17. Summary of Impacts and Mitigation Measures

17.1 Introduction

It has been the intention of Indaver to reduce the adverse effects of the proposed development on the environment to a practical minimum. Where unavoidable environmental effects have been identified during the environmental impact assessment process, measures have been proposed to mitigate these effects as much as reasonably possible.

The predicted effects and recommended mitigation and monitoring measures are comprehensively detailed in the relevant chapters of the EIS. The proposed mitigation and monitoring measures are summarised in the various sections below. This chapter also summarises the likely residual environmental effects associated with the proposed development after the implementation of all mitigation and monitoring measures.

17.2 Summary of Mitigation and Monitoring Measures

17.2.1 Population and Human Health

The Health and Safety features incorporated into the design of the proposed development are outlined in **Chapter 4** ***Description of the Proposed Development*** of this EIS. The Health and Safety policy, procedures and work practices of the proposed development will conform to all relevant health and safety legislation both during the construction and operational stages of the proposed development. The proposed development will be designed and constructed to best industry standards, with an emphasis being placed on the health and safety of employees, local residents and the community at large. The technology to be employed in the proposed development is well understood and has been used successfully in equivalent projects internationally, with no implications for health and safety. The characteristics of the proposed development are presented in **Chapter 4** ***Description of the Proposed Development*** of this EIS and in the drawings submitted with the 2016 planning application and the updated drawings submitted with this planning documentation pack (2025).

Many of the mitigation measures described elsewhere, such as in relation to emissions to air and noise will have the effect of mitigating any effects on human health. In addition, to minimise any potential psychological effects in relation to worry about human health effects, even though the overwhelming evidence is that there are none, ongoing information and education of the community will be made available. This may be facilitated by information and performance of the facility and emissions being available on a website for the public to review. Seeing the real values will likely reassure reasonable persons.

To minimise the risk that the proposed development will cause nuisance, comprehensive mitigation measures described elsewhere in the EIS will be implemented, during both the construction and operational phases of the development. These mitigation measures will reduce any significant negative effects of the proposed development on the residential amenity of the local area.

17.2.2 Major Accidents and Disasters

17.2.2.1 Mitigation During Construction

None of the hazards identified in this report arise during the construction phase of the proposed development. However, a Construction and Environmental Management Plan (CEMP) will be in place to ensure that the construction is carried out in a safe manner with regard to safeguarding the environment from potential incidents on site. The CEMP also sets out the Construction Traffic Management Plan which will be finalised and implemented by the Contractor. The CEMP is included in **Appendix 5.1** of this EIS.

Risk assessment is an integral part of the CEMP. Furthermore, the PSCS (Project Supervisor Construction Stage) will ensure that the interaction of different activities at the site is managed safely so as not to present any unacceptable risks.

The CEMP will also incorporate the development of an Incident Response Plan (IRP) to ensure that, in the unlikely event of an incident, response efforts are prompt, efficient, and appropriate. The objectives of the IRP will be to:

- Ensure the health and safety of workers and visitors along the site.
- Minimise any impacts to the environment and ensure protection of the water quality and the aquatic species dependent on it.
- Minimise any impacts on properties, services etc.
- Establish procedures that enable personnel to respond to incidents with an integrated multi-departmental effort and in a manner that minimises the possibility of loss and reduces the potential for affecting health, property, and the environment.
- The CEMP also sets out provisions for traffic management during the carrying out of the construction works.

17.2.2.2 Mitigation During Operation

Based on the findings of the HAZID&RA exercise, there were no scenarios identified which presented a Priority Risk and there was one scenario which presented a Substantial Risk. This scenario involved a fire at the bunker. This scenario received a Severity Rating of 3, for both Human Health and for the Environment, and a Likelihood Rating of 4, giving the scenario a Risk Rating of 12. As such the risk assessment team examined the risk reduction measures planned for this area to ensure that all necessary measures would be in place to protect against this scenario.

Risk Mitigation Measures at Bunker

The scenario involving a fire at the bunker was identified as presenting the highest risk rating of the scenarios examined in the HAZID&RA. The following risk reduction and risk mitigation measures will be put in place to protect against this scenario.

- All process activities at the site, including receipt and handling of materials at the bunker, will be carried out by trained operators. Indaver will develop standard operating procedures (SOPs) to govern how these activities are carried out.
- Indaver will conduct a visual inspection of waste as it is unloaded at the bunker. This inspection will be carried out by a trained operator. For new customers, loads will be emptied out in the tipping hall area and examined in more detail prior to admittance to the bunker.
- A fire damper will be fitted, which will close in the event of a fire initiating at the bunker. This measure will ensure that there will be no air supply to the boiler from the bunker area under these circumstances.
- The bunker will be a concrete structure and will be compartmentalised (1-hour fire rating). This measure will help to mitigate against the risk of this scenario by limiting the rate at which a fire can develop in this area.
- Fire wrapping will be installed on cables at the bunker, to ensure continued function in the event of a fire developing.
- Indaver will operate a hot work permitting system at the site, to control ignition sources.
- Where practicable, when maintenance works are required, equipment will be taken outside of the bunker for these works.
- The nature of the activity carried out at the site means that there is a quick throughput of material at the bunker (typical residence time of a 4-5 days). This means that waste is not left to settle within the bunker for a long period of time.

- Indaver will also implement a Bunker Management Programme. This will be carried out once or twice per year, prior to shutdown periods. Indaver will lower the bunker level to bring the inventory to low level (as far as practicable). This, in conjunction with the quick turnaround of material in the bunker (4-5 days residence time), will help to avoid a situation where a waste batch is allowed to sit in the bunker for a long period of time.
- Indaver will install UV/IR detectors in the bunker and at the hopper. These detectors will enable early detection in the event of smouldering waste in the bunker. If practicable and safe to do so, Indaver can load this waste directly to the hopper and then add more waste on top to smother it. This is done at other sites in accordance with a documented procedure and this same procedure will be implemented at Ringaskiddy.
- A dedicated deluge system will be installed above the hopper.
- At the time of the HAZID&RA review it was noted that Indaver had implemented a monitoring programme at another of their sites, to study the potential for methane formation due to anaerobic digestion of waste in the bunker at that site. This study has since been completed and has found that the methane levels are very low during operations and rise to levels of up to 400 ppm during shutdowns, when there is no primary air extraction at the bunker. This concentration does not present a fire hazard. Indaver will install LEL detectors at the bunker at the Ringaskiddy site, so that similar monitoring can be carried out there also.
- Indaver will install 4 no. fixed water cannons at the bunker, which will provide the facility to douse spot fires. This measure will allow Indaver to respond to a developing fire scenario, allowing the operator of the facility to extinguish the event before it becomes fully developed. This allows the fire to be extinguished rapidly and with relatively low volumes of water when compared with a fully developed fire.
- Indaver will also install a closed dry head sprinkler system in the bunker, as back up to the water cannons. The sprinkler system will be designed to extinguish a fully developed fire. As such, even in the worst case fire scenario the policy is one of extinguishment and not one of controlled burn down.
- A 250 mm high stop block or kerb will be installed at the bunker to protect against the risk of a trailer falling into the bunker when unloading waste.
- The bunker will be designed to act as fire water retention facility, to prevent the risk of fire-fighting water that is applied at the bunker subsequently escaping off site as contaminated run-off.

These measures govern all stages of the potential development of this scenario. The measures will protect against the conditions arising under which a fire could occur, they will enable rapid detection and response at the early stages in the event that a fire scenario developing, they will enable extinguishment of the fire even in the event of escalation to a fully developed fire scenario, and protect against the risk of environmental contamination from fire-fighting run off.

With these measures in place, the HAZID&RA found that Indaver would have all necessary measures in place at the bunker, throughout all phases of the operation. As such the risks associated with this scenario were considered to be ALARP (as low as reasonably practicable).

During the course of the planning oral hearing in April and May 2016 held by An Bord Pleanála (ABP), concerns were raised about the ability of people to safely leave Haulbowline Island during such an event. The analysis in the HAZID&RA Report (**Section 2.8.1**) shows that that the worst case thermal radiation levels at the closest point to the bunker fire on the public road would result in exposure levels of 3.8 kW/m^2 at this point. As such there is no risk of adverse impacts to any off-site receptors arising from the thermal radiation emitted in this scenario.

Risk Mitigation Measures at Containment Areas

The following risk reduction and risk mitigation measures will be put in place to protect against accident scenarios involving loss of containment of materials in tanks or IBCs.

- Design of tanks incorporating measures to protect against siphoning of the tank contents (e.g. a hole in pipeline at top point on tank outlet or a check valve) in the event of line failure.
- Impact protection on storage tanks.
- Double skinned tanks, with leak detection between skins to detect a leak in the primary containment layer (fuel oil, ammonia).
- Deliveries to the tanks are manned activities carried out by trained operators.
- Transfer hoses are inspected by trained operators prior to delivery being made.
- Visual inspection of tankers prior to acceptance on site.
- Overfill protection system on storage tanks (level gauging, level switches).
- Personal protective equipment (PPE) for operators involved in carrying out deliveries, where required.
- Contents of aqueous waste tank are diluted (>70% water), thereby reducing the fire hazard.
- UN approved containers / packaging for materials; caged IBCs to protect against loss of containment of aqueous HCl due to impact.
- Bunded IBCs to retain a spill from the primary containment.
- Investigations / follow up if supplier provides faulty or damaged IBC.

Other Control Measures (general, site-wide measures)

In addition to identifying area-specific measures, the risk assessment also noted a series of other measures which provide risk reduction or mitigation across multiple site areas.

- All operators will be trained in the tasks they must carry out, with periodic refresher training as required.
- Documented SOPs for carrying out activities on site.
- Trained fitters for carrying out maintenance works.
- Regular site inspection.
- Formalised preventative maintenance program on site (SAP).
- Lock out, tag out procedure when carrying out maintenance works on plant. Permit to work sign off by authorised party.
- Vessels, piping designed to recognised standard/specification.
- Indaver personnel conduct screening / assessing of deliveries to site.
- Speed limit / traffic management controls.
- Oil water separator on drains.
- ATEX zoning.
- Control of ignition sources on site.
- Fire-fighting system - hoses, extinguishers.
- Fire-fighting systems / water main and water cannons.
- Spill kits.
- Emergency response team.

Based on these assessments, and on the controls that will be implemented as risk reduction and risk mitigation measures at the site, the risks associated with accident scenarios at the Indaver facility in Ringaskiddy were found to be ALARP.

17.2.2.3 Monitoring During Construction

The CEMP will include provision for continuous inspections, auditing and monitoring of the construction works. The Site Environmental Manager (SEM) will draw up a schedule of monitoring, which will set out roles and responsibilities for monitoring and reporting the works. In the event that the monitoring results indicate that the works are not being carried out in accordance with the contractual requirements, the SEM is responsible for initiating and reporting on the corrective actions to be implemented.

The SEM and the Construction Manager will also carry out quarterly audits to ensure that the Contractor engaged in carrying out the works is successfully meeting all environmental commitments / requirements under the CEMP.

The effective implementation of the CEMP will help to reduce the risks associated with the construction phase of the project in terms of the environmental effects. The PSCS (Project Supervisor Construction Stage) will monitor performance against the CEMP to ensure that it is adhered to throughout the process.

17.2.2.4 Monitoring During Operation

Indaver will ensure that there are appropriate controls in place (infrastructural and procedural) to manage the risks associated with the planned operations at the Resource Recovery Centre.

Indaver will also install detection and alarm systems to enable operators to rapidly detect and respond in the event of process deviations or accidents developing at the site. These will include:

- Oxygen monitoring at the furnace, with interlocks on the supply to ensure excess oxygen and protect against incomplete combustion.
- Interlocks will also be installed to prevent oil flow to the furnace when burners are not firing.
- Vibration detection on the fan at the furnace.
- Periodic cleaning of the furnace as part of the preventative maintenance programme, to protect against the risk of slag accumulation on the walls of the furnace.
- UV/IR detection systems.
- Pressure gauge at the burner, with interlocks to bring system to safe shut down.
- Process control system at the boiler system, linked to temperature monitors.
- Monitoring of stack emissions.
- Indaver will implement an automatic purge control sequence before the boiler is fired.
- Process controls to detect pressure drop at the bag house, with alarm.
- Process controls with temperature and weight detection at the bag house.
- Screening assessments of deliveries to the site. Indaver will also conduct investigations where issues arise with waste arriving on site (e.g. waste arriving in a damage container).
- Preventative maintenance programme to ensure that plant and equipment remains fit for purpose.
- Overfill protection systems on storage tanks (level gauging and level switches).
- Indaver will also conduct daily visual inspections of the site.

