.

EIS DISPLAY LOCATIONS

Members of the public may inspect and purchase copies of the EIS document, including the Non-Technical Summary, during normal office hours, at the following locations:

Dublin City Council – Civic Offices Wood Quay Reception
Wood Quay
Dublin 8

(A 1 in 500 scale model of the Dublin WtE facility will also be displayed at this location.)

Dun Laoghaire Rathdown County Council
County Hall
Marine Road
Dun Laoghaire
Co. Dublin

Fingal County Council
County Hall,
Swords
Fingal,
Co. Dublin

South Dublin County Council
County Hall,
Tallaght
Dublin 24.

Ringsend Regional Office
Cambridge Road
Ringsend
Dublin 4

(A 1 in 2000 scale model of the Site and surrounds will also be displayed at this location)

Ringsend Library
Fitwilliam Street
Dublin 4.

In addition, the Non-Technical Summary of the EIS will be available on the Dublin Waste to Energy website (www.dublinwastetoenergy.ie)

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1. Introduction

- 1.1.1. The following is a Non Technical Summary of the Environmental Impact Statement (EIS) for the proposed Dublin WtE facility. The EIS is a statement of the likely effects of the proposed Facility on the Environment, prepared in accordance with the Planning and Development Regulations, 2001. This EIS will accompany the Planning Application to An Bord Pleanala, the Waste Licence Application to the Environmental Protection Agency (EPA), the appropriate licences to the Commission for Energy Regulation (CER) and to support the Compulsory Purchase Order (CPO) to an Bord Pleanala.
- 1.1.2. Dublin City Council (the Authority) acting on behalf of the four local authorities for the Dublin Region, i.e. Dublin City Council, Fingal County Council, South Dublin County Council and Dun Laoghaire Rathdown County Council, proposes to establish a waste to energy facility (the Facility) to thermally treat household, commercial and non-hazardous industrial waste. The proposed Dublin WtE facility will have a design capacity to thermally treat up to 600,000 tonnes of waste annually and will be located on the Poolbeg Peninsula in Dublin.
- 1.1.3. Elsam Dublin Waste to Energy Ltd has been commissioned by Dublin City Council to prepare an Environmental Impact Statement for the proposed development. The project is known as the Dublin Waste to Energy Project (the Dublin WtE project) and is part of the implementation of the integrated waste management strategy for the Dublin Region as detailed within the current Dublin Region Waste Management Plan.

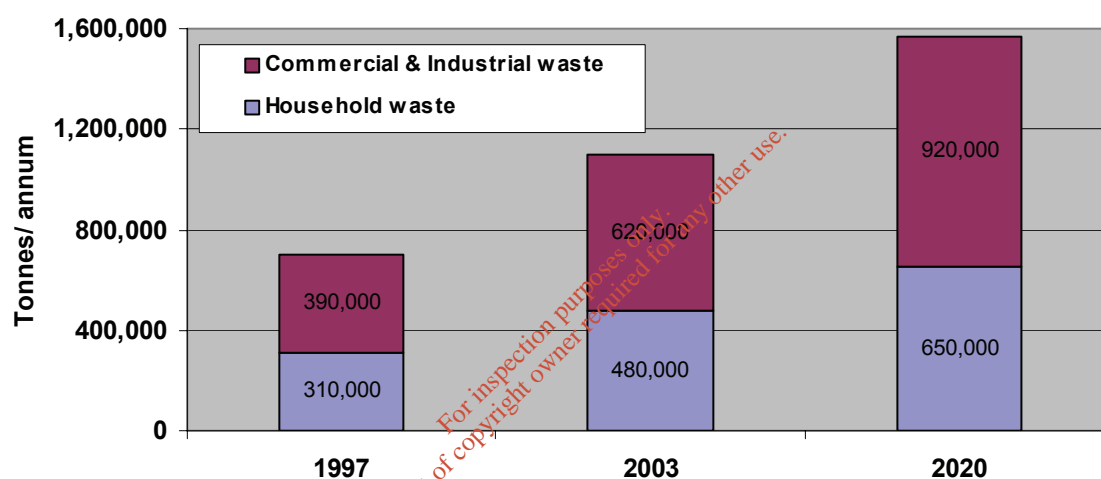
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2. Waste Management Plan for the Dublin Region

- 2.1.1. Dublin's waste strategy goals are summarised by the EU waste hierarchy pyramid, see Figure 2, which stresses that a new approach to managing waste is required to lead to more sustainable waste management. The strategy is to place emphasis on prevention, minimisation, reuse, recycling and recovery of energy in order to end the over-reliance on landfill disposal.
- 2.1.2. With the growth in population, employment and economic activity in the Region, the amount of waste generated is on the increase. Waste generation has increased significantly from 1997 as shown in Figure 1 below. The current Dublin Waste Management Plan 2005-2010 reports that 1.1 million tonnes of household, commercial and industrial waste were recorded in 2003. By 2020 it is expected that a total of 1.5 million tonnes of household, commercial and industrial waste will be generated in the region.

Figure 1 Household, Commercial, & Industrial Waste Trends

(Source: Dublin Waste Plans 1998 & 2005)



- 2.1.3. The reliance on landfill is still high in the region, with 74% of municipal and similar industrial type waste generated disposed to landfill in 2003. The remainder of the waste, 26% is recycled and recovered through source separated collection systems and additional recycling facilities. The aim is to recycle 59% of the region's waste and to landfill 16% by 2013. The development of key infrastructure such as central biological treatment facilities and a waste to energy plant is essential to achieving this goal.
- 2.1.4. At present the region is dependent on landfill for residual waste management and in 2006 there are three facilities in operation; Balleally Landfill, Arthurstown Landfill and the privately operated KTK Landfill in Co. Kildare. The majority of these landfills are currently nearing capacity and under current authorisations are due to close within three years. The local authorities are developing a replacement landfill in Fingal to serve the long term disposal requirements of the region.

3. Need for the Project

- 3.1.1. The need for the development of a WtE facility with the capacity to serve the waste management needs of the Dublin Region was identified as far back as 1997 in the Regional Waste Management Strategy.

Figure 2 Waste Hierarchy Pyramid



- 3.1.2. The adoption of the Dublin Waste Management Plan in 1998/2001 formalised the region's policy direction and set out an objective to develop thermal capacity for municipal and non-hazardous industrial waste.
- 3.1.3. Subsequent feasibility studies were carried out in 1999 to assess various technologies capable of treating this waste stream and examine the best location for the plant. The target date set for the implementation of the Facility in the first regional plan was 2004.
- 3.1.4. An extensive period of public consultation and community interaction including establishing a community office in Ringsend has been underway since 2001. Baseline environmental monitoring has been carried out since 2003 to facilitate the preparation of this Environmental Impact Statement.
- 3.1.5. The replacement Waste Management Plan for the Dublin Region was adopted and published in November 2005. The need for development of thermal capacity in the Region was re-confirmed within this plan.
- 3.1.6. The Waste Management Plan for the Dublin Region 2005-2010 sets out specific targets and objectives for recycling, thermal treatment and residual landfill. The development of key infrastructure such as central biological treatment facilities and a waste to energy plant is essential to achieving these goals and thus meeting regional, national and European targets.
- 3.1.7. As mentioned above, the Region remains overly reliant on landfill and after recycling, the main tool for reducing landfill reliance will be the proposed Dublin WtE facility, which will divert Approx 600,000 tonnes per annum (tpa) away from landfill.
- 3.1.8. The WtE will be the preferred residual waste treatment option and waste still requiring landfill at this stage will comprise residual waste in excess of the capacity of the plant, plus other non-combustible residues.

