15 Material Assets

15.1 Introduction

This chapter describes and assesses the potential impacts of the proposed development on material assets. The existing environment is also described. Mitigation measures are proposed, where required and the predicted residual impacts are described.

The proposed development will consist principally of a waste-to-energy facility (waste incinerator) for the treatment of up to 240,000 tonnes per annum of residual household, commercial and industrial non-hazardous and hazardous waste and the recovery of energy. Of the 240,000 tonnes of waste, up to 24,000 tonnes per annum of suitable hazardous waste will be treated at the facility.

In addition to the provision of the waste-to-energy facility, the proposed development will include an upgrade of a section of the L2545 road, a connection to the national electrical grid, an increase in ground levels in part of the site, coastal protection measures above the foreshore on Gobby Beach and an amenity walkway to the Ringaskiddy Martello tower.

Material assets are defined in the EPA Advice notes on current practice in the preparation of EIS (EPA 2003) as ‘resources that are valued and that are intrinsic to specific places, they may be either human or natural origin and the value may arise for either economic or cultural reasons’.

The assessment of cultural heritage is presented in **Chapter 14 *Archaeological, Architectural and Cultural Heritage*** of this EIS.

This chapter addresses the following aspects:

- Land Use
- Local Settlement
- Infrastructure and Utilities
- Natural Resources
- Waste Management

15.2 Methodology

This chapter has been prepared having regard to the following guidelines:

- Revised Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency, draft September 2015);
- Advice Notes for Preparing Environmental Impact Statements Draft September 2015
- 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)

A desk study was carried out on the existing material assets associated with the site of the proposed development. Projections of resource use were made, for both the construction and operational phases of the development, and the impact assessed.

Where relevant, impacts on particular material assets such as the road network and construction waste disposal facilities are considered in detail elsewhere in this EIS. Refer to **Chapters 5 *Construction Activities*** and **Chapter 7 *Roads and Traffic*** of this EIS for further assessment of the impact of the proposed development on these assets. Cultural heritage is dealt with in **Chapter 14 *Archaeological, Architectural and Cultural Heritage*** of this EIS. Refer to **Chapter 4 *Description of the Proposed Development*** of this EIS for a detailed description of the site and surrounding areas.

15.3 Existing Environment

15.3.1 Site Location

The site for the Ringaskiddy Resource Recovery Centre is located approximately 15km to the south-east of Cork City, in the townland of Ringaskiddy on the Ringaskiddy Peninsula in the lower part of Cork harbour.

The L2545, the main road from Ringaskiddy village to Haulbowline Island forms the northern boundary of the site. The eastern boundary of the site extends to the foreshore of Cork harbour along Gobby Beach. The lands to the immediate south and west are in agricultural use. The site surrounds the Hammond Lane Metal Recycling Co Ltd facility. The site is located approximately 800m east of the village of Ringaskiddy.

15.3.2 Land Use and Wayleaves

15.3.2.1 Land Use and Zoning

The site is currently covered in scrub with some pockets of trees and open grass areas. The open grass areas are in agricultural use. The site, owned by Indaver, covers an area of approximately 13.55 hectares and is situated on a north-facing slope. The land rises from north to south, and also generally from east to west.

The majority of the site is zoned for industrial use designated as a Strategic Employment Area in the Carrigaline Local Area Plan 2011. A small section of the overall Indaver site includes lands zoned as open space, which characterises an area of open space that acts as a buffer between proposed industry and established uses. The zoning objective in the LAP states that while the patterns of land use will remain largely unchanged, if the adjoining land designated for industry is developed, consideration will be given to landscaping including strategic tree planting on the land.

Section 6.4.11 of the Cork County Development Plan 2014-2020 states that the provision of strategic large scale waste treatment facilities will be considered in 'Industrial Areas' designated as Strategic Employment Areas in the local area

plans subject to the requirements of National Policy, future Regional Waste Management Plans and the objectives set out in local area plans.

15.3.2.2 Wayleaves

There is a wayleave for an existing underground 300mm diameter 19Bar transmission gas main located within the site. The gas main is not currently supplying gas to any site. The gas main runs along the southern boundary of the site and then moves northwards through the site. The gas main terminates at the existing Above Ground Installation (AGI) along the Haulbowline Road before the bridge to Rocky Island. Due to the nature of the proposed works, the gas main will require to be diverted within the site.

There is a wayleave for existing twin 110kv overhead power lines, supported on steel pylons, on an alignment which is approximately parallel to the Indaver site southern boundary, located to the south of the site.

15.3.3 Local Settlement

The nearest settlement to the proposed facility is the village of Ringaskiddy. Other settlements in the area include Shanbally, Monkstown, Passage West, Carrigaline, Crosshaven and Cobh.

15.3.4 Infrastructure and Utilities

15.3.4.1 Road Infrastructure, Access and Traffic

The site is served by the L2545 road which is a continuation through Ringaskiddy village of the N28. The N28 is a National Primary Route which links Cork City to Ringaskiddy. Transport Infrastructure Ireland (TII), plans to construct a new M28 motorway from the Bloomfield Interchange, near Douglas, to a new roundabout on the eastern side of 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.

The M28 will run in a north-south alignment to the west of the proposed development. It will require the purchase of some Indaver owned lands at the western extremity of the site. Indaver lands will also be required at the northern western extremity of the site for a proposed new roundabout, where the new M28 will meet the existing L2545. The location of the proposed new roundabout is shown on the planning drawings.

The local L2545 road which runs along the northern boundary of the site.