17.2.3 Roads and Traffic

As part of the design process for the proposed development, a number of mitigation measures were included to control the impact of the generated traffic on the local road network.

17.2.3.1 Indaver Staff Mobility Management Plan

Indaver has prepared a Mobility Management Plan (MMP) for staff employed at the facility, which is intended to reduce the amount of single-occupancy car trips to and from the site. Note that for the purpose of this assessment, no reductions in single-occupancy car trips have been assumed as a result of the implementation of the mobility management plan.

This MMP will be reviewed and revised on an annual basis. The review will comprise the undertaking of staff travel-to-work surveys and the review of targets set in the MMP. In the longer term, this will remain part of the company policy in order to ensure that the longer-term capacity of the N28 and upgraded M28 are still considered.

The Indaver Staff Mobility Management Plan is included in **Appendix 7.2**.

17.2.3.2 Staff Operational Hours

As outlined in this assessment, Indaver has structured staff working hours in order to ensure that arrivals and departures will occur outside of the AM and PM network peak periods. This will ensure that the traffic flows associated with staff movements at the site will occur during hours where there will be sufficient reserve capacity on the local road network to accommodate the projected increase in traffic. Once the M28 is operational, the implementation of restrictions to staff working hours shall be lifted as the M28 will have capacity to accommodate these trips and the impact of these on Ringaskiddy village is removed.

Similarly, during the construction stage in 2029, restrictions on arrivals and departures have been proposed which will ensure that no vehicles (construction staff and HGVs) will arrive or depart the site during the AM and PM network peaks. Instead, these movements will occur during hours with sufficient reserve capacity on the local road network.

17.2.3.3 Indaver HGV Mobility Management Plan

The strategic development proposals submitted by the Port of Cork (2015) and the renewed application (2025) for an expansion of their facility at Ringaskiddy includes a Freight Mobility Management Plan, developed to assist the Port in managing and controlling the flow of traffic to and from Ringaskiddy during peak hours. The Port's approach includes a number of key elements, as outlined in the Traffic and Transportation chapter of the EIS documentation submitted as part of their planning application, including:

- Development and use of a booking system to manage freight arrivals and departures,
- Controlling and optimising gate operations to regulate HGV flow,
- Extended operating hours to allow the Port to operate outside of the AM and PM peaks, and
- The use of IT solutions to disseminate information to hauliers regarding port operations and traffic conditions.

Through the above measures, it is stated that the number of arrivals and departures can be controlled and reduced to an acceptable level.

The principle of mobility management is key in the Ringaskiddy area, where there are peak periods that experience high traffic flow, and corresponding inter-peak periods with significant spare capacity on the road network. Though the Port of Cork has completely different operational requirements to an incinerator with energy recovery, Indaver recognise the need for a similar approach to Mobility Management of HGV traffic.

In a similar manner to systems already in use at its Meath facility, Indaver proposes to implement an MMP for HGVs. This will include a dedicated Waste Planner who manages the SAP delivery booking system, control of gate operations at the site entrance, extended operating hours to allow customers to avoid the morning and evening peak periods on the local road network, and a web-text service to disseminate information to customers.

This will optimise the volume of waste delivery HGV traffic travelling to and from the site on the road network over the course of the whole day, allowing for traffic arrivals to be controlled and scheduled during peak periods.

The above measures will allow Indaver to control the arrival and departure of HGVs in the 07:00-09:00 and 16:00-18:00 peak periods and reduce HGV trips to and from the resource recovery centre during these times to a minimal level in the scenario where the M28 is not operational. Once the M28 is operational the system will remain in use to ensure orderly deliveries throughout the course of the day as outlined, with the need to reduce arrivals and departures in peak hours no longer required.

It is noteworthy that regardless of traffic conditions in the Ringaskiddy area, Indaver must have control over the delivery of waste material, including advanced notification of the type of waste material to be delivered, and the date of delivery. This is due to the need to control the calorific value (CV) of the mix of waste accepted at the facility at any one time. Consequently, Indaver already adopt a robust approach to the advance planning of the acceptance of waste at specific times, this practice is currently in place at the Meath facility.

Adopting this system will ensure that the impact of HGV traffic flows associated with the facility will be minimised during peak periods until the M28 is operational, and that truck queuing in and out of the facility will be nominal. The HGV mobility management plan covers all stages of delivery, from pre-arrival, through to arrival and presence on-site, and departure. The system works as follows:

- Step 1 – The Indaver Waste Planner uses the booking system to create a high-level waste delivery plan,
- Step 2 – A week in advance, the waste planner in consultation with clients, creates a sales order for each delivery. This includes information about the customer, the waste type and the allocated delivery slot,
- Step 3 – The waste delivery arrives at the facility – note that drivers cannot enter the facility without checking in with the gate-keeper and receipt of a swipe card,
- Step 4 – The gate-keeper matches the delivery in question with the relevant sales order, the booking system records the arrival time and vehicle registration number, the driver receives a swipe card and a delivery docket,
- Step 5 – The driver swipes the card at the weighbridge, recording the entry weight and time, and the driver enters the site,
- Step 6 – The driver proceeds to the waiting zone outside the tipping hall, hands in the delivery docket, and proceeds to a tipping gate when instructed to do so,
- Step 7 – After tipping, the driver returns to the weighbridge,
- Step 8 – The driver swipes his card at the weighbridge, recording the exit weight and time, completing the delivery. An automatic record of the delivery is printed at the gatehouse,
- Step 9 – The driver parks outside the gatehouse, returns his swipe card to the gatekeeper and receives the printed delivery record. The driver then leaves.

At restriction periods, the number of available slots at the facility will be restricted in order to control the arrival of vehicles at the site. Turnaround time at the facility is approximately 25 minutes.

In addition to the proposed HGV MMP, the proposed extended operating hours of 06:00-20:00 will allow hauliers to schedule their deliveries to the proposed facility outside of the prevailing AM and PM network peak hours. Discussions with operators has suggested a strong preference for the proposed extended operating hours at the site, allowing these clients to schedule their deliveries outside of peak traffic times.

Indaver already employs a dedicated Waste Planner for the Meath facility who maintains communications with customers as part of their role. Indaver also already uses a web-text service for the Meath facility, to disseminate general announcements. Indaver proposes to have a dedicated Waste Planner and associated communications tools including a web-text service in Cork to allow hauliers and other customers to communicate with the Indaver Waste Planning Department quickly and efficiently regarding operations at the facility and prevailing road and traffic conditions.

The booking system allows Indaver to keep records of all arrivals and departures at the facility and can generate records for review by the local authority in order to demonstrate the efficacy of the proposed MMP, including arrival, entry and departure times, turnaround times and longer-term delivery trends.

17.2.3.4 Construction Traffic Management Plan

Indaver will appoint a construction management team for the duration of the construction phase. The team will supervise the construction of the project, including monitoring the performance of the contractors to ensure that all of the proposed construction phase mitigation measures are implemented and that construction impacts and nuisance are minimised. Indaver will liaise with neighbours and the general community during the construction phase to ensure that any disturbance is kept to a minimum.

The Construction Traffic Management Plan included in the CEMP, will be updated by the appointed main contractor prior to construction commencing. The Construction Traffic Management Plan will comprise all of the construction traffic mitigation measures which are set out in this EIS and any additional measures which may be required by the conditions attached to any grant of permission by An Coimisiún Pleanála. The Construction Traffic Management Plan will also include any specific requirements of Cork County Council during the construction phase including any monitoring and reporting requirements. This Plan will be submitted to and agreed with Cork County Council prior to construction commencement.

17.2.4 Air Quality

In order to sufficiently ameliorate any potential negative effects on the air environment, a schedule of measures has been formulated for both the construction and operational phases associated with the proposed development.

17.2.4.1 Mitigation During Construction

The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for effect from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of dust produced will be deposited close to the generated source. A series of measures, based on best practice, have been formulated (see below) for the construction phase of the project, as construction activities are likely to generate some dust emissions.

In order to ensure that no dust nuisance occurs, the following dust control measures will be implemented.

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic only apart from the contractor's car park which will be hardcore only
- Furthermore, any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 km/h, and on hard surfaced roads as site management dictates
- Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust
- Wheel washing facilities will be provided for vehicle exiting site in order to ensure that mud and other wastes are not tracked onto public roads
- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods

- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions

17.2.4.2 Mitigation During Operation

A number of measures have been incorporated into the design of the proposed development to ensure that emissions from the plant do not exceed regulatory emission limit values as outlined in the Industrial Emissions Directive 2010/75/EU. In addition, the stack height has been designed in an iterative fashion in order to ensure that ambient ground level concentrations are minimised.

Air modelling predictions indicate that ambient air quality levels from the proposed development will be within the ambient air quality standards at all locations beyond the proposed development site boundary, based on maximum and abnormal operating conditions. Thus, no specific additional mitigation measures are required during the operational phase of the proposed development.

17.2.4.3 Monitoring During Construction

At all times, these procedures will be strictly monitored and assessed by the Site Environmental Manager (SEM) as outlined in the Construction Environmental Management Plan (CEMP) in **Appendix 5.1** of this EIS. Boundary monitoring of dust emissions will be undertaken using Bergerhoff dust gauges at a number of locations near sensitive receptors with results compared to the TA Luft dust deposition level of 350 mg/(m^2*day) as an annual average. In the event of significant dust deposition occurring outside the proposed development site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

17.2.4.4 Monitoring During Operation

Monitoring of air emissions from the main stack will be undertaken on a scheduled basis. The specific monitoring requirements will be specified by the EPA in the Industrial Emissions licence which will be required prior to operations commencing onsite.

17.2.5 Climate

17.2.5.1 Construction Phase

The objective of the mitigation measures outlined below is to ensure that GHG emissions are minimised wherever possible during the construction phase of the proposed development. The mitigation measures which are relevant to GHG emission reductions are outlined below:

- All vehicles will be required to switch off engines when stationary (no idling)
- All vehicles will be serviced and maintained to ensure emissions are minimised
- Where practicable, building materials will be reused within the extent of the proposed development; and
- Where practicable, building materials will be sourced locally (within 20-25km) to reduce the embodied emissions associated with transport

As a result of these mitigation measures, the GHG emissions will be reduced during the construction phase compared to the baseline scenario.

During construction, the Contractor will be required to mitigate against the effects of extreme rainfall / flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind / storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction.

During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

17.2.5.2 Operational Phase

The objective of the mitigation measures outlined below is to ensure that GHG emissions are minimised wherever possible during the operational phase of the proposed development. The key mitigation measures which are relevant to GHG emission reductions are outlined below:

- During the treatment of waste at the facility, the thermal energy generated by the burning of waste will be recovered and will give an electrical output of about 21 MW_e with a net electrical output from the plant for export to the national grid of 18.5MW_e. Thus, the export of 18.5MW_e will give a direct benefit in terms of GHG emissions which would have been released in the production of 18.5MW_e from fossil-fuel burning power stations.
- The proposed development will also recover and recycle ferrous and non-ferrous materials during the thermal treatment process. The recycling of these metals will require less energy than processes using virgin inputs and thus lead to a direct saving in energy and thus GHG emissions.
- Currently, Ireland is exporting an average of 314,00 tonnes of residual waste per annum (based on data over the period 2019 – 2024). The operation of the facility could potentially allow 240,000 tonnes of residual waste currently exported to continental Europe to cease leading to a saving of over 5,070 tonnes of $CO2_{eq}$ / annum.
- The risk of rising sea levels due to climate change and the risk of increased flooding has been mitigated by a range of site-specific measures including the raising of the levels on the site and the adjoining road. As outlined in **Chapter 4** ***Description of the Proposed Development*** of the EIS, the facility itself has a recommended minimum flood defence level / building level of 4.55mOD. This is significantly higher than the 1 in 200 year flood level, even when a 1.00m conservative climate change allowance is included i.e. 2.87mOD + 1.00m = 3.87mOD). This therefore provides a very high standard of flood protection to the site infrastructure. The proposed L2545 upgrade works will include raising a 190m section of the road to a maximum height of 3.495mOD between the car park and the eastern end of the Hammond Lane Metal Company. This is approximately 0.9m above the existing road level. This will elevate the road to above the 1 in 200-year design tidal water level. This will offer a high level of protection to the road from tidal flooding.

As outlined in **Section 6.3.2.1** of **Chapter 6** ***Population and Human Health*** there are no major accident scenarios envisaged from either flooding or coastal erosion.