4. Alternatives considered

4.1. Alternative Strategies

4.1.1. The Dublin Waste Strategy 1997 compared a number of alternative waste management scenarios from the perspective of environmental impact, technical feasibility, and economics. A summary of these scenarios is provided in Table 1. A modelling exercise allowed the environmental impacts, costs, and waste management performance to be assessed and compared for each of the alternatives. Following the assessment, the fourth scenario – combining maximum recycling levels with thermal treatment of the remaining waste – although somewhat more expensive than the other alternatives, was found to be the Best Practicable Environmental Option (BPEO) for the Region.

Table 1 Alternative Waste Management Scenarios of the Dublin Waste Strategy

Scenario	Recycling	Bulk Waste Reduction/Recovery
1	Mandatory recycling according to national and EU recycling targets plus proposed landfill directive	None
2	Maximum realistic recycling	None
3	Mandatory recycling according to national and EU recycling targets plus proposed landfill directive	Thermal treatment
4	Maximum realistic recycling	Thermal treatment

4.1.2. The preferred scenario and associated targets remain the basis of regional policy in terms of integrated waste management. In terms of international experience (see Section 15.2 of the Plan), the targets set for Dublin are ambitious and a strategy aiming to achieve any higher recycling rates, or a lower landfill rate, would not be realistic.

4.1.3. During the review of the Dublin Waste Management Plan carried out in 2004-2005, an assessment was carried out to determine whether any new approaches were available requiring the overall strategy to be modified. In particular, an assessment of the potential for Mechanical Biological Treatment (MBT) to play a role in Dublin was conducted. Section 17.4 of the Plan found that MBT would not offer any significant advantages for the Dublin region, and indeed would prove less sustainable. For this reason the policy of employing thermal treatment for residual waste was not changed.

4.1.4. The do-nothing strategy was also considered in relation to the proposed Facility. By not developing the Facility, there would be a number of negative consequences for the waste management strategy of the region:

- Waste tonnage consigned to landfill would remain at current high levels and likely exceed the EU Landfill Directive targets.
- Given the deficiencies in landfill capacity in the region (set out in Section 12 of the Plan), Dublin's waste would need to be transported to other regions for a sustained period of time. This might extend to exporting waste for treatment abroad which would be contrary to the EU Proximity Principle and the need for Member States to be self sufficient in terms of solid waste infrastructure.

4.1.5. Both of these factors would have negative environmental impacts, and cost implications. The cost implications could in turn impact on the ability of the local authorities to implement the waste prevention, reuse, recycling and biological treatment policies of the Plan.

- 4.1.6. The “zero waste” option was also examined. While considered a long-term aspiration, it was not seen as a practical prospect in the Dublin Region.

4.2. Alternatives Technologies

- 4.2.1. A Feasibility Study Report for Thermal Treatment of Waste for the Dublin Region was completed in 1999. Phase 1 of the study examined the various thermal treatment technological options, associated environmental impacts, operational issues and costs. The report examined three alternative thermal options:

- Waste-to-Energy (WtE)
- Gasification
- Pyrolysis

- 4.2.2. The report concluded that WtE was a safe, tried and tested technology with full-scale facilities in operation across Europe. These facilities are capable of meeting stringent EU environmental standards. Gasification and Pyrolysis in comparison were considered to be emerging technologies, which had not been operated at the scale required by the Region. These technologies were also found to be costly to operate relative to WtE.

- 4.2.3. Following a detailed assessment the study concluded that ‘... No other thermal technology can compete with waste-to-energy technology on the basis of cost, reliability and ability to deal with untreated municipal waste’. Regarding the alternative technologies, it was recommended that these continue to be monitored to assess their future suitability if required.

- 4.2.4. During the procurement of the Dublin WtE facility, the process for selecting companies was an open competition advertised in the EU procurement journal. The first stage of procurement, whereby potential Service Providers are short listed, was carried out so as to enable alternative thermal technologies to be proposed.

5. Site Selection

- 5.1.1. The Poolbeg Site has been identified through a systematic assessment of areas suitable for thermal treatment in the Dublin Region.
- 5.1.2. A site selection assessment was carried out in 1999 by MC O'Sullivan Consulting Engineers on behalf of the local authorities of the Dublin Region, which identified the Poolbeg site as the preferred site. The other three short listed sites were again visited during the preparation of this EIS. Each of these three sites at Robinhood (Walkinstown), Cherrywood (Loughlinstown) and Newlands (Clondalkin) are still zoned industrial and are currently (June 2006) vacant. However, they are deemed to be no more advantageous than they were in 1999 and indeed less so due to the greatly increased traffic and residential/commercial development encroaching on them. On the other hand the Poolbeg site is now seen to have additional advantages that were not considered in the 1999 Site Selection Report, as detailed in Section 1.5.4 below.
- 5.1.3. As part of the Environmental Impact Assessment (EIA) process, the Poolbeg site was considered having regard to other published criteria. The Site met these criteria and no major constraints were identified. These confirmed the suitability of the Poolbeg site for the proposed Dublin WtE facility.
- 5.1.4. The proposed location of the Dublin WtE facility at the Poolbeg site not only provides a strategic location but also provides the following additional synergies with the surrounding existing facilities:
- (a) Ringsend Waste Water Treatment Works. In the event that land spreading of sludge will no longer be an option due to environmental constraints, it will be possible to pump the sludge directly to the proposed Dublin WtE facility for thermal treatment.
 - (b) There is also the opportunity to use the treated effluent from the Ringsend Waste Water Treatment Works within the WtE process thus reducing the quantity of potable water required.
 - (c) The close proximity to an existing cooling water channel will facilitate the use of seawater for cooling.
 - (d) The close proximity to grid connection. Power will be exported to the power grid via the existing substations which service the generating stations located in Poolbeg.
 - (e) When district heating infrastructure is developed in the future, it will be possible to use heat from the proposed Dublin WtE facility for district heating in new residential and commercial developments nearby in accordance with the energy and waste management policy objectives of the Dublin Waste Management Plan, Section 14.3.
 - (f) The site's location within Dublin Port is convenient for export of any residues and will minimise traffic impacts on the surrounding area.
 - (g) Some very large prefabricated components for the Facility can be imported through Dublin Port.
 - (h) The completion in 2006 of the East Wall dual carriageway road development scheme and in 2008 of the Samuel Beckett Memorial Bridge (Guild Street to Macken Street).

6. Proposed Scheme

- 6.1.1. The proposed Dublin WtE facility will be located on the Poolbeg Peninsula in Dublin. Most of the Site is located south of Pigeon House Road and is rectangular in shape measuring circa 160 m x 340 m and covers an area of approximately 5.5 hectares (13.6 acres). The location of the Site can be seen in Figure 3 below.

