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Dublin Waste to Energy Ltd

EPA Oral Hearing into the Dublin Waste to Energy Project

Brief of Evidence - Cumulative Impacts and Interactions

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ARUP

WITNESS STATEMENT

1. EXPERIENCE AND QUALIFICATIONS

My name is Ria Lyden. I am a Director of Arup Consulting Engineers.

I have a Bachelor of Engineering Degree in Civil Engineering and a Master of Business Administration Degree. Both degrees are from University College Cork. I am a Chartered Engineer. I am a Fellow of the Institution of Engineers of Ireland and a member of the Institution of Structural Engineers. I have worked as a civil and environmental engineer for 27 years.

Since 1992 I have prepared, or supervised the preparation of numerous environmental impact statements for a wide range of industrial, infrastructure, institutional, commercial and residential projects.

2. INTRODUCTION

Arup Consulting Engineers were the main consultants to Elsam Dublin Waste to Energy Ltd, now DONG Energy, for the preparation on behalf of Dublin City Council of the EIS and waste licence application for the Dublin Waste to Energy Project.

The EIS was prepared by a team of specialists with considerable experience in the preparation of EISs and reference was made to the EPA Documents, *Guidelines on the information to be contained in Environmental Impact Statements*, EPA 2002, and *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)*, EPA 2003. I refer to these documents below as the 'EPA Guidelines'.

The EU has also prepared guidelines, *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions*, published by the Office for Official Publications of the European Communities in May 1999. I refer to this document below as the 'EU Guidelines'.

Arup prepared chapter 20 of the EIS, Cumulative Impacts and Interactions.

My evidence will cover the approach adopted in the EIS to assess cumulative impacts, indirect impacts and interaction of impacts and will demonstrate that these impacts have been assessed in the EIS.

3. REQUIREMENT FOR THE CONSIDERATION OF CUMULATIVE IMPACTS AND INTERACTIONS

Schedule 6 of the Planning and Development Regulations 2001, which mirrors Article 3 of the EIA Directive, specifies the information to be contained in an EIS, including:

A description of the aspects of the environment likely to be significantly affected by the proposed development, including in particular:

- "Human beings, fauna and flora
- Soil, water, air, climatic factors and the landscape
- Material assets, including the architectural and archaeological heritage, and the cultural heritage and
- The *inter-relationship* between the above factors."

"A description is also required of the likely significant effects (including direct, *indirect*, *secondary*, *cumulative*, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from:

- The existence of the proposed development
- The use of natural resources."

4. DEFINITIONS

There are no generally agreed and accepted definitions for indirect or secondary impacts, cumulative impacts or inter-action of impacts.

The EPA Guidelines define cumulative impact thus: *The addition of many smaller impacts to create one larger more significant impact.*

The EPA Guidelines also use the term synergistic impacts. Synergistic impact is defined as: *Where the resultant impact is of greater significance than the sum of its constituents.*

The EPA Guidelines do not define indirect or secondary impacts.

The EU Guidelines use slightly different definitions, as follows:

Indirect Impacts: Impacts on the environment, which are not a direct result of the project, often produced away from or as a result of a complex pathway. Sometimes referred to as second or third level impacts, or secondary impacts.

Cumulative Impacts: Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project.

Impact Interactions: The reactions between impacts whether between the impacts of just one project or between the impacts of other projects in the area.

The term 'impact interactions' is equivalent to the term 'inter-relationship of effects'. The EU guidelines accept that their definitions overlap to a certain extent. The EU guidelines also refer to 'Cross-Media Impacts', in which the impact in one environmental medium may also have an indirect impact on another medium.

5. METHODOLOGY USED IN THE EIS TO ASSESS CUMULATIVE AND INDIRECT IMPACTS AND INTERACTIONS.

In the screening stage of preparation of the EIS for the Dublin WtE project, the potential for significant cumulative and indirect impacts and interactions was examined and any such potential impacts were identified. Where the potential for significant cumulative, indirect and secondary impacts and interactions was identified, such impacts and interaction of impacts were included in the scope and addressed in the baseline and impact assessment studies for each of the relevant environmental media and aspects of the project. The cumulative, indirect and secondary impacts and interaction of impacts were presented in the chapters of the EIS which address the most relevant environmental media and aspect of the project.