15.3.4.2 Power

There are 10kV and 38kV power lines traversing the site.

The 38kV power line feeds an ESB Networks substation (the Lough Beg substation) which is located at the south eastern corner of the Hammond Lane

premises. The 38kV power line enters the Lough Beg substation from the south west.

There is a 10kV power line located on an approximate north-south alignment in the eastern part of the site, adjacent to the Hammond Lane premises. It crosses perpendicular to the L2545 into the Beaufort Research Laboratory lands located to the north.

There is another 10kV power line located on an approximate north-south alignment adjacent to the western boundary of the western part of the site.

Twin 110kV overhead power lines, supported on steel pylons, are located adjacent to and parallel to the southern boundary of the site.

There are three underground 220kV power cables located beneath the L2545 road along the northern boundary of the site.

15.3.4.3 Water Supply

There is a 450mm diameter Irish Water main in the L2545 road adjacent to the site's northern boundary.

15.3.4.4 Gas Supply

There is an existing underground 300mm diameter 19Bar transmission gas main located within the site. The gas main is not currently supplying gas to any site. The gas main runs along the southern boundary of the site and then moves northwards through the site. The gas main terminates at the existing Above Ground Installation (AGI) along the Haulbowline Road before the bridge to Rocky Island.

There is an existing 4 bar gas distribution main located beneath the L2545 road. The diameter of the main reduces from 180mm diameter to 125mm diameter after the supply tee to the NMCI. The 125mm section is to the east of the tee.

15.3.4.5 Underground services along the L2545 road

In addition to the 450mm diameter watermain, 220kV electricity cables and 4 bar 125mm/180mm gas distribution main, there are public lighting cables, Eircom underground cables, Enet fibre optic cables, private foul sewer and surface water drainage pipes located underneath the L2545 road. As discussed above, a 10kV overhead power line crosses the road.

15.3.4.6 Drainage

Currently no foul sewer serves the site. There is an Irish Water foul sewer network in Ringaskiddy Village which extends to the just west of the western extent of the site This sewer currently discharges untreated sewage to Cork Harbour. Irish Water proposes to construct a sewage treatment facility at Shanabally which will treat sewage from Ringaskiddy and other Lower Harbour towns and villages.

The site is served by a storm water drain, which is located in the L2545 road. There is a significant risk of pluvial flooding to the L2545 and the low lying areas of the site during periods of heavy rainfall combined with high tide.

Background to flooding issues on the L2545

The existing levels of the road along the northern boundary of the Indaver site are set at circa 2.4m to 2.95m OD. Based on a review of all available information, the predicted 1 in 200 year design tidal level has been estimated as 2.73m OD. Sections of the road close to the Gobby beach car park are below this level and are therefore at risk of tidal flooding during a 1 in 200 year tidal event.

Based on a review of the historic flooding of the road, discussions with Cork County Council, and the preliminary flood risk assessment mapping produced by the OPW, there is a significant risk of pluvial flooding of the road during periods of heavy rainfall combined with high tide.

The existing storm water drainage system along the road consists of a 450mm diameter pipe which outfalls to the sea at Gobby Beach. There are a minimal number of gullies along the road to accept water and transfer it to the storm water sewer. Therefore, it can be concluded that the existing formal drainage system along the road is inadequate. The dominant drainage mechanism for the road is "over the edge" drainage to the Indaver site on the south side of the road. A number of channels have been cut in the berm on the southern side of the road which allow surface water drain from the road and into the Western Fields area of the Indaver site.

The invert level of the outfall is -0.28mOD. Once the level of the tide rises above this elevation the drainage system can become tide locked if there is insufficient differential head at the outfall. When this occurs the surface water which has reached the pipe is unable to discharge through the outfall and collects in the drainage pipe. The discharge pipe becomes surcharged and any subsequent rain water falling on that area of the road normally drained by the existing gullies cannot drain away and causes the road to flood. This area of the road is located adjacent to the entrance to the public car park at Gobby beach.

15.3.5 Natural resources

There are no quarries or mineral resources on or adjacent to the site. As explained in **Chapter 13 *Soils, Geology, Hydrogeology, Hydrology and Coastal Recession*** of this EIS, the bedrock aquifer beneath the site is mudstone/sandstone and is rated as LI: Locally Important Aquifer – Bedrock which is moderately productive only in local zones. The vicinity of the site is served by a public water supply and there are no known wells in close proximity to the site.

15.4 Characteristics of Proposed Development in relation to Material Assets

The characteristics of the proposed development in relation to material assets are as follows:

- Service diversions will be required in order to facilitate the development construction

- Grid connection to the national grid will be required for operation of the development
- Power and water supply will be required in addition to an upgraded foul and surface water drainage system
- The L2545 road will be upgraded
- Coastal protection works in the form of shingle will be required
- Residues from waste will be generated during operation phase
- There will be movement of materials on and off site during the construction phase
- Low-lying areas of the site will be raised to 4.55m OD

15.5 Potential Impacts

This section addresses potential impacts on material assets. Potential impacts represent the worst case scenario in the absence of mitigation.

15.5.1 'Do Nothing' Impacts

If the proposed development did not go ahead, it is likely that the site would continue in its current agricultural use, in the short term. In the longer term it would probably be developed for another industrial use due to the industrial zoning on the site.

The L2545 road would continue to flood following heavy rainfall because the road drainage is inadequate. Excess surface water from the road would be diverted to the western field. There is a risk that a 1 in 200 year tidal flood event, combined with sea level rise as a result of climate change, would cause flooding to a small area of the site adjacent to the road.