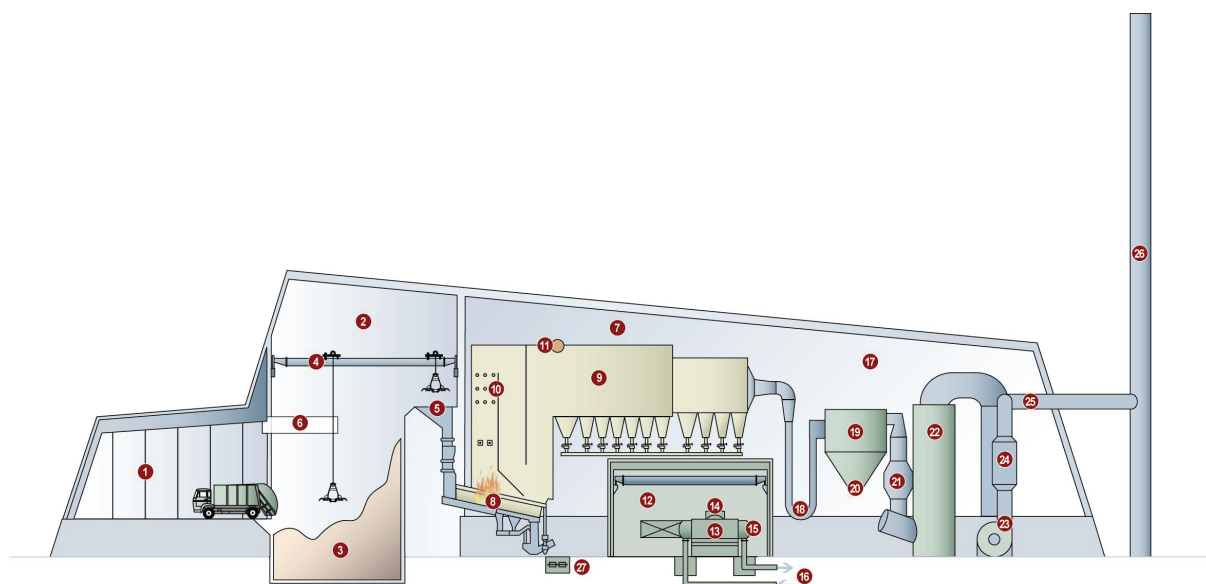
Figure 3 Location of the Site



- 6.1.2. There will be three buildings on the Site:

- (a) Main process building
- (b) Cooling water pump house
- (c) Security building

- 6.1.3. The main building will be approximately 200m long by 130m wide by 52m in height, at the highest point. A schematic of the waste to energy process is shown in Figure 4 below.

Figure 4 Schematic Diagram of the Waste to Energy Process

1. Waste reception hall
2. Waste bunker compartment
3. Waste bunker
4. Waste crane for feeding the boiler grate
5. Waste hopper
6. Control room
7. Boiler area
8. Grate
9. Boiler, where the heat energy is transferred from the flue gas to the boiler water
10. NO_x reduction by spraying ammonia water into the flue gas
11. Boiler drum, where water and steam are separated
12. Turbine room
13. Steam turbine
14. Generator, producing electricity
15. Condenser, where the remaining heat energy in the steam is cooled
16. Cooling system
17. Flue gas treatment area
18. Activated carbon and lime are added to the flue gas to bind dioxins and other components
19. Fabric filter, where the flue gas treatment residue is removed from the flue gas
20. Extraction point for flue gas treatment residues
21. Flue gas cooler
22. Two-stage wet scrubber for reduction of HCl, SO₂, HF and Hg emissions
23. ID fan
24. Silencer
25. Emission Monitoring
26. Stack
27. Bottom ash for recycling

1: Waste Reception Hall

- 6.1.4. The waste reception hall will handle up to 50 waste trucks per hour. There will be a series of chutes, ample space for the waste trucks to manoeuvre and an area for inspection of incoming waste. The waste reception hall is kept under constant negative pressure to avoid the leaking of any odours to the surrounding environs.

2 & 3: Waste Bunker Compartment and Waste Bunker

- 6.1.5. Waste will only be received in the opening hours as specified in the operational licence from EPA. It is intended that waste will be accepted at the Facility between 08.00 and 22.00, six days per week, but incineration will take place 24 hours a day/365 days a year. The waste bunker will be designed to be large enough to ensure that the incinerator can store sufficient waste to allow a continuous feed of fuel outside of waste acceptance hours.

4 & 5: Waste Crane and Hopper

- 6.1.6. Two waste cranes will mix the waste and feed the waste into the furnace inlet hopper. A third grab will be on stand-by in case of maintenance or breakdown. From the hopper the waste will be pushed into the grate at an appropriate rate.

8: Grate

- 6.1.7. The Facility will have two parallel independent incineration lines. Each line has a capacity of 35 tonnes/hour, i.e. the capacity of the Facility is 70 tonnes/hour. The actual incineration of the waste takes place on the grates. The waste is continuously moved forward at a controlled speed to ensure optimum burnout. The ashes will be deposited into the bottom ash bunker. The grate is water-cooled and the hot water from this cooling process will be collected and used for pre-heating.

27: Bottom Ash Collection

- 6.1.8. The bottom ash will be collected and stored on site in a bunker.

9: Boiler

- 6.1.9. The hot gas from the incineration process will be led through the boiler in four passes – three vertical and one horizontal. The boiler walls will be lined with steel pipes and the heat energy from the gases turn the water in the pipes to steam, which is subsequently fed to the steam turbine.

12, 13, 14, 15 & 16: Steam Turbine and Electricity Generator

- 6.1.10. The steam turbine drives a generator producing electricity. Approximately 480,000 MWh will be fed to the National Grid in a year. This amount of electricity is equal to the demand from approximately 50,000 homes. The plant will be designed to allow for a future district heating network, and will have the potential for heating future housing and office developments in the area.

10, 17, 18, 19 & 22: Flue Gas Cleaning

- 6.1.11. After releasing their heat, the flue gases pass through a series of cleaning processes, which will reduce the stack emissions to the level specified by the EPA – in accordance with the Waste Incineration Directive as implemented in Ireland by the European Communities (Incineration of Waste) Regulations 2003. The various processes and systems reduce dust particles, nitrogen oxides (NO_x), heavy metals, dioxins & furans, hydrogen chloride (HCl), sulphur-dioxide (SO₂), Carbon Monoxide (CO) and Hydrogen Fluorides (HF), to the levels for which the plant is licensed. Ammonia is sprayed into the boiler to reduce NO_x, activated carbon to bind dioxins and furans and mercury, and lime to reduce HCl and SO₂ are injected into the gas stream and are subsequently retained in

bag filters. A final scrubbing with water and Sodium Hydroxide (NaOH) takes out the remaining HCl, HF and SO₂.

25: Emission Monitoring

- 6.1.12. Emissions monitoring equipment will be provided to monitor the air pollutants. The monitoring system will meet the requirements of the Waste Incineration Directive, Irish implementing regulations and the Waste Licence. All monitoring results will be displayed in the control room.
- 6.1.13. Emissions monitoring will include the measurement of dioxin emissions from the stack on a fortnightly basis. A monitoring filter will be removed and analysed in an independent laboratory with the subsequent results being representative of dioxin emission concentrations for that period. It should be noted that such monitoring is not a requirement of EU or Irish legislation.