The matrix and expert opinion approaches were used in the identification of the potential for significant cumulative and indirect impacts and interactions. Refer to Table 20.1 for the matrix of potential interactions. Modelling and carrying capacity analyses were used to evaluate impacts.

Reference was also made to the EPA Guidelines and in particular to the guidance given for the preparation of an EIS for Project Type 32 – Waste disposal installations for the incineration,

chemical treatment or landfill of hazardous and non-hazardous waste, in the EPA's Advice Notes on Current Practice (in the preparation of Environmental Impact Statements).

6. CUMULATIVE IMPACTS AND INTERACTIONS

The following text summarises the cumulative, indirect and secondary impacts and interactions of impacts, which have been addressed in the Dublin WtE EIS. It is not intended to be exhaustive or repeat detailed information, which has been provided by other witnesses. Specific references to the sections of the EIS, in which these impacts are addressed, are presented in Appendix 1.

6.1 Landscape and Visual Impact

The landscape and visual impact study, in chapter 6 of the EIS, addressed the cumulative impact of the Dublin WTE project and the existing surrounding developments. The indirect or secondary impact of the Dublin WTE project on future developments in the area was also addressed.

Specific mitigation measures and the residual impact were expressed in terms of indirect and cumulative impacts.

As a landmark building of significant architectural merit, the project is expected to have a positive cumulative visual impact on the Poolbeg peninsula, and it is expected to have a positive indirect impact as a catalyst for future development.

6.2 Traffic

A detailed traffic study was undertaken and was described in chapter 7 of the EIS. The cumulative impact of the traffic from the facility in combination with current and future road and traffic developments was assessed.

Specific mitigation measures were identified in the traffic study for indirect and cumulative impacts, air quality impacts and material assets impacts.

The residual cumulative impact of the traffic generated by the operational phase of the facility is expected to be imperceptible.

6.3 Air Quality

A detailed air quality study was presented in Chapter 8 of the EIS and by Dr Porter at this hearing. In determining the impact of emission to air from the facility, the ground level concentrations of the different substances emitted were combined with the background levels, which were obtained from monitoring in the vicinity of the site and took into account existing air emission sources and existing traffic.

The specific impacts of the emissions to air from the three power stations in the vicinity of the Dublin WtE site (Poolbeg, North Wall and Synergen Power Stations) were included in the assessment. The air emissions from the traffic generated by the project were also included in the assessment, and an allowance was made for expected future changes in air quality.

The emissions from the facility, combined with the cumulative background levels were compared with the relevant air quality standards. These air quality standards have been defined in order to protect human health and the environment.

The assessment of impact for each individual parameter was expressed in terms of the cumulative impact on other media such as human beings and the environment. The cumulative assessment also

addressed the incremental emissions from the facility in the context of relevant international protocols.

The assessment indicated that the cumulative ground level concentrations would below the relevant air quality standards or guidelines for the protection of human health or the environment.

6.4 Climate

In addressing climate impacts, in chapter 8 of the EIS and at this hearing, the impact of the Dublin WtE facility was assessed in the context of the cumulative emissions of greenhouse gases from Ireland and Ireland's obligations under the Kyoto Protocol. The assessment indicated that the project would have a positive impact on Ireland's greenhouse gas emissions.

6.5 Noise

A detailed assessment of the construction and operational stage predicted noise levels was presented in chapter 9 of the EIS and by Ms Harmon at this hearing. Baseline noise levels were measured, which took account of existing noise in the neighbourhood.

The noise emissions from the operation and construction phases were modelled to give resulting levels at the sensitive receptors, which were combined with the measured background levels, thus addressing the cumulative impact of the project with other developments in the vicinity, for comparison with the relevant standards. The study included an assessment of the likelihood of complaints due to construction and operational phase noise from the development, thus assessing the impact of the development on human beings.

While there will be a small noise impact during construction, the noise impacts during the operational phase of the facility will be imperceptible.

6.6 Vibrations

Vibration impacts were assessed in chapter 9 of the EIS. Background levels and impacts from the development were found not to be significant.

