2. NON-TECHNICAL SUMMARY

2.1 Introduction

2.1.1 General

Indaver Ireland proposes to construct a Waste Management Facility at Ringaskiddy in Co. Cork. The Waste Management Facility will consist of three elements:

- Community Recycling Park
- Waste Transfer Station
- Incineration / Waste-to-Energy Plant.

2.1.2 Planning Application and EIS

Indaver applied to Cork County Council for planning permission for the community recycling park, the waste transfer station and phase 1 of the waste to energy plant in November 2001. In March 2003, the Cork County Manager informed the Councillors that a material contravention of the new Cork County Development Plan would be required in order to grant permission. Indaver is awaiting the decision of the County Council in relation to the material contravention.

The material contravention procedure is the mechanism which allows the Local Authority to give planning permission for a development which it deems to contravene a provision of the County Development Plan. The material contravention requires a vote in favour by a three quarters majority of the elected members of the Local Authority.

The planning application was accompanied by an Environmental Impact Statement (EIS). The EIS described the existing environment at the site, the likely impacts of the facility (both phases) on the environment, the mitigation measures which would be taken, and any residual impacts. These descriptions covered a wide range of environmental topics such as human beings, flora and fauna, air and noise, soil and water, climatic factors and landscape, material assets and cultural heritage. The EIS also contained a non-technical summary.

Copies of the EIS have been provided with this licence application. The reader is referred to the EIS, and its non technical summary, for a detailed description of the existing environment and the potential environmental effects of the project.

2.1.1 Licensing

The incineration of waste is an activity listed under the third schedule of the Waste Management Act 1996. Use of any waste principally as a fuel to generate energy is an activity listed under the fourth schedule of Waste Management Act 1996.

The incineration of hazardous and non-hazardous waste is also listed in paragraphs 11.1 and 11.3 respectively in the first schedule of the EPA Act 1992, as activities, which require an IPC Licence. The operation of combustion installations with a thermal input greater than 50MW is also an activity, which requires an IPC Licence, under class 2.1 of the first schedule. The energy recovery element of the Ringaskiddy facility will have a thermal input greater than 50MW.

2.1.2 Activities

As classified under the Waste Management Act the following activities will undertaken:

Third Schedule

7. Physio-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcination) which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule (including evaporation, drying and calcination).

8. Incineration on land or at sea. **(Primary activity)**

11. Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.

12. Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.

13. Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.

Fourth Schedule

1. Solvent reclamation or regeneration.

2.Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).

3. Recycling or reclamation of metals and metal compounds.

4. Recycling or reclamation of other inorganic materials.

6. Recovery of components used for pollution abatement.

9. Use of any waste principally as a fuel or other means to generate energy.

13. Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.

Reference Document

This Reference Document contains all relevant information on the activities to be undertaken at the facility.

2.2 Indaver NV

Indaver NV is the Flemish parent company of Indaver Ireland. Indaver is a waste management company that specialises in integrated waste management for industries and households. Indaver recycles and treats both domestic and industrial waste. Advice on the prevention of waste is an integral part of the Indaver service.

In 1985, the Flanders region of Belgium was experiencing a waste management crisis, not unlike the crisis that exists in Ireland currently. The vast majority of waste was being disposed of to landfill and there was a very low rate of recycling. Hazardous waste was being exported to other countries for disposal. The Flanders Government, in partnership with local industry, formed Indaver NV to provide an integrated waste management strategy for Flanders in order to address the waste crisis.

Flemish Environmental Holding is the holding company of the Government of Flanders and it is the majority shareholder in Indaver NV. The remaining shares are held by a number of leading private companies in Flanders. The Indaver group plays a leading role in providing waste management solutions for households, commercial activities and industry. The company employs over 800 people and has operations in 11 European countries. Each year

Indaver NV manages approximately 900,000 tonnes of waste, with approximately 450,000 tonnes of this waste being recycled or recovered.

2.3 Indaver Ireland

Indaver Ireland is a wholly owned subsidiary of Indaver NV and has a number of activities in Ireland in addition to the Ringaskiddy project.

2.3.1 Newspaper Recycling Business

Indaver Ireland operates a Newspaper and Magazine recycling business under a 'Bring it Back' theme. This business is currently serving Munster and Leinster, targeting newsagents, garage forecourts, local authorities and large employers. The newspaper recycling business is certified to the ISO 14001, ISO 9002 and OSHAS 18001 standards and there are warehouses, which operate under waste permits, in Dublin and Mallow for the storage of newspapers and magazines. The paper collected is then sent to paper mills in Europe for recycling.

2.3.2 Carranstown Waste Management Facility

In July 2001, Indaver Ireland received planning permission for a waste management facility at Carranstown, Co. Meath. The decision was appealed to An Bord Pleanala and in March 2003 An Bord Pleanala upheld Meath County Council's decision to grant permission. The facility at Carranstown will incorporate a 20,000 tonne/annum material recycling facility for sorting dry recyclable waste and a waste to energy plant with a capacity to treat approximately 150,000 tonnes of non-hazardous solid waste per annum. Indaver Ireland has applied to the EPA for a waste licence for the Carranstown plant.

2.3.3 MinChem

MinChem Environmental Services Limited is a wholly owned subsidiary of Indaver NV. MinChem is a hazardous waste management company with offices in Dun Laoghaire, Dublin Port and Cork. MinChem has been operating in Ireland since 1977.

MinChem exports hazardous waste from Ireland to Britain and other European countries for recovery, disposal or treatment. It operates a transfer station in Dublin Port for the export of these materials. The transfer station operates under a waste licence issued by the EPA. MinChem is accredited to ISO 14001, ISO 9002 and OSHAS 18001, the internationally recognised quality, environmental, health and safety standards.

Over 65 people are employed by the MinChem and Indaver Ireland companies. Information on Indaver's activities in Ireland can be found on the website www.indaver.ie and the company brochure is attached.