26: Stack

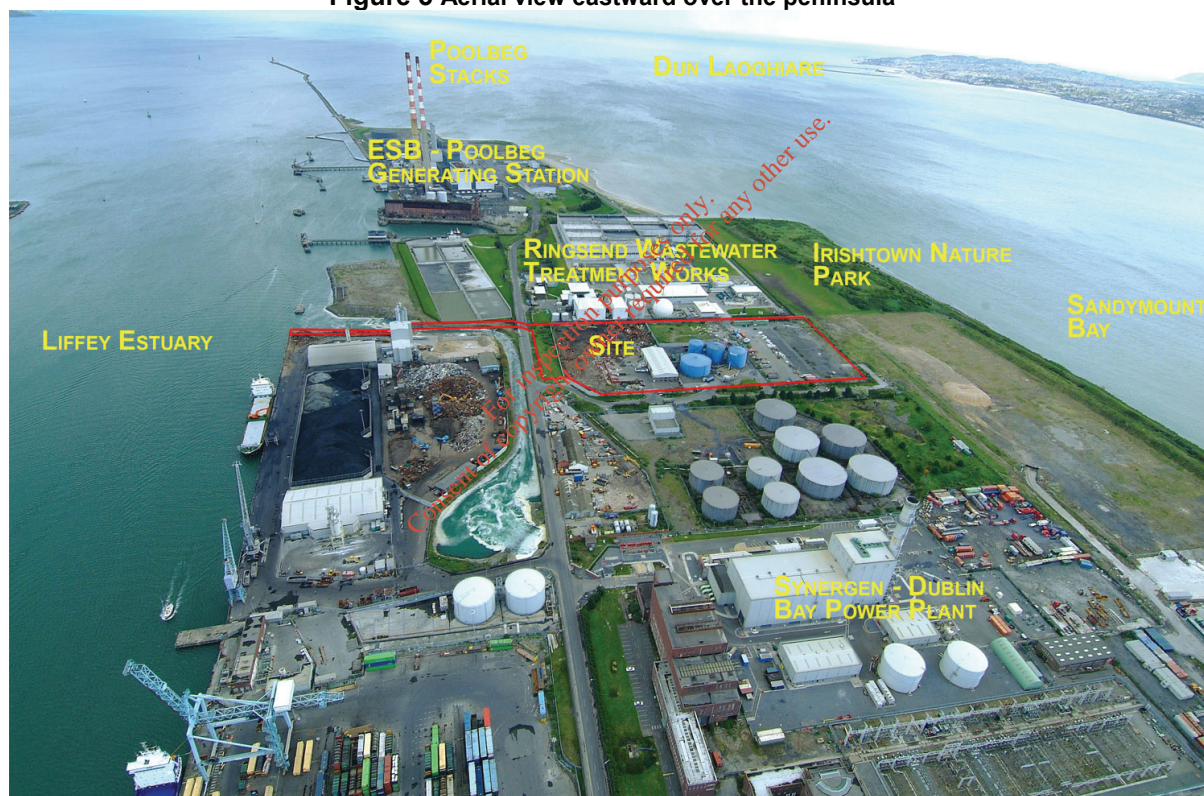
- 6.1.14. The stacks will be approximately 100m in height. This will be approximately half the height of the existing ESB-Poolbeg Stacks.

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7. Landscape and Visual impact

- 7.1.1. The landscape and visual assessment involved reviewing aerial photography, plans, sections and elevations of the proposed scheme, various publications and reports, together with visits to the site and environs of the proposed development. In addition a series of Photomontages were prepared from viewpoints in surrounding areas.
- 7.1.2. Poolbeg peninsula has a central and pivotal setting within the arc of Dublin Bay. Despite its overwhelmingly industrial character it is a significant landscape and visual feature dominated by the tall stacks of Poolbeg ESB Generating Station.
- 7.1.3. The site by contrast is visually indistinct and its character is consistent with the core industrial nature of its surrounds. The site has a visually degraded industrial appearance and is of low landscape sensitivity. The site has no specific landscape or visual-related designation. However, areas of the peninsula are important as an amenity and recreational resource, particularly in terms of its association with Dublin Bay, e.g. coastal walks, views to and from the area, Shellybanks Beach and also because of Irishtown Nature Park located directly southeast of the site.

Figure 5 Aerial view eastward over the peninsula



7.2. Characteristics of the Proposed Development

- 7.2.1. The main building occupies a central position on the site and presents a strong architectural spiralling form. The overall height of the building is 52m and it has a strong, contemporary architectural design, see Figure 6. The northern elevation facing Pigeon House Road includes a large area of glazing through which it will be possible to view internal technical aspects of the Dublin WtE facility.
- 7.2.2. Twin stacks to be located alongside the northern elevation of the proposed building. The stacks are slender and rise to 100m in height – approximately half of the height of the two existing ESB stacks at Poolbeg Generating Station.

7.3. Impact of the proposed development

- 7.3.1. The proposed development is of visual significance and will be visible from a wide range of areas around and across the arc of Dublin Bay. However, the landscape and visual impact will be strongly influenced by the existing industrial setting and the nature of existing views to and from this prominent coastal setting.
- 7.3.2. The proposed development will also be viewed as a major change in architectural approach to development on the peninsula. Existing development constitutes a visual collection of container stacks, silos, warehouses, *etc.* The proposed development will enclose the entire waste to energy process within a single structure.

Figure 6 Aerial view from South East (as represented on physical model)