6.7 Residues and Consumables

Cross media effects relevant to air emissions were addressed in the EIS. The plant has been designed to ensure that the potential pollutants to air in the flue gases emissions will be removed from the flue gases and collected as residues in the flue gas treatment equipment. The process effluent will be reused in the process and any pollutants in the process effluent will be collected as solid residues. These solid residues were addressed in chapter 10 of the EIS. The residues will be reused or disposed of to appropriately licensed facilities and will not have a significant environmental impact.

6.8 Soils, Geology and Groundwater

A detailed soil, geology and groundwater study was undertaken and was presented in chapter 11 of the EIS. Potential indirect and cumulative impacts were addressed as part of the overall predicted impact of the facility during the construction phase. These included the potential impacts on water quality, on the estuarine ecology and on air quality, and the potential indirect impact on soils.

The proposed mitigation measures for impacts on soils addressed all the relevant direct, indirect and cumulative impacts and it is predicted there will be no significant residual negative impacts on the soils or geological environment.

6.9 Water

Cross-media effects with respect to cooling options were addressed in the EIS. Three cooling methods were considered. Once-through seawater cooling could have potential impacts on water and the estuary but will reduce noise, visual impact and will improve energy efficiency.

A detailed study was undertaken of the existing hydrography of Dublin Bay and the Liffey Estuary and of the impact of the emissions from the cooling water system, and was presented in chapter 12 of the EIS and by Mr Vested and Dr Rasmussen at this hearing. The cumulative impact and interaction of the cooling water emissions from the Dublin WTE facility together with the relevant emissions from the Synergen and Poolbeg power plants and the Ringsend wastewater treatment plant was predicted and assessed. The impacts of the cooling water emission on estuarine flora and fauna were addressed in chapter 15 of the EIS.

A potential indirect impact on water was also addressed. This was the reuse in the WTE plant of treated 'grey' water from the Ringsend wastewater treatment plant rather than discharging the effluent to the river, as is done currently.

6.10 Human Beings

The impact on human beings was addressed in a number of chapters of the EIS. Impacts and interactions of impacts on Human Beings with respect to Landscape and Visual aspects, Traffic, Noise, and Air Quality were detailed in the respective chapters. Other impacts on human beings were addressed in chapter 13. These included the potential for complex indirect, cumulative and interactive impacts between soils, dioxins and dibenzofurans emission to air and human health; and the potential for complex indirect, cumulative and interactive impacts from all the emissions from municipal waste incineration on human health The general conclusion of these studies was that properly equipped and operated modern municipal waste incineration does not pose a threat to human health.

Indirect effects due to employment generated and the Community Gain Fund were also addressed. These were expected to be positive.

6.11 Terrestrial Ecology

An assessment of the impact of the facility on the existing terrestrial flora and fauna species within and around the site was presented in chapter 14 of the EIS.

The potential cumulative and interactive effects of construction activities and the operational phase of the facility on the ecology of the vicinity were addressed. The indirect impacts on the designated Special Areas of Conservation and Special Protection Areas in Dublin Bay were also addressed in chapters 14 and 15.

6.12 Estuarine Ecology

An assessment of the impact of the facility on the existing marine flora and fauna species in the vicinity of the site was presented in chapter 15 of the EIS. Various indirect and cumulative impacts on the estuarine ecology were addressed including an increase in suspended solids in the water due

construction works, noise pollution effects on marine mammals, the increase in water temperature due to the cooling water discharge, the discharge of biocides contained in the cooling water, the extraction of water from the River Liffey, the potential entrainment and impingement of fish and other aquatic life, and the potential for any marine ecology impacts to affect commercial fishing.

In relation to all of these aspects, the impact of the proposed development is not expected to be significant.

6.13 Material Assets

The impacts on material assets were assessed in chapter 17. The indirect impact on human beings in relation to property values was assessed, as was the significant impact of the facility in reducing the demand for landfill capacity.

