

16 Cumulative Impacts, Other Impacts and Interactions

16.1 Introduction

This chapter addresses the cumulative impacts, indirect impacts and main interactions between different aspects of the environment likely to be significantly affected by the proposed development. This chapter also addresses environmental effects which have not been specifically addressed in the individual chapters of the EIS.

Only topics that could be logically linked to the development have been examined in detail. Accordingly, when a topic is not mentioned, the authors have concluded that no potential for impact exists.

16.2 General

The requirement to address cumulative impacts, indirect impacts and interactions of effects comes from the Planning and Development Regulations and Environmental Impact Assessment Directive 2011/92/EU. Schedule 6 of the Planning and Development Regulations 2001, as amended, which mirrors Article 3 of the Environmental Impact Assessment directive, specifies the information to be contained in an EIS, including the information listed below:

“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, and*
- *the use of natural resources.”*

16.3 Methodology Used to Assess Cumulative and Indirect Impacts and Interactions

16.3.1 Guidance

Reference was made to the EPA Documents, *Guidelines On The Information To Be Contained In Environmental Impact Statements (EPA 2002)*, *Advice Notes On Current Practice (In The Preparation Of Environmental Impact Statements) (EPA 2003)*, *Revised Guidelines On The Information To Be Contained In*

Environmental Impact Statements Draft (EPA 2015) and Advice Notes For Preparing Environmental Impact Statements Draft (EPA 2015) in the preparation of this chapter of the EIS. These are referred to 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*, (Office for Official Publications of the European Communities 1999). These are referred to below as the EU guidelines.

At the screening stage in the preparation of the EIS for the proposed development, 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 and indirect 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 and indirect impacts and interaction of impacts are presented in the chapters of the EIS which address the most relevant environmental media.

The matrix and expert opinion approaches, as outlined in the EU Guidelines, were used in the identification of the potential for significant cumulative and indirect impacts and interactions. Refer to **Table 16.1** for the matrix of potential interactions. Modelling and carrying capacity analyses were used to evaluate impacts.

Reference was also made to the EPA guidelines *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) and Advice Notes For Preparing Environmental Impact Statements Draft (EPA 2015)*, and in particular to the guidance given for topics which would usually be addressed when preparing an EIS for developments of a particular project class.

16.3.2 Definitions

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

The EPA 2015 Guidelines provide the following definitions:

Cumulative impact: The addition of many smaller effects to create one larger, more significant effect.

Synergistic impact: Where the resultant effects is (sic) of greater significance than the sum of its constituents.

Indirect impacts: Effects that arise off-site or are caused by other parties that are not under the control of the developer (such as a quarry)

Secondary Effects: Effects that arise as a consequence of a project (a new waste water treatment plant will reduce the yield of mussels in a nearby estuary)

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.

16.4 Interaction of Effects in Different Environmental Media

16.4.1 Matrix of Effects

Table 16.1 presents the effects matrix. The effects matrix examines the potential for the topic or issue in the left hand column to have an effect on the environmental media listed in the top row of the matrix as a result of the proposed development.

If there is the potential for an effect during the construction phase, this is indicated by a 'C'. An 'O' indicates the potential for an effect during the operational phase and 'OC' indicates the potential for an effect during both phases. If there is considered to be no potential for an effect, this is indicated by '-'.
.

The purpose of the effects matrix is to identify potential effects in different media. Actual effects and their significance are dealt with in the most relevant chapter.

Table 16.1 Potential Interaction of Effects Matrix (C = Construction, O = Operational)

	Noise & Vibration	Air Quality	Climate	Landscape & Visual	Archaeological Architectural & Cultural Heritage	Population & Human health	Material Assets	Ecology/ Biodiversity	Soils & Geology	Surface Water & Groundwater	Road Network & Traffic
Noise and Vibration		-	-	-	C	CO	-	CO	-	-	-
Air Emissions	-		CO	-	-	CO	-	CO	-	-	-
Emissions to surface water and Groundwater	-	-	-	-	-	CO	CO	CO	-		-
Landscape & visual impact	-	-	-		O	O		CO	-	-	-
Lighting	-	-	-	O	-	O	-	O	-	-	-
Archaeological Architectural & Cultural Heritage	-	-	-	-		-	-	-	-	-	-
Socio-economic impact	-	-	-	-	-		CO	-	-	-	CO
Traffic impacts	CO	CO	CO	-	-	CO		CO	-	-	
Residues and wastes	-	-	-	-	-	CO		CO		CO	
Ecology/Biodiversity	-	-	-	-	-	-	-		-	-	-
Soils & Geology	C	C	-	-	C	C	C	C		C	C

16.4.2 Potential Interactions

16.4.2.1 Noise and Vibration Emissions

There is the potential for the noise and vibration, arising from the construction phase of the proposed development, to impact on the Martello Tower. The potential and predicted effects of noise and vibration during construction on buildings, including the Martello Tower, is addressed in **Chapter 10 Noise and Vibration** of this EIS. There is the potential for the noise and vibration, arising from both the construction and operational phases, to cause disturbance to fauna. The potential and predicted effects of noise and vibration during construction and operation on fauna are addressed in **Chapters 12 Biodiversity** of this EIS. There is the potential for noise and vibration, arising from both the construction and operational phases of the proposed development, to impact human beings. The potential and predicted effects of noise and vibration arising from both the construction and operational phases on human beings are addressed in **Chapter 10 Noise and Vibration** of this EIS.

16.4.2.2 Air Emissions

There is the potential for the air emissions, arising from both the construction and operational phases of the proposed development, to impact on climate, human beings and flora and fauna. The potential and predicted effects of air emissions arising from both the construction and operational phases on climate, human beings and flora and fauna are addressed in **Chapters 9 Climate, 6 Population and Human Health and 12 Biodiversity** of this EIS respectively.