2.4 Ringaskiddy Waste Management Facility

2.4.1 Site Description

The site for the Ringaskiddy waste management facility is situated at the northeastern corner of the Ringaskiddy peninsula, and occupies an area of approximately 12 hectares. The main road from Ringaskiddy village forms the northern boundary of the site. Cliffs along the shore and the West Channel of Cork Harbour form most of the eastern boundary. On the southern and western boundaries there is agricultural land. The site encircles the premises of the Hammond Lane metal recycling business. The site is flat for some distance from the northern boundary but rises steeply as one approaches the southern boundary. Currently the site is partly in tillage and partly unused, with areas of gorse and scrub.

The site location is shown in figure 2.1.

2.4.2 Facility layout

The waste management facility will be developed in two phases. The external works and the buildings will be constructed and the mechanical plant for the fluidised bed furnace, post combustion chamber and flue gas cleaning line of the waste to energy plant will be installed in the first phase. The waste transfer station and the community recycling park will also be constructed in phase 1. The mechanical plant for the moving grate furnace and its flue gas cleaning line will be installed in phase 2. This application applies to both phases of the waste to energy plant.

The site layout is shown in figure 2.2. The Waste Management Facility will consist of three elements located from west to east on the site. The community recycling park will be the western most element of the facility. The waste transfer station will be to the east of the community recycling park, to the north of the Hammond Lane premises. The hillside to the south of the community recycling park will be retained as scrubland, with the improvement of its habitat potential by the planting of native species. The waste to energy plant will occupy the area to the east of the entrance to the Hammond Lane premises.

A footpath will be provided along the southern and eastern boundary of the facility, to provide a link from the Martello Tower, which is located on the crest of the ridge to the south of the site, to the shore.

2.4.3 Description of Activities

Community Recycling Park

The Community Recycling Park will be similar to conventional 'Bring Bank' or 'Civic Amenity' sites, but will accept a wider range of recyclable material. The items deposited in the recycling park will subsequently be sent off-site to suitable recycling facilities. The park will accept a wide range of recyclable materials such as:

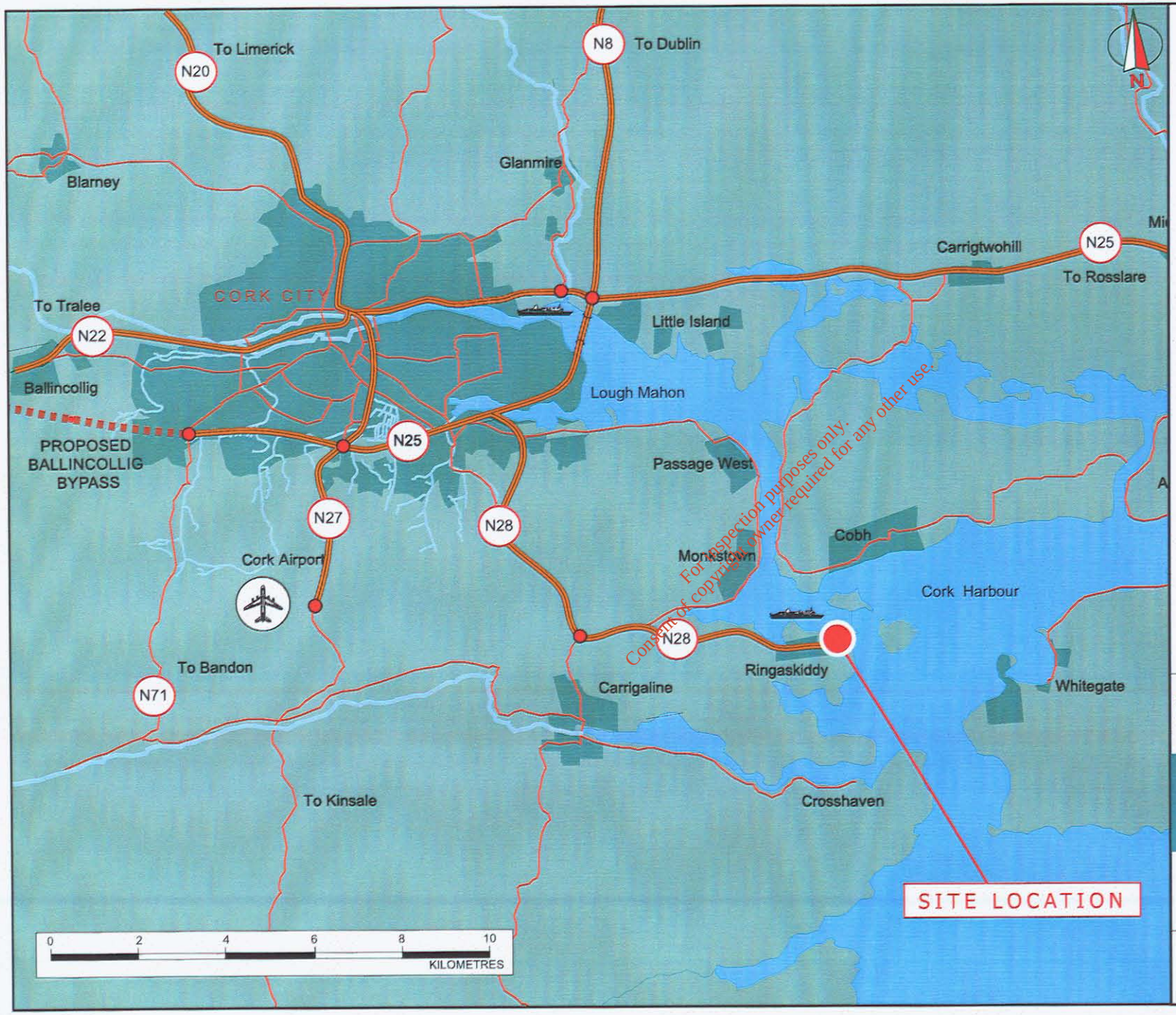
- cardboard
- newspapers and magazines
- glass
- aluminium drink cans
- textiles (such as clothes and blankets)
- footwear
- batteries
- waste oils
- fluorescent tubes.

The park is expected to handle 260 tonnes per annum of these materials.

The park will be supervised during opening hours, which will be 10.00 to 19.00 weekdays and 10.00 to 14.00 on Saturdays, depending on public demand, and information and advice on household waste management will be available to the public.