6.14 Overall Cumulative Impact of the development

The overall cumulative impact of the development can be summarised as follows:

- The proposed Dublin WtE facility if designed, constructed and operated in accordance with this EIS will not have a significant impact on the environment.
- The two principal residual impacts from the Dublin WtE facility will be the reduction in the volume of municipal, industrial and commercial waste to be landfilled in the greater Dublin area, and the supply of 60MW of electricity to the national grid. When the proposed mitigation measures are put in place, no residual negative impacts are anticipated to result from either the construction or operational phases of the proposed development.
- When district heating is developed, heating will be supplied to selected residential and commercial properties in the area.

7. CONCLUSION

In conclusion, the significant cumulative impacts, indirect impacts and interactions of effects were fully addressed in the EIS. The approach adopted in the EIS, in which the cumulative and indirect impacts and interaction of impacts were presented in the chapters which address the most relevant environmental media, is in compliance with the recommendations of the EPA and EU Guidelines.

Appendix 1

1. CUMULATIVE AND INDIRECT IMPACTS AND INTERACTIONS

Cumulative and indirect impacts and interactions of impacts have been addressed in the Dublin WtE facility EIS. The following text provides references to the locations in the EIS, in which the cumulative and indirect impacts and interactions of impacts have been addressed. These examples and references are not exhaustive and it is not intended to repeat information, which has been provided by other witnesses.

1.1 Landscape and Visual Impact

The detailed landscape and visual impact study, including the generation of photomontages, was described in chapter 6 of the EIS. When considering the existing environment (6.4) the following aspects were considered:

- Traffic
- Air quality and climate
- Soils geology and groundwater (6.4.2)
- Water (6.4.5)
- Human beings (6.4.3, 6.4.4, 6.4.5, 6.4.7),
- Terrestrial ecology (6.4.4, 6.4.6, 6.4.9, 6.4.13).
- Estuarine ecology (6.4.5)
- Material assets (6.4.11, 6.4.12)

The facility design included mitigation measures, which take cognisance of the air quality and climate study and the traffic studies. This resulted in the stack height being designed to ensure the adequate level of air dispersion required, and the facility is orientated to allow for the most appropriate traffic movement both on and off the site. Furthermore the site levels selected took cognisance of the ground conditions in order to strike the correct balance between material excavation and visual impact. The impact of these mitigation measures on landscape and visual impact was addressed in the landscape and visual assessment.

The study addressed the incremental impact of the Dublin WTE project in the context of the surrounding present developments. The site context and existing developments were described in sections 6.4.1 to 6.4.9. The incremental impact of the Dublin WTE project on foreseeable future developments were addressed in sections 6.6.2 to 6.6.4 and 6.6.21. The cumulative impact with and indirect impact on existing development was addressed in sections 6.6.5 to 6.6.8 and 6.6.23.

Specific mitigation measures were included in the design in the context of the indirect impact on and cumulative impact with future developments, ecology and traffic. Refer to sections 6.7.4 to 6.7.6.

The residual impact was expressed in terms of indirect and cumulative impact in section 6.8.1.

1.2 Traffic

A detailed traffic study was undertaken and was described in chapter 7 of the EIS. The traffic study calculated the traffic, which will be generated by the development. The existing baseline traffic, which reflects the traffic generated by other developments in the area, was measured. Future road and public transport developments in the city, and future growth and change in traffic

patterns in the area and City were included with the baseline traffic in the traffic prediction model. The increase in traffic resulting from the Dublin WTE project was presented as a percentage increment to the traffic on the road network in the future opening year and design year. Refer to tables 7.7, 7.8 and 7.9 of the EIS. Thus the cumulative impact of the facility in combination with current and future developments was assessed.

The emissions from the predicted traffic flows generated during the operational phase of the development were considered in the air quality and climate assessment (section 8.4, Annex 5 to Appendix 8.1 and Appendix 8.2 section 8.3.5) and noise assessment (9.2.7, 9.2.9, 9.2.11, 9.2.17 Fig 9.3, 9.4).

The movement of spoil from the site and the importation of clean fill material will cause additional traffic movements during construction phase. The construction trip generation was discussed in Section 7.7.11 and the Worst Case Construction Related Daily Trip Generation was given in Table 7.22.

Specific mitigation measures were identified in the traffic study for indirect and cumulative impacts, air quality impacts and material assets impacts. Refer to sections 7.8.1, 7.8.3 and 7.8.4.