The Department of Defence were consulted during the preparation of the EIS. The Department queried whether the emissions from the stack are likely to have pose a hazard to helicopters flying to Haulbowline and Spike Islands. The US Federal Aviation Authority (US FAA) (2006) examined the issue of the safety risks of aircraft overflight of industrial stacks and determined that no accidents or incidents had been recorded, which were attributed to overflight of exhaust plumes. The US FAA determined that the risks associated with exhaust plumes is deemed acceptable. Consequently it is considered that there is not likely to be a significant interaction between helicopter flights and the emissions to air from the facility.

16.4.2.3 Emissions to Surface Water and Groundwater

There is the potential for the emissions to surface water and groundwater, arising from both the construction and operational phases of the proposed development, to impact on human beings, flora and fauna and the drainage network. The potential and predicted effects of emissions to surface water and groundwater arising from both the construction and operational phases on human beings, flora and fauna and the drainage network are addressed in **Chapters 6 Population and Human Health 12 Biodiversity and 13 Soils, Geology, Hydrology and Hydrogeology** of this EIS respectively.

16.4.2.4 Landscape and Visual Impact

There is the potential for the landscape and visual impacts, arising from the operational phase of the proposed development, to have an effect on the cultural heritage features such as Martello Tower and Spike Island, and on the tourism potential and the residential and recreational amenity of the area. The visual impacts on the cultural heritage features are addressed in **Chapters 11 *Landscape and Visual Impact*** and **14 *Archaeological, Architectural and Cultural Heritage*** of this EIS. The landscape and visual impacts on the tourism potential and the residential and recreational amenity of the area are addressed in **Chapters 11 *Landscape and Visual Impact*** and **6 *Population and Human Health*** of this EIS. There is the potential for the proposed planting for visual screening to have an effect on biodiversity. This is addressed in **Chapter 12 *Biodiversity*** of this EIS.

16.4.2.5 Lighting

There is the potential for the lighting around the site and on the stack, during the operational phase of the proposed development, to have an impact on the residential amenity and on biodiversity. The impacts of the lighting on residential amenity and on biodiversity are addressed in **Chapters 11 *Landscape and Visual Impact*** and **Chapter 12 *Biodiversity*** of this EIS respectively.

16.4.2.6 Socio-economic Impacts

The additional employment of up to 320 construction workers in the construction phase and 63 personnel in the operation phase of the proposed development and the increased economic activity will lead to increased consumption of resources and generation of waste. These are expected to have a slight impact on material assets. The impact of the additional employment on the road network has been addressed in **Chapter 7 *Roads and Traffic*** of this EIS.

16.4.2.7 Traffic Impacts

The increased traffic generated by the construction and operational phases of the proposed development has the potential to have an impact on air quality, climate and human beings and to generate noise, which in turn could have an impact on human health and biodiversity. The impacts on air quality and human beings due to the traffic from the proposed development, and the impacts of the noise generated by the proposed development are addressed in **Chapters 8 *Air Quality***, **6 *Population and Human Health*** and **10 *Noise and Vibration*** of this EIS, respectively. The traffic generated by the development will have a negligible impact on climate.

16.4.2.8 Residues and Wastes

The residues and wastes which arise during the construction and operational phases of the proposed development have the potential to have an impact on human beings, biodiversity and surface water and groundwater quality if disposed of incorrectly. The impacts of the disposal of residues is addressed in **Chapter 15 *Material Assets*** of this EIS.

16.4.2.9 Soils and Geology

The working methods required to excavate and fill the site to the proposed new levels and to construct the foundations of the proposed development have the potential to impact on air and water quality, human beings, biodiversity, the Martello Tower and to generate noise. These impacts are addressed in **Chapters 8 Air Quality, 13 Soils, Geology, Hydrology and Hydrogeology, 6 Population and Human Health** and **10 Noise and Vibration** of this EIS, respectively. The nature of the material excavated from the site will determine its suitability for reuse as fill. If the material is not suitable for reuse it will be disposed of to a permitted site. The potential and predicted impacts on material assets are addressed in **Chapter 15 Material Assets** of this EIS. The potential and predicted impacts on traffic are addressed in **Chapter 7 Roads and Traffic** of this EIS.

16.4.2.10 Grid Connection to ESB Networks Lough Beg Substation

The waste-to-energy facility will be connected to the national electrical grid via the existing ESB Networks 38kV electrical substation (known as Lough Beg substation) adjacent to the eastern boundary of the Hammond Lane facility. The grid connection will be made by running underground cables from the electrical substation on the Indaver site to the Lough Beg substation.

The lands over which the entire grid connection will be constructed lie within Indaver's ownership (save for a small section comprising associated works on the adjacent Lough Beg substation owned by ESB Networks). These works will be carried out by ESB Networks and do not form part of the planning application. However, the impacts of the grid connection including the works required within the Lough Beg substation lands have been appraised in this EIS.

The works required within the Lough Beg substation lands will involve some minor excavation works and modifications to electrical equipment in order to connect the underground cable into the national grid. Refer to Section 4.5.10.2 of Chapter 4 for further details on the connection method.

No significant impacts on the environment, whether direct, indirect or cumulative have been identified in relation to the grid connection works within the Lough Beg substation lands.

16.5 Secondary or Indirect Effects

There are two potential projects which may be associated with the Ringaskiddy Resource Recovery Centre.

16.5.1 Potential Future Pre-treatment Facility

A pre-treatment facility is not required for the operation of the Ringaskiddy Resource Recovery Centre and is not proposed as part of the current application.

However, Indaver may propose the development of a pre-treatment facility for hazardous and non-hazardous waste on its site in Ringaskiddy in the future. The potential location would be the western field. The pre-treatment facility would require planning permission and would require an industrial emissions licence to operate. Thus the construction and operation of the facility would be fully

assessed by the competent authorities. To obtain these consents, it would be necessary to demonstrate that the facility complied with the proper planning and sustainable development of the area and that the operation would not cause significant environmental pollution on its own or in combination with other developments in the area including the Ringaskiddy Resource Recovery Centre.