15.5.2 Land Use and Wayleaves

If the development proceeds, the eastern part of the site will be developed for industrial use.

The level of the western field will be raised and the field will be used during construction. At some future date Indaver may develop it, subject to planning permission. The raising of the level of the western field will mean that the field will not be subject to flooding. This is a significant positive impact on land use.

The raising of the level of the L2545 will also mean that this section of the road will not be subject to flooding. This will have a positive impact on road users.

Due to the nature of the proposed works, the gas main will require to be diverted within the site. Gas Networks Ireland have been consulted in relation to the proposed diversion and have agreed on an indicative diversion route along the eastern boundary of the site. The indicative diversion route within the site is shown on the engineering drawings included in the planning application.

There will be no impact on adjacent land use as a result of the proposed development.

15.5.3 Local Settlement

There will be no potential impacts on the local settlements from the construction or operation of the facility.

15.5.4 Infrastructure and Utilities

15.5.4.1 Road Infrastructure, Access and Traffic

Construction and operational traffic entering and leaving the Indaver site will use the N28 and L2545. It is shown that there will be sufficient capacity on the N28 for the proposed development. Refer to **Chapter 7 *Roads and Traffic*** of this EIS for further details.

Description of L2545 upgrade

The proposed L2545 upgrade works will include raising a 185m section of the road to a maximum height of 3.45m OD between the car park and the eastern end of the Hammond Lane Metal Company. This is approximately 1.0m above the existing road level. This will elevate the road to above the 200 year design tidal water level plus an allowance for climate change. This will offer a high level of protection to the road from tidal flooding. The road will be raised over a length of approximately 185m in order to ensure a smooth transition down to existing road levels, in accordance with road design standards. The recently constructed footpath on the northern side of the road will also be raised to the new road level.

The proposed road drainage network upgrade will extend along the entire northern boundary of the Indaver site. It has been designed to cater for the 7 hours when the storm water outfall is tide locked and a 1 in 30 year rainfall event plus an allowance for climate change.

A 260 metre length of new linear concrete surface water channel will extend from the western boundary (of the western field area) of the Indaver site, running along the southern edge of the L2545 until it meets the entrance to the Hammond Lane Metal Company. This section of the L2545 is currently super-elevated – i.e. the camber on the road falls from north to south, therefore surface water drains to the south. This section of the L2545 will not be raised as the existing levels are already above the predicted 1 in 200 year design tidal level (2.73m OD) and it will be protected to 3.35m OD by the proposed elevated section of road to the east. The new surface water channel will be drained at regular intervals by gullies which will outfall to the existing 450mm diameter surface water sewer beneath the road. Therefore surface water will no longer flow from the road into the Indaver site (western fields) to the south.

The raised section of the L2545 between the car park and the eastern end of the Hammond Lane Metal Company will be drained by a kerb and gully sealed drainage system which will be connected to two new surface water pipes underneath the road. The two 1500mm diameter pipes will be approximately 190m in length and will provide 660m^3 of surface water storage. There will be three large concrete chambers constructed on the line of the twin surface water pipes at the start middle and end of the run. The first two chambers will be situated in the road and the terminal chamber will be constructed at the entrance to the car park by Gobby Beach. The recently constructed surface water drainage

system on the Haulbowline road will be diverted into the terminal chamber. This chamber will be connected to the existing 450mm diameter surface water sewer via a short length of new 450mm diameter pipe, a new Class 1 bypass hydrocarbon interceptor and a new manhole constructed on the line of the existing pipe. This will allow the upgraded surface water drainage system to discharge to sea via the existing 450mm surface water outfall at Gobby Beach.

All of the above works will be within Indaver ownership, apart from a small area in Hammond Lane ownership. Consent has been given by Hammond Lane to undertake these works.

Transport Infrastructure Ireland (TII) in conjunction with Cork County Council are preparing proposals for the upgrade of the N28 between Bloomfield Interchange and Ringaskiddy village. The scheme has yet to be submitted for planning approval. The terminal roundabout of the route is located on the L2545 at the western boundary of the Indaver site. The roundabout at present is proposed to be raised approximately 1m above existing road level which would leave a 130m length of existing road with flat longitudinal gradient between the proposed roundabout and the proposed raised section of the L2545 as part of this application. However this section will continue to be adequately drained by the surface water channel proposed as part of this application.

15.5.4.2 Power

Electricity Supply for the Site

Construction Phase

It is anticipated that the construction phase of the proposed development will require a peak load of 300kVA. This demand will be met by the use of diesel generators and a temporary connection at 10kV. There is sufficient supply to meet this demand.

Operational Phase

The waste-to-energy facility will be connected to the national electrical grid via the 38kV electrical substation (known as Lough Beg substation) adjacent to the eastern boundary of the Hammond Lane facility. This connection method has been determined by a feasibility study carried out by ESB Networks. Based on discussions with ESB Networks, the connection will simply be an extension of the 38kV line into the ESB side of the proposed Indaver electricity compound as this line currently terminates at the existing Lough Beg substation. ESB Networks have confirmed that the extension of the 38kV line into the Indaver site can be over ground or underground. Indaver have selected the underground option and the proposed routing for the underground lines has been identified on the drawings. The routing has been designed in compliance with ESB guidelines and standards. The grid connection will be made by running underground cables from the ESB side of the Indaver electricity compound 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 they are included in the environmental impact assessment. The works required within the Lough Beg substation lands are straightforward and are not likely to result in significant impacts on material assets.