Waste Transfer Station

The waste transfer station will be utilised for the sorting, and repacking if necessary, of industrial hazardous and non-hazardous waste. The waste transfer station will include a warehouse and a storage compound for industrial hazardous and non-hazardous waste. The warehouse will be subdivided, to allow segregated storage of different types of waste, and each area will be contained to ensure that, in the unlikely event of a spillage, any spilled materials will be retained. Drummed industrial waste collected from Indaver's customers will



INDAVER IRELAND Ringaskiddy waste management facility

Ringaskiddy Waste Management Facility - Licence Application

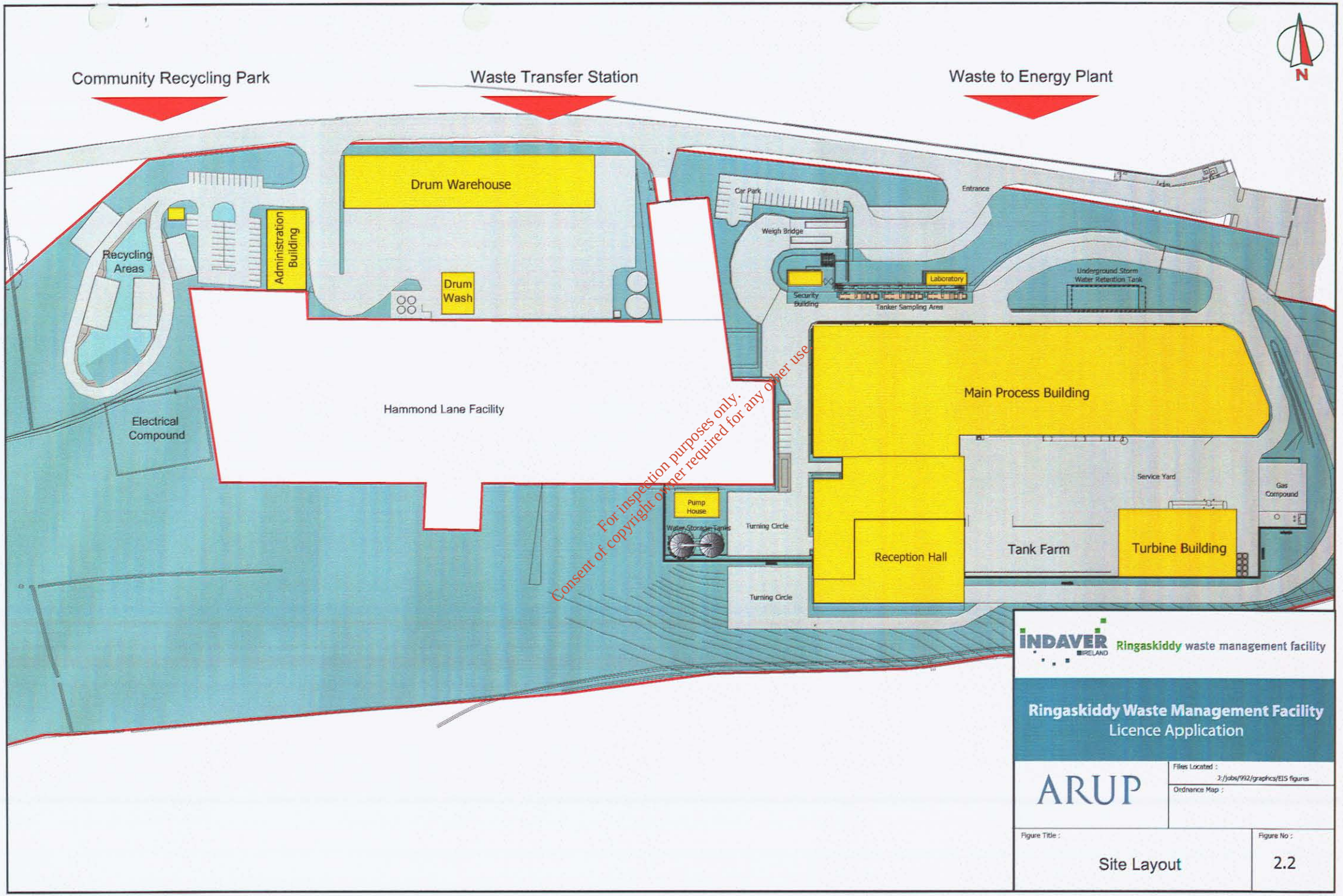
ARUP

Files Located : J:/jobs/992/graphics/EIS figures

Ordnance Map : Ordnance Survey Ireland Licence No. EN 0002801 © Government of Ireland

Figure Title : Site Location

Figure No : 2.1



be sorted at the transfer station. Material for export will be prepared for shipment. Material for incineration on site will be collected and transferred to the waste to energy plant. Some materials will be pumped from drums to bulk tanks on site. The material, transported in road tankers, will either go for recovery off site or for incineration in the waste to energy plant. The facility will handle 15000 tonnes of industrial hazardous and non-hazardous waste per annum.

There will also be offices for administrative staff.

The following facilities will be provided in the waste transfer station:

- warehouse for drum storage for approximately 1800 x 200l drums
- unloading area
- repacking area
- drum washing area
- solvent storage tanks and tanker loading area
- container parking area.

Liquid drummed waste that is suitable for treatment in the waste to energy plant onsite will be transferred into bulk storage tanks. The drums or containers will then be cleaned. These drums or containers will either be returned to the customer for re-use or sent for recycling. The material that has been bulked up in storage tanks will be transported to the waste to energy facility by road tanker. Drummed waste for recovery may also be transferred to the bulk tanks and then sent off site by road tanker for export to overseas recovery facilities. Drummed materials for recovery will be repacked where necessary and exported to the appropriate facilities. Solids may be repacked prior to incineration onsite. Material that is not suitable for recovery, or for incineration on site, will be prepared in lots for shipment to the appropriate disposal facilities abroad.

The waste transfer station will accept waste from 09.00 to 19.00 on weekdays and 09.00 to 14.00 on Saturdays. Work at other activities may be undertaken in the transfer station outside these hours.