The pre-treatment facility would be for the sorting, repacking if necessary and temporary storage of non-hazardous and hazardous waste. The pre-treatment facility main elements could consist of a warehouse, in which waste would be stored in segregated banded areas, a tank farm for the bulking of liquid waste and offices.

There would be truck traffic associated with the facility, but the truck movements are likely to be substantially less than the truck traffic generated by the Ringaskiddy Resource Recovery Centre. The pre-treatment facility would involve activities which would generate noise. However, the noise would have to comply with the industrial emissions licence noise limits. Emissions to air are not likely to be significant. There would be no emissions of process effluent and waste generation would not be significant. The buildings in the facility and the landscaping would be designed to fit in with the Ringaskiddy Resource Recovery Centre and the surrounding area. The facility would not have a significant impact on cultural heritage or on soils, geology, hydrology or hydrogeology. Depending on the quantities of waste stored temporarily, it is possible that the site would be a major accident establishment.

16.5.2 Potential Future District Heating System

The thermal energy generated in the waste-to-energy facility will be recovered as steam which can be used to generate electricity, directly in heat applications or in a combination of heat and power plant. Indaver is exploring the option to supply heat or steam to industries located in Ringaskiddy. However, this is not part of the current application.

The main potential impact of such a district heating system would be a reduction in the use of the fossil fuels, which are currently used to generate steam or heat in the facilities being supplied. There would be a consequent reduction in the greenhouse gas emissions. The pipework to supply the steam or hot water would probably be laid in the roads in the area and there would be some disruption to road users for the duration of the construction phase.

16.6 Cumulative Impacts

Existing and proposed developments with which there is the potential for cumulative impacts with the proposed Ringaskiddy Resources Recovery Centre are addressed below.

16.6.1 Hammond Lane Metal Company Ltd.

Hammond Lane Metal Company Ltd., located adjacent to the Indaver site, was recently extended in 2015. Currently, Hammond Lane operates under a waste permit. However Hammond Lane has applied to the EPA for an industrial emissions licence for “activity class 11.4(b)(iv) recovery, or mix of recovery and disposal of non-hazardous waste with a capacity exceeding 75 tonnes per day

involving one or more of the following activities, (other than activities to which the Urban Waste Water Treatment Regulations 2001 (S.I. No. 254 of 2001) apply): treatment in shredders of metal waste, including waste electrical and electronic equipment and end-of-life vehicles and their components.” (EPA register number P0997-01).

Construction of the Hammond Lane facility has been completed. The potential for cumulative impacts exists only for the operational impacts from Hammond Lane. The impacts of the Hammond Lane Metal Company Ltd, which have the potential to have a cumulative effect with the proposed Ringaskiddy Resources Recovery Centre, have been addressed in this EIS.

The traffic associated with Hammond Lane currently was included in the background traffic levels recorded in the traffic survey. The assessment of the impact of traffic from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background traffic, which was increased by a growth factor to represent expected general increases in background levels in the future. This allowed for increases in activity at Hammond Lane. Refer to **Chapter 7 Roads and Traffic** of this EIS. Ferrous metals from the proposed Ringaskiddy Resources Recovery Centre could be recycled in Hammond Lane and car shred from Hammond Lane could be treated in the proposed Ringaskiddy Resources Recovery Centre. This would result in a slight cumulative net reduction in truck movements on the wider road network.

The noise emissions from Hammond Lane were recorded in the daytime ambient background noise survey undertaken for the noise impact assessment study. The assessment of the impact of noise from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative existing background noise. Refer to **Chapter 10 Noise and Vibration** of this EIS.

The emissions to air from the Hammond Lane facility were included in the ambient air quality monitoring survey undertaken for the air quality impact study. The assessment of the impact of emissions to air from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background ambient air quality. Refer to **Chapter 8 Air Quality** of this EIS.

The potential cumulative impacts of the Hammond Lane facility and the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre on biodiversity were addressed **Chapter 12 Biodiversity** of this EIS.

There is no potential for any other significant cumulative impacts.

16.6.2 3MW Wind Turbines

Four pharmaceutical/medical device plants in Ringaskiddy received planning permission to erect 3MW wind turbines. Three of the turbines were erected and are now in operation. One wind turbine is located in the Janssen Biologics plant circa 1.5km to the west of the Indaver site. A second is located directly to the south of the site in the DePuy plant. The third turbine is located in the GlaxoSmithKline plant, at Loughbeg, Currabinny, circa 1km to the south. The

Novartis plant, circa 2km to the west-southwest of the site, has planning permission for a turbine, which has not been erected yet.

The cumulative visual and landscape impacts of the four turbines have been assessed in the **Chapter 11 Landscape and Visual Impact** of this EIS as part of the landscape and visual background.

Due to its proximity to the site, the DePuy turbine has the potential to have a cumulative impact on air emissions, noise and biodiversity. The actual cumulative impacts are assessed in **Chapters 8 Air Quality, 10 Noise and Vibration and 12 Biodiversity** of this EIS, respectively.

The assessment of the impact of traffic from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background traffic, which was increased by a growth factor to represent expected general increases in background levels in the future. This increase allows for additional traffic during the construction of the Novartis turbine. Refer to **Chapter 7 Roads and Traffic** of this EIS.

Due to distance and the nature of the operation of the turbines, there is no potential for any other significant cumulative impacts.

16.6.3 Fleming Developments (In Receivership)

Between 2000 and 2008, Fleming Developments built a facility at Loughbeg to manufacture modular building pods. In 2012, Fleming Developments (In Receivership) received a grant of planning permission for continuation of use of demountable residential accommodation units at Ring Port Business Park, Loughbeg, Ringaskiddy.

Any existing traffic associated with Fleming Developments was included in the background traffic levels recorded in the traffic survey. The assessment of the impact of traffic from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background traffic, which was increased by a growth factor to represent expected general increases in background levels in the future. This allowed for increases in traffic from Fleming Developments. Refer to **Chapter 7 Roads and Traffic** of this EIS.