The residual impact from the operational phase was expressed in terms of cumulative impact, in section 7.9.1.

1.3 Air Quality

A detailed air quality and climate study was presented in Chapter 8 of the EIS. In determining the impact of emission to air from the facility, the ground level concentrations of the different substances emitted were combined with the background levels, and the total level for each substance was compared with the reference standards. The background levels, obtained from monitoring in the vicinity of the site, take into account existing air emission sources and existing traffic in the vicinity of the site. Refer to sections 8.3.17 and 8.3.18.

The specific impacts of the emissions to air from the three power stations in the vicinity of the Dublin WtE site (Poolbeg, North Wall and Synergen Power Stations) were assessed in combination with the emissions to air from the Dublin WtE facility. Refer to section 8.4.16 and Annex 3 to Appendix 8.1 of the EIS and table A8.6.

The air emissions from the traffic generated by the project were also included in the assessment, the details of which were given in Annex 5 to Appendix 8.1, and an allowance was made for future changes in air quality, which would be expected to occur by 2012. (Note 3 to table 8.8.)

The cumulative background levels to which the increment from the Dublin WTE project was added were summarised in Table 8.8.

The emissions from the facility, combined with the cumulative background levels were compared with the relevant air quality standards. The air quality standards have been defined in order to protect human health and the environment. Refer to Table 8.9.

The assessment of impact for each individual parameter was expressed in terms of the cumulative impact on other media such as human beings and the environment. Refer to sections 8.4.5 to 8.4.8.

In sections 8.4.17 and 8.4.18, the cumulative assessment also addressed the incremental emissions from the facility in the context of relevant international protocols.

Specific mitigation measures for the operational phase were included in the design of the facility.

Emissions during the construction phase were also considered and mitigation measures were provided to minimise the impact on air during construction (8.5.3).

1.4 Climate

In addressing climate impacts, the impact of the Dublin WtE facility was assessed in the context of all emissions of greenhouse gases from Ireland and Ireland's obligations under the Kyoto Protocol. Refer to section 8.4.22 to 8.4.39. The assessment was summarised in sections 8.4.37 to 8.4.39.

1.5 Noise

A detailed assessment of construction and operational stage predicted noise levels was conducted and was presented in chapter 9 of the EIS. Baseline noise levels were measured. These took account of existing noises in the neighbourhood including noise emanating from the scrap handling, primarily from the scrap yard placed on the north side of Pigeon House Road, a fan at a silo to the north of the measuring position, a fan at the sewage treatment plant, and to some extent vehicles on Pigeon House Road. Refer to section 9.2.19.

The predicted noise emissions from the plant associated with the incineration process and worst-case traffic movements were considered in sections 9.3.6 and 9.3.7.

During the construction phase noise emissions from construction activities were predicted which include soil stripping, piling and steam blowing during commissioning (9.3.11, 9.3.12).

The noise emissions from the operation and construction phases were modelled to give resulting levels at the sensitive receptors and these levels were combined with the measured background levels, thus addressing the cumulative impact of the project with other developments in the vicinity for comparison with the relevant standards. Refer to section 9.3.24 and tables 9.10 and 9.11. The study included an assessment of the likelihood of complaints due to noise from the development in both the construction and operational phases, thus assessing the impact of the development on human beings. Refer to sections 9.4.11 to 9.4.17.

Off site noise impacts from traffic associated with the development were also assessed in section 9.4 and appendix 9.2.

1.6 Vibrations

Vibration impacts were assessed. Background levels and impacts from the development were found not to be significant. Refer to sections 9.4.18 to 9.4.22.

1.7 Residues and Consumables

Cross media effects relevant to air emissions were addressed in the EIS. Sections 5.6.47 to 5.6.57 explained how the plant has been designed to ensure that the potential pollutants to air in the flue gases emissions will be removed from the flue gases and collected as residues in the flue gas treatment equipment, for removal off site as solid waste. Sections 5.5.34 explained that process effluents will be reused in the process. Any pollutants in the process effluent will be collected as solid residues, as explained in section 5.6.58. These solid residues were addressed in chapter 10. The residues will be reused or disposed of to appropriately licensed facilities.