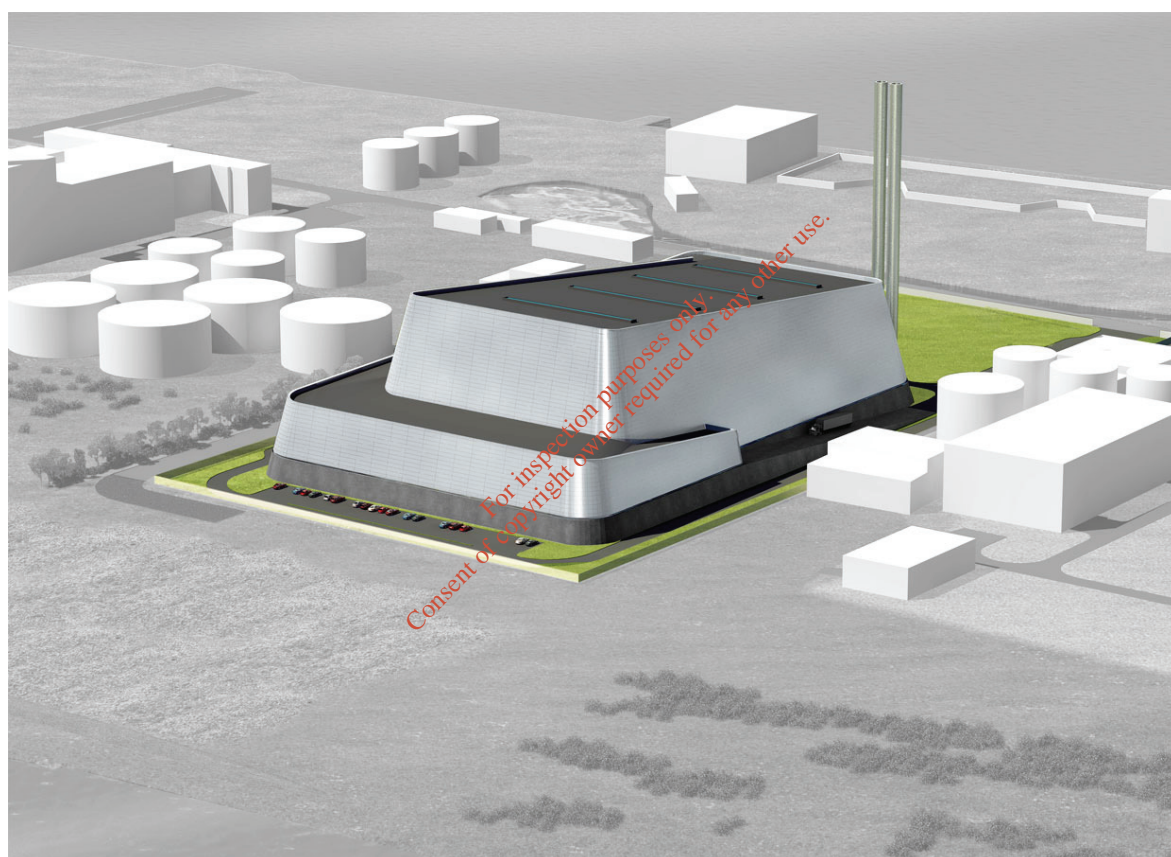


Figure 7 Aerial view of proposed Dublin WtE facility from the North



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7.4. Impact on Landscape, Cityscape and Seascape

- 7.4.1. While the proposed development is significant it will not adversely alter the existing unique character of the Poolbeg peninsula within Dublin Bay. The peninsula will remain unaffected as a central and pivotal feature within the arc or sweep of the bay. Furthermore, the existing Poolbeg Stacks will retain their predominant landmark influence on the character of the peninsula and the bay.
- 7.4.2. Overall, the proposed development will not have a significant impact in terms of the contribution of Poolbeg peninsula to the landscape, cityscape or seascape character of Dublin Bay. However, the proposed Facility will have a significant influencing presence on the immediate character of the peninsula, and particularly on the south shore areas. However, this is not considered to be of a negative nature. On the contrary, the proposed Facility has been designed to be a landmark structure, defining a new approach for architectural treatment of industrial development.

7.5. Visual Impact

- 7.5.1. The development will have a strong visual presence from locations on Poolbeg peninsula and from areas off the peninsula particularly where viewed from directly north within Dublin Port or at Clontarf, see Figure 8, and from the southwest and south at Irishtown and Sandymount, see Figure 9.
- 7.5.2. The visual impact will remain significant for the coastal promenade, strand and bay at Sandymount. However, as the viewer moves away from the coast or further along the coast, the impact will quickly reduce as the development becomes an increasingly smaller part of the wider developed context.
- 7.5.3. In operation, a water vapour plume will also be visible from the stacks. Such plumes are already a feature associated with the many existing stacks on Poolbeg peninsula.
- 7.5.4. The Poolbeg peninsula is already an area of high lighting set within the backdrop of the city. As such the lighting associated with the proposed development will not give rise to any additional adverse impact.

Figure 8 (Photomontage Viewpoint 7 of EIS) – an open view south from Clontarf with the twin ESB – Power Generating Station stacks dominating the horizon and standing as a clear landmark on the Poolbeg Peninsula



- 7.5.5. The proposed development comprises a major building of visual prominence which given its scale and site context, cannot be visually screened. Therefore, a building of significant architectural and visual merit has been designed for the site. The building in conjunction with the provisions of the Poolbeg Masterplan has the potential to set the trend for the rejuvenation of the architectural quality of the industrial elements on the peninsula.
- 7.5.6. In terms of landscape restoration, it is proposed to establish a strong visual evergreen screen along the eastern, southern and western boundaries of the site. Four spiralling berms will provide for definition and framing of views towards the glazed northern elevation. In this way the landscaping seeks to visually anchor the development, screening the low-level traffic movements, whilst setting-off the architectural treatment of the building.
- 7.5.7. The proposed development will remain as a prominent building of visual significance on the peninsula. Therefore the development will continue to have a particular visual influence and impact. The development also has the potential to be viewed as a positive landmark building and as part of the envisaged framework for Poolbeg has the potential to act as a catalyst for the positive architectural treatment of industrial development on the peninsula.

Figure 9 (Photomontage Viewpoint 17 of EIS) – a clear view north toward the Poolbeg Peninsula from the promenade at Sandymount



8. Traffic

- 8.1.1. The Facility is proposed to operate 24 hours, 7 days a week and it is proposed that it will accept deliveries between 8:00 AM and 10:00 PM Monday through Saturday, 312 days per year. It is also proposed that waste be delivered directly to the Facility from within a defined catchment area around the Dublin WtE facility and the remainder will primarily come from three licensed transfer stations located at Ballyogan, Ballymount and Kilshane Cross. Direct deliveries will arrive by refuse collection vehicles (RCVs) and transfer station deliveries will arrive by bulk transfer vehicles.
- 8.1.2. The most relevant land use and transport plans for the area, namely the Dublin City Development Plan, The Dublin Docklands Development Area Master Plan and the Poolbeg Framework Plan were examined, which set the context for the future transport and development of the area.
- 8.1.3. The current and future transport receiving environment was established in terms of the road conditions, traffic flows, future roads and improvements, public transport, and pedestrian and cyclists' services and facilities.
- 8.1.4. A classified turning movement count survey was undertaken at the site in April 2006. From the results, existing site traffic generation was determined and heavy goods vehicle (HGV) movement patterns were established.
- 8.1.5. Trip generation was estimated for the proposed Facility, which included trip generation caused by waste deliveries, residue removal, employees, and visitors, construction and of occasional operations such as service overhauls.
- 8.1.6. Waste residues will be removed off site by truck to a dockside location, therefore their impact on the local road network, except immediately within the vicinity of the Site, will be minimal.
- 8.1.7. The Facility is anticipated to employ approximately 64 staff members. This will include a number of shift workers, therefore the traffic generation of employees is relatively low.
- 8.1.8. The traffic impact analysis showed the proposed development will not generate significant traffic on either the local or strategic road network and adequate capacity was available on the road network to accommodate the development.
- 8.1.9. Overall in transport terms the site is well located and will not create any undue traffic impact on the local community or the road network provided proposed traffic management measures and the associated mitigation measures are implemented.

9. Air Quality and Climate

9.1.1. Air quality refers to the presence or absence of airborne pollutants, and the impact of these materials on the atmospheric environment. In order to reduce the risk to human health and the environment from poor air quality, National and European statutory bodies have set objective limit values for a range of air pollutants.

9.1.2. An air quality assessment was undertaken for the construction and operation of the proposed Facility. This involved an assessment of the existing air quality and the prediction and assessment of future air quality. Mitigation measures are proposed where appropriate to reduce, remedy or avoid significant adverse impacts.

9.2. Air Quality

9.2.1. Air dispersion modelling results indicate that the background ground level concentrations of air pollutants, with the Facility in operation, comply with the relevant air quality standards or guidelines for the protection of human health and vegetation.