Due to distance and the nature of the Fleming Developments, there is no potential for any other significant cumulative impacts.

16.6.4 IMERC and The National Maritime College of Ireland

IMERC is a marine research and innovation campus being developed by University College Cork, Cork Institute of Technology and the Irish Naval Service. The National Maritime College of Ireland and the Beaufort Research Laboratory are the first two components of IMERC to be developed and further elements are planned. The further elements will include facilities for marine and energy research and commercial and incubator units. No residential accommodation is planned. The site for the additional facilities is to the north of L2545 road, between the National Maritime College of Ireland and the access road to Haulbowline.

Any existing traffic associated with the existing IMERC facilities, the National Maritime College of Ireland and the Beaufort Research Laboratory, was included in the background traffic levels recorded in the traffic survey. The assessment of the impact of traffic from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background traffic, which was increased by a growth factor to represent expected general increases in background levels in the future. This allowed for increases in traffic from IMERC. Refer to **Chapter 7 Roads and Traffic** of this EIS.

The cumulative visual and landscape impacts of the National Maritime College of Ireland and the Beaufort Research Laboratory have been assessed in the **Chapter 11 Landscape and Visual Impact** of this EIS as these are part of the existing landscape and visual background.

Due to the nature of the National Maritime College of Ireland and the Beaufort Research Laboratory, there is no potential for any other significant cumulative impacts.

16.6.5 The Island Crematorium

The Island Crematorium is located in a former naval magazine on Rocky Island, which is located between Ringaskiddy and Haulbowline Island.

The existing traffic associated with the Island Crematorium, was included in the background traffic levels recorded in the traffic survey. The assessment of the impact of traffic from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background traffic, which was increased by a growth factor to represent expected general increases in background levels in the future. This allowed for increases in traffic from the Island Crematorium. Refer to **Chapter 7 Roads and Traffic** of this EIS.

Any emissions to air from the Island Crematorium were included in the ambient air quality monitoring survey undertaken for the air quality impact study. The assessment of the impact of emissions to air from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background ambient air quality. Refer to **Chapter 8 Air Quality** of this EIS.

Due to the nature of the Island Crematorium, there is no potential for any other significant cumulative impacts.

16.6.6 Ispat Steelworks Site, Haulbowline Island

The Ispat steel manufacturing facility, located adjacent to the naval base on Haulbowline Island, ceased operation in 2001 and the buildings on the site have been demolished. The site is currently being investigated and assessed to determine potential contamination remediation requirements. Cork County Council has planning permission and a waste licence to undertake remediation works and redevelop as a public park the East Tip, which was associated with the steelworks. An overall development master plan for the entire Island is currently being developed.

The detailed design of the East Tip remediation works and the assessment of the remediation requirements for the steelworks site are underway. No date has been announced for the commencement of the remediation works on site. The cumulative impact of the traffic from the remediation works and the public park and the proposed Ringaskiddy Resources Recovery Centre has been addressed in **Chapter 7 Roads and Traffic** of this EIS.

The potential cumulative impact on climate from the Haulbowline East Tip remediation project development and the proposed Ringaskiddy Resources Recovery Centre was assessed in **Chapter 9 Climate** of this EIS.

Haulbowline Island is more than 1km from the Indaver site. Due to the distance and the nature of the proposed works on the Island, there is no potential for any significant cumulative impacts, apart from traffic, during the construction phase of the remediation works. Due to the distance and the nature of the completed development on the Island, there is no potential for any significant cumulative impacts, apart from traffic, during the operational phase of the completed development on the Island.

16.6.7 Irish Naval Service base, Haulbowline Island

The naval base at Haulbowline is the headquarters of the Irish Naval Service.

The existing traffic associated, with the existing the Naval Base, was included in the background traffic levels recorded in the traffic survey. The assessment of the impact of traffic from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background traffic, which was increased by a growth factor to represent expected general increases in background levels in the future. This allowed for increases in traffic from the Naval Base. Refer to **Chapter 7 Roads and Traffic** of this EIS.

Any emissions to air from shipping using the Naval Base were included in the ambient air quality monitoring survey undertaken for the air quality impact study. The assessment of the impact of emissions to air from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background ambient air quality. Refer to **Chapter 8 Air Quality** of this EIS.

Similarly, any existing noise emission from the Naval Base, if measurable at the monitoring locations, were recorded in the ambient background noise survey undertaken for the noise impact assessment study. The assessment of the impact of noise from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative existing background noise. Refer to **Chapter 10 Noise and Vibration** of this EIS.

The Department of Defence were consulted during the preparation of the EIS. The Department queried whether the emissions from the stack are likely to have pose a hazard to helicopters flying to Haulbowline and Spike Islands. It is considered that there is not likely to be a significant interaction between helicopter flights and the emissions to air from the facility. Refer to Section 16.4.2.2 above for further details.

The Naval Base is circa 1km from the Indaver site. Due to the distance and the nature of the Naval Base activities, there is no potential for any other significant cumulative impacts.

16.6.8 Spike Island

The prison on Spike Island, to the east of Ringaskiddy has been closed since 2004. In 2010, the Department of Justice and Law Reform handed control of the island to Cork County Council, and the island has become a visitor attraction, with boat tours operating from Cobh. Cork County Council published a master plan for Spike Island in 2012. The master plan proposes that the Island is developed as a tourist and amenity destination with improved access, ferry links to other locations in the harbour, redevelopment of the existing buildings for compatible new uses, construction of walking and cycling paths, an adventure centre, a retreat centre, a camp site and extensive landscaping. Limited tourist accommodation has been proposed.

A planning application for redevelopment of Spike Island has not been made and no specific information on potential impacts is available. Spike Island is separated from the Indaver site by a channel which is circa 700m wide. Due to the distance and the nature of the proposed development on the Island, there is no potential for a significant cumulative impact, apart from traffic, during the operational phase of the proposed development on the Island.