Waste to Energy / Incineration Plant

The first phase, a fluidised bed incinerator with post combustion chamber, will treat hazardous and non-hazardous solid and liquid waste. The combined thermal capacity of the plant in phase 1 will be 45MW (nominal capacity of 100,000 tonnes per annum of waste with an average calorific value of 12.1MJ/kg). Hazardous waste, such as solvents produced by pharmaceutical and chemical industry and also non-hazardous wastes from commercial enterprises and industry will be handled in this plant.

The second phase, a moving grate incinerator installed in the main process building, will treat non-hazardous solid industrial, commercial and household waste. The thermal capacity of the moving grate incinerator will be 35.2MW (nominal capacity of 100,000 tonnes per annum of waste with an average calorific value of 9.5MJ/kg).

The decision to proceed with this phase will be taken when the waste strategies of the Cork Local Authorities, and the requirements of other waste producers, have been defined. This application applies to both phases of the waste to energy plant.

In both phases of the waste to energy plant, energy will be recovered by using the heat from the combustion process to produce steam to drive a turbine and generate electricity. The thermal input of the process, with both phases in operation, is expected to be approximately 80MW.

It is anticipated that the waste to energy facility will operate 24hrs/day, seven days per week. There will be planned shutdowns for maintenance purposes. Waste will be accepted from 09.00 to 19.00 on weekdays and 09.00 to 14.00 on Saturdays.

All waste accepted, handled and processed at the facility will be classified in accordance with ADR (road transport regulations) and IMDG code (regulations for handling and sea transport of dangerous goods) unless specifically noted otherwise.

2.5 Process Description

2.5.1 General

The design of the proposed facility has been optimised to include the most up to date emissions control and flue gas cleaning technology, which will be similar for both phases. The waste-to-energy process (or incineration with energy recovery) will consist of a number of process elements:

- waste intake, acceptance and storage
- combustion process
- energy recovery process
- flue gas cleaning including dioxin and furan removal
- solid residue handling and storage.

2.5.2 Waste Intake and Acceptance

Indaver Ireland will implement procedures, similar to those which are currently in operation at other Indaver facilities, to regulate the acceptance, testing, approval and if necessary, the rejection of incoming wastes.

The trucks and tankers will go through a radioactivity scanner and over a weighbridge at the waste to energy plant entrance. The drivers of trucks carrying waste will report to the security office, at the entrance to the waste to energy plant, or to the truck reception office in the transfer station. Their documentation will be checked and the drivers will be instructed on where to proceed. Tankers carrying liquid waste to the waste to energy plant will proceed to the tanker sampling station, where samples will be taken for analysis in the laboratory on site. These wastes will be subject to a series of analyses to confirm that they comply with the specifications agreed in advance with the consignor. The trucks and tankers will be allowed to proceed into the facility if the documentation and testing results are satisfactory. Radioactive waste will not be accepted on site. Some trucks, on long-term contracts, carrying non hazardous waste, will access the facility using a swipe card, which will record their details. The drivers of these trucks will not have to report to the security offices.

Waste is received in different ways at the waste to energy plant, depending on the nature of the waste stream.

Trucks carrying solid waste will unload in an enclosed reception hall, discharging the waste to a bunker. There will be a quarantine and inspection area in the reception hall. The bunker will be compartmentalised, with separate compartments for different types of waste. There will be a supervisor in the reception hall directing trucks to tip the waste into the appropriate compartment. The reception hall and bunker will be under negative pressure, that is air will be drawn into and through the reception hall and bunker from the outside. This will ensure that there will be no emissions of odour or litter. The bunker will have sufficient capacity to allow the plant to accept waste during periods when the furnaces will be shut down for short periods and to allow operations to continue over weekends and longer periods without deliveries.

The solid wastes will be transferred by crane from the bunker into the hoppers which feed the furnaces. It may be necessary to shred or sieve some of the larger pieces of waste prior to feeding to the furnace.

Liquid wastes will be unloaded from road tankers and pumped to storage tanks. Different categories of liquids will be stored in separate tanks. The liquids will be pumped from the storage tanks to the post combustion chamber. Some liquid wastes will be pumped directly from a road tanker to the post combustion chamber.

2.5.3 Combustion Process

Fluidised Bed Furnace and Post Combustion Chamber

Phase 1 will use a fluidised bed furnace to burn hazardous and non-hazardous waste. In the fluidised bed furnace, solid or sludge-like waste will be introduced onto a bed of sand, which will be agitated or 'fluidised' by an upward movement of air through a porous plate below it.

The operating temperature of the fluidised bed will be a minimum of 850°C. The flue gases from the fluidised bed furnace will be directed to a post combustion chamber, which will operate at a temperature up to 1250°C, depending on the content of halogenated organic substances, expressed as chlorine, of the waste. All liquid wastes will be directed to the post combustion chamber. The liquid waste will be injected into the post combustion chamber.

The operating capacity of the fluidised bed furnace and post combustion chamber will be determined by the calorific value of the waste, rather than a set tonnage. The combined thermal capacity of the fluidised bed and post combustion chamber will be 45MW (100,000 tonnes per annum nominal capacity). Hazardous and non-hazardous solid waste and high moisture content wastes such as sludge will be handled in the furnace. The post combustion chamber capacity will handle hazardous liquid wastes such as solvents.

Natural gas will be used as required, as an auxiliary fuel, to maintain the temperatures in the furnaces.

Moving Grate Furnace

A moving grate furnace will be installed in phase 2 to treat non-hazardous waste. Waste from the bunker will be fed to a hopper, which will feed the moving grate furnace. The moving grate mechanism will transport the waste slowly from the feed point to the ash discharge. Air will be added to the furnace to support combustion. The waste will be held in the furnace for approximately one hour to ensure complete combustion.

The thermal capacity of the moving grate furnace will be 35.2MW (100,000 tonnes per annum nominal capacity).

2.5.4 Energy Recovery

The hot flue gases from the post combustion chamber or moving grate furnace will be directed through a steam boiler to generate steam. There will be a boiler on each line. The steam from the two boilers will drive a turbine, which will drive an electricity generator. Approximately 10MW of electricity will be generated in phase 1, of which approximately 8MW will be exported to the national grid. With both phases in operation approximately 14MW will be exported to the national grid and circa 4MW will be used in the facility.