17.2.6 Noise and Vibration

In order to sufficiently ameliorate potential noise and vibration effects, a schedule of noise and vibration control measures has been formulated for both construction and operational phases, where required.

17.2.6.1 Mitigation During Construction

The construction phase appraisal has indicated that, during the various key activities proposed as part of this development, construction activities can be undertaken within the proposed noise criteria at the nearest sensitive buildings. During out–of-hours construction periods, or other construction scenarios with high potential for noise and vibration generating activities best practice noise and vibration control measures will be employed by the contractor in order to avoid significant effects at the nearest sensitive buildings. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- selection of quiet plant
- noise control at source
- screening
- liaison with the public, and
- monitoring

Details in relation to these mitigation measures is set out in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring.

As discussed in **Chapter 5** ***Construction Activities***, a construction environmental management plan (CEMP) has been prepared prior to construction commencing, refer to **Appendix 5.1.** The Site Environmental Manager (SEM), appointed by the Contractor, will be responsible for the successful development, implementation and maintenance of the CEMP, will carry out environmental inspections.

Selection of Quiet Plant

This practice will relate to static plant, such as compressors and generators. Units will be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

Noise Control at Source

If required, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

For mobile plant items such as cranes, dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant will be switched off when not in use and not left idling.

- For piling plant, noise reduction will be achieved by enclosing the driving system in an acoustic shroud, where necessary. For steady continuous noise, such as that generated by diesel engines, it is possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover.
- For percussive tools such as pneumatic concrete breakers, rock drills and tools a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensure any leaks in the air lines are sealed. Further reductions in noise levels will be achieved by erecting localised screens around breakers or drill bits when in operation in close proximity to noise sensitive boundaries.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling, materials will not be dropped from excessive heights. Drops chutes and dump trucks will be lined with resilient materials.
- For compressors, generators and pumps, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation, where required.
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. It has been assumed for the purposes of this assessment that a standard construction site hoarding will be erected around the site boundaries of the main building works of the waste to energy building. The site hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound insulation.

In addition, careful planning of the site layout will also be considered. Where feasible, site buildings such as offices and stores will be placed between the source and receiver to provide noise screening.

Liaison with the Public

The Site Environmental Manager (SEM) will be the designated officer appointed to site during construction works as described in the **CEMP (Appendix 5.1).** Any noise complaints should be logged and followed up in a prompt fashion by the SEM. In addition, as part of the communication strategy for the project, prior to particularly noisy construction activity or those with potential for perceptible vibration levels, e.g. rock breaking, piling, etc., the SEM will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

17.2.6.2 Mitigation During Operation

Fixed Installations and On-Site Vehicle Movements

Practicable noise control measures will be employed to ensure that noise from process and building services plant do not exceed the operational the set noise limits. In addition, the inclusion of an acoustic attenuators to the aero condenser structure will be required to meet, as a minimum, the insertion loss values included in **Table 10.22** in **Chapter 10** ***Noise and Vibration***.

In addition to the measures outlined above, the following forms of noise control techniques will be employed as standard to ensure operational plant noise levels are kept to a minimum:

- plant will be sited as far away from noise-sensitive locations as is practicable
- duct mounted attenuators will be installed on the atmosphere side of all air moving plant
- splitter attenuators will be installed providing free ventilation to internal plant areas
- anti-vibration mounts will be installed on all reciprocating plant.

Additional Vehicles on Public Roads

The noise effect assessment outlined above has demonstrated that mitigation measures are not required.

17.2.6.3 Monitoring During Construction

Prior to the construction works commencing on site, environmental noise and vibration monitors will be installed at the selected monitoring locations. The SEM will be responsible for this monitoring.

Noise monitoring will be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*. Vibration monitoring will be conducted in accordance with BS 4866 (2010) *Mechanical vibration and shock. Vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures*.

Project Programme

The construction programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. If piling or rock breaking works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance.

17.2.6.4 Monitoring During Operation

The facility will be licensed by the EPA through an IED licence. As part of the IED licence, annual noise monitoring will be required at the nearest noise sensitive locations to compare against the operational Emission Limit Values (ELV's). Monitoring will be undertaken during day, evening and night-time periods in accordance with the monitoring procedures included within EPA's NG4 2016 document.

Monitoring results will be submitted to the EPA for review and will also be included within the facilities Annual Environmental Report (AER) issued to the EPA.

17.2.7 Landscape and Visual

Mitigation measures have been included in the design and will be implemented in the development of the proposed development.

17.2.7.1 Proposals for this application

The most visible building will be the main process building and stack. Therefore, the form, height, positioning and cladding of this building have been carefully chosen to reflect the shape of the existing natural ridgeline, and to sit within it. The narrowest part of the building has been aligned to face and minimise visual effects on views from Ringaskiddy Martello tower. The varying heights of the roof are at minimum heights to house the internal machinery. The cladding materials have been chosen to reflect the existing shades and tones apparent in the area. Darker sections are proposed towards the bottom of the building and lighter sections towards the top, with angled sections of different tones to reflect the angle to the ridge depending on whether the viewer is viewing from the north, south, east or west and what the predominant backdrop from that direction will be. Many shapes, heights and colour ranges were tested using a 3D model and photomontages. The dark green and grey colour palette worked best against the sky and sea and the darker greys, greens, browns and black colours against the landform. The breaking down of the facades and roofline also helped to reduce the overall appearance of scale of the building.

The other buildings including the administration, warehouse, electrical substation, aero-condenser, turbine and tanks will be of relatively small scale and will be placed behind the larger buildings or landscaped mounding where possible which will reduce their visual effect significantly. These buildings will be clad in a similar colour and material where they may be visible. Although closer to the road, due to the scale, these buildings will not be as visible as the larger main process building in longer range views.

The landscape proposals and mitigation measures are illustrated in the photomontages, along with the more detailed landscape masterplan drawings and sections (dwg no's. 6124_300-303). These proposals include ground remodelling to fit the larger process building into an excavated area of the slope to help reduce its height and visual mass. This involves retaining walls and reinforced grass slopes to the rear of the buildings around the service yards which will not be visible to the public.

The landscape proposals also include screen mounding along the eastern and northern boundaries of the whole site. These will have an immediate screening effect, while vegetation alone will take a few years to establish. The mounding shall predominantly be around 1 in 1.5 to 1 in 2 slopes although the height will vary in places and therefore will be of differing heights dependant on the shape and space available along the boundary at different sections of the proposed development site. They are intended not to be uniform in shape and height but to form more natural organic forms which relate to the existing contours of the proposed development site. They will in general, form bunds of 1-3m high and will effectively screen many close views.

The overall strategy for the landscape planting proposals throughout the proposed development site is to utilise and emulate the species that are already present on the site. Retaining as much vegetation as possible and also planting with the same native species as found in the local area will blend the site visually with the surrounding established vegetation particularly when viewed from a distance. The triangular field at the top of the embankment to the southwest of the proposed development site will provide habitat enhancement, transitioning it from improved agricultural grassland to an area of more diverse natural meadow grassland, as set out in **Chapter 12** ***Biodiversity*** of this EIS.

Along the northern boundary, the direction where most views of the proposed development site are from, the planting shall be dense mixed deciduous and evergreen planting on the earth mounds, using a range of age and sizes of tree, up to semi mature to provide some instant screening effect. The planting shall have a high percentage of the evergreen species for year-round screening in particular pine which is found throughout the area. The mounds will be planted with native woodland and over time as this establishes and grows in height the building will become even less visible. This planting will occur during the first planting season (November – March) after all of the construction works have been completed.

The landscape treatment along to the northern boundary of the proposed development site from Gobby Beach to Western Fields will create a more '*campus*' style landscape reflecting the evolving change of the nearby NMCI, Beaufort, IMERC and Haulbowline campuses.

At the entrances to the proposed development site, larger semi mature species shall be planted for immediate effect. Closer to the buildings, the planting areas will predominantly be used for higher woodland planting rather than grasses or shrub planting to minimise visual effects. To the east of the proposed development site, along the coast there is currently an area of dry heathland, with scrub. A native grassland/scrub habitat will be maintained along the proposed public amenity walkway which will travel through the area. Between the footpath and proposed development site, a mixture of native scrub and taller oak and pine woodland will be planted to assist in screening close range views of the development from the walkway.

The proposed development site will require security, wire mesh type fencing which will be coloured matt black and will be set back from the public road and will be located within the planting on the internal slopes of the mounding where possible to reduce the visual effect and retain a vegetated boundary to the public footpath. To the south the proposed development site will be fenced, and the existing boundary hedgerows supplemented where these have been retained and replanted where there has been disruption due to the construction phase.

The lighting effects have been illustrated from particular viewpoints in the three nighttime photomontages. Relatively low-level lighting has been proposed to reduce nighttime effects on the wider area while still illuminating the entrances and exits.

Reinforced grass slopes will be used where possible instead of concrete retaining walls for environmental, biodiversity and to a lesser degree visual reasons as these are generally required to the rear of the main process building, tanks and pump house where the visual effect will be screened. Similarly, reinforced grass areas will be provided in the '*shutdown yard*'.

A new bitumen macadam footpath will be constructed to give access from Gobby Beach to the Martello Tower. It is proposed to run along the eastern edge of the proposed development site and will be fenced with a low timber fence along the eastern edge. A viewing area will be provided at the higher southeast corner of the proposed development site providing expansive views over Cork Harbour, Spike Island and Cobh. The footpath will then run along the elevated southern boundary of the site towards the Martello Tower. There will be low additional mounding and planting to the northern edge of the footpath to mitigate any views down into the service yard of the proposed development.

17.2.7.2 Monitoring

In order to ensure the designed mitigation measures are effective, the construction of the proposed development must follow the design and material and colour selection as set out above and as detailed in the EIS and accompanying architectural drawings.

In relation to landscape mitigation, it is important that stringent specifications will be employed with regard to all the planting works, and that the landscape contract will include a 12 month maintenance period during which any plants which fail will be replaced.

17.2.8 Biodiversity

The likely success of the proposed mitigation measures is high, either in their current form or as they will be adapted on-site to achieve the desired result. The mitigation measures have been drawn up in line with current best practice and include an avoidance of sensitive habitats at the design stage. It is clear in what the mitigation measures are designed to achieve in lowering or reducing the risk of effect to acceptable levels.

Whilst the proposed methods of mitigation may be amended and supplemented the risk that the mitigation measures will not function effectively in preventing significant ecological effects is low. The following mitigation measures will be implemented:

17.2.8.1 Mitigation During Construction

A construction environmental management plan (CEMP) has been prepared and will be updated prior to construction commencing. Refer to **Appendix 5.1.** The CEMP will include all of the construction mitigation measures, which are set out in this EIS and NIS, and any additional measures which are required by the conditions attached to any decision of An Coimisiún Pleanála, should permission be granted. The principal measures which will be set out in the CEMP are summarised below.

Protection of Habitats

- To prevent incidental damage by machinery or by the deposition of spoil during the site clearance stage, any trees /habitats earmarked for retention will be securely fenced early in the construction phase. The fencing will be clearly visible to machine operators.

- To prevent Japanese Knotweed from outside the proposed development site being inadvertently being brought into the site, the contractor will be required to inspect vehicles before using them on site and will pay particular attention to caterpillar tracks and where trucks and dumpers are stowed. The supplier of fill will be required to provide a guarantee that the fill to be imported does not contain knotweed. In addition, the fill will be inspected for signs of knotweed, prior to importation to site. The UK Environmental Agency's publication *Managing Japanese knotweed on development sites - The Knotweed Code of Practice* (EA 2013), states that inspection of topsoil brought into the site, should be carried out using the guidance in appendix I-IV of the code BS 3882:2007 '*The British Standard Specification for topsoil and requirements for use'*. This Standard was replaced subsequently by BS3882:2015 *Specification for Topsoil*. The inspection of fill will be carried out according to this Standard.

Protection of Water Quality

- A dedicated holding tank for storage of construction foul effluent will be constructed prior to commencement of the main construction activities. The effluent will be regularly disposed of off-site by tanker by a licensed contractor to an approved licensed facility.

- Storm water will be managed carefully during construction. In general, storm water will be infiltrated to ground via silt traps and managed soakaways. The laydown areas will be suitably drained and any areas which will involve the storage of fuel and refuelling will be paved and bunded and hydrocarbon interceptors will be installed to ensure that no spillages will get into the surface water or groundwater.