9.2.2. The stack height was confirmed by air dispersion modelling to ensure adequate dispersion.

9.3. Climate

9.3.1. An assessment was undertaken of the impact of the Facility on climate, in particular the greenhouse gas emissions from the Facility were quantified and compared with the alternative of landfilling the same amount of waste. The Facility was found to have marginally less greenhouse gas emissions than the landfilling alternative.

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10. Noise and Vibration

- 10.1.1. The impact on the environment of noise and vibration from the Dublin WtE facility at Poolbeg was examined.
- 10.1.2. The existing noise and vibration levels were measured at the site boundary and at the nearest noise sensitive locations.
- 10.1.3. The noise and vibration assessment shows that during operation, the Facility will comply with the relevant guidelines.
- 10.1.4. During construction, noise and vibration will be generated from construction activities. Construction noise and vibration were considered in the assessment and also found to comply with the relevant guidelines, with mitigation in place.
- 10.1.5. Such mitigation measures will include the following; the Facility has been designed with an enclosed waste reception hall to prevent unnecessary noise to the environment, trucks will be properly maintained, on site speed restrictions will be enforced, the driving routes on site will be as short as possible and all activities related to the operation, e.g. collection of bottom ash, will take place inside the building.

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11. Residues and Consumables

11.1. Ashes and Residues

11.1.1. Ash and residues will be generated during the WtE process. There will be three main solid residues:

- a) Bottom ash
- b) Boiler ash
- c) Flue gas treatment residues

11.1.2. The types and approximate quantities of ash and residues from treating 600,000 tonnes of waste are detailed in Table 2 below.

Table 2 Estimated Ash and Residues by Type and Quantity

Ash Type	Tonnes/annum
Bottom Ash	120,000
Boiler Ash	3,000
Flue Gas Treatment Residues	24,000
Total	147,000

11.1.3. Bottom ash is what remains at the end of the grate after the burnout of the waste. Bottom ash is classified as non-hazardous. Bottom ash will be stored onsite in the bottom ash bunker. Until the framework for re-use of bottom ash develops in Ireland, the bottom ash will be exported by ship for recycling and reuse in the UK or Continental Europe.

11.1.4. Boiler ash is contained in the flue gases from the combustion process and accumulates in the boiler. Depending on its content, the boiler ash will either be stored with the bottom ash (if non-hazardous) or with the flue gas treatment residues (if hazardous), prior to removal offsite for either re-use or disposal overseas.

11.1.5. Flue gas treatment residues are the residues removed from the flue gases in the treatment processes. Flue gas treatment residues will be collected and stored in an enclosed system. The flue gas treatment residue, due to its composition, will be classified as hazardous for transportation and disposal. The residue will be transported offsite in sealed containers and will be shipped to Mainland Europe.

11.1.6. There will be no emissions from the ash and residue handling operations during normal conditions. The residues handling, storage and loading areas will be enclosed to prevent the potential for windblown ash.

11.1.7. No treatment of any ash or residue will take place onsite.

11.2. Material Usage

11.2.1. A number of materials will be used in the WtE process. Most will be used for flue gas treatment, including activated carbon and lime, ammonia solution, sodium hydroxide and water. Diesel and liquefied petroleum gas (LPG) will be used for the auxiliary burner system, the emergency generator and for any vehicles permanently used on site. Activated carbon and lime will be stored onsite in silos. Ammonia solution, sodium hydroxide and diesel will be stored in bunded tanks. LPG will be stored in small quantities on site. Due to quantities of relevant materials stored onsite, the Dublin WtE facility will be regulated by the Health and Safety Authority under rules that control major accident hazards involving dangerous substances (COMAH).

12. Soils, Geology and Groundwater

- 12.1.1. An assessment of the impact of construction and operation of the proposed Dublin WtE facility on soils, geology, and groundwater was undertaken.
- 12.1.2. The Site is located on the Poolbeg Peninsula, on a reclaimed area that was formerly the foreshore. This area was predominantly reclaimed in the early 1970s and as such fill covers all remnants of the natural ground on site.
- 12.1.3. The assessment looked at the bedrock and soils underlying the site. A layer of fill that includes gravels, sands, silts and clays, including rubble, bricks, concrete, glass, timber and cinders, covers the natural ground. Some hydrocarbon contamination, generally below levels of concern, was recorded in the fill.
- 12.1.4. Soil will be excavated during construction. A risk assessment will be undertaken of the soil to determine its suitability for reuse in landscaping onsite. Unsuitable soil will be removed from site for disposal.

12.2. Groundwater

- 12.2.1. The groundwater beneath the site was found to be slightly contaminated with hydrocarbons, and salty due to the close proximity to the sea.
- 12.2.2. During construction, dewatering will be required to construct parts of the Facility. The groundwater abstracted during construction will be discharged to sewer.
- 12.2.3. Mitigation measures will be put in place to ensure the construction and operation of the Facility will not have a significant impact on geology, soils and groundwater.

12.3. Water

- 12.3.1. Cooling water will be abstracted for use in the Dublin WtE facility. Water will flow from the intake point in the port, through the condensers where it will be used to cool the steam after the turbine, and will return to the port through the outfall channel. The discharge temperature will be a higher temperature than the intake temperature. Because the water is heated it will become lighter than the main body of water in the port and will stay on the surface and form a so-called 'buoyant thermal plume' that will spread over the water in front of the outfall channel. The excess temperature of the thermal plume will gradually decrease after discharge due to loss of heat to the atmosphere and mixing with the background water.
- 12.3.2. Modelling was undertaken of the mixing of the discharged heated water. The modelling took into account the flows in the River Liffey, and the movement of water due to the rise and fall of the tides in the River Liffey and Dublin Bay. The water inflows from the rivers Tolka and Dodder and the cooling water discharges from Synergen and Poolbeg Power Plants were also included in the model.
- 12.3.3. The model was calibrated to reproduce the present conditions with respect to water levels, currents, temperature and salinity (salt content). The Dublin WtE facility was built into the model and simulations were made to determine the extent and magnitude of the thermal plume.
- 12.3.4. The simulations showed that the average excess surface temperature due to the WtE discharge is about 1-2° C for a confined area close to the outfall location. Locally near the outfall, for a short period of time at each tide, the excess temperature can be higher and up to 10° C.

- 12.3.5. In order to control fouling in the cooling water system, it is proposed to add biocides (substances that control marine growth) to the system. Ten different types of biocide were considered in order to determine the best product. Following research, two specific types emerged as potentially suitable. The effects on the marine environment for these two specific biocides - chlorine dioxide and hypochlorite - were modelled.
- 12.3.6. The modelling analysis indicated that hypochlorite would only have an impact very locally to the proposed cooling water outfall where as the chlorine dioxide would have a much greater impact on the Liffey Estuary. Consequently the hypochlorite was identified as the preferred biocide.
- 12.3.7. Temperature and quantity of cooling waters will be continuously monitored to ensure the optimal running of the Dublin WtE facility and compliance with the conditions of the Waste Licence.
- 12.3.8. The addition of biocides will be monitored and optimised according to the requirements of the intake water to ensure that excess biocides are not used.