2.5.5 Gas Cleaning

Each furnace will have dedicated flue gas cleaning systems. The flue gases from the boiler will be cooled in the evaporating spray towers prior to treatment in the flue gas cleaning system. All water produced in the various processes in the waste to energy plant will be used in the spray towers. Consequently there will be no process effluent emissions from the waste to energy plant.

Ammonia or urea will be injected into the flue gases in the first part of the boiler to reduce emissions of nitrogen oxides. Activated carbon and lime will be injected into the flue gases leaving the spray towers. Dioxins, furans and heavy metals will be adsorbed onto the activated carbon particles. The flue gases will then pass through a bag house filter, which will remove dust, salts and the carbon particles from the gases. The gases will be cooled and will pass through a wet scrubber system, which will use an alkaline reagent to remove sulphur dioxide, hydrogen chloride, hydrogen fluoride and heavy metal residues. There will then be a final flue gas cleaning step, which will be either activated carbon and lime injection and a second bag house filter or a lignite coke bed. The final step will reduce further the concentrations of dioxins and furans in the flue gases. The exhaust gases will be reheated and discharged through the 55m stack.

The stack emissions will be monitored as required by the EU Directive on incineration of waste and in compliance with the operating licence.

2.5.6 Ash and Solid Residues

There will be the following solid residues from the waste to energy plant:

- bottom ash
- ferrous metals
- cyclone/electrofilter ash
- boiler ash
- flue gas cleaning residues.

If lime or limestone is used in the scrubbers, gypsum will also be produced.

Refer to section 2.9.7 below for a description of waste emissions from the plant.

2.5.7 Plant Utilities and Infrastructure

The following utilities will be distributed and used on site:

- Various water utilities
- Nitrogen
- Compressed air
- Site drainage systems
- Fire water retention
- Electrical supply
- Natural gas.

Public water supply

The water supply to the site will be from the Cork County Council public supply main, which runs in the road near to the site. The estimated demand for water will be 384 m^3/day. Water will be collected from roofs of buildings in the waste to energy plant and all process water will be reused in order to minimise the consumption of mains water. Two water storage tanks, with a total capacity of 2000m^3 will be provided on site, to store water to be used in fire fighting in the waste to energy building. A 500m^3 will be provided to store water to be used in fire fighting in the waste transfer station.

Nitrogen

Nitrogen will be generated on site and there will also be backup storage of liquid nitrogen. It will be supplied to all the liquid waste bulk storage tanks to provide an inert medium and to fill the space above the liquid in the tanks, to prevent a build up of potentially flammable vapours.

Compressed air

Compressed air will be supplied to the waste to energy plant for some of the process equipment and the instrument air systems. The air compressors will be located in the turbine building.

Site Drainage Systems

Separate drainage systems will be provided in the facility for sanitary drainage, storm water drainage from roofs, storm water drainage from roads and parking areas and storm water drainage from tank bunds and hard-standings.

Fire Water Retention

In a fire, the water used to fight the fire could become contaminated with chemicals. The facility will be designed to ensure that any fire fighting water will drain to a retention tank so that it will not cause contamination of the groundwater or soil. A 1500m^3 storm water retention tank will be located in the northern part of the waste to energy plant. It will retain water from roads and hard-standings in the event of a fire. The waste bunker will have a total capacity of 12,400m^3. Water from fire fighting in the reception hall will drain to the bunker. The floor, over a proportion of the waste to energy plant building, will be 5m below the general ground floor level. The lower floor area will be constructed as a concrete basement. Water from fire fighting in the building will collect in these areas where it will be retained. A 300m^3 retention tank will be provided to retain fire-fighting water in the waste transfer station.

Electrical Supply

The facility will be connected to the national grid and will have the facility to import power from the grid or to export power to it. The facility will generate approximately 18MW of which 14MW will be exported to the grid. There is an existing 38 kV ESB sub-station on the eastern side of the Hammond Lane premises. The ESB has indicated that power can be exported to the grid on the 20KV distribution network.

Natural Gas

Natural gas will be used as an auxiliary fuel and in restarting the furnaces after shutdown. A natural gas main, which crosses along the southern and eastern part of the site, will be diverted.

2.6 Process Control Strategy

There will be a central, computerised process control system in the waste to energy plant. This will allow the operators to control and monitor the critical operating systems in the waste to energy plant. The output displays will be located in the main control room of the waste to energy plant. Certain equipment will be controlled locally.

2.7 Site Laboratory

When Indaver enters a contract with a waste consignor, the contract will specify certain parameters of the waste to be sent to the waste to energy plant. When a tanker of hazardous liquid waste arrives at the facility it will be sampled. The samples will be tested in the laboratory on site to determine if they comply with the agreed specifications and to identify any safety issues. The laboratory will contain standard testing equipment.

2.8 Materials and Energy

2.8.1 Raw Materials, Auxiliary Materials, Finished Products

The incoming wastes will be the raw materials for the process. These include hazardous solid waste and waste solvents from industry for thermal treatment onsite. The waste to energy plant will also treat non-hazardous wastes such as industrial treatment plant sludge and commercial and industrial solid waste. The raw materials for the waste transfer station will be the industrial solid and liquid hazardous waste for onward shipment or incineration in the waste to energy plant. The raw material for the community recycling park will be the household waste deposited by members of the public. The different waste streams that may be handled at the facility are detailed in the tables contained in section 3 of this application.

In addition, there will be various utility materials required for the operation of the facility such as ammonia or urea and lime or limestone. Various chemicals will be used in the treatment of water for the boilers. There will be some chemicals and reagents required to perform laboratory testing and detergents required for cleaning purposes. The plant maintenance staff will use oils and lubricants.

The list of the materials to be used and the annual quantities are provided in the tables in section 8 of this document.

2.8.2 Energy

When phase 1 is operational, the facility will generate approximately 10MW of electricity and will itself have a 2MW requirement. There will be approximately 8MW of electricity available for export to the national grid. This is enough electricity to power approximately 12,000 homes annually.

When phase 1 and 2 are both fully operational, the facility will generate approximately 18MW of electricity. There will be approximately 14MW of electricity available for export, which will provide enough electricity to power 20,000 homes annually.

Natural gas will be used to heat the furnaces during start up following a shutdown. Natural gas will also be used as an auxiliary fuel to maintain the furnace at the required temperature, in the event of waste of a lower calorific value being burnt.