The employment of good construction management practices will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. The Construction Industry Research and Information Association (CIRIA) in the UK has issued a guidance note on the control and management of water pollution from construction sites, *Control of Water Pollution from Construction Sites, guidance for consultants and contractors* (Masters-Williams et al 2001). Additional guidance is provided in the CIRIA technical guidance on *Control of Water Pollution from Linear Construction Projects* (Murnane *et al.* 2006).

Construction mitigation measures are further outlined in **Appendix 5.1.**

Measures, as recommended in the guidance above, that will be implemented to minimise the risk of spills and contamination of soils and waters, include:

- Training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures

- Careful consideration will be given to the location of any fuel storage facilities. These will be designed in accordance with guidelines produced by CIRIA and will be fully bunded

- All vehicles and plant will be regularly inspected for fuel, oil and hydraulic fluid leaks. Suitable equipment to deal with spills will be maintained on site

- Where feasible, soil excavation will be completed during dry periods and undertaken with excavators and dump trucks. Topsoil and subsoil will not be mixed together. Specific measures will be implemented, as specified by the Invasive Species Management Plan to ensure that Japanese Knotweed is not spread within the proposed development site or outside the site boundaries

- Ensure that all areas where liquids are stored or cleaning is carried out are in a designated impermeable area that is isolated from the surrounding area, e.g. by a roll-over bund, raised kerb, ramps or stepped access

- Use collection systems to prevent any contaminated drainage entering surface water drains, watercourses or groundwater, or draining onto the land

- Minimise the use of cleaning chemicals
- Use trigger-operated spray guns, with automatic water-supply cut-off
- Use settlement lagoons or suitable absorbent material such as flocculent to remove suspended solids such as mud and silt
- Ensure that all staff are trained and follow vehicle cleaning procedures. Post details of the procedures in the work area for easy reference

Air Quality

Construction activities have the potential to generate dust emissions, particularly during the site clearance and excavation stages. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with ambient conditions, including rainfall, wind speed, wind direction and on the distance to potentially sensitive locations. Most of the dust would be deposited close to the potential source and any effects from dust deposition would typically be within a hundred metres or so of the construction area. A dust minimisation plan will be prepared and implemented by the building contractor during the construction phase of the proposed development. The following avoidance, remedial or reductive measures will be implemented as part of the dust minimisation plan:

- During very dry periods when dust generation is likely, construction areas will be sprayed with water
- Exhaust emissions from vehicles operating within the proposed development site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor through regular servicing of machinery
- Vehicle speeds will be limited in the construction site
- Surrounding roads used by trucks for access to and egress from the proposed development site will be cleaned regularly using an approved mechanical road sweeper. Roads will be cleaned subject to local authority requirements. Site roads will be cleaned on a daily basis
- During construction wheel-wash facilities will be provided with rumble grids to remove excess mud from wheels. These facilities will be located at the exit from the proposed development site and away from sensitive receptors, where possible. Wheel wash run off will be stored in an onsite storage tank and will be disposed of by permitted waste haulage company at a permitted or licensed facility
- Internal haul roads will be paved at the earliest possible opportunity and inspected regularly for cleanliness
- Materials carried on vehicles to site will be enclosed or covered with tarpaulins
- Daily visual inspections will be carried out at locations around the proposed development site boundary as required. These inspections will monitor the effectiveness of dust mitigation measures
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind

Waste Management

- Waste generated during the construction phase will be carefully managed according to the accepted waste hierarchy which gives precedence to prevention, minimisation, reuse and recycling over disposal with energy recovery and finally disposal to landfill.
- All waste removed from the site will be collected only by contractors with valid waste collection permits, under the Waste Management (Collection Permit) Regulations 2007 and 2008. All facilities to which waste will be taken will be audited in advance, to ensure that they have appropriate waste licences or permits, under the Waste Management Act 1996 as amended by the Protection of the Environment Act 2003, and the regulations thereunder, allowing them to accept the type of waste that is to be sent there.

Hazardous waste generation will be minimised, and such waste will be recovered where feasible, and only disposed of if recovery is not feasible. Hazardous waste will be managed in accordance with the relevant legislation.

Invasive Species

Prior to the commencement of construction works an invasive species survey will be undertaken within the proposed development boundary by a competent expert to determine if invasive species listed under Part 1 of the Third Schedule of S.I No. 477 of 2011 have established in the area in the period between pre-planning and post consent.

Amber list species (with the exception of Sycamore) will be managed/removed during construction works in line with best practice and the landscape plan.

Badger

An active sett was recorded within the proposed development site boundary. Additional surveys will be carried out immediately prior to the commencement of site works, to determine the status of the sett. This will allow a more accurate and up-to-date picture of how badgers are using the site once road construction is completed and when usage of the road commences. Once construction has been completed, there may be a change in the distribution of badgers within the site and the adjoining area. This may include the utilisation of the new artificial sett and underpass.

If Badgers are discovered at that time, the mitigation measures outlined in the NRA publication, *Guidelines for the Treatment of Badgers Prior to the Construction of a National Road Scheme* (NRA, 2005a), should be followed. If necessary, the following measures will be employed for all construction works where Badger issues arise.

- Badger sett tunnel systems can extend up to *c.* 20m from sett entrances. Therefore, no heavy machinery should be used within 30m of badger setts (unless carried out under licence); lighter machinery (generally wheeled vehicles) should not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance should not take place within 10m of sett entrances.
- During the breeding season (December to June inclusive), none of the above works should be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts.
- Following consultation with the NPWS and Badger experts, works closer to any active setts may take place during the breeding season provided appropriate mitigation measures are in place, e.g. sett screening, restricted working hours, etc.
- All affected Badger setts will be clearly marked and the extent of bounds prohibited for vehicles clearly marked by fencing and signage. Bunting is an option on a temporary basis. Hazard tape is inadequate as it is prone to deterioration and damage by wind or cattle etc.
- All contractors/operators on site should be made fully aware of the procedures pertaining to each sett on site.
- Construction activities within the vicinity of affected setts may commence once these setts have been evacuated and destroyed under licence from the NPWS. Where affected setts do not require destruction, construction works may commence once recommended alternative mitigation measures to address the Badger issues have been complied with.
- Works close to Badger setts or removal of Badgers from a site may only be carried out under the supervision of a qualified expert under licence from the NPWS.

Bird

The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land, or any such growing in any hedge or ditch from the 1st of March to the 31st of August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Nonetheless, it is recommended that vegetation be removed outside of the breeding season.

Retention of the native hedgerows and enhancement of existing scrub within the proposed development site will reduce the loss of breeding and nesting habitat for birds. Additional native planting of treelines and hedgerows are proposed. The creation of alternative scrub habitat at the south-west of the site will provide alternative foraging/nesting habitat as this habitat matures. NRA guidelines on the protection of trees and hedges prior to and during construction should be followed (NRA, 2006). Native species will be utilised for new planting at the proposed development site. The landscape plan will in time provide alternative feeding resources for birds.

Otter

No Otter signs or holts were noted within 150m of the proposed development. However, Otters do occur within the wider landscape and are common within Cork Harbour. A detailed pre-construction survey will confirm the absence of Otter holts within 300m of the proposed development area.

Marine

Coastal protection works will take place outside the main wintering season for birds (October to March).

It is anticipated that monitoring of the sacrificial material placed on the beach and of the cliff face will take place every year. If such material is to be replaced in the future, an ecological survey will be carried out in advance to ensure that ecological conditions have not changed in the intervening period.

17.2.8.2 Mitigation During Operation

Landscape Plan

Woodland and scrub and other areas of semi-natural vegetation outside the proposed development area will be retained.

Boundary landscape planting will be of Irish native species that reflect the existing vegetation of the area. These will be derived from local native-origin stocks.

The semi-natural grassland in the south-western side of the site will be managed and allowed to naturally recolonise (under ecological management) to create scrub habitat in the medium term. This is discussed in **Chapter 12 *Biodiversity* (Section 12.5.18)** and the updated Landscape Design Report (BSM 2025).

Biodiversity Enhancement

Bats

The existing trees within the proposed development site lack the structural elements that would make them suitable for roosting bats. Therefore, the provision of bat boxes suitable for the species recorded within the site are recommended. Examples of same are listed below. The boxes have been selected to provide a range of roosting opportunities for different species and colony sizes. They can be sited on existing semi-mature trees, however the pole mounted bat boxes will be used where necessary. The boxes will be installed by the project ecologist considering relevant factors including foraging resources, commuting routes, future landscape development, and lighting and will be regularly checked for usage as part of an ongoing ecological monitoring programme.

Vincent Pro Bat Box

Two Vincent Pro bat boxes will be provided. This box features three vertical chambers of different sizes, providing ideal roosting space for a variety of species. Beneath the crevice entrances is a ladder which provides a rough surface for bats to land. Limited cleaning is required for these boxes as the droppings will fall out of the bottom of the chambers. The front and top of the box are black which helps the box to absorb heat. This bat box can be used by Leisler's, Common Pipistrelle, Soprano Pipistrelle, Brown long-eared, Natterer's and Whiskered Bat.

Bat Box 1FD

Two Bat Box 1FD will be provided. Suitable for Pipistrelle and Nathusius' Pipistrelle Bats as well as Daubenton's Bats and Long-Eared Bats. This is especially in mixed bat zones and for initial settlement attempts. The front panel can be removed for inspection and cleaning.

Swift

The swift is a Red List bird of conservation concern in Ireland because its population has declined by over 40% in the last 15 years. Conservation actions across the country are helping to recover populations. Swifts are faithful to their nest sites. Nest box projects, especially built-in nest boxes, can provide safe long-term homes for new breeding pairs of Swifts.

Commercial Swift nest bricks are made from hollow brick or concrete composite designed to allow access by Swifts and manufactured to modern building regulation standards. They can be integrated into the walls of buildings during the construction phase.

Ten Swift boxes (Triple Entry Swift Box (ACRES) or similar) will be installed under the guidance of the supervising ecologist. These will be installed following the Swift Conservation Ireland Guidelines (2019). These will be placed at least 5m above ground level with an open area of the building i.e., free of overhanging ledges, vegetation, and other obstacles. There will be no directional lighting in the vicinity of this area. Boxes will be positioned in rows to encourage colonial nesting. These will placed on a northern or eastern aspect to prevent overheating.

Swifts look for nest sites at locations with established colonies. Swifts are known to occur in the Ringaskiddy area (Source NBDC), although none were recorded during the site surveys. To increase the chances of attracting Swifts to a new nest location, a recording of a Swift call should be played. Swift calls can be broadcast from a small speaker placed as close as possible to the nest box or brick. New nest box sites where no lures are played are less likely to be successful in attracting nesting Swifts. This will be carried out under licence of the National Parks and Wildlife Service (NPWS).

Other Breeding birds

In order to enhance the site for nesting birds eight nesting bird boxes (a range of bird box types) will be installed at the proposed development site with retained scrub. A range of nest boxes will be used including three 1B Schwegler nest boxes, three 1ZA Schwegler wren roundhouses and two Treecreeper FSC Nest Box

Four Swallow nest cups will be installed to provide alternative nest sites for swallows. These will be installed on the new site buildings under ecological supervision.

Hedgehog Boxes

Four SCHWEGLER Hedgehog Dome (or similar) will be provided. These will be located under the retained hedgerow/scrub habitat. This dome encourages Hedgehogs to settle in -a particular area and provides year-round shelter, including during the winter months. This will be located somewhere protected from wind and rain. Ideally this will be filled with hay (supplied with the dome) but alternatively use dry leaves and straw, as well as cut up newspaper and wood shavings. These will be located adjacent or within suitable habitat but will not be situated near internal or external roads.

Log Piles/Loggeries

Building invertebrate habitats can provide shelter to many beneficial insects and offer a great foraging habitat for birds and other mammals.

Dead wood is one of the most valuable habitats for urban wildlife. The decline of the availability of deadwood is linked to the decline of many woodland birds due to the loss of foraging opportunities provided by this habitat.

Key points:

- Install the logs vertically
- Site the loggery in a shaded part of a site
- Do not use concrete to bed the logs in. The beetles require the logs to be in contact with the soil
- Do not use well-rotted logs as they will have little wood left as food

Four log piles will be installed under retained hedgerow and scrub habitats. Log piles are suitable for invertebrates, small mammals and birds and can be easily installed in areas of retained vegetation and/or open spaces. They are stacks of logs piled up and allowed to rot down. Left undisturbed they will support a good range of biodiversity.