16.6.9 Port of Cork

The Port of Cork has a significant facility in Ringaskiddy. In 2015, the Port of Cork obtained planning permission from An Bord Pleanála to extend the Ringaskiddy deep water facility. The project includes container berths and a multi-purpose berth at Ringaskiddy East, a deep water berth extension at Ringaskiddy West, road improvements and an amenity area. There are a number of port-related facilities, such as grain stores and hard-standings for vehicle storage, in and around the Port of Cork.

The existing traffic associated, with the Port of Cork and associated facilities, was included in the background traffic levels recorded in the traffic survey. The assessment of the impact of traffic from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background traffic, which was increased by a growth factor to represent expected general increases in background levels in the future. The cumulative impact with traffic from the extended Port of Cork facilities was also included in the assessment. Refer to **Chapter 7 Roads and Traffic** of this EIS.

Any emissions to air from shipping using the Port of Cork were included in the ambient air quality monitoring survey undertaken for the air quality impact study. The assessment of the impact of emissions to air from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background ambient air quality. Refer to **Chapter 8 Air Quality** of this EIS.

The potential cumulative impact on climate from the Port of Cork development and the proposed Ringaskiddy Resources Recovery Centre was assessed in **Chapter 9 *Climate*** of this EIS.

Existing noise emissions from the Port of Cork, if measurable at the monitoring locations, were recorded in the ambient background noise survey undertaken for the noise impact assessment study. The assessment of the impact of noise from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative existing background noise and the future predicted noise emissions from the Port of Cork's extended facilities. Refer to **Chapter 10 *Noise and Vibration*** of this EIS.

The landscape and visual impact assessment included an assessment of the cumulative impact with the upgraded Port of Cork facilities. Refer to **Chapter 11 *Landscape and Visual Impact*** of this EIS.

The Port of Cork facilities are between 500m and 1.5km from the proposed Ringaskiddy Resources Recovery Centre. Due to the distance and the nature of the completed Port of Cork development, there is no potential for any other significant cumulative impacts.

16.6.10 M28 Cork to Ringaskiddy Motorway Scheme

Cork County Council, in association with the Transport Infrastructure Ireland (TII), plans to construct a new M28 motorway from the Bloomfield Interchange, near Douglas, to Ringaskiddy. This road, which is currently being designed, will serve the future traffic needs of the area while removing traffic from Shanbally and Ringaskiddy villages. The timeframe for construction of this road remains to be confirmed. It is expected that the application for a motorway order will be made to An Bord Pleanála in 2016. As the motorway order application has not been made yet, no environmental mitigation measures and predicted impacts have been published, and the timing of the construction stage is not known. It is necessary to make assumptions in relation to certain aspects of the development and it is difficult to be conclusive about the potential cumulative impact.

The noise emissions from the existing N28, if measurable at the monitoring locations, were recorded in the ambient background noise survey undertaken for the noise impact assessment study. The assessment of the impact of noise from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative existing background noise and the future predicted noise emissions from the M28. Refer to **Chapter 10 *Noise and Vibration*** of this EIS.

The potential cumulative impacts of the M28 and the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre on biodiversity were addressed **Chapter 12 *Biodiversity*** of this EIS.

The M28 will terminate at the western boundary of the Indaver site. Due to the distance to the main part of the M28 and the likely timing, it is considered unlikely that there will be a significant cumulative impact on soils, geology, hydrology or hydrogeology during the construction or operational phases. The potential cumulative impacts of the M28 and the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre on biodiversity were

addressed **Chapter 13 Soils, Geology, Hydrology and Hydrogeology** of this EIS.

The potential cumulative impacts of the M28 and the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre on climate, biodiversity, cultural heritage and material assets were addressed **Chapters 9 Climate, 14 Cultural Heritage and 15 Material Assets** of this EIS, respectively.

If the construction of the M28 and the proposed Ringaskiddy Resources Recovery Centre coincide, there will be a minor positive cumulative impact on human beings due to the increased employment and economic activity. The M28 may require engineering fill and there may be unsuitable soil and stone to be removed from site. The proposed Ringaskiddy Resources Recovery Centre will require engineering fill and there will be unsuitable soil and stone to be removed from site. Consequently, there may be a significant cumulative impact on material assets, in the demand for engineering fill and the disposal of unsuitable soil and stone.

16.6.11 Municipal Sewage Treatment Plan at Shanbally

Irish Water has commenced construction of a new municipal sewage treatment plant at Shanbally, Ringaskiddy, for the Cork Lower Harbour Main Drainage Scheme. The facility will treat the sewage from the Lower Harbour towns and villages including Carrigaline, Ringaskiddy and Shanbally. The plant is due to be operational in 2017.

The existing traffic associated, with the construction of the new municipal sewage treatment plant, was included in the background traffic levels recorded in the traffic survey. The assessment of the impact of traffic from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background traffic, which was increased by a growth factor to represent expected general increases in background levels in the future. The traffic arising from the operation of the new municipal sewage treatment plant is included in the general growth factor. Refer to **Chapter 7 Roads and Traffic** of this EIS.

The site of the new municipal sewage treatment plant for the Cork Lower Harbour Main Drainage Scheme is circa 4km from the site of the proposed Ringaskiddy Resources Recovery Centre. Due to the distance and the nature of the new municipal sewage treatment plant, there is no potential for any significant cumulative impacts.

16.6.12 Residential Developments

Planning applications have been submitted for several small scale and single unit residential developments in the Ringaskiddy area.

The traffic associated with the existing residential developments was included in the background traffic levels recorded in the traffic survey. The assessment of the impact of traffic from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background traffic, which was increased by a growth factor to represent expected general increases in background levels in the future. The traffic arising

from future residential development is included in the general growth factor. Refer to **Chapter 7 Roads and Traffic** of this EIS.

Due to the distance and the nature of the residential developments, there is no potential for any other significant cumulative impacts.

16.6.13 Aghada Power Station

The potential cumulative impacts of the 152m high stack of the Aghada Power Station on the eastern side of Cork Harbour was included in the bird collision risk assessment, undertaken as part of the assessment of cumulative impacts on birds, **Chapter 12 Biodiversity** of this EIS.