Diesel will be used to power the emergency generator, the firewater pumps and forklift and loader trucks.

Space heating demand in the administration building may be met by a small gas fired boiler or by electricity.

2.9 Emissions from the Facility

2.9.1 General

As part of the operation of the facility, there will be emissions to the air and to the sewers and emissions of noise and solid residues.

2.9.2 Emissions to Air

2.9.2.1 Source

There will be no main or minor air emissions from the community recycling park.

There will be no main emissions to air from the waste transfer station. There may be minor emissions of solvent vapours from the waste transfer station arising from the following activities:

- the repackaging or cross pumping of drums which are being repacked

- breathing losses from the bulk tanks
- transferring of liquid waste in drums to bulk storage tanks.

There will be main and minor air emissions from the waste to energy plant. The main emissions will be from the stack and will be the products of combustion after flue gas treatment. There will be minor emissions from the laboratory fume hoods, vents from the bulk tanks, and the emergency electricity generator, when it's operating. The stack emissions will be continuous for approximately 7500 hours per annum. The maximum and typical emissions to air from the waste to energy plant are given in Table 2.1 below.

Table 2.1 - Air Emissions from the Waste to Energy Plant

Daily Average Values	**EU Maximum Emission Concentration 2000/76/EC**	**Typical Emission Concentration**
Total Dust	10 mg/m^3	1 mg/m^3
Total organic carbon (TOC)	10 mg/m^3	1 mg/m^3
Hydrogen Chloride (HCl)	10 mg/m^3	1 mg/m^3
Hydrogen Fluoride (HF)	1 mg/m^3	1 mg/m^3
Sulphur Dioxide (SO_2)	50 mg/m^3	20 mg/m^3
Nitrogen Oxides (as NO_2)	200 mg/m^3	170 mg/m^3
Hourly Average Value		
Cadmium Thallium	Total 0.05 mg/m^3	Total 0.025 mg/m^3
Mercury	0.05 mg/m^3	0.025 mg/m^3
Antimony Arsenic Lead Chromium Cobalt Copper Manganese Nickel Vanadium	Total 0.5 mg/m^3	Total 0.25 mg/m^3
Average Values Over 6 – 8 Hours		
Dioxins and furans	0.1 ng/m^3	0.01 ng/m^3
Average Value		
Carbon Monoxide	100 mg/m^3	20 mg/m^3

2.9.2.2 Effects of the emissions to air on the environment

When preparing the EIS, computer modelling of the dispersion of the treated emissions from the stack was undertaken to determine the ground level concentrations of the substances that will be emitted. The modelling was based on the phase 1 and 2 emissions, with both incinerator lines in operation, as these will be the maximum emissions.

The modelling of the emissions to air from the Ringaskiddy facility, based on a number of conservative assumptions, indicates that the ambient ground level concentrations will be well below the relevant air quality standards or guidelines for all compounds emitted from the facility. The modelling results demonstrate that the maximum concentrations occur at or near the site's southern boundary. The results show that the impact of the emissions to air from the Ringaskiddy waste management facility on the environment will be insignificant and will be limited to the immediate environs of the site. Refer to chapter 9 of the EIS for the study of the impact of the emissions to air from the facility.

2.9.3 Emissions to surface water

There will be no direct discharges to soil, groundwater or surface water during the operational phase of the development and a number of measures will be incorporated into the design to ensure that the soils and groundwater on site are protected from any potential sources of contamination.

All storage tanks in the waste to energy facility and the waste transfer station will be bunded. The floor of the warehouse in the waste transfer station will be laid to falls to floor sumps, in which any spillage will collect. Surface water runoff from the tanker unloading bays and solvent storage tank bunds, in the waste to energy plant and waste transfer station, will be collected. If contaminated, it will be directed to the furnace or sent off site for disposal. If uncontaminated, it will be discharged to the main drainage systems.

Surface water from other hard standing areas of the waste to energy plant and waste transfer station will be directed to monitoring chambers and tested before being discharged to the County Council surface water drainage sewer. If contaminated it will be directed to the furnace or sent off site for disposal. If uncontaminated it will be discharged to the main drainage systems. The retention tanks in the waste to energy plant and waste transfer station will also collect contaminated water that may result from a fire. Rainwater from the roofs of the waste to energy plant will be collected for use in the process. Surface water from the car-parking areas in the waste transfer station and community recycling park will drain via hydrocarbon interceptors to the local authority sewer.

Solid wastes delivered to the facility will be stored in a waste bunker. The waste bunker will drain to a sump, which will be designed to be water retaining. These mitigation measures will prevent any potential leakage of leachate from the waste to the soil or groundwater.

The containers used to collect liquid waste in the community recycling park will be designed to contain any spills or leaks.

Regular monitoring of groundwater will take place to detect any changes in quality during the operational phase of the development.

The waste management facility is not expected to have a significant impact on the geology, soils, groundwater or surface waters.

2.9.4 Emissions to sewer

Sanitary effluent will be generated in the kitchens, toilet areas and showers. There will be two packaged wastewater treatment plants, which will treat the sanitary effluent arising in the facility. The treated effluent will discharge to the Cork County Council sewerage system. Rainwater run-off collected in the facility's storm water systems, with the exception of rainwater from the roofs of the buildings in the waste to energy plant, will be discharged to the Cork County Council surface water sewers. Rainwater from the roofs of the buildings in the waste to energy plant will be collected for use in the process.

2.9.5 Emissions to ground

There will be no emissions to ground. Measures will be taken to prevent accidental emissions to the ground. A network of ground water monitoring boreholes will be installed. Annual monitoring will be undertaken to ensure that the activities on site do not have an impact on the ground water.

2.9.6 Noise Emissions

Most process equipment will be located inside the buildings and will not result in significant noise emissions externally. A number of major plant items will be located externally and noise will be emitted from these. The externally located equipment on the site, which will have noise emissions, include the aerocondensers, externally located pumps and fans, the nitrogen

generator, and the emergency generator, when it is operating. As none of this equipment is in operation yet, no specific noise emission data is available.