Insect Hotels

Three insect hotels will be installed on the edge of the existing semi-natural grassland (south of site). Insect hotels are excellent for attracting a wide range of invertebrate species. Perforations allow for insect access and a chamber with bamboo below for solitary bees. This can be positioned anywhere in the site where pollination is to be encouraged. The nesting tubes are ideal for solitary bees to build their nests in, the vertical slots are designed to encourage butterflies, other refuge holes are perfect for ladybirds and lacewings and the pinecones offer an excellent habitat for a range of other species.

17.2.9 Soils, Geology, Hydrogeology, Hydrology and Coastal Recession

17.2.9.1 Mitigation During Construction

Soils and Geology

Threats to soil and subsoil

The threats of erosion, compaction and loss of organic matter on soils and subsoils during construction will be mitigated by pre-construction design and soil management in accordance with the Defra (2009) guidance document.

All earthworks will be undertaken in accordance with a project-specific earthworks specifications ensuring that all excavated material and imported material is classified appropriately to allow maximum opportunity for the reuse of materials on the proposed development.

Where compaction of the soils and subsoils has occurred under trafficked areas, haul roads and construction compounds, decompaction of the soils and subsoils is required. Where practical, compaction of any soil or subsoil which is not part of the works or to remain in-situ within the site will be avoided.

The area that will result in sealing of the soil should be minimised in the detailed design.

Loss or damage of future quarry or pit reserves

The excavated rock will be re-used as general fill onsite where feasible minimising the loss of the feature. The Contractor will ensure acceptability of the material for re-use within the proposed development boundary with appropriate handling, processing and segregation of the material.

Disturbance of natural ground

Earthworks haulage will be along predetermined routes within and outside the proposed development boundary. The identified haulage routes are along existing national, regional, and local routes or within the proposed development boundary extents.

Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practicable, compaction of any soil or subsoil which is to remain in-situ with the proposed development will be avoided.

Washout of Fines / Sediment Runoff

The design and construction of pre-earthworks drainage on the proposed development will control the surface water runoff on the site. The pre-earthworks drainage design will incorporate sediment control measures such as silt fences, straw wattles, sediment traps and water filtration. Care will be undertaken in earthworks activities to minimise dust generation, groundwater infiltration, and generation of run-off.

Sediment control methods are outlined in the Construction Environment Management Plan (CEMP) in **Appendix 5.1** of this EIS.

Degradation of material for reuse

The earthworks will be undertaken in accordance with a project-specific earthworks specifications ensuring that the excavated and imported material is classified appropriately to allow maximum opportunity for the reuse of materials on the proposed development. Overburden and rock excavated on the site will be assessed for re-use. The excavation, management, stockpiling and placement of engineering fill shall be undertaken in accordance with best practice to retain the existing structure and integrity of the excavated materials. Processing of marginal or unacceptable material should be considered where possible. Material that is not suitable for reuse will be exported off site for disposal or recovery at appropriately licensed or permitted sites.

Earthworks operations will be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding and degradation of formation.

Geological Heritage Area

The Geological Survey of Ireland (GSI) was consulted on the effect the proposed development on the Ringaskiddy County Geological Site (CK077). The GSI state that machinery accessing Gobby Beach to place the beach nourishment material above the foreshore should aim to minimise damage tolimestone boulder erratics and bedrock outcrops within the heritage area. Appropriate mitigation measures should be put in place to minimise or mitigate potential effects. The GSI is to be consulted on these mitigation measures in advance of any on-site works and will require a site visit to confirm these measures are being undertaken.

Potential Ground Contamination

It is proposed to excavate areas of made ground and export this material offsite to an appropriate licensed facility. The material shall undergo assessment in accordance with EPA guidance (2021) and the material shall be categorised in accordance with the Waste Framework Directive (2008) to classify the material for export offsite.

Geohazards and Landslide Risk

Bulk excavations for foundations on the site will be undertaken in accordance with best practice to ensure stability of open excavations and cut slopes on the site. It is proposed to construct retaining structures and retention systems in Area 2 while excavating and regrading the site to ensure a safe working environment for construction workers.

Ongoing coastal processes are causing failure on the cliff face of the eastern coastal boundary but the proposed development has been located a sufficient distance from the eastern coastal boundary to ensure that the waste-to-energy facility will not enhance or accelerate the natural process of coastal retreat at this location.

The proposed placement of sacrificial beach nourishment material above the foreshore will mitigate the coastal erosion process of the cliff face.

Hydrogeology

Good construction management practices, as outlined in the CIRIA guidance *Control of Water Pollution from Construction Sites Guidance for consultants and contractors* (Masters-Williams *et al*., 2001) will be employed by the appointed contractor to minimise the risk of transmission of hazardous materials as well as pollution of groundwater. The construction management of the site will take account of these recommendations to minimised as far as possible the risk of groundwater contamination.

Measures to be implemented to minimise the risk of spills and contamination of waters include:

1. Employing only competent and experienced workforce, and site-specific training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures.
2. Ensure that all areas where liquids (including fuel) are stored, or cleaning is carried out, are in designated impermeable areas that are isolated from the surrounding area and within a secondary containment system, e.g., by a roll-over bund, raised kerb, ramps or stepped access.
3. Good housekeeping at the site (daily site clean-up, use of disposal bins, etc.) during the entire construction phase.
4. Potential pollutants to be adequately secured against vandalism.
5. Provision of proper containment of potential pollutants according to codes of best practice.
6. Thorough control during the entire construction phase to ensure that any spillage is identified at early stage and subsequently effectively contained and managed.

Appendix 5.1 ***CEMP*** also addresses good construction management practices that will be employed to prevent the risk of pollution of the existing groundwater and to manage any groundwater dewatering during construction.

To mitigate any potential risks regarding groundwater contamination, groundwater monitoring campaigns are recommended.

Hydrology

There are no existing watercourses on site. Cork Harbour, with associated protected areas, lies adjacent to the eastern boundary of the site. The employment of good construction management practices will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. In general, storm water will be infiltrated to ground via managed soakaways. The laydown areas will be suitably drained and any areas which will involve the storage of fuel and refuelling will have paved areas with bunding and hydrocarbon interceptors to ensure that no spillages will get into the surface water or groundwater systems.

The proposed placement of sacrificial material on the beach will be undertaken above the foreshore on Gobby Beach. Clean material will be used. Refuelling of equipment will not be allowed on the beach.

Coastal Recession

Access to the recreational amenity of Gobby Beach shoreline and nearby car park will be temporarily impacted (for approximately 3 weeks) during the placement of sacrificial beach material. The sacrificial material consists of imported shingle which will be temporarily deposited on the car park. To ensure the safety of the general public, it is envisaged that the area of the beach, in which the construction works will taking place and the area of the car park in which the materials will be stored, and which will be used by the machinery, will be closed to the public for the duration of the proposed works. However, access to other sections of the beach will be maintained for the duration of the works.

17.2.9.2 Mitigation During Operation

Soils and Geology

All substances that would have the potential to cause a negative effect on the soils and geology will be stored in appropriate containers and, if required, placed within bunded areas in the proposed development. All storage tanks for chemicals will be fully bunded or double skinned. Raw materials for the process will be stored in containers or silos within the process building. Residues will be stored in the bottom ash hall and silos within the process building.

All waste entering the facility will be stored in fully contained structures. All waste storage facilities will be rendered impervious to the materials stored therein.

All concrete underground storage structures whether for waste or liquid (as there is a possibility that firewater run-off may enter any of the tanks) will be constructed as watertight structures in accordance with the requirements of relevant Codes of practice such as EN 1992-3:2006 Eurocode 2 – *Design of Concrete Structures – Part 3: Liquid retaining and containment structures*.

Typically, these structures will be reinforced concrete with minimum wall and base thicknesses of 250 mm or greater depending on the structural requirements. The construction of these tanks will comply with the requirements of the Eurocode. The structures will be integrity tested to confirm that they are watertight. This will be demonstrated to the satisfaction of the EPA following installation and prior to use for storage.

Similarly, the storm water attenuation tank (which could also contain fire-water run-off) will be a watertight unit, which will be tested and demonstrated to be watertight to the satisfaction of the EPA.

The waste bunker will be constructed in accordance with the requirements of relevant Codes of practice such as EN 1992-3:2006 Eurocode 2 – *Design of Concrete Structures – Part 3: Liquid retaining and containment structures*. This will prevent any potential leakage of leachate from the waste to soil or groundwater.

All underground process piping or process drains, which will contain liquids which could cause contamination, will be double contained and regularly maintained and inspected for integrity.

Rainwater run-off from fire-fighting in external areas, which could be contaminated, will drain to the surface water drainage system and will be collected in the storm water holding tank. Run-off from fire-fighting in the bunker area will be collected in the bunker. Run-off from fire-fighting in other parts of the waste-to-energy facility will be collected by the floor drains and held in the recovered water tank. Refer to **Chapter 4 *Description of the Proposed Development*** of this EIS, for a description of the firewater containment systems.

Roads, hard standings and yard areas will be paved to prevent any contamination of groundwater or soil. Storm water run-off from these areas will drain via hydrocarbon interceptors and will be collected in the storm water holding tank where it will be sampled to ensure that contaminated surface water will not be discharged from the site.

Tanker loading and unloading operations in the waste-to-energy facility will be undertaken in a dedicated tanker loading/unloading bay which will have a local collection system and holding tank to contain any spillage.

Hydrogeology

Roads, hard standings and yard areas in the eastern part of the site will be paved. Surface water run-off from such areas and from the roofs of the buildings will be collected in the surface water drainage system. This will reduce the infiltration of surface water into the groundwater, in the western part of the site, and have a minor effect on the groundwater flow regime. The levels of the western field will be raised but the area will not be paved. This will allow the infiltration of surface water into the groundwater.

Regular monitoring of groundwater levels and groundwater quality analysis are recommended. This will detect any possible changes in groundwater level and quality during the operational phase of the proposed development.

Hydrology

During operation, as described above, surface water will be contained within the site. The surface water discharge will be monitored prior to discharge and if an out of specification reading is detected the pumps will be shut off and all contaminated runoff will be contained within the retention tank system i.e. both surface water tanks.

In the event of a fire on site, the water used for fire-fighting will be retained.

As discussed above, the levels of the low-lying parts of the site will be raised to 4.55m OD. This development level will offer a very high standard of flood protection to the site. Refer to **Appendix 13.4 *Flood Risk Assessment*** for further details. This measure will ensure that the risk of flooding to the site is very low. The finished floor level of the buildings on the site will be set at even more conservative levels, all above 5m OD.

It is proposed to upgrade the L2545 to address the risk of flooding of the road. The upgrade works will include raising a 190m section of the road to a maximum height of 3.495m OD between the car park adjacent to Gobby Beach and the eastern end of the Hammond Lane Metal Company site. 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 and ensure that access and egress routes are maintained during extreme flood events.

A new dedicated surface water drainage system will also be installed as part of the upgrade works to collect, convey and attenuate the runoff from the road before connecting back into the existing drainage to discharge to the foreshore.

These measures are sufficient to ensure that the risk of flooding of the site and L2545 is extremely low.

Coastal Recession

No other mitigation measures are proposed.

17.2.10 Archaeological, Architectural and Cultural Heritage

17.2.10.1 Mitigation During Construction

The construction phase of the proposed development will involve ground disturbance with the potential to affect previously unrecorded sub-surface archaeological remains. The primary areas of effect are confined to three zones:

- Area 1 (Western Fields)
- Area 2 (site of Waste-to-energy facility)
- Portion of Area 3 (along the southern boundary, associated with the proposed amenity walkway)

Ground disturbance in Areas 1 and 2 will involve ground reduction and associated works. In contrast, the amenity walkway in Area 3 will be constructed using a no-dig methodology, thereby preserving any potential sub-surface archaeological material in this location. No ground reduction is proposed for the remainder of Areas 3 or 4, and as such, no archaeological mitigation is required in these areas.

All undisturbed areas, excluding the walkway footprint, will be securely fenced during construction to prevent inadvertent disturbance.

Pre-Construction Investigations

In consultation with the Cork County Council Archaeologist (Ms. Annette Quinn), a programme of licensed archaeological investigation will be undertaken in Areas 1 and 2 in advance of construction. This will include:

- Geophysical Survey in Area 1, subject to suitable ground conditions
- Archaeological Testing in both Area 1 (to investigate any anomalies identified during the geophysical survey) and Area 2 (where ground conditions preclude geophysical survey)

The purpose of this investigation is to establish the presence, extent, and significance of any archaeological material. All works will be carried out under licence issued by the National Monuments Service and in accordance with the *Policy and Guidelines on Archaeological Excavation* (Department of Arts, Heritage, Gaeltacht and the Islands, 1999).