The emissions to air from the Aghada Power Station were included in the ambient air quality monitoring survey undertaken for the air quality impact study. The assessment of the impact of emissions to air from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background ambient air quality. The licensed emissions from the ESB Power Station were included in the cumulative impact assessment. Refer to **Chapter 8 Air Quality** of this EIS.

The assessment of the landscape and visual impact of the proposed Ringaskiddy Resources Recovery Centre included the Aghada Power Station as part of the existing background. Refer to **Chapter 11 Landscape and Visual Impact** of this EIS.

Aghada Power Station is circa 5km from the site of the proposed Ringaskiddy Resources Recovery Centre. Due to the distance there is no potential for any other significant cumulative impacts.

16.6.14 Centricia Power Station Whitegate (formerly Bord Gáis)

The emissions to air from the Centricia Power Station were included in the ambient air quality monitoring survey undertaken for the air quality impact study. The assessment of the impact of emissions to air from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background ambient air quality. The licensed emissions from the Centricia Power Station were included in the cumulative impact assessment. Refer to **Chapter 8 Air Quality** of this EIS.

The assessment of the landscape and visual impact of the proposed Ringaskiddy Resources Recovery Centre included the Centricia Power Station as part of the existing background. Refer to **Chapter 11 Landscape and Visual Impact** of this EIS.

Centricia Power Station is circa 4km from the site of the proposed Ringaskiddy Resources Recovery Centre. Due to the distance there is no potential for any other significant cumulative impacts.

16.6.15 Amenity Developments

The Ringskiddy and District Residents Association received planning permission in 2014 for the construction of a community children's playground on a site

adjacent to the N28 in Ringaskiddy Village. This playground has been constructed. The Port of Cork planning permission, referred to above, includes a pier, slipway and amenity area at Paddy's Point.

There will be a minor positive cumulative impact on population and human health from the amenity area at Paddy's Point, the footpath proposed in the Port of Cork planning permission and the footpath and viewing gallery to the Martello Tower, which is proposed as part of proposed Ringaskiddy Resources Recovery Centre.

The proposed development will result in environmental enhancement in the immediate area in the form of an upgraded local road, an amenity footpath and viewing platform and sensitive landscaping.

Due to the nature of the amenity developments and the distance, there is no potential for any significant cumulative impacts.

16.6.16 Ferry and Cruise Ship Business

The ferry port at Ringaskiddy is used by a weekly ferry to Brittany, which arrives and departs on Saturdays in the summer months. Cruise liners visiting Cork Harbour come mainly in the months from April to October and usually dock at Cobh, with Ringaskiddy port facilities being used if there is a second ship in port.

The cumulative impact of the traffic generated by the weekly ferry and the cruise liners and the construction and operation of the proposed Ringaskiddy Resources Recovery Centre is addressed in **Chapter 7 Roads and Traffic** of this EIS.

Due to the nature of the ferry and cruise liner traffic and the distance to the ferry port, there is no potential for any other significant cumulative impacts.

16.6.17 Pharmaceutical and Medical Devices Manufacturing Plants

There are a number of large pharmaceutical and medical devices manufacturing plants in Ringaskiddy.

The traffic associated with the pharmaceutical and medical devices manufacturing plants was included in the background traffic levels recorded in the traffic survey. The assessment of the impact of traffic from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background traffic, which was increased by a growth factor to represent expected general increases in background levels in the future. Refer to **Chapter 7 Roads and Traffic** of this EIS.

The emissions to air from the large pharmaceutical and medical devices manufacturing plants in Ringaskiddy were included in the ambient air quality monitoring survey undertaken for the air quality impact study. The assessment of the impact of emissions to air from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative impact with the existing background ambient air quality. The licensed emissions from the pharmaceutical plants and the ESB and Centricia power plants were

included in the cumulative impact assessment. Refer to **Chapter 8 Air Quality** of this EIS.

Existing noise emissions from the pharmaceutical and medical devices manufacturing plants, if measureable at the monitoring locations, were recorded in the ambient background noise survey undertaken for the noise impact assessment study. The assessment of the impact of noise from the construction and operations phases of the proposed Ringaskiddy Resources Recovery Centre included the cumulative existing background noise and the future predicted noise emissions from the pharmaceutical and medical devices manufacturing plants. Refer to **Chapter 10 Noise and Vibration** of this EIS.

The assessment of the landscape and visual impact of the proposed Ringaskiddy Resources Recovery Centre included the pharmaceutical and medical devices manufacturing plants as part of the existing background. Refer to **Chapter 11 Landscape and Visual Impact** of this EIS.

Due to the nature of the activities at the pharmaceutical and medical devices manufacturing plants and the distance to them from the proposed Ringaskiddy Resources Recovery Centre, there is no potential for any other significant cumulative impacts.

16.6.18 Proposed new wind turbine at De Puy

De Puy are proposing to construct a new 3MW turbine on their site at Loughbeg, Ringskiddy. The proposed turbine will be similar in appearance to the existing 3MW turbine on the site. The proposed turbine if permitted, will be located to the south of the existing turbine, and is expected to be at least 1km from the proposed stack on the Indaver site. It is expected that a planning application for the proposed wind turbine will be submitted to Cork County Council in December 2015. As the planning application had not been made during the writing of this EIS, no environmental mitigation measures and predicted impacts had been published, and the timing of the construction stage was not known. It is necessary therefore to make assumptions in relation to certain aspects of the development and it is difficult to be conclusive about the potential cumulative impact.

Due to the distance of the proposed wind turbine development to the Indaver site, it is considered unlikely that there will be a significant cumulative impact on soils, geology, hydrology, hydrogeology, air quality, climate, noise, human beings, material assets, landscape and visual, traffic and cultural heritage during the construction or operational phases. No impact on biodiversity or increased collision risk to birds, including birds listed as qualifying interests for the Cork Harbour SPA, have been identified.