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13. Human Beings

- 13.1.1. The impacts on human beings were assessed by considering the community issues and the health impacts from a Dublin WtE facility.
- 13.1.2. The socio economic and community infrastructure for the Ringsend, Irishtown and Sandymount areas were examined.
- 13.1.3. Community facilities in the area include community halls, schools, healthcare centres and a range of sports and recreational facilities such as Irishtown Stadium, ESB Sportsco and a number of public parks. The local area has a high proportion of long-time residents and this is reflected in the low level of population change within the study area.
- 13.1.4. It is predicted that construction of the Dublin WtE facility will have a positive effect on employment in the local area both directly in terms of employment of construction workers, and also indirectly for other local businesses / service providers such as retail outlets, restaurants, pubs and accommodation.
- 13.1.5. No negative impact on industry or community facilities in the local area is expected to arise from the Dublin WtE facility. Two existing industrial facilities (Clearway Disposal and the Hibernian Molasses Company), which currently operate at the Dublin WtE Site will be re-located. The proposed development will not detract from the level of community facilities currently available.
- 13.1.6. The principal of community gain was first introduced in the policy statement Changing Our Ways (1998) (Section 9.2 Public Support and participation).
- "Local authorities, working closely with local communities, should utilise a proportion of income from waste charges and gate fees to mitigate the impact of facilities on these communities through appropriate environmental improvement projects".*
- 13.1.7. Dublin City Council is proposing to implement the following Community Gain initiatives, if granted planning approval.
- A Community Gain Fund that will be used to finance facilities/services for the benefit of the local community
 - District Heating to be generated by the Dublin WtE facility
 - The refurbishment / redevelopment of the Pigeon House Power station and Hotel for appropriate uses, in partnership with the local community
- 13.1.8. Due to quantities of relevant materials stored onsite, the WtE facility will be regulated by the Health and Safety Authority under rules that control major accident hazards involving dangerous substances (COMAH). A preliminary risk assessment has identified a small number of possible major-accident scenarios. The risk assessment concluded that the effects of any of these major-accidents outside the site would be minimal. The residual risk to humans and the environment from the Dublin WtE facility would be extremely low.
- 13.1.9. A comprehensive safety management system will be established for the Dublin WtE facility. This system will include training of staff, regular auditing and inspection and on-site emergency plans.

14. Terrestrial Ecology

- 14.1.1. A terrestrial ecological assessment was undertaken for the construction and operation of the proposed Dublin WtE facility. Terrestrial ecology includes both the land flora (vegetation) and fauna (animals) and their associated habitat.
- 14.1.2. All of the habitats present are classified in the broad categories of built land and disturbed ground and none are of conservation value. There are no known flora species of conservation value in the area.
- 14.1.3. The mammal species associated with the site are common to developed and disturbed habitats and none are of conservation value. The presence of skylarks on waste ground to the south of the site is of some note as skylark is listed as a species of moderate conservation concern. The presence in winter of Brent geese on the grasslands associated with the adjoining sewage treatment works is of note as these are part of the Dublin Bay internationally important population.
- 14.1.4. The Irishtown Nature Park, whilst rich in plant species derived from various sources, is not of significant conservation importance. From the terrestrial perspective, the closest designated sites are Booterstown Marsh proposed Natural Heritage Area (situated almost 3 km south of the site) and the Grand Canal proposed Natural Heritage Area (situated approximately 2 km east of the site).
- 14.1.5. The impact of site clearance is not considered of significance as the existing habitats are not of conservation importance. Overall, the replacement of existing habitats with further, highly modified habitats is rated as a Neutral impact. The construction activities could have a disturbance effect on the Brent geese, which feed during winter on the grassland to the south-east of the site. However, the geese in Dublin Bay are well used to high levels of disturbance and are unlikely to be much affected by construction activities. Even if disturbed, which would be temporarily, they have many other sites in the Dublin Bay area to retreat to. The construction activities would not be expected to have any adverse impacts on the flora and fauna of the Irishtown Nature Park. Once operational, the plant would not be expected to have any impacts on the terrestrial ecological interests of the immediate area. The proposed development would not have any impacts, direct or indirect, on the ecological interests of the Booterstown Marsh or Grand Canal proposed Natural Heritage Areas.
- 14.1.6. Owing to the low ecological significance of this site, and considering that there are no significant adverse impacts, specific mitigation measures are not considered necessary.

15. Marine and Estuarine Ecology

- 15.1.1. Dublin Bay is an area of high conservation importance and is legally protected under both the EU Habitats Directive and the EU Birds Directive. Specific sites of conservation importance include the Liffey and Tolka Estuaries, and Sandymount Strand, all immediately adjacent to the proposed development. Baseline surveys of the area showed that all the species and habitats recorded are typical of the east coast of Ireland
- 15.1.2. Salmon, an important fish species, uses the River Liffey. There are well-established seal colonies in Dublin Bay but seals do not generally enter the Liffey near the proposed development. Dolphins and whales have been observed in the Bay but generally do not occur near the proposed development.
- 15.1.3. The operation of the proposed Dublin WtE facility has the potential to impact the marine and estuarine environment in a number of ways. These include impacts from water abstraction, heat pollution and biocides.
- 15.1.4. Water is to be taken from the Liffey Estuary immediately upstream of the proposed development and used as cooling water within the process. Salmon and other fish may be drawn into the system with cooling water. The use of grates in front of the intake should reduce levels of fish deaths. The rates of mortality will also be monitored and if found to be unacceptable, further deterrents will be installed.
- 15.1.5. Cooling water is to be released back into the Liffey at a higher temperature than it was taken out. Fish are particularly sensitive to temperature. If the heated water stretches across the width and depth of the Liffey for extended periods it could impact on salmon migrating upstream to spawn. Models indicate that heated water will not fill the river channel during normal operation. Once in operation, the extent of the heated water will be monitored to ensure that this is the case.
- 15.1.6. The proposed development will take into account other discharges and ensure that the combined effect does not have a significant adverse impact on the marine and estuarine flora and fauna of the area.

16. Architectural Heritage, Archaeological and Cultural Heritage

- 16.1.1. An assessment of the existing Archaeological, Cultural Heritage and Architectural Heritage was undertaken based on a desk study of available information on the archaeological, cultural heritage and architectural heritage of the study area and a field survey of the Site.
- 16.1.2. The proposed Dublin WtE facility will be located along Pigeon House Road to the north of which is the recorded monument of the sea wall (DU019:029-01). Historical and cartographic sources point to an earlier sea wall (DU019:029-02) being located along the line of the current sea wall and Pigeon House Road. The sea walls were initially constructed to prevent the build up of deposits within the main navigational route of the River Liffey. This was followed in the seventeenth and eighteenth century by reclamation of the lands to the south of the wall between Ringsend and Poolbeg lighthouse. The proposed site remained undeveloped in the eighteenth and nineteenth century. In the twentieth century a portion of the site was reclaimed.
- 16.1.3. There are no recorded features of an architectural heritage or cultural heritage merit within the proposed site, and therefore the proposed Dublin WtE facility will have no physical impact on the receiving architectural heritage or cultural heritage environment and no mitigation measures are required.
- 16.1.4. Although there are no recorded archaeological monuments within the proposed site the northern section of the site is within the constraint area of the sea walls (DU019:029-01/02). However the proposed design will avoid the line of these walls as noted in historic maps, with the intention for the associated cooling water pipelines to bridge the monument. A sheet pile structure and pump house will be constructed within the estuary area. The proposed development will therefore not directly impact on the recorded monument (DU019:029-01/02), but may have a potential slight impact on maritime archaeology.
- 16.1.5. It is recommended that archaeological monitoring of all groundbreaking and earthmoving activities within the proposed Facility take place under licence to the Department of the Environment Heritage and Local Government. It is also recommended that the Underwater Unit of the National Monument Section be consulted once a construction programme has been finalised to assess the suitability of conducting an Inter-tidal Survey in the area of the cooling water channel and the Liffey estuary.