In addition, monitored vegetation clearance and targeted archaeological testing will be carried out along the line of the path from Gobby Beach to the Martello Tower, as shown on the first, second, and third editions of the OS maps. The aim of the testing is to determine whether any section of the original path remains intact.

Should archaeological features be identified during the course of these investigations, they will be resolved to professional archaeological standards, either by preservation *in situ* or preservation by record, as appropriate.

L2545 Road Upgrade
The proposed upgrade of the L2545 will occur within the existing road footprint. As no new ground disturbance is proposed, no archaeological mitigation is considered necessary for this element of the development.

Coastal Protection Works at Gobby Beach
An intertidal and metal detector survey was conducted at Gobby Beach in May 2015, extending across the intertidal and foreshore area to the base of the glacial till slope on the eastern site boundary. The survey identified a single find: a cast-iron cannonball (62 mm diameter). No other artefacts or features were identified.

The proposed coastal protection works will be confined entirely to the area above the high water mark, and no works will take place within the intertidal zone. However, given the potential for unrecorded sub-surface features immediately adjacent to the foreshore area, the following mitigation strategy will be implemented during coastal protection works:

- A single, clearly defined access route to the base of the glacial till slope will be established and fenced off for the duration of the works
- All groundworks in this area will be subject to archaeological monitoring
- Any archaeological features or artefacts identified will be addressed through preservation in situ or preservation by record, as appropriate

17.2.10.2 Connection to the National Electrical Grid – Area 2
Two grid connection options (A and B) are proposed for the development:

Archaeological monitoring will be undertaken during the groundworks associated with the proposed grid connections; options A and B. Should archaeological features be identified, they will be resolved to professional archaeological standards, either by preservation *in situ* or preservation by record, as appropriate.

Martello Tower Vibration Monitoring
In consultation with the Cork County Council Conservation Officer (Ms. Elena Turk), it is acknowledged that while the proposed development will not physically intrude on the Ringaskiddy Martello Tower (RMP CO087-053; RPS No. 575), the monument may be sensitive to construction-related vibration, particularly during groundworks.

The tower forms part of a wider defensive complex, including its enclosing circular wall and associated ditch, which collectively contribute to its architectural and historical significance. As such, any effect on the structural integrity of these features, either through ground borne vibration or settlement, will be proactively assessed and managed. A programme of vibration monitoring will be implemented throughout the construction phase to assess and manage any potential effects on the structural integrity of the monument.

17.2.10.3 Mitigation During Operation
An assessment of the visual effect of the proposed development on the Martello tower (RMP CO087-053; RPS No. 00575) is presented in **Chapter 11 *Landscape and Visual Assessment***, supported by a series of photomontages. The visual effect will be mitigated through a combination of design measures and site layout considerations, as outlined below:

- The waste-to-energy facility will be located in a substantial cut at the eastern end of the site. This will screen much of the proposed development from view, significantly reducing its visual presence in the surrounding landscape.
- No buildings are proposed along the southern boundary of the site near the Martello tower. The existing field boundary in this location will be retained, ensuring the protection of key views. In particular, the view from the Martello tower to the north, overlooking Haulbowline Island and Great Island, will remain unobstructed.

- The upper sections of the main process buildings and the upper portion of the stack will be visible from the top of the ridge and from the Martello tower when looking northeast towards Spike Island. However, the orientation, massing, and external finishes of these structures have been carefully designed to minimise their visual effect. The main process building will be clad in varying shades of natural green to blend with the darker hues of the ridge and the lighter tones of the sky at higher elevations. The stack will be coloured off-white to grey. On occasion, depending on atmospheric conditions such as temperature and wind speed, a short, thin steam plume may be visible from the stack.

In addition, the proposed amenity walkway extending from Gobby Beach, through the eastern boundary of the proposed development site and along the southern boundary of the Indaver lands -together with the associated viewing platform - will enhance public access to the Martello Tower.

The formalisation of this route across Indaver-owned lands is expected to have a positive effect on the accessibility and visibility of the monument, supporting its appreciation and continued integration into the cultural landscape.

17.2.11 Material Assets

17.2.11.1 Mitigation During Construction

The proposed development will be constructed and operated in accordance with good practice in energy and resource conservation, and efficiency.

A Construction Environmental Management Plan (CEMP) has been prepared, refer to **Appendix 5.1**, and summarises the overall environmental management strategy that will be adopted and implemented during the construction phase including the responsible and efficient management of material assets including water and waste. Under the CEMP, the contractor will appoint a Construction Waste Co-Ordinator who will be responsible for implementing the construction waste management plan (CWMP). Refer to **Section 9** of **Appendix 5.1** of this EIS for details of the CWMP.

17.2.11.2 Mitigation During Operation

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.

An 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 and maintenance activities, will be sent off site to be recycled where practical, 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 (now An Coimisiún Pleanála) and given the low risk that the amenity walkway and viewing platform could be impacted in 40 years' time, coastal protection measures have been included in the proposed development as a precautionary measure so as to reduce the rate of erosion of the glacial till face. Refer to **Chapter 13** ***Soils, Geology, Hydrogeology, Hydrology and Coastal Recession*** for further details.

17.3 Residual Effects

A summary of the residual effects of the proposed development, after the implementation of the mitigation and monitoring measures as described above and in the various chapters of the EIS, is provided below.

17.3.1 Population and Human Health

The proposed mitigation measures will either avoid, prevent or reduce effects to human beings during the construction and operation phases of the proposed development.

From health protection terms strong evidence is that there will be no deleterious effects. Mainly as a result of a misunderstanding of the health effects of modern well-run incinerators it is acknowledged that some public anxiety might remain, but this will be mitigated by an education program and no long-term adverse health effects are predicted.

The potential economic benefits both direct from employment in the facility itself and indirect from positive effects on other sources of employment has potential to give positive health effects

It is considered that there will be a minor residual effect on the recreational amenity of the site and its immediate vicinity as the site will have somewhat more of an industrial character than it does at present. However, the industrial context is in keeping with its location within a Strategic Economic Area.

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 effect on the Ringaskiddy and Cork City and County areas.

It is estimated that the Community Benefit Fund will be approximately €240,000 per year for the life of the waste-to-energy facility. This considerable sum of money on an ongoing basis for the community has major potential to provide improved access to services and health improvements.

As no adverse effect is predicted in terms of health protection, and potentially positive effects are predicted in terms of access to services and health improvements the overall residual effect on human health of the project is assessed as being positive.

17.3.2 Major Accidents and Disasters

17.3.2.1 During Construction

There are no major accident hazard implications during the construction phase of the proposed development. The accident scenarios discussed in this chapter of the EIS mainly relate to hazards associated with the storage and handling of dangerous substances or the storage and handling of waste at the site. As such, these hazards will not arise until after the construction phase has been completed and the operational phase has commenced.

17.3.2.2 During Operation

In the event of an accident occurring during operations, Indaver will have emergency response measures in place to minimise the effects to human health and to the environment.

As the site will be licensed by the EPA, Indaver has conducted an environmental liabilities risk assessment (ELRA) and prepared a closure restoration and aftercare management plan (CRAMP), in accordance with the EPA's guidance. Indaver has prepared ELRA's for their operations at Carranstown and at Dublin Port and a similar approach will be adopted for the assessment at Ringaskiddy. In accordance with the EPA's guidance, Indaver has put the appropriate financial provisions in place at these other sites to cover the liabilities and potential liabilities identified in the ELRA.

Indaver will ensure that appropriate financial provisions are in place, accordance with the EPA guidance, for the Ringaskiddy site also.

17.3.3 Roads and Traffic

Regardless of whether or not the proposed development proceeds, there are ongoing capacity issues on the local road network at a number of key junctions, particularly at Shannon Park and Shanbally roundabouts. The majority of the issues at these junctions are associated with the morning and evening network peak periods (06:30-07:30 and 15:30-16:30), with the Shannon Park Roundabout also quite busy in the early portion of 18:00-19:00 period (although less so than the two periods mentioned above). However, these capacity issues will be relieved upon the completion and operation of the M28 motorway which will result in a significant redistribution of traffic from the N28.

The introduction of the proposed development has a moderate impact during the construction phase in the 18:00-19:00 evening period. This impact is short term in nature as it is associated with construction activity at the site. Post-opening, the facility will not have a significant impact on the local road network.

Indaver have committed to scheduling construction traffic during the construction phase, and operational traffic in 2030 (and beyond) so as to have a minimal amount of traffic flow to and from the site in two-hour periods in the morning and evening, thereby avoiding the peak periods outlined above in the morning and evening, and instead availing of the capacity on the local road network outside of these times in the scenario where the M28 is not operational. Once the M28 is operational, the restrictions on scheduling of operational traffic shall be no longer required.

17.3.4 Air Quality

17.3.4.1 During Construction

During the construction phase of the proposed development, there may be some effect on nearby properties due to dust emissions from the construction site and other activities. Air emissions may also result from idling construction vehicles and the use of mobile generators. However, due to the formulation of an effective dust and air quality minimisation plan, it is considered that the residual effect will be short-term and slight.

Effect on Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the effect of the proposed development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the effect of construction of the proposed development is likely to be short-term and imperceptible with respect to human health.

17.3.4.2 During Operation

Based on the results of air dispersion modelling of process emissions, the air quality effect of the proposed development will not be significant.

Effect on Human Health

Air dispersion modelling was undertaken to assess the effect of the proposed development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the dispersion modelling results, emissions from the proposed development are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant effect on human health. **Chapter 6 *Population and Human Health* (Section 6.5.1.7)** confirms that there will not be a significant effect on human health due to air emissions from the proposed development. Conservative assumptions were made when determining the input data for the air modelling assessment and the approach used in the study leads to an over-estimation of the actual levels that will arise. In relation to the spatial extent of air quality effects from the proposed development site, ambient concentrations will decrease significantly with distance from the proposed development site boundary.

17.3.5 Climate

17.3.5.1 Construction Phase GHGA

The Institute of Air Quality Management document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2024) states that site traffic and plant is unlikely to have a significant impact on climate. The quantity of road traffic during the construction phase of the proposed development leads to a very small increase in greenhouse gas emissions. Based on the scale and temporary nature of the construction works and the intermittent use of equipment, the potential effect on climate change from the direct effect of the proposed development in relation to Ireland's obligations under the EU 2030 target is deemed to be short-term, not significant and negative.

A detailed climate assessment of the construction stage traffic has found that GHG emissions will be no more than 0.0033% of the Transport Sectoral Emission Ceiling 2030 target. It has also been confirmed that there is no significant traffic cumulative effect (**Chapter 7 *Roads and Traffic*** of the EIS) and it can therefore be determined that the construction stage traffic will have a residual direct, short-term, not significant, negative effect on climate.

17.3.5.2 Effects of Climate Change on the Construction Phase

The potential for changes to long-term weather effects as a result of climate change are not considered to be as significant in the context of the construction phase of the proposed development which will take place over a short-term period in the near future. Thus, in line with the methodology outlined in **Table 9.4 of Chapter 9 *Climate***, the likelihood of extreme weather and flooding for the construction phase of the proposed development is assessed to be of low likelihood and with a low exposure leading to a finding of low vulnerability and thus a non-significant effect.

Therefore, the effect of climate change on the construction phase of the Proposed Development is direct, short-term, not significant and negative.

17.3.5.3 Operational Phase Greenhouse Gas Assessment

The assessment has shown that the operational phase will not have a significant effect on climate. Net emissions from the operational phase will be equivalent to a saving of approximately 0.057% of the 2031-2035 Carbon budget thus the effect of the proposed development will be insignificant in the context of aggregated national emission sources as determined after taking into account the benefits associated with energy recovery and displacement of electricity derived from fossil fuel sources and the benefits from the replacement of landfilling with the proposed facility operations.

In reference to Principle 1 of IEMA Guidance (IEMA, 2022), the proposed development will replace activities which have a higher GHG profile. The proposed development will lead to lower net greenhouse gas emissions than landfilling when energy recovery under both scenarios is considered.

In reference to Principle 2 of IEMA Guidance (IEMA, 2022), a range of measures will be employed which will reduce GHG emissions and are in line with “best practice” as outlined in the IEMA guidance (IEMA, 2022). During the treatment of waste at the proposed development, the thermal energy generated by the burning of waste will be recovered and will give an electrical output of about 21 MW with a net electrical output from the plant for export to the national grid of 18.5MW_e. Thus, the export of 18.5MW_e will give a direct benefit in terms of GHG emissions which would have been released in the production of 18.5MW_e from fossil-fuel burning power stations.