To control noise emissions, the equipment specifications will include noise emission limits. When the plant is in operation a noise survey will be undertaken and noise abatement measures will be implemented, if required. These may include the installation of acoustic screens and enclosures. The plant will meet a daytime limit of 55dB L_{Aeq} and a night time limit of 45dB L_{Aeq} at the nearest noise sensitive locations, identified during the noise study, around the site.

A noise prediction model, prepared as part of the environmental impact assessment, demonstrated that the noise emissions from the plant will not have any significant environmental impact.

An annual noise survey will be undertaken to monitor the noise emissions from the site.

2.9.7 Waste Emissions

The facility when operational will generate a number of different waste streams. There will be the following solid residues from the waste to energy plant:

- bottom ash
- ferrous metals
- cyclone/electrofilter ash
- boiler ash
- flue gas cleaning residues.

If lime or limestone is used in the scrubbing system, gypsum will be produced.

The bottom ash will be classified as a non-hazardous material and may be suitable for recovery and use in road construction or can be disposed of to non-hazardous landfill. The electrofilter ash and boiler ash are also expected to be classified as non-hazardous. This will be confirmed by composite sampling and analysis. This ash will be disposed of to landfill. It is expected that the flue gas cleaning residues will be classified as a material requiring disposal to a hazardous waste landfill. The gypsum will be non-hazardous and may be suitable for use in the construction industry or else can be sent to non-hazardous landfill. The quantities of waste expected when both phases of the plant are operational, based on the nominal capacities of the combined fluidised bed furnace and post combustion chamber of 45MW and moving grate furnace of 35.2MW respectively, are outlined below.

Table 2.2 - Estimated Residue Quantity and Type

Ash Type	Tonnes/annum	Hazardous/Non-Hazardous (classified for disposal to landfill)
Bottom	23,000	Re-useable, non-hazardous
Ferrous metals	2,100	Will be recovered for reuse
Gypsum	2,555 (If lime/limestone used in scrubber)	Will be recovered for reuse
Electrofilter	5,050	Non-hazardous
Boiler	3,100	Non-hazardous
Flue Gas Cleaning Residue	5,800 to 8,650 (note 1)	Hazardous

Note 1: The quantity of flue gas cleaning residues will depend on the type of scrubbing system used.

Other wastes that will arise include obsolete laboratory chemical wastes, arising in the site laboratory, and general office and canteen wastes. The laboratory wastes will be stored in

appropriate dedicated containers in the laboratory building. These will be collected periodically and sent for disposal to the appropriate facilities. General office and canteen wastes will be separated at source and recycled where possible.

The wastes from the facility are not expected to have any significant environmental impact.

2.10 Environmental Considerations

2.10.1 Application of Best Available Techniques (BAT)

The European IPPC Bureau has not yet defined Best Available Techniques (BAT) for waste incineration. In the absence of other guidance, BAT is taken as conforming with or exceeding the requirements of the Directive 2000/76/EC on the incineration of waste. The waste management facility has been designed with due regard to the requirement to utilise BAT in the plant processes and the emission abatement systems. Examples of the use of BAT in the facility include:

- Energy recovery
- Multi-stage flue gas cleaning systems
- Two stage dioxin removal
- On-line continuous sampling of dioxins in the stack emissions.

2.10.2 Best Available Technology Not Entailing Excessive Cost (BATNEEC)

The EPA has issued a series of BATNEEC guidance notes for different industry sectors. There is none for the incineration sector. Reference has been made to the BATNEEC Guidance Note For the Chemical Sector, Rev 1, 1996.

BATNEEC will be utilised in various aspects of the facility, as follows:

- Breathing losses from the tank farm in the waste to energy plant will be routed to the post combustion chamber
- There will be a closed loop vapour return to the tank farm during tanker offloading operations
- Breathing losses from the tank farm in the waste transfer station will be treated in an abatement system
- Fugitive emissions from repackaging room operations, in the waste transfer station, will be treated in an abatement system
- Run-off from areas, which will have a greater potential of a spill or leak, will be collected separately and tested prior to release into main drainage systems.

2.10.3 Cleaner Technology

Where feasible, cleaner technologies will be utilised in the waste to energy plant in order to minimise wastes and reduce resource consumption. Examples include:

- Reuse of all process water, eliminating process effluent
- Collection of rainwater from roofs for use in the process
- Air cooled condensers
- Use of liquid wastes to optimise calorific value
- Use of natural gas as the auxiliary fuel

- Maintaining the waste reception hall and waste bunker at negative pressure.

2.10.4 Energy Efficiency

The waste management system will incorporate systems and procedures to conserve energy. These include:

- Generating steam at relatively high temperature to optimise energy recovery
- The expansion of the steam to a relatively low pressure in the turbine to optimise energy recovery
- Using the flue gases to preheat the boiler feed water
- Secondary combustion air taken in from under the roof of the waste to energy building
- Using the steam from the turbine in a reheater for plume suppression
- Variable speed drive on fans and pumps.

2.10.5 Statutory Requirements

The activities on site and the emission from the site will comply with all relevant statutory requirements. The activities on the site will not have an adverse impact on any sites protected under the Habitats directive or any European site. The activities on the site will not have an adverse effect on water quality.

Indaver Ireland, MinChem, and their Directors, have never been prosecuted under the Waste Management Act, 1996.

2.10.6 Accident Prevention and Emergency Response

Accident Prevention

The plant has been designed with safety of operations as a primary consideration. All processes will undergo hazard and operability studies, at the detailed design stage, to identify and mitigate potential hazardous situations. Identification of operating hazards has already begun, as part of the preliminary design of the plant. The site management system will incorporate standard operating procedures, which will specify safe working methods for all process activities. Staff will receive training in their duties and in the standard operating procedures. A preventative maintenance system will be put in place, which will incorporate routine checks and maintenance of key equipment to ensure they will remain in good working order.

Emergency Response

A site emergency response plan will be prepared before the plant is commissioned. The plan will include an emergency response team, which will be trained and equipped to respond to an emergency on site. The waste to energy plant will be manned 24 hours per day and the waste transfer station will be manned during normal business hours. A response team will be on site during normal working hours and will be on call at all times outside normal business hours.

Fire fighting equipment including sprinklers, deluge systems, foam systems and hydrants will be installed at appropriate locations around the site.