Refer to **Chapter 4** ***Description of the Proposed Development***, **Section 4.5.10** of this EIS for details of the grid connection.

The waste-to-energy facility will convert the thermal energy produced by the combustion of the waste into approximately 21 MW of electricity. Approximately 2.5 MW will be used by the plant itself, with the remainder, approximately 18.5 MW being exported to the local electrical distribution system.

A licence to generate electricity and a licence to export electricity to the transmission/distribution network will be required from the Commission of Electricity Regulation.

Power line diversion

The 10kV power line located on an approximate north-south alignment in the eastern part of the site, adjacent to the Hammond Lane premises, will have to be relocated. ESB Networks have been consulted in relation to the proposed diversions and have agreed on an indicative underground diversion route within the site. The indicative diversion route within the site is shown on Engineering Drawings as part of the planning application. The potential impacts of the proposed diversion are not likely to be significant.

The other 10kV power line and the 38kV power line will not need to be diverted.

The 220kV power lines and corresponding ESB telecoms fibre optics cables .beneath the L2545 may need to be raised as a result of the raising of the L2545. Both ESB Networks and EirGrid have been consulted in relation to the proposed works.

Preliminary studies undertaken to date by ESB networks suggest a potential derating of the cable by up to 10% of its power capacity due to less effective heat dissipation though the surrounding backfill material because of the increase depth of material proposed over the cable. ESB networks will undertake a thermocouple temperature survey with cable temperatures measured and recorded over a three month period to determine the actual current heat dissipation from the cable which is expected to be better than was assumed for the preliminary study. These works would require a short outage on the line of two to three days which will be planned around a maintenance outage.

A number of technically feasible solutions, if it is determined that the cables will be derated to an unacceptable level, have been identified by ESB Networks i.e.

i. Diverting the cable into new higher ducts

ii. Replacing the existing cable - within the existing duct - with a large diameter higher rated cable

iii. Leave the cable in its present position and provide thermal backfill over and to the sides of the ducts

The worst case option is option i) as this would involve laying new ducts to a higher level to ensure the current cable rating is at least maintained. The existing cable would be cut and recovered over the section of the road that is being raised

and reused in the new higher ducts. A short length of new cable would also be required. Three new joint bays would be required to allow the raised cable to be jointed back to the existing cables at either end and to join the short length of new cable to the recovered length of cable respectively. The new ducts and joint bays would be constructed within the existing road footprint adjacent to the existing underground cables. However, the works have been discussed with ESB Networks who have confirmed that they are technically feasible

These works would require an outage of the 220kV cables for a three to four week period and will be carried out within the 12 week period estimated for the L2545 upgrade works. This would be programmed during spring or summer when the demand on the national electricity grid is at its lowest. The impact therefore of these works is not considered to be significant.

15.5.4.3 Water Supply

Water supply for the site

There is a 450mm diameter Irish Water main in the L2545 road adjacent to the site's northern boundary.

Construction Phase

During the construction phase of the project, water will be required for consumption by the construction personnel, for general construction works and for the construction of the concrete elements of the buildings. The volume of water required during construction on an average daily basis is estimated at approximately $10m^3$ per day. This will be supplied by a connection to Irish Water local mains located in the L2545 road to the north of the site.

Operation Phase

The water requirements of the facility are detailed in **Chapter 4** ***Description of the Proposed Development*** of this EIS. The estimated maximum annual quantity of water required for the operational phase of the proposed facility will be circa $5.4m^3$ per hour.

The Irish Water mains water supply, piped along the L2545 road at the northern boundary of the site, will be used to supply the proposed facility. The boiler purge and water used to wash down areas of the process building will be collected for use in the process to reduce the quantity of water required from the Irish Water supply.

The water main is 450mm diameter and the proposed facility's water requirements are not expected to have a significant impact on the water supply to the area.

Water main diversion

The 450mm diameter Irish Water main will be diverted along the section of road to be raised between the car park and east of Hammond Lane. Cork County Council (acting as agents for Irish Water) and Irish Water have been consulted in relation to the proposed diversions. The potential impacts of the proposed diversion are not likely to be significant.

15.5.4.4 Gas Supply

As detailed previously, an existing underground 300mm diameter 19Bar transmission gas main is located within the site. The gas main is not currently supplying gas to any site. The gas main runs along the southern boundary of the site and then moves northwards through the site. The gas main terminates at the existing Above Ground Installation (AGI) along the Haulbowline Road before the bridge to Rocky Island. Due to the nature of the proposed works, the gasmain will require to be diverted within the site. Gas Networks Ireland have been consulted in relation to the proposed diversion and have agreed on an indicative diversion route along the eastern boundary of the site. The indicative diversion route within the site is shown on the engineering drawings included in the planning application. GNI confirmed that they were satisfied that the proposed gas diversion route was feasible.

There is an existing 4 bar 180mm gas distribution main which reduces to 125mm main at the western side of the Hammond Lane entrance, located beneath the L2545 road. This 125mm main will be locally diverted within the road to facilitate the L2545 upgrade. Gas Networks Ireland have been consulted in relation to the proposed diversion.

As detailed in **Chapter 13 *Soils, Geology, Hydrogeology, Hydrology and Coastal Recession***, a coastal erosion study was carried out by Arup in order to better understand the coastal processes in the vicinity of the site, the rate of erosion of the glacial till face on the eastern boundary of the site and the specific coastal protection measures required. The study found that the proposed development would not increase the current rate of erosion of the glacial till face.