17. Material Assets

- 17.1.1. The impacts of the Facility on material assets in the vicinity were assessed, including land use issues, utilities, natural resources and transport network.
- 17.1.2. To facilitate the proposed Dublin WtE facility, it will be necessary to relocate two commercial enterprises (Hibernian Molasses and Clearway Disposal) to alternative sites. The remainder of the site required for the cooling water system, north of Pigeon House Road, can be facilitated without the need to relocate any commercial interests. There will be no residential properties, community facilities or agricultural land acquired to facilitate this project.
- 17.1.3. It is not expected that local property values will be negatively impacted as a result of locating the Dublin WtE facility on the Poolbeg Peninsula. The areas surrounding the Peninsula are well-established residential areas where demand is expected to remain strong. There may be a temporary impact on the house market in local residential neighbourhoods once construction of the Facility begins, however research shows this would likely be a very short term effect.
- 17.1.4. Two 110kV cables and one 220kV cable cross the southern end of the Site and may have to be relocated. The existing Hibernian Molasses pipeline, currently crossing Pigeon House Road, will be removed during preparation of the Site.
- 17.1.5. It is proposed to connect the Facility to the power grid, subject to agreement with ESB Networks, which will be made in due course.
- 17.1.6. The Dublin WtE facility will treat 600,000 tonnes of household, commercial and non-hazardous industrial waste, which is currently landfilled.
- 17.1.7. Approximately 60MW of electricity will be exported to the national grid. This will replace the power being generated from fossil fuels, thus reducing the consumption of these fuels. The design of the Facility will allow for production of district heating to a district heating network comprising new residential and commercial developments.
- 17.1.8. A comprehensive traffic management plan will be developed as part of the proposal to ensure that negative impacts to the local traffic are minimised.
- 17.1.9. The principal residual impacts from the Dublin WtE facility are the reduction in the volume of municipal, industrial and commercial waste to be landfilled in the Dublin region and the supply of 60MW of electricity to the national grid. When district heating is developed, heating will be supplied to selected residential and commercial properties in the area. No other residual impacts are anticipated.

18. Construction and Decommissioning

- 18.1.1. It is expected that construction work at the Dublin WtE facility will commence in 2008 and that construction and commissioning of the Facility will take approximately 36 months.

18.2. Construction Employment, and Facilities

- 18.2.1. Throughout the construction phase there will be some variation in the numbers working on site. The construction workforce will average 275 with a maximum of approximately 500.
- 18.2.2. Temporary office accommodation and welfare facilities will be provided in the western part of the site. A minimum number of parking spaces will be provided on-site, for site construction management and visitors. To ensure that construction workers do not create additional demand for parking in the vicinity of the proposed development, or cause obstruction on the adjacent road network, the workforce will either be encouraged to use public transport, or the contractors will be required to provide transport to the site for their workforce.
- 18.2.3. It is proposed that work will take place 24 hours per day during the construction phase. The construction programme will be planned in such a way that noisy construction activities outside normal hours will be limited, where possible, and will be strictly monitored.

18.3. Construction Impacts and Mitigation

- 18.3.1. Normal construction techniques will be employed. Every reasonable effort will be made to ensure that any environmental impacts will be minimised during the construction phases of this project. The construction planning will be geared towards keeping disruption and nuisance to a minimum.
- 18.3.2. The earthworks will require excavation of some areas and the filling of others, with the levelling of the site. Some soil will have to be excavated from the bed of the new cooling water channel. This work may be done by dredger, with the spoil being disposed of at sea in accordance with the necessary permit.
- 18.3.3. A dust minimisation plan will be put in place to lower the potential for dust generation from site activities. Appropriate measures will be taken to ensure that the site and the surroundings are maintained to a high standard of cleanliness.
- 18.3.4. Storm water run-off will be controlled and discharged via a silt trap.
- 18.3.5. Due to the nature of construction activities, there will be diesel-powered plant and machinery operating at the site for the duration of the construction phase. All fuels will be stored in bunded areas.
- 18.3.6. A construction waste management plan will be implemented to control and minimise the generation of construction waste and where possible, the waste arising will be reused or recycled in preference to disposal.
- 18.3.7. It is anticipated that with the proper construction management, there will not be any significant negative residual impacts arising from the construction of this development.

19. Sustainability

- 19.1.1. Sustainability is an important objective for all activities undertaken by Dublin City Council.
- 19.1.2. The widely accepted definition of sustainable development, on which this section of the EIS is based, is that outlined in the World Commission on Environment and Development report "Our Common Future" (1987), and states that "humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs".
- 19.1.3. Sustainable development is not a fixed state of harmony, but rather a "process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are made consistent with future as well as present needs" (ibid).
- 19.1.4. Sustainability is about three main issues: environment, economy and community. The Dublin WtE project has been reviewed in the context of these recognised sustainability criteria. The conclusion is that the Dublin WtE project is in accordance with sustainable development objectives.

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20. Cumulative Impacts and Interactions

- 20.1.1. The cumulative impacts and interactions of the proposed Dublin WtE facility are addressed in relevant chapters of the EIS.
- 20.1.2. The Effect Matrix below, Table 3, examines whether a topic in the left hand column has an impact during construction and/or operation on each of the topics listed along the top row. The effect table should be read from left to right.

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21. Conclusion

- 21.1.1. It is concluded that the proposed Dublin WtE facility if designed, constructed and operated in accordance with this EIS will not have a significant impact on the environment.

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Table 3 Inter-relationship and Interaction of Effects matrix (C = Construction, O = Operational)

	Landscape and visual impact	Traffic	Air Quality and Climate	Noise and Vibration	Soils, geology and groundwater	Water	Human beings	Terrestrial Ecology	Estuarine Ecology	Architectural Heritage, archaeology and cultural heritage	Material Assets
Landscape and visual impact	-	-	-	-	CO	-	CO	CO	-	CO	CO
Traffic	CO	-	CO	CO	C	-	CO	-	-	CO	CO
Air Quality and Climate	O	CO	-	-	C	O	CO	CO	O	O	O
Noise and Vibration	-	-	-	-	C	-	CO	CO	-	-	-
Soils, geology and groundwater	C	C	C	C	-	CO	CO	CO	CO	C	C
Water	CO	-	-	-	C	-	CO	-	CO	-	C
Human beings	-	-	CO	-	-	-	-	-	-	-	CO
Terrestrial Ecology	CO	-	CO	-	-	-	CO	-	CO	-	-
Estuarine Ecology	-	-	-	-	-	CO	CO	CO	-	-	-
Architectural Heritage, archaeology and cultural heritage	C	-	-	-	-	-	CO	-	-	-	CO
Material assets	CO	CO	-	-	C	C	CO	-	-	-	-

Note: C = Construction Phase Interaction; and, O = Operational Phase Interaction