Fire and smoke detectors and alarms will be provided though out the facility. Key equipment will be provided with alarms to give notice of malfunctions or unsafe conditions. These alarms will be signalled to the process control system.

Emergency Shutdown Procedure

An emergency shut down procedure will bring one or both incinerator lines to a safe status. The emergency shut down will be initialised by situations such as:

- An electric power failure
- Simultaneous occurrence of a flue gas temperature at the outlet of the boiler above 250°C and a failure of the water feed to the flue gas cleaning systems or a temperature at the inlet of the bag house filter of 250°C
- Some plant interlocks
- Manual alarm.

In case of failure of the electrical power supply, motors and equipment required for the emergency shut down, will be powered by the emergency generator.

2.10.7 Procedure for Closure

The facility will have a life of 25 to 30 years. Should circumstances arise whereby it becomes necessary to cease operations at the facility, then Indaver Ireland will implement a decommissioning programme to ensure that any negative environmental impact is minimised. This programme will include:

- Removal of any chemicals or wastes stored on site. Any oils, lubricants or fuels that are on site at the time of closure will be recycled/disposed of through appropriate registered contractors.
- Plant, equipment and machinery will be emptied on ceasing operations, dismantled and stored under suitable conditions until sold, or if a suitable buyer cannot be located, recycled/disposed of through appropriate licensed waste disposal contractors.
- The plant buildings will be subject to thorough house cleaning procedures prior to final departure.
- The site and buildings will be left in a secure manner and appropriate security maintained on site in the event of the site potentially being vacant for an extended period of time.
- If the site is being permanently vacated it will be returned to its current agricultural use.
- There will be no asbestos used in the construction of the facility so its removal during decommissioning will not arise.

Post Closure Care

When the facility is decommissioned all materials will be removed from the facility. There will be no emissions from the facility after cessation of the activity. No post closure care management plan will be required.

2.11 Monitoring of Emissions

2.11.1 General

Monitoring to determine the following emissions will be undertaken:

- Emissions to air
- Emissions to storm water sewer
- Waste emissions (ash).

Ambient monitoring will be undertaken of the following:

- Ground water
- Noise

- Odour.

2.11.2 Emissions to Air

Monitoring

It is proposed to monitor continuously the two main emission points from the waste to energy plant. These are the flues for the two furnace lines.

Monitoring will be undertaken for the substances, the emission of which has been limited by the EU Directive 2000/76/EC on the incineration of waste. These are total dust, total organic carbon, hydrogen fluoride, hydrogen chloride, sulphur dioxide, carbon monoxide, nitrogen oxides, heavy metals (cadmium, thallium, mercury, arsenic, lead, chromium, cobalt, copper, manganese, nickel and vanadium), dioxins and furans. The monitoring methods and frequencies are listed in tables 13.1 and 13.2 in chapter 13. A dedicated room, housing the monitoring equipment, will be located adjacent to the stacks, at high level in the waste to energy building.

2.11.2.1 Monitoring equipment interface with plant control system

The readings from the continuous measurement devices will be sent for processing to two separate systems, the plant computerised control system and to the emission registration system. The plant operators will be able to view the monitoring data on the plant computerised control system, while the plant is in operation.

2.11.2.2 Dioxin and Furan Monitoring

A specialised dioxin/furan monitoring system will be installed. This will be similar to the equipment used for measuring dioxins/furans in plants, which are required to comply with the German Environmental Regulations, BIm Sch V. The equipment will take a continuous sample of dioxins and furans for a two-week period. The sample will be removed and sent to an accredited laboratory for testing.

2.11.3 Emissions to Sewer

Two of the emissions to sewer will be from the site storm water drainage system. It is proposed to monitor these emissions. The other two emissions to sewer will be from the facility's packaged sewage treatment plants and will comprise only treated sewage. It is not proposed to monitor the sewage emissions.

The emissions will be monitored for TOC and pH. The monitoring chambers will be located close to the retention tanks.

Refer to tables 13.3 and 13.4 in chapter 13 for a summary of the monitoring of the emissions to sewer.

2.11.4 Waste Emissions

The main ash and solid residues from the site will be monitored on a fortnightly basis for the first two to three months following commencement of operations, until consistent results are achieved. In agreement with the EPA, monitoring for the full suite of parameters will be once every six months for the first two years thereafter, and annually in subsequent years. For the bottom ash, boiler ash, cyclone/electrofilter ash and flue gas cleaning residue a composite sample of each will be collected over a 14 day period. The samples will be sent to external consultants for compaction and drying. The samples will then be tested at an accredited laboratory. Refer to tables 13.5 to 13.13 in chapter 13 for a summary of the solid residues monitoring.

2.11.5 Groundwater Monitoring

There will be no emissions to ground from the facility. Nevertheless, it is proposed to monitor the quality of groundwater under the site annually. Groundwater wells will be installed on completion of construction. Table 13.14 in chapter 13 summarises the groundwater monitoring proposed.

2.11.6 Noise Monitoring

It is proposed to carry out annual noise monitoring at three noise sensitive locations. Daytime (30 minute duration) and night time (15 minute duration) measurements of LAeq, LA10 and LA90 will be taken.

2.11.7 Odour Monitoring

It is proposed to carry out weekly odour monitoring at various locations around the site. This will be an instantaneous olfactory assessment carried out by site staff. Table 13.15 in chapter 13 summarises the noise monitoring proposed

2.12 Financial Provisions

Indaver Ireland will be in the position to meet all financial commitments and liabilities incurred in operating the Ringaskiddy Waste Management Facility and in decommissioning the facility in an appropriate manner. An environmental liabilities risk assessment will be carried out to identify such financial provisions and this will be submitted to the EPA when completed. The proposed financial provision will be submitted to the EPA for approval.

Indaver Ireland will have all the necessary insurances in place to meet public liability, product liability, legal expenses, environmental liability and on-site clean up costs.

Confidential information relating to Indaver's audited accounts and the business plan for the Ringaskiddy Waste Management Facility have been provided to the EPA under separate cover.

2.13 Appendix 2

A2.1 Indaver Ireland company brochure, waste management information leaflets and a copy of the web page of the Navan Recycling Centre.