As part of the study, a very conservative rate of erosion was applied to the site in order to assess whether the proposed development could be impacted over the duration of the planning permission (40 years in total). The study found that there would be no impact on the proposed development after 30 years. The study found that there could be a risk of an impact on a small section of the proposed development after 40 years however this would be confined only to the amenity walkway and a small section of the diverted gas pipeline outside of the fence line. The waste-to-energy facility would not be impacted by coastal erosion during the duration of the planning permission.

If such a conservative rate of erosion was to occur, this section of diverted gas pipeline would be directly impacted in 40 years time and would require rerouting to minimise impacts. It is noted that this gas main is not currently supplying gas to any site and may or may not be decommissioned in the future. It is also noted that GNI confirmed that they were satisfied that the proposed gas diversion route was feasible.

15.5.4.5 Underground services along the L2545 road

In addition to the 450mm diameter watermain, 220kv electricity cables and 4 bar 180mm/125mm gas distribution main, there are public lighting cables, Eircom underground cables and Enet fibre optic cables located underneath the L2545 road. As discussed above, a 10kV overhead power line crosses the road.

There is only a marginal increase in road level (circa 100mm) at this location along the L2545. The public lighting columns at the northern edge of the footpath,

on the northern edge of the road, will have to be raised to match the new road level and the associated duct chambers will also be raised to match the new footpath level.

New Eircom ducting is proposed for the northern road verge to allow Eircom cables to be locally diverted within the road. All of the utilities providers have been consulted in relation to the proposed diversions. Diversion works to the remaining services are not envisaged, however some protection measures like cover slabs may need to be employed during the construction phase. Refer to **Chapter 5 *Construction*** for further details.

15.5.4.6 Drainage

Refer to Section 15.5.4.1 above for details on the drainage upgrade of the L2545.

As discussed previously, small areas of the site along the northern boundary are at risk of pluvial flooding. The levels of the low-lying parts of the site will be raised to 4.55m OD. This level will offer a very high standard of flood protection to the site.

Surface Water Drainage

The eastern part of the resource recovery facility, when constructed, will form a rainwater catchment area of 3ha consisting of roofed areas, roads and hard standings. The storm water runoff will be discharged to the Local Authority sewer located in the L2545 road to the north of the site.

In order to prevent flooding of the local sewers, the rate of discharge from the site will be controlled to the Greenfield rate, based on the SUDS Design Guidelines. The site will be provided with attenuation to store and control the storm water discharge. The attenuation tank will have a Greenfield discharge rate of 18l/s. The attenuation tank will be constructed from modular cells and will be located beneath the car park adjacent to the administration building.

A surface water tank and a firewater retention tank will be provided. Both tanks will be located underground beneath the administration building car park to the west of the main entrance.

A dedicated surface water drainage network will collect and convey all the road and service yard runoff to Surface Water Holding Tank 01 via a Class 1 full retention hydrocarbon interceptor. A second dedicated drainage network will collect and convey all the runoff from all roof areas and discharge them direct to Surface Water Holding Tank 02. Surface Water Tank 01 will have a capacity of 1790m^3.

The tanking unloading area, which is located adjacent to the fuel tank, will be provided with cut off drains to collect any spillage that may occur during loading of the fuel and ammonia tanks. A local holding tank with a 2m^3 capacity will be provided. The outlet valve of the local holding tank will be closed during any tanker loading or unloading operation. If a spillage occurs during a loading or unloading operation, the spilled liquid will be collected in the local holding tank. The contents of the tank will then be pumped out and dealt with appropriately. When the unloading operation has finished, if no spillage has occurred, the valve will be opened and the contents of the tank will drain via a forecourt interceptor to the holding tank.

The fill will be placed in western field to raise the ground level and the area will be finished with stone. Any storm water will infiltrate into the ground. There will be no sources of potential contamination in the area. A new filter drain will be located between the bottom of the raise plateau embankment and the site boundary to aid with the infiltration to ground.

All runoff from the road and hardstanding areas which drain direct Tank 01 will be monitored by an internal Indaver monitoring and sampling station. In the event of there being an out of specification reading Tank 01 can be isolated from Tank 2 and the water removed in accordance with Indaver operational procedures for dealing with contaminated water. This arrangement allows for the roof runoff to continue to be discharged from the site. Monitoring will also take place at the outfall from the attenuation tank. If the monitoring at either location detects contamination, the outlet valve will be closed and the contaminated water will not be discharged. The contaminated water may be conveyed by tanker to the aqueous waste tank, for injection into the process, or removed off site for appropriate disposal. It is expected that monitoring will normally show the storm water to be uncontaminated so the holding tank will typically be empty.

Fire water retention, the retention and control of contaminated water generated when fighting a fire, will be provided on the waste-to-energy facility area. A firewater retention tank will be provided. It will be located underground beneath the administration building car park to the west of the main entrance.

In the event of a fire in the bunker, the water used to fight the fire will be captured in the bunker where it will be stored for disposal. The bunker will have more than adequate capacity for the volume of water used to fight the fire as well as the waste which will be in it. If there is a fire in any other part of the waste-to-energy facility, the water used to fight the fire will be captured the recovered water tank or clean water tank which are located below the building floor. The bunker and the recovered water tank will be designed as water retaining structures. The fire-fighting water from any fire in an outdoor area would be captured in the storm water drainage system and will be collected in both the surface water holding tanks, where it can be stored for disposal. The surface water pumps which are located in Tank 02 will be switched if the fire alarm is activated. The combination of both of the surface water tanks will provide sufficient retention capacity in accordance with the EPA guidelines for fire water retention.