16.6.19 Community Gain Fund

It is expected that, if granted planning permission, Indaver would be required to establish a community gain fund to fund environmental and other community projects and initiatives in the Ringaskiddy area. A payment was a condition of the Port of Cork planning permission. It is likely that there would be a positive cumulative impact from the two funds, but as the detail of the potential condition imposed Indaver is not known, it is not possible to assess the cumulative impact.

16.6.20 Overall Cumulative Impact

The proposed Ringaskiddy Resource Recovery Centre will recovery energy and ferrous and non-ferrous metals from residual non-hazardous and hazardous waste, a substantial proportion of which would otherwise be exported for energy recovery. The recovered energy will be used to generate electricity, most of which will exported to the power grid, thus replacing energy generated from fossil fuels. The jobs created during construction and operation, and the contribution which Indaver and its employees will make to the local economy, will have a slight positive economic impact on the Ringaskiddy and Cork City and County areas. The placing of sacrificial material on the beach will reduce the rate of erosion of the coastline at the site. Raising the levels and improving the drainage of the L2545 road will have a positive significant local impact on road users by reducing incidents of the road flooding.

Due to the design and proposed mitigation measures, the construction and operation of the facility is not expected to have a significant impact on air quality, climate, biodiversity, soils, geology, hydrology, hydrogeology or material assets. At peak times, the traffic from the facility will have negligible impact on the Ringaskiddy road network. Outside peak hours the Ringaskiddy road network operates below capacity and the traffic from the facility will not have a significant impact.

During the construction phase of the project, there will be a slight to major impact on nearby noise sensitive properties. However, the calculated noise impacts are within the relevant criterion set for this phase. Noise from the operation of the facility will not have a significant impact.

The site will have somewhat more of an industrial character than it does at present and there will be a minor residual impact on the recreational amenity of the site and its immediate vicinity. There will be a residual negative impact on the view to and from the Martello tower and the visual landscape of the Martello tower will be permanently altered. Other negative impacts on cultural heritage are not anticipated.

Although the impact on views from within a 0.5km radius to the north and east (including Rocky Island), within areas of Cobh at White Point, from the Martello Park Road as it passes adjacent to the site (including the residential property to the northwest of the site), the National Maritime College car park, Gobby Beach and Ringaskiddy Martello tower, will be significant to moderate negative in nature at the operational stage this is due to the change in view from a predominantly green ridgeline, to an industrial building. However this is in the context of an area that is already semi-industrial in nature. Overall, the greater surrounding area is deemed capable of absorbing the development without changing the character of the Cork Harbour Landscape.

16.7 Trans boundary Impacts

16.7.1 Introduction

This section describes potential trans boundary impacts from the proposed Ringaskiddy Resources Recovery Centre. The potential for trans boundary impacts arises as follows:

- Boiler ash and flue gas cleaning residues from the proposed development will be shipped to continental Europe for recovery or disposal as there is no suitable facility in Ireland or Northern Ireland.
- The proposed facility will treat currently 24,000 tonnes per annum of hazardous waste, which currently is shipped to waste-to-energy facilities in Europe.
- In 2014 Indaver exported just under 200,000 tonnes of municipal solid waste from Ireland to waste-to-energy plants in Europe. The proposed Ringaskiddy Resource Recovery Centre would have the capacity to treat all of this waste.

16.7.2 Boiler Ash and Flue Gas Cleaning Residues

Circa 2,000 tonnes per annum of boiler ash and circa 9,104 tonnes per annum of flue gas cleaning residues will be produced in the Ringaskiddy waste-to-energy facility. The boiler ash and flue gas cleaning residues will be in the form of fine particles and will contain heavy metals.

It is expected that the boiler ash and flue gas cleaning residues from the Ringaskiddy facility will be similar in composition to the boiler ash and flue gas cleaning residues from the Meath facility.

The boiler ash and flue gas cleaning residues will be suitable for use to backfill the void space in an underground salt mine. Alternatively, the boiler ash and flue gas cleaning residues will be suitable after treatment (solidification by mixing with water) for disposal to a landfill for hazardous waste. Currently in Ireland or in Northern Ireland, there are no landfills licensed to accept hazardous waste and no underground salt mines, licensed to use material such as the residues for backfilling.

Boiler ash and flue gas cleaning residues from Indaver's Meath facility are currently shipped to underground salt mines in Germany where the residues are solidified and used to backfill the mine instead of using other raw materials. It is proposed that, until a suitable facility is developed in Ireland, the boiler ash and flue gas cleaning residues from the proposed Ringaskiddy facility will also be shipped to underground salt mines in Germany.

16.7.2.1 Transport to and use of residues in Germany

Two container truck loads per week of boiler ash and seven to eight container truck loads per week of flue gas cleaning residues will be removed from the Ringaskiddy facility. The boiler ash and flue gas cleaning residue containers will be taken to a port, loaded onto a ship and shipped to Rotterdam in the Netherlands, or another container port in Europe. From the port of entry the containers will be transported by road to the final destination. The proposed final destination is the Hattorf and Wintershall Reutilisation Facility, which is an underground salt mine in Germany. The facility has been approved for the reutilisation by the relevant authorities in Germany.

The regulation of the transport of the boiler ash and flue gas cleaning residues will be subject to Trans Frontier Shipment (TFS) licence which is a licence which must be approved by the origin/destination/transit authorities consenting to the movement/transit and acceptance of wastes between EU member states. The

regulation governing this is EU Regulation 1013/2006. This licence tracks waste from origin to destination and ensures that each authority is aware of the status of the waste until final recovery when the individual TFS notification annex consigned with each shipment is signed off as having been received and treated by the receiver. This completed licence is then circulated back to Indaver as the producer as well as all relevant authorities.