1.8 Soils, Geology and Groundwater

A detailed soil, geology and groundwater study was undertaken which consisted of a desk study and geotechnical and environmental site investigations. The study was presented in chapter 11 of the EIS.

Potential indirect and cumulative impacts were addressed as part of the overall predicted impact of the facility during construction phase in Section 11.5 and operational phase in Section 11.6. Specifically the potential impact on water quality was addressed in Sections 11.5.3, 11.5.4, 11.5.8, 11.5.11, 11.5.12, 11.6.2, and 11.6.5. The potential impact on air quality was addressed in 11.5.3.

In order to construct the cooling water channels some underwater excavation will be necessary. This will result in the temporary impact on the estuarine ecology in the vicinity of the excavation. Refer to section 11.5.12 and 15.5.11.

It is envisaged the fill material onsite will be reused in soft landscaping areas in accordance with the landscape plan proposed for the site. This is proposed as a mitigation measure for various impacts including visual, soils and materials assets.

A potential indirect impact on soils was addressed in section 4.4.1 (a) relating to potential to divert sewage sludge for thermal treatment.

Mitigation measures for impacts on soils proposed in Section 11.7 addressed all the relevant direct, indirect and cumulative impacts and it is predicted there will be no significant residual negative impacts on the soils or geological environment.

1.9 Water

Cross-media effects with respect to cooling options were addressed in section 5.11.30 and 5.11.31. Three cooling methods were considered, air cooled condensers, cooling towers and once-through seawater cooling.

A detailed assessment was conducted of the existing hydrography of Dublin Bay and the Liffey Estuary and the predicted impact of the facility, specifically the emissions from the cooling water systems of the Dublin WTE project. The study was presented in chapter 12 of the EIS. The dispersion of the emission plume from the facility was analysed using a 3D computer dispersion model of the Liffey and Estuary. The relevant emissions from the Synergen and Poolbeg Power plants and the Ringsend Waste Water Treatment plant were inputted into the model. Refer to sections 12.3.5 and 12.3.8.

The cumulative impact and interaction of the emissions from the Dublin WTE with the relevant emissions from the Synergen and Poolbeg Power plants and the Ringsend Waste Water Treatment plant was predicted by this model and assessed.

The existing estuarine flora and fauna were addressed in 12.1.21 to 12.1.25 and the predicted impact is addressed in 12.4.28 as well as in sections 15.5 and 15.7.

A potential indirect impact on water was addressed in section 5.5.36. This was the reuse in the WTE plant of treated 'grey' water from the Ringsend wastewater treatment plant rather than discharging the effluent to the River, as is done currently.

1.10 Human Beings

The impact on human beings was addressed in a number of chapters of the EIS. The main one was chapter 13. A detailed description of the existing environment in the vicinity of the proposed

facility is provided and the predicted impact on human beings from the proposed facility was detailed.

Impacts and interactions of impacts on Human Beings with respect to Landscape and Visual aspects, Traffic, Noise, Air Quality were dealt with separately and are detailed in the respective chapters.

The potential for complex indirect, cumulative and interactive impacts between soils, the emission to air of dioxins and dibenzofurans and human health is addressed in the dioxin uptake study in sections 13.4.9 to 13.4.16 and Appendix 13.1. The study modelled the dioxin ingestion of a theoretical MARI and TARI, as defined in section 13.4.9. The conclusion of this study was as given in section 13.4.16.

The potential for complex indirect, cumulative and interactive impacts from all the emissions from municipal waste incineration on human health was assessed in published studies such as those by the World Health Organisation 1996, The Health Research Board 2003, and the UK Department of Environment Food and Rural Affairs in 2005. These were referenced in sections 13.3.27 to 13.3.41. The general conclusion of these studies was that properly equipped and operated modern municipal waste incineration does not pose a threat to human health.

The facility during construction and operation will generate employment, which will have a direct and indirect socio-economic benefit. This has been considered in section 13.6.1. The proposed Community Gain Fund could have a positive indirect impact on community facilities, as addressed in section 13.6.2. The landscaping proposal will have an indirect positive impact on residential amenities, which is described in section to 13.6.3.