Details of the proposed surface water management system are provided in **section 4.14.3** of **Chapter 4** ***Description of the Proposed Development***, and in **Chapter 13** ***Soils, Geology, Hydrogeology, Hydrology and Coastal Recession*** of this EIS. Details of the upgrade to the drainage in the L2545 road are provided in **section 4.5.1 L2545 Road Upgrade** in **Chapter 4** of this EIS.

Foul Water Drainage

There is no foul sewage system on the site at present. Management of domestic effluent generated on site during the construction phase is described in **Chapter 5,** ***Construction Activities,*** **Section 5.6.3** ***Storm Water and Foul Water Disposal*** of this EIS.

During the operation of the proposed development, sanitary wastewater will be treated as follows:

- All sanitary wastewater will be collected and treated in a standalone wastewater treatment facility that will treat the wastewater to a 20:30 standard, i.e. 20mg/l BOD and 30mg/L SS.
- The treated domestic effluent will then be pumped to Irish Water's foul sewer located east of Ringaskiddy Village.

Once the Irish Water Lower Harbour sewage treatment facility (Shanbally plant) has been constructed and becomes operational, the pumped untreated sanitary water will go directly to the Irish Water sewer located east of Ringaskiddy Village, which will then be pumped to the Lower Harbour wastewater treatment facility. The site wastewater treatment facility will be removed.

15.5.4.7 Assessment of Site Utilities

Some site utilities will require upgrading for the development of the proposed development. Among the changes that will be required will be the relocation of the high pressure gas main which crosses the site, connection to Cork County Council foul and storm sewers, and connection to the electricity transmission network.

All drainages from the site will be controlled and monitored as part of the industrial emissions licence for the facility.

15.5.5 Fuel Oil

It is estimated that the proposed facility will use approx. 400 tonnes of light fuel oil per annum. This light fuel oil will be supplied from an on-site storage tank.

During operation, the plant will use light fuel oil at start up to bring the furnaces to the required operating temperature. Light fuel oil may also be occasionally required as a supplementary fuel to maintain the temperature if waste of an exceptionally low calorific value is received. It will also be required for the operation of the emergency power generator. Refer to **Section 4.5.12** for details.

15.5.6 Natural Resources

The construction of the proposed development will require considerable movements of materials to and from the site. Most of the materials leaving the site will consist of spoil from the excavation works. Where possible, excavated materials will be reused on site for backfilling purposes, re-grading and landscaping. However, it is expected some of the excavated material may not be suitable for reuse on site. Any excavated materials suitable for re-use may deteriorate due to poor materials handling, storage, and exposure to adverse weather conditions. In particular, where materials consist of high fines content and wet weather is experienced during the excavation activities, such materials may become unusable.

It is estimated that almost 74,664m^3 of surplus material will be removed from the site. This figure includes an allowance for bulking up of material. Uncontaminated soil and stone materials which are not suitable for re-use will be disposed of to an appropriate site which is permitted under the Waste Management (Collection Permit) Regulations 2007 and 2008 to accept soil and stone. There are 13 such permitted sites within a 40km radius of the proposed resource recovery centre

site. The environmental impacts associated with the permitted site have already been assessed by the planning authority under the approval process specified in the Waste Management (Collection Permit) Regulations 2007 and 2008.

Almost 30,261m^3 of engineering fill and crushed stone will be imported onto the site. This figure include an allowance for bulking up of material. The material will be transported by road. Of the 30,261m^3 of imported engineering fill and crushed stone required for the construction works, approximately 1,100m^3 of shingle will be required for the coastal protection works and approximately 4,796m^3 will be required for the road upgrade.

Materials required for the construction works will be sourced locally where possible. Materials required from quarries will only be sourced from quarries which are listed on the register maintained by the local authority. The environmental impacts associated with the registered quarry have already been assessed by the local authority under Section 261 of the Planning and Development Act 2000, as amended.

It is envisaged that replenishment of the shingle for the coastal protection works may be required every two to five years but it depends on the duration of the material remaining on site. The impacts described for the initial instalment of shingle will be repeated during replenishment.

In the context of capacity of the market in Ireland for construction materials, the requirements of the construction phase will not be significant.

Materials will be consumed in the operation of the Waste-to-Energy facility. These are described in more detail in **Section 4.6.2** of **Chapter 4** ***Description of the Proposed Development***. Using residual waste to generate electricity will replace non-renewable fossil fuels such as natural gas, coal and oil in the generation of electricity.

The use of a closed steam condensate cycle will minimise the usage of water.

15.5.7 Waste Management

15.5.7.1 Construction Phase

Management of and disposal of waste during the construction phase is described in **Chapter 5** ***Construction Activities*** of this EIS. As described above, it is estimated that almost 74,664m^3 of surplus material will be removed from the site. This material will be disposed of to a site with a Local Authority permit to accept clean soil and stone, if it cannot be used on another construction site.

15.5.7.2 Operational Phase

Within the resource recovery centre, adequate provision will be made for the separation of waste at source. Office and canteen waste generated on site will be recycled where appropriate or treated in the waste-to-energy facility. Laboratory chemicals may be treated in the waste-to-energy facility or sent abroad for disposal, as appropriate.

Solid waste residues from the Waste-to-Energy facility are detailed in **Section 4.13.1** of **Chapter 4** ***Description of the Proposed Development*** of this EIS.