16.7.2.2 Quality Standards for shipping containers

Boiler ash and the flue gas cleaning residues will be loaded into a container truck in the Ringaskiddy facility. The container must have a valid safety approval plate or "CSC plate". CSC is the abbreviation for Convention for the Safe Containers. The Convention for Safe Containers is an international regulation that has been developed for all the containers used for international transport, with the aim of achieving the highest possible level of safety of human life in the handling, stacking and transporting of containers. The "CSC plate" is the guarantee that the container is safe to travel. A safety certificate is issued by the container manufacturer. The certificate is renewed after 5 years, then every 30 months, by a certified inspector. Standards, such as EN ISO 6346 for compulsory identification marking, are also followed. Prior to loading the container, a check is carried out to ensure the container is fit for purpose.

16.7.2.3 Risk of a shipping accident

Van Den Bosch is an international logistic services provider which transports boiler ash and the flue gas cleaning residues for Indaver. Van Den Bosch confirmed that in the 51 years of its history none of its containers has ever fallen overboard and no ship has sunk with its containers on board.

16.7.2.4 Behaviour of boiler ash and flue gas cleaning residues in contact with water

If the boiler ash and flue gas cleaning residues come in contact with water, they will solidify. Thus, if there was a shipping accident, and the container entered the sea and was holed, the boiler ash and flue gas residues would solidify on contact with water. The solidified boiler ash and flue gas residues could then be removed from the seabed.

16.7.2.5 Potential for impact at the reutilisation facility

The proposed final destination, the Hattorf and Wintershall Reutilisation Facility, an underground salt mine in Germany, has been approved for the backfilling of waste by the relevant competent authorities in Germany. It is a requirement of this approval that 'state of the art' technology, the equivalent under German law of Best Available Technology, is used in backfilling the waste. Germany is subject to the EU environmental legislation, including the environmental liabilities directive, 2004/35/CE. The competent authorities and operators of the facility must comply with the requirements of EU environmental legislation in granting approval and operating the facility, respectively.

16.7.2.6 Conclusion on Potential for Trans Boundary Impacts in the Netherlands or Germany

Netherlands

Given the low risk of a shipping accident, the low risk of leakage from the transport containers, and the fact that the boiler ash and flue gas cleaning residues will solidify on contact with water, if there is a release, it is not likely that there would be a significant adverse trans boundary impact due to the shipping of the boiler ash and residues to Rotterdam or another European container port.

Germany

Given the fact that the proposed final destination, the Hattorf and Wintershall Reutilisation Facility, has been approved for backfilling using material such as the boiler ash and flue gas cleaning residues by the relevant competent authorities in Germany, and that the operator and German authorities are subject to EU environmental legislation, it is not likely that there would be a significant adverse trans boundary impact due to backfilling of the residues in the Reutilisation Facility in Germany.

16.7.3 Other potential transboundary impacts.

Two other potential causes of transboundary impacts are addressed.

16.7.3.1 Potential for Trans Boundary Impact in Northern Ireland

Indaver is aware that a proposal is under consideration to obtain the necessary consents to allow the backfilling, using boiler ash and flue gas cleaning residues from waste-to-energy facilities, of an underground salt mine in Northern Ireland. If such a facility is developed, residues from the proposed Ringaskiddy Resource Recovery Centre would be transported by road to Northern Ireland.

Any such proposal would be subject to scrutiny by the relevant competent authorities in Northern Ireland. As Northern Ireland is subject to EU environmental legislation, including the environmental liabilities directive, 2004/35/CE, the competent authorities and operators of such a facility would have to comply with the requirements of this legislation in granting approval and operating the facility.

Consequently, it is not likely that there would be a significant adverse transboundary impact due to the backfilling of the residues in an underground salt mine in Northern Ireland.

16.7.3.2 Potential for Trans Boundary Impact due to Reduced Amounts of Hazardous and Municipal Solid Waste being Exported to Europe

Currently hazardous waste is exported from Ireland by ship for treatment in waste-to-energy facilities in Europe. The proposed Ringaskiddy Resource Recovery Centre would treat up to 24,000 tonnes per annum of this waste. This would reduce the amount of hazardous waste being exported by ship from Ireland to ports in Europe and transported onwards by road to the final

destination. There would be a consequent reduction in the risk to the environment posed by the transport of this waste. However, as 2.5 million tonnes per annum (source Eurits) of hazardous waste are transported around Europe and treated in waste-to-energy facilities there, the positive impact of the reduction in risk to the environment would not be significant.

In 2014 Indaver exported just under 200,000 tonnes of municipal solid waste from Ireland to waste-to-energy plants in Europe. The proposed Ringaskiddy Resource Recovery Centre would have the capacity to treat all of this waste. This would reduce the amount of municipal solid waste being exported by ship from Ireland to container ports in Europe and transported onwards by road to the final destination. However, as a total of 78 million tonnes per annum of municipal solid waste are treated in waste-to-energy plants in Europe, the reduction in the amount of municipal solid waste being recovered in Europe would not be significant.

16.8 References

Environmental Protection Agency (2002) *Guidelines On The Information To Be Contained In Environmental Impact Statements* EPA, Wexford

Environmental Protection Agency (2003) *Advice Notes On Current Practice (In The Preparation Of Environmental Impact Statements)* EPA, Wexford

Environmental Protection Agency (2015) *Revised Guidelines On The Information To Be Contained In Environmental Impact Statements Draft* EPA, Wexford

Environmental Protection Agency (2015) *Advice Notes For Preparing Environmental Impact Statements Draft* EPA, Wexford

Office for Official Publications of the European Communities (1999) *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions*, Office for Official Publications of the European Communities, Luxembourg

<http://www.monaghan.ie/en/services/environment/wastemanagement/landfill/>
accessed November 2015.

Environmental Protection Agency (2010) *Waste Licence Landfill for Non-Hazardous Waste WA0146-02* EPA, Wexford

Environmental Protection Agency (2010) *Waste Licence Landfill for Non-Hazardous Waste WA0165-02* EPA, Wexford

US Federal Aviation Authority (2006) *Safety Risk Analysis of Aircraft Overflight of Industrial Exhaust Plumes*, FAA, Oklahoma City