During the construction there may be a temporary impact on human beings from soil stripping and excavation but mitigation measures to reduce the impact of these activities have been provided in the Chapter 11, Soils, Geology and Groundwater.

1.11 Terrestrial Ecology

A baseline study of the existing flora and fauna species within and around the site for the proposed Dublin WtE Facility was conducted. The study was presented in chapter 14 of the EIS.

In addition, baseline studies were undertaken in 2003, which drew on existing bird data for Dublin Bay, principally wintering waterfowl data from the Dublin Bay Project database. The bird study is reproduced in Appendix D, Volume 2, of the Technical Appendices to the Dublin Waste to Energy Baseline Monitoring Report, which was prepared by COWI and RPS-MCOS in 2005 and has been available on the project website. Material from the bird study was also incorporated into Chapter 3, Volume 1 of the Baseline Monitoring Report, entitled Estuarine Ecology and also presented at the An Bord Pleanála oral hearing.

The potential cumulative and interactive effects of construction activities and the operational phase on the ecology of the vicinity were addressed in sections 14.4.1 to 14.4.4, and on the designated sites in 14.5.1 and 14.5.2. Indirect impacts on Brent Geese were addressed in section 14.4.2 and at this hearing. The indirect impacts on the designated Special Areas of Conservation and Special Protection Areas in Dublin Bay are addressed in sections 14.5.1 and 14.5.2 and 15.5.31.

1.12 Estuarine Ecology

A baseline study of the marine and estuarine ecology was carried out including an extensive literature review. The study was presented in chapter 15 of the EIS.

During the construction phase there could be an increase in suspended solids in the water due to soil stripping. The possible effect of this on estuarine ecology is addressed in 15.5.11 and 15.5.12.

Marine fauna may be affected by noise pollution. However, impacts are likely to be minimal and short term and mainly restricted to the construction phase. Refer to section 15.5.13.

During operation it is proposed to discharge cooling water to the River Liffey, which will result in a temperature increase resulting in a thermal plume. The impact of the predicted increase in temperature on estuarine ecology was addressed from 15.5.20 to 15.5.27 and 15.5.41. Mitigation measures were provided in 15.6.9.

It is also proposed to use biocides within the cooling water system to prevent biofouling of the cooling water pipes. The impact of the discharge of biocides on the estuarine ecology was addressed in 12.4.39 to 12.4.41. Mitigation measures were provided in 12.5.1 to 12.5.3. It is also proposed to extract water from the River Liffey for cooling water and provide a screen at the intake point. This could result in the potential entrainment and impingement of fish and other aquatic life. However, invertebrate and flora species diversity in the area of the intake was low and thus impingement impacts were not expected to be significant, as discussed in sections15.5.35 and 15.6.13.

There is the potential for the reduction in estuarine and marine ecology which would have the potential to effect commercial fishing. This was addressed in section 15.5.38. However, as the impact of the proposed development is not expected to be significant, the effect on this aspect of human beings is not expected to be significant.

1.13 Architectural Heritage, archaeology and cultural heritage

A baseline desktop architectural heritage, archaeology and cultural heritage was undertaken.

There is the potential during construction, specifically during soil stripping and excavation, for possible archaeological features to be disturbed. However, it is proposed for a qualified archaeologist to be present during soil stripping and excavations and all possible identified archaeological features will be logged. Thus impacts on archaeology are not expected to be significant.

1.14 Material Assets

The impacts on material assets were assessed in chapter 17. The indirect impact on human beings in relation to property values was assessed in 17.4.8 and 17.4.9. Other indirect impacts include the significant impact in reducing the demand for landfill capacity, section 17.4.19.

1.15 Overall Cumulative Impact of the development

The overall cumulative impact of the development was summarised in the non-technical summary section 1.21.1, which relates to negative impacts and in section 17.6 in relation to positive impacts.

1.21.1 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.

17.6.1 The two 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 greater Dublin area, and the supply of 60MW of electricity to the national grid. Where the above mitigation measures are put in

place, no residual impacts are anticipated to result from either the construction or operational phases of the proposed development.

17.6.2 When district heating is developed, heating will be supplied to selected residential and commercial properties in the area.