15.5.7.3 Bottom Ash

As mentioned previously in **Section 4.13.2** of **Chapter 4** ***Description of the Proposed Project*** of this EIS, the incineration process results in the generation of some residual materials. The bottom ash and recovered metals have the potential for beneficial use.

As explained in Section 4.13.4, the Waste-to-Energy facility will generate 6,583 kg per hour, which is approximately 52,700 tonnes per annum, of bottom ash. The bottom ash is expected to be similar to the bottom ash from the Meath waste-to-energy facility. The bottom ash from the Meath waste-to-energy facility has been classified as non hazardous and non toxic to the aquatic environment according to EPA methodology and Commission Regulation (EU) No 1357/2014 and Commission Decision 2014/955/EU.

It is the intention of Indaver to identify potential uses for the bottom ash. This material is suitable for use in road construction and such a use would be in accordance with government policy on reuse of materials and avoidance of waste. If no market can be found for the bottom ash, it will be disposed of to a suitably licensed landfill site for non-hazardous waste. Approximately 52,700 tonnes per annum is the equivalent of approximately 51 number 20 tonne truck loads per week.

Potential Reuse of Bottom Ash

Bottom ash from waste incineration in EU countries, including Belgium, is used in road construction or as railway ballast. Although there is no Irish or European legislation or standards governing the quality of ash for use in roads, if the ash is to be used for road construction it must generally be of better quality than if it were to be disposed of in landfill. If an ash recovery facility is constructed in Ireland it would be the intention of Indaver to proactively identify potential uses for the bottom ash.

It will be a requirement of the industrial emissions licence that Indaver specifies to the EPA the intended disposal or recovery facility for all wastes generated at the facility, including the bottom ash. If an ash recovery facility is developed in Ireland, to which Indaver proposes to send the bottom ash from Ringaskiddy, the EPA's approval will be required. This will ensure that any treatment and proposed reuse will be acceptable to the EPA. Thus the reuse of the ash is unlikely to have a significant negative effect on the environment. By replacing quarried crushed stone, the reuse of the bottom ash would have a minor positive impact on resource use.

Potential Landfill of the Bottom Ash

If no market can be found for the bottom ash, it will be sent off-site of to a suitably licensed landfill for non-hazardous waste. Before granting a licence to a landfill, the EPA must determine that the operation of the facility will not cause significant environmental pollution. Consequently, the disposal of the bottom ash in a licensed landfill is not likely to have a significant negative effect on the environment. The bottom ash will use up 52,700 tpa of landfill licensed acceptance quantity. The bottom ash will be transported by road to the landfill and could potentially impact on the capacity of the road network.

Potential landfills, which would be suitable for the disposal of the bottom ash, are:

- Knockharley landfill, Co. Meath
- Ballynagran landfill, Co. Wicklow
- Bord Na Mona landfill at Drehid, Co. Kildare

Knockharley landfill, in County Meath, operated by Knockharley Landfill Ltd, is licensed by the EPA, licence number WA0146-02, to accepted 200,000 tonnes per annum of non-hazardous waste. The landfill has capacity to accept the bottom ash from Ringaskiddy.

Knockharley landfill is located a short distance from the N2 national primary route. Trucks carrying bottom ash to Knockharley landfill would use the national road network, which has more than adequate capacity to accommodate the numbers of trucks. The disposal of the bottom ash in Knockharley landfill is not likely have significant negative effect on the environment.

Ballynagran landfill, in County Wicklow, operated by Ballynagran Landfill Ltd, is licensed by the EPA, licence number WA0165-02, to accepted 175,000 tonnes per annum of non-hazardous waste, including 67,500 tonnes per annum commercial waste and 45,000 tonnes per annum industrial waste. The tonnages of household, commercial and industrial waste can be altered with the agreement of the EPA, subject to the total quantity not exceeding 175,000 tonnes per annum. The landfill has capacity to accept the bottom ash from Ringaskiddy.

Ballynagran landfill is located a short distance from the M11 motorway. Trucks carrying bottom ash to Ballynagran landfill would use the national road network, which has more than adequate capacity to accommodate the numbers of trucks. The disposal of the bottom ash in Ballynagran landfill is not likely have significant negative effect on the environment.

Drehid landfill, County Kildare, operated by Bord Na Móna Plc, is licensed by the EPA, licence number WA0201-03, to accepted 360,000 tonnes per annum of non-hazardous waste. The landfill has capacity to accept the bottom ash from Ringaskiddy.

The Drehid landfill is accessed from the M4 motorway via the R402 and the R403. Trucks carrying bottom ash to Drehid landfill would use the national road network, which has more than adequate capacity to accommodate the numbers of trucks. The disposal of the bottom ash in Drehid landfill is not likely have significant negative effect on the environment.

15.5.7.4 Boiler Ash and Flue Gas Cleaning Residues

Circa 2000 tonnes of boiler ash and 9,104 tonnes of flue gas cleaning residues will be produced annually, refer to **Sections 4.13.3** and **4.13.4**. This is the equivalent of two truckloads of boiler ash and eight or nine truckloads of flue gas cleaning residues being sent off site per week. Currently no landfills in Ireland are licensed to accept waste with the characteristics of the boiler ash and flue gas cleaning residues. Until such a facility is developed in Ireland, the boiler ash and flue gas cleaning residues will be exported for disposal to a licensed landfill for hazardous waste or will be used to backfill salt mines. Salt mines are highly suitable environments for containing boiler ash and flue gas cleaning residues. The impervious nature of salt rock offers an long-term geological barrier and a geo-technically stable environment to guarantee that the residues are

permanently isolated from the environment. The absence of water in the underground salt mine's environment removes any risk of leaching of, for example, heavy metals from residues.