The proposed development will also recover and recycle ferrous and non-ferrous materials during the thermal treatment process. The recycling of these metals will require less energy than processes using virgin inputs and thus leads to a direct saving in energy and thus GHG emissions.

In reference to Principle 3, where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the proposed development’s remaining emissions should be considered as outlined in the IEMA guidance (IEMA, 2022). However, given that the proposed development will lead to lower GHG emissions than the landfilling alternative, no compensation measures are required in line with IEMA guidance (IEMA, 2022).

With a reduction in residual emissions through best practice and the implementation of a series of adaptive design measures, the net impact of the proposed development is not significant. The impact of these measures will be to ensure that the proposed development will have in effect net positive GHG emissions when the displacement of fossil-fuel burning power stations and replacement of landfilling is taken into account. Thus, the predicted impact to climate is deemed to be indirect, long-term, negative and negligible in line with IEMA guidance (IEMA, 2022). As the proposed development itself will not directly reduce emissions a negligible impact, in terms of IEMA terminology, is more appropriate than a positive impact, in line with IEMA guidance (IEMA, 2022).

Using the EPA EIAR terminology (EPA, 2022) the operational phase will have a residual direct, long-term, not significant, negative effect on climate.

17.3.5.4 Effect of Climate Change on the Operational Phase

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. However, the likelihood of extreme weather and flooding was assessed to be of low likelihood and with a low or medium exposure leading to a finding of low vulnerability and thus a not significant effect.

A detailed flood risk assessment has been undertaken as part of the proposed development and adequate attenuation and drainage have been provided for to account for increased rainfall in future years. Therefore, the effect of climate change on the operational phase of the Proposed Development is direct, long-term, not significant and negative.

17.3.6 Noise and Vibration

The predicted residual effects of the development are set out below taking account of the predicted effects and control measures.

17.3.6.1 During Construction

During the construction phase of the project, there will be a slight to moderate short-term effect on nearby noise sensitive properties due to noise emissions from construction works and site traffic. Due to the distance between the construction works and the nearest sensitive receptors, however, the calculated noise effects are within the relevant criterion set for this phase.

Construction works will take place outside of normal working hours for up to 8 weeks. During these working hours, construction noise will be limited to the criteria set within **Chapter 10** ***Noise and Vibration*** to avoid any significant effects to the surrounding environment. The implementation of appropriate noise control measures will ensure that noise effect is kept within the recommended criteria.

The application of binding noise limits, monitoring, and controlled working hours, along with implementation of appropriate noise and vibration mitigation measures as set out above, will ensure that noise and vibration effect is sufficiently controlled to within the relevant criteria. The overall noise effect during the construction of the proposed facility at the nearest noise sensitive properties is short term, minor to moderate. Vibration effects during this phase are determined to be temporary and not significant.

Noise levels associated with of the Resource Recovery Centre for the worst case construction scenarios assessed are calculated to be less than 35dB L_{Aeq} at the closest areas of the Cork Harbour SPA to the north of the development site. This particular area of the SPA is located in close proximity to a number of existing industrial facilities (i.e. GSK, De Puy and Hovione) with operational noise limits of 55 dB L_{Aeq} during daytime periods and 45 dB L_{Aeq} during night-time periods. Given that predicted construction noise levels at this location are significantly below the permitted operational noise levels from adjacent facilities, the noise effect from construction activities at the closest area of the SPA are short-term, imperceptible.

All other areas of the Cork Harbour SPA are located at distances beyond 1.5km from the proposed site with lower construction noise levels predicted at these distances, (less than 30dB L_{Aeq}) which is well below typical baseline noise levels in the surrounding environment. Taking the above into consideration, the construction phase of the Resource Recovery Centre is determined to have no significant effect to the existing noise environment at any parts of the designated Cork Harbour SPA. The overall effect is neutral, short-term, imperceptible.

17.3.6.2 During Operation

The proposed waste-to-energy facility has been assessed against the relevant operational noise emission limit values (ELV's) prescribed within the EPA's noise guidance document *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4, EPA 2016) at the closest noise sensitive locations the assessment has concluded that due to the distance between the proposed development and the nearest sensitive buildings, the proposed site layout and the recommended noise mitigation measures, the facility can operate within the adopted day, evening and night-time noise limit values.

The overall noise and vibration effect from the operation of the proposed facility is expected to be long term, not significant taking account of the existing noise environment and the predicted effect of the proposal.

17.3.7 Landscape and Visual

The landscape and visual effects of the proposed development will generally be greatest from the north, south and east particularly 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 proposed development site (including the residential property to the northwest of the proposed development site), the National Maritime College car park, Gobby Beach and Ringaskiddy Martello tower. Landscape and visual effects will be predominantly direct in nature.

The proposed development has been sensitively designed in relation to the Martello Tower protected structure in order to retain its prominence when viewed from around the harbour. The main process building is situated at a distance from the tower and aligned to have its narrowest part face the tower. The proposed development does not block views of the tower from most viewpoints around the harbour. The building has been set down as far as possible into the ridgeline and appears to be at a similar or lower height than the Martello tower from most viewpoints. The stack does however extend above the height of the Martello tower although it is slender in form and set at a distance from it, and the vertical forms of the existing wind turbines and electricity pylons rise higher than the Martello tower and are located much closer to it.

As the building is large in scale, the primary purpose of the mitigation landscape planting will be to provide screening from the closer viewpoints. The building extends above this planting from all views. The landscape mitigation will also ensure that the direct landscape effects on the proposed development site, namely the planting that is to be removed during construction will be replaced and enhanced for biodiversity reasons.

Visual mitigation during the design stage also focused on the careful design and colour selection of the main buildings. The design of the building, although large, uses colour and form to reduce its overall effects. Some of the more distant views are neutral in nature as the scale of the building is not so apparent and the proposed development looks similar in character to the surrounding large scale industries which are characteristic of the setting in wider and longer range views.

Although many of the effects will be 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 substantially modified and semi-industrial in nature.

Residual landscape and visual effects will range considerably by virtue of both the local and much broader setting of the proposed development in its immediate context and in the wider context of the Lower Harbour, and will range from slight neutral effects at greater distances across the Lower Harbour to moderate negative effects in closer proximity to the proposed development site. Residual effects also include a number of significant negative effects that are localised to the immediate environs of the Martello tower, and significant neutral effects along the local road fronting the site and areas at Gobby Beach.

The Lower Harbour area is currently and will continue to undergo process of change in its visual and landscape character in the short, medium and long term with the other planned and permitted developments in the area including, M28 Cork to Ringaskiddy Motorway Scheme (under construction), redevelopment of the Ringaskiddy Port, further development of the IMERC campus, Haulbowline and Spike Islands and continued development of other industrial, renewable energy and pharmaceutical projects in the lower harbour area.

17.3.8 Biodiversity

17.3.8.1 Designated Sites

Potential effects on designated Natura 2000 sites (SAC/cSAC/SPA) are specifically addressed in a Report for Screening for Appropriate Assessment (AA) and Natura Impact Statement (NIS) which has been submitted as part of this application. This report concluded the following:

A range of precautionary measures have been incorporated into the design of the proposed development, and other mitigation measures have been developed and proposed, with the purpose of avoiding or minimising impacts on the qualifying interests and conservation objectives of the Cork Harbour SPA, which is located c.405m from the proposed development site. The likely success of these measures was also considered and no particular difficulties in their effective implementation were identified.

The provisions of Article 6 of the 'Habitats' Directive 92/43/EC (2000) defines 'integrity' as the 'coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and / or population of species for which the site is or will be classified'. The draft documents Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (Draft) (EC, 2015) states that the integrity of the site can be usefully defined as the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated"

Following a comprehensive evaluation of the potential direct, indirect and in-combination impacts on the qualifying interests and conservation objectives for the Cork Harbour SPA, it has been concluded that the proposed development will not have an adverse effect on the integrity of the Cork Harbour SPA.

Similarly, following the implementation of mitigation measures, no adverse effects on NHAs/pNHAs will occur.

17.3.8.2 Habitats

There will be removal of an area of habitat including scrub/immature woodland and remnants of semi-natural grassland. Hedgerows and areas of semi-natural vegetation outside the proposed works area will be retained and the biodiversity value of grassland in the southwest of the site will be increased by allowing this area to naturally recolonise. Additional native planting will also be carried out along the boundary of the proposed development site. In the long-term, the residual impact on habitats will be neutral and imperceptible.

Mitigation measures, outlined in **Chapter 12 *Biodiversity* Section 12.6** will be implemented and inspected by a suitably qualified and experienced project ecologist to ensure that no adverse effects on marine habitats during construction works.

Operational discharges will be controlled and monitored, in accordance with the provisions of the site's Industrial Emissions licence to ensure that local water quality is protected throughout the operation of the development.

17.3.8.3 Invasive Species

No residual effects are predicted.

17.3.8.4 Bats

In the short to medium term there will be a slight effect on bat foraging and commuting habitat at the proposed development site with the removal of two areas of foraging habitat i.e. northern treeline and scrub/immature woodland at the east of the proposed development site. This is likely to have a negative, slight and short to medium term effect on foraging and commuting habitat at the proposed development site.

Natural recolonisation will be allowed at the west of the proposed development site, in areas which currently have lower value semi-natural grassland. This will provide alternative areas of dense scrub/immature woodland as the area matures. In the medium-long term, this will provide alternative foraging habitat for bats within the proposed development site. The effect on bats will be localised and is unlikely to significantly affect overall bat populations as there will no loss of critical resources for bats.

Overall, the residual effect of the proposed development will be neutral, imperceptible and long-term at a local level.

17.3.8.5 Badger

There will be no direct effects on Badgers as a result of the proposed development. The implementation of mitigation measures will ensure that Badger access to exit points and commuting routes are retained around the proposed development site during the construction and operational phases.

Badgers which currently use the sett adjoining the Hammond Lane Facility, are likely to be habituated to similar levels of disturbance to those predicted to occur during operation of the proposed development. The retention of scrub habitat around the Badger sett is likely to reduce disturbance to Badgers using the sett.

The habitats within the proposed development site boundary are of lower value to foraging Badgers and the removal of scrub and long grassland habitat will not significantly reduce available foraging habitat to local Badger populations.

Overall, the residual effect on the Badger group which use the proposed development site is predicted to be negative, slight and long-term at a local level.

17.3.8.6 Otter

The proposed development site is of low value for Otter. Given the limited Otter use of this area and the lack of direct effects on aquatic habitats, following water quality mitigation the effects during construction are predicted to be neutral, imperceptible and long-term.

17.3.8.7 Other Mammals

The habitats to be affected are common, however heavy scrub cover is likely to be locally valuable for small mammal species, particularly in the urban edge setting of Ringaskiddy. During the construction phase, disturbance and site clearance works are predicted to have a negative, slight and short-term effect on other mammal species.

Mammals are generally nocturnal in habit and in many circumstances can tolerate high levels of human presence and disturbance. Mammals which use this area are also habituated to comparable levels of disturbance and no significant disturbance effects are predicted to occur to habitats outside the active facility during operation of the proposed development.

The enhancement of grassland habitats such as scrub, treelines and hedgerows will mean that small mammal species such as Hedgehog and Pygmy Shrew are likely to quickly recolonise the area following construction works. As part of the management regime, unmanaged areas of scrub will be allowed to develop, providing significant opportunities for small mammals to colonise these areas.

Overall, the residual effect on other mammals is predicted to be negative, slight and long-term at a local level.

17.3.8.8 Marine Mammals

No residual effects have been identified.

17.3.8.9 Reptiles and Amphibians

No residual effects have been identified.

17.3.8.10 Breeding Birds

In the short to medium term, the loss of common scrub/immature woodland associated with site clearance works and disturbance will have a moderate, negative effect on breeding birds. However, as newly planted and naturally recolonising areas mature within the proposed development site mature, this effect will be reduced to negative and slight.

The landscape plan will provide additional breeding and foraging habitat for red list, amber list species and other common bird species. New habitats within the proposed development site are likely to increase breeding bird diversity at the proposed development site.

Residual effects on breeding birds will be negative, slight and long-term at a local level.

17.3.8.11 Wintering Birds

The habitats within the proposed development site are of no value for wintering wading birds and waterbirds. During operation, noise levels in adjoining habitats will return to baseline levels and no residual disturbance effects on coastal/shoreline habitats are predicted to occur.