Boiler ash and flue gas cleaning residues from Indaver's Meath facility are currently shipped to 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. It is likely that the boiler ash and flue gas cleaning residues from the Ringaskiddy Resource Recovery Centre will be shipped to this facility, which has capacity to accommodate the material.

15.5.7.5 Ferrous and Non-ferrous Metals

Circa 2,600 tonnes per annum of ferrous and non-ferrous metals will be recovered for recycling. The before granting the licence or permit, the competent authority considered the effects on the environment of the facility. Consequently the recover or recycling of the ferrous and non-ferrous metals is not likely to have significant negative effect on the environment. The recover or recycling of the ferrous and non-ferrous metals is expected to have a minor positive effect on the environment.

15.6 Mitigation Measures

The proposed Ringaskiddy Resource Recovery Centre will be constructed and operated in accordance with good practice in energy and resource conservation, and efficiency.

During operation, energy efficient power systems will be employed, water conservation measures will be implemented, and wastes will be avoided, minimised or recycled where economically feasible.

Air-cooled condenser will be used to cool the steam from the turbine, and air cooling will be used in the transformers. This will minimise the quantity of potable water that will be required.

Wastes arising on site, for example from the administration building, will be sent off site to be recycled if they are suitable, and treated in the Waste-to-Energy facility if not. A beneficial reuse will be sought for the bottom ash. Metals will be recovered from the bottom ash.

Coastal protection mitigation measures are not required for the waste-to-energy facility element of the development. However, given the concerns raised by An Bord Pleanála and given the low risk that the amenity walkway and a section of the diverted gas pipeline could be impacted in 40 years' time, coastal protection measures have been included in this planning application as a precautionary measure so as to reduce the rate of erosion of the glacial till face. Sacrificial beach material (shingle) will be placed at the toe of the glacial till face (above the foreshore) on Gobby Beach in order to reduce erosion rates. Refer to Chapter 13 for further details.

Access to Gobby Beach (aside from the beach area proposed for the coastal protection works) will be maintained for the duration of the construction works.

15.7 Potential Cumulative Impacts

The potential for cumulative impacts as a result of the construction and operation of the proposed development and the following projects has been assessed where relative:

Proposed Projects

- N28
- Haulbowline Development and Spike Island Masterplan
- Port of Cork expansion
- Possible district heating system from Indaver to local users
- Cork Lower Harbour Main Drainage Scheme sewage treatment plant, Shanbally
- Wind turbine at Novartis

Existing Projects

- Wind turbines at DePuy, GSK and Janssen
- Hammond Lane extension
- NMCI and Beaufort Laboratory

If the construction of the N28 upgrade, the Haulbowline East Tip and Steelworks Site Remediation projects, the Port of Cork expansion and the Shanbally sewage treatment plant are under construction at the same time as the proposed Ringaskiddy Resource Recovery Centre, cumulative impacts could occur. There would be a cumulative demand for construction materials such as concrete, sand, crushed rock and steel and for power, water and telecoms.

The operation of all the developments, apart from the N28, is likely to result in a cumulative demand for power, water and other utilities. The proposed Ringaskiddy Resource Recovery Centre will generate power to help meet the power demand.

It is anticipated that the scale of the construction materials market in Ireland and the utilities capacity in the Ringaskiddy area are such that there will not be a significant cumulative impact on material assets as a result of the proposed development.

15.8 Residual Impacts

When the facility is in operation it will have a beneficial residual impact in the reduction in the quantity of hazardous waste being exported to Europe for disposal and in the reduction in the quantity of non-hazardous industrial, commercial and municipal solid waste and sludge going to landfill or being exported from Ireland.

The operation of the waste-to-energy facility will have residual effects in relation to the consumption of resources as outlined in **Table 4.13** of **Chapter 4** ***Description of the Proposed Development*** of this EIS.

Boiler ash and flue gas residues will be landfilled in a hazardous waste landfill or sent for recovery in a saltmine. These residues will be exported to landfill or to a saltmine, if no suitable facility has been developed in Ireland by the time the plant is commissioned.

The proposed development will also have a number of positive residual impacts on material assets. The bottom ash that is generated as a result of the incineration process is reused in many EU countries for use in road construction. Landfilling of these solid residues will only take place, if no viable market can be found. If these residues can be successfully used, it will have a positive effect in that it will reduce the requirement for the use of virgin materials.

The proposed development will have a beneficial residual impact as it will reduce the quantity of hazardous waste being exported to Europe for disposal. It will also reduce the quantity of non-hazardous industrial, commercial and municipal solid waste going to landfill.

In addition, the proposed facility will produce approximately 21MW of electricity, with approximately 18.5MW for export to the National Grid. This is enough energy to power approximately 30,000 homes annually and replaces non-renewable fossil fuels in the generation of electricity, which is a very positive long-term residual impact.

As discussed above and in Chapter 13, coastal protection measures are proposed to slow the erosion rate of the glacial till face. With the application of the sacrificial material, there will continue to be no impact from coastal erosion on the entire proposed development after 30 years. With the application of the sacrificial material, the diverted gas pipeline will not be impacted after 40 years. However, there is still low a risk of an impact on small section of the amenity walkway and viewing platform after 40 years