In the short to medium term, the loss of common habitats associated with site clearance works and disturbance will have a slight, negative effect on wintering passerines which use the proposed development site. However, as newly planted and naturally recolonising areas mature within the proposed development site mature, this effect will be reduced. Residual effects on winter birds will be neutral, imperceptible and long-term at a local level.

17.3.8.12 Other Species

Additional habitats, both natural and artificial, will be created for terrestrial invertebrates. Native planting will provide alternative habitat for terrestrial invertebrates. Biodiversity enhancements including insect hotels, butterfly banks and loggeries will create breeding sites for a range of terrestrial invertebrates.

The effect on terrestrial invertebrates will be neutral, imperceptible and long-term at a local level.

17.3.9 Soils, Geology, Hydrogeology, Hydrology and Coastal Recession

It is expected that, with the implementation of the mitigation measures described above, the construction and operation of the proposed development will not result in significant negative effects on soils, geology, hydrology or hydrogeology and coastal recession (Refer to **Table 17.1**). There will be a positive effect on the L2545 due to the improvement in drainage.

The placing of the sacrificial material, acting as beach nourishment on Gobby Beach above the foreshore, will reduce the rate of recession of the glacial till slope along the eastern site boundary. It is noted that the construction effects experienced during the placement of the shingle will be repeated when the shingle is reapplied in the future.

The proposed development will not increase the current rate of retreat. Coastal protection mitigation measures are not required for the waste-to-energy facility element of the proposed development. However, given the concerns raised by An Bord Pleanála during the previous planning application in 2008 and given the low risk that the amenity walkway and viewing platform 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.

The waste-to-energy facility will not be impacted by the predicted retreat rates over the design life of the planning permission (30 years). 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 viewing platform outside of the security fence line.

The coastal protection measures will have no negative effects on the adjoining areas. However, there will be benefits associated with the works as well as the provision of an environmentally friendly solution. The net coastal sediment transport goes from south to north according to wind conditions and swell, therefore the material is likely to move towards the north in the medium and long term. The closest area of the Cork Harbour Special Protection Area (SPA) is located to the southwest of the site. Since the net movement of beach nourishment shingle is from south to north, the sacrificial material will not impact on this part of the SPA. Other sections of the SPA which are to the north of the site are more than two kilometres from the site and these are too remote from the site to receive any significant quantities of beach nourishment material.

The proposed development will have no negative effects on the M28 Cork to Ringaskiddy Motorway Scheme.

Table 17.1: Residual Effects for Construction and Operational Phase - Soils, Geology, Hydrogeology, Hydrology and Coastal Recession

Feature	Description	Importance	Magnitude	Effect	Significance	Mitigation Measure	Residual Effect (construction and operation)
Soils and Geology							
Threats to Soils and Subsoils							
Agricultural Soils	Acid Brown Earths (AminDW)	High	Small Adverse	Reduction in soil quality	Moderate / Slight	Refer to **Section 13.6.1**	Imperceptible
	Acid Brown Earths (AminDW)	High	Negligible	Loss of feature	Imperceptible	Refer to **Section 13.6.1**	Imperceptible
	Lithosols/Regosols (AminSW)	High	Small Adverse	Reduction in soil quality	Moderate / Slight	Refer to **Section 13.6.1**	Imperceptible
	Lithosols/Regosols (AminSW)	High	Negligible	Loss of feature	Imperceptible	Refer to **Section 13.6.1**	Imperceptible
Soil Health	Soil (Brown Earths)	High	Small Adverse	Erosion, compaction	Moderate / Slight	Refer to **Section 13.6.1**	None
	Soil (Brown Earths)	High	Moderate Adverse	Sealing	Significant/Moderate	Refer to **Section 13.6.1**	None
	Soil (Brown Earths)	High	Small Adverse	Loss of organic matter	Moderate / Slight	Refer to **Section 13.6.1**	Imperceptible
	Soil (Brown Earths)	High	Negligible	Loss of feature	Imperceptible	Refer to **Section 13.6.1**	Imperceptible
	Subsoil (Till derived from Devonian Sandstones)	Medium	Small Adverse	Erosion, compaction	Slight	Refer to **Section 13.6.1**	None
	Subsoil (Till derived from Devonian Sandstones)	Medium	Moderate Adverse	Sealing	Moderate	Refer to **Section 13.6.1**	None
	Subsoil (Till derived from Devonian Sandstones)	Medium	Negligible	Loss of organic matter	Imperceptible	Refer to **Section 13.6.1**	Imperceptible
	Subsoil (Till derived from Devonian Sandstones)	Medium	Negligible	Loss of feature	Imperceptible	Refer to **Section 13.6.1**	Imperceptible
Loss or Damage of Future Quarry Reserves							

Feature	Description	Importance	Magnitude	Effect	Significance	Mitigation Measure	Residual Effect (construction and operation)
Mineral/Aggregate Resources	Crushed Rock Aggregate Potential	Very high	Small Adverse	Irreversible loss / damage of future quarry reserve	Imperceptible	Refer to **Section 13.6.1**	None
	Granular Aggregate Potential	Medium	Negligible	Irreversible loss / damage of future quarry reserve	Imperceptible	Refer to **Section 13.6.1**	None
Loss or Damage to Geological Heritage Areas							
Geological Heritage Site	Ringaskiddy (CK077)	High	Small Adverse	Irreversible loss / damage of geological heritage area due to the placement of sacrificial material	Moderate / Slight	Refer to **Section 13.6.1**	Imperceptible
	Haulbowline and Rocky Islands (CK053)	High	Negligible	Irreversible loss / damage of geological heritage area	Imperceptible	Refer to **Section 13.6.1**	None
Earthworks							
Soils and Subsoils	Noise, dust and vibrations caused from excavation and haulage of earthworks materials	High	Moderate Adverse	Disturbance of natural ground	Significant/Moderate	Refer to **Section 13.6.1**	Imperceptible
	Sediment run off from cuttings, excavations and stockpiles	High	Moderate Adverse	Wash out of fines/sediment runoff	Significant/Moderate	Refer to **Section 13.6.1**	Imperceptible
Subsoils	Poor earthworks practices/management will result in decreasing the % reuse of site won acceptable material for reuse	High	Moderate Adverse	Degradation of material for reuse	Significant/Moderate	Refer to **Section 13.6.1**	None
Potential Ground Contamination							
P0997-01	The Hammond Lane Metal Company Ltd	High	Negligible	Potential Source of Contamination	Imperceptible	Refer to **Section 13.6.1**	None

Feature	Description	Importance	Magnitude	Effect	Significance	Mitigation Measure	Residual Effect (construction and operation)
Made Ground	Described as soft to firm clay/silt/gravel with medium cobble content	High	Small Adverse	Potential Source of Contamination	Moderate / Slight	Refer to **Section 13.6.1**	None
Potential Ground Contamination	Potential for leakage or spillage of construction related materials, contaminating the subsoils present	High	Small Adverse	Potential Source of Contamination	Moderate / Slight	Refer to **Section 13.6.1**	None
Geohazard and Landslide Susceptibility							
Coastal Erosion	Eastern coastal boundary of the proposed development that is actively eroding and slope failures are occurring	High	Negligible	Failure of slope causing a landslide	Imperceptible	Refer to **Section 13.6.1**	Imperceptible
Landslide Susceptibility	Landslide risk in Area 2, 3 and 4 of the proposed development	High	Small adverse	Failure of slope causing a landslide	Moderate / Slight	Refer to **Section 13.6.1**	Imperceptible
Hydrogeology							
Loss or Damage of Proportion of Aquifer							
Locally Important Aquifer (Ll)	Bedrock which is Generally Unproductive except for Local Zones	Medium	Small Adverse	Loss or damage of proportion of aquifer through excavation.	Slight	Refer to **Section 13.6.2**	Imperceptible
Change to groundwater regime							
Locally Important Aquifer (Ll)	Bedrock which is Generally Unproductive except for Local Zones	Medium	Small Adverse	Change in the groundwater levels	Slight	Refer to **Section 13.6.2**	Imperceptible
Potential Effects on Groundwater Quality							

Feature	Description	Importance	Magnitude	Effect	Significance	Mitigation Measure	Residual Effect (construction and operation)
Locally Important Aquifer (Ll)	Groundwater Contamination related to accidental spillage	Medium	Small adverse	Effects on Groundwater Quality	Slight	Refer to **Section 13.6.2**	Imperceptible
Locally Important Aquifer (Ll)	Groundwater Contamination related to existing high PAH levels in a few areas	Medium	Small adverse	Effects on Groundwater Quality	Slight	Refer to **Section 13.6.2**	Imperceptible
Groundwater Contamination Sites							
Locally Important Aquifer (Ll)	Groundwater Contamination	Medium	Small adverse	Effects on Groundwater Quality	Slight	Refer to **Section 13.6.2**	Imperceptible

17.3.10 Archaeological, Architectural and Cultural Heritage

The construction and operation of the proposed development will give rise to a number of residual effects on the archaeological and cultural heritage resource. These effects remain after the implementation of all recommended mitigation measures and are described below in accordance with the EPA (2022) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*.

17.3.10.1 Effect on Access Path to Ringaskiddy Martello Tower

The proposed development will involve ground excavation of the landscape through which the path connecting Gobby Beach to the Ringaskiddy Martello Tower (RMP CO087-053; RPS No. 575) once extended. This path is depicted on the first, second, and third edition OS maps and is considered part of the tower's historic curtilage and military landscape.

Although the path is no longer visible at surface level, its historic alignment will be permanently altered by the proposed development. This change will result in the loss of interpretation of the original approach route to the tower. The residual effect is assessed as: Negative in quality, Moderate in significance, Indirect in nature and Permanent in duration.

17.3.10.2 Loss of Subsurface Archaeological Features

Should archaeological features be identified during licensed archaeological investigations and subsequently deemed to require preservation by record, their permanent removal through excavation will represent a permanent loss of physical heritage.

While full excavation, documentation, and post-excavation analysis (as guided by the 1999 Policy and Guidelines on Archaeological Excavation) will mitigate the physical loss, the destruction of the in-situ resource remains unavoidable. However, the resulting information will contribute to a broader understanding of past activity in the area, thereby offsetting the loss with long-term academic and public benefit.

The residual effect is assessed as: Negative in quality, Significant in significance, Direct in nature, and Permanent in duration.

17.3.10.3 Visual and Perceptual Effects on Martello Tower Setting

The visual setting of the early 19th century Martello Tower has already been significantly altered by historic and modern development, including land reclamation, industrialisation, and urban expansion within Cork Harbour. The proposed development will add to this cumulative transformation.

The stack and upper levels of the main process building will be visible from the Martello Tower, partially obstructing north-eastward views. Although key sightlines, such as those to Fort Mitchell on Spike Island, will be retained, the northwestern part of the island will be obscured by the new facility. This change will alter how the tower relates visually to elements of the historic coastal defence network.

In addition, from certain harbour viewpoints, particularly from the inner harbour corridor northeast of Spike Island toward Marloag Point on Great Island, the Martello Tower will be partially or fully obscured. This results in a permanent alteration of the cultural landscape, diminishing the tower's prominence and legibility within the historic defence system of the lower harbour.

The residual effect is assessed as: Negative in quality, Moderate in significance, Indirect in nature, and Permanent in duration.

17.3.11 Material Assets

When the proposed development 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 residual household, commercial and industrial waste which is currently landfilled, exported or treated at a waste to energy facility further from the waste source.

The operation of the waste-to-energy facility will have residual effects in relation to the consumption of resources. Refer to **Table 4.2** in **Chapter 4** ***Description of the Proposed Development*****.**

Boiler ash and flue gas residues will be landfilled in a hazardous waste landfill or sent for recovery in a salt mine. These residues will be sent to a salt mine in Northern Ireland for recovery or exported to landfill or to a salt mine in Germany, if no suitable facility is available in Ireland by the time the plant is commissioned.

The proposed development will also have a number of positive residual effects 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. Indeed, export of bottom ash for processing to other EU countries may be a route to achieve this if no facility is available in Ireland. 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 and also the need to export municipal solid waste for thermal treatment/recovery in Europe.

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 significant positive long-term residual impact.

As discussed above and in **Chapter 13** ***Soils, Geology, Hydrogeology, Hydrology and Coastal Recession***, 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. However, the study found that there could be a risk of an impact on a small section of the proposed development after 40 years but this would be confined to the amenity walkway and viewing platform outside of the security fence line.

Finally, the upgrade of the drainage network on the L2545 will result in a positive moderate long-term residual effect as the risk of flooding on the road will be reduced.