2. PROJECT DESCRIPTION

2.1 Introduction

The proposed waste management facility will consist of three main elements:

1. A Community Recycling Park
2. A Recycling Plant for Non Hazardous Waste
3. A Waste to Energy Plant for Non Hazardous Waste

The main buildings and areas on the site are shown in Figure 2.1 - site layout.

NOTES

1. LEVELS ARE GIVEN IN METRES AND RELATE TO O.S. DATUM (MALIN HEAD).

LEGEND

- SITE BOUNDARY LINE
- EXISTING GROUND LEVELS
- PROPOSED GROUND LEVELS
- PROPOSED BUILDING
- PROPOSED ASPHALT PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- PROPOSED CONCRETE BLOCK PAVIOR
- PROPOSED GRAVEL AREA

ISSUE	DESCRIPTION	DRN	ORIG	AUTH CHK	APP
A	PRELIMINARY				

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PROJECT WASTE MGMT FACILITY - CARRANSTOWN

TITLE
FIGURE 2.1
SITE LAYOUT
(PAGE 18 OF DOCUMENT 2666-22-RP-001A)

CLIENT REF.		CLIENT DRG No.	
PROJECT No.	2606		
A0 SCALE	NTS	CONT'R DRG No.	2666-22-DR-001

2666_22_DR_001

2.2 Community Recycling Park

The Community Recycling Park will be located at the front of the facility and will offer as wide a range of recycling opportunities as possible. There will be approximately twelve different categories of waste accepted in order to optimise the recovery and recycling options available. The recycling park will operate on a similar basis to the recycling park currently operated by Meath County Council in Navan. A photograph of the Navan recycling park is contained in Figure 2.2.

Likely categories of recyclable waste accepted are as follows:

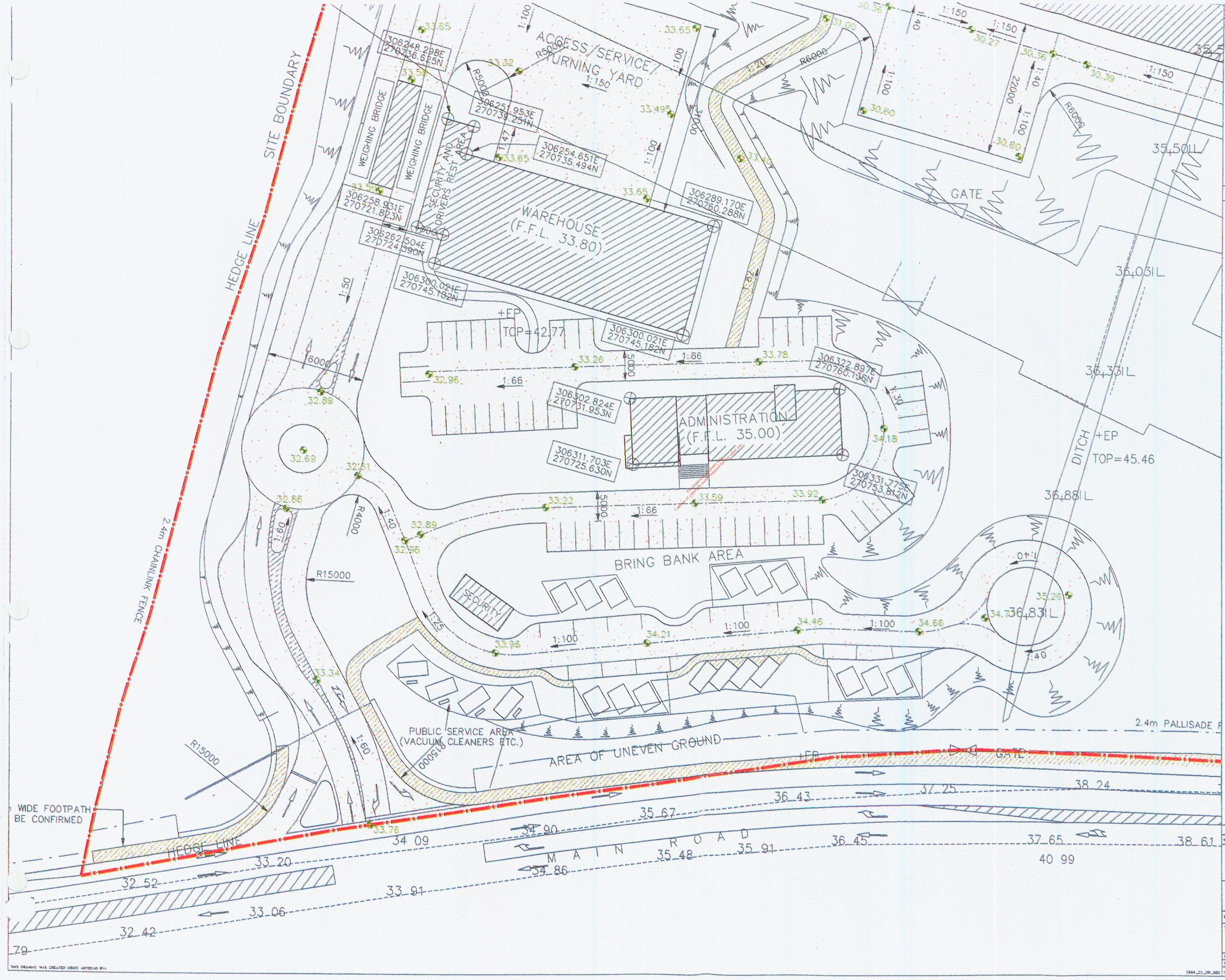
- Cardboard
- Newspaper
- Paper
- Glass
- Plastic
- Aluminium drink cans
- Textiles (clothes and blankets, for example)
- Footwear
- Batteries
- Waste oils
- Wood
- Garden waste (green)

Individual waste streams will be deposited into dedicated containers by members of the public. The storage containers will be kept in shelters as necessary, which will be planted with an organic green roof system on the roof to improve the visual appearance of the area from the road. The containers will be emptied as they become full, and the containers will be designed to minimise the noise generated during these occasional collections. The layout of the recycling park is shown in Figure 2.3.

The Recycling Park will be staffed continuously during opening hours to monitor deliveries of waste and ensure that no inappropriate waste is delivered. As no organic kitchen waste will be accepted at the park there will not be a problem with odour or vermin. Otherwise, the area will be kept clean and odour free through good housekeeping practices: regular washing and sweeping of the area, provision of hand washing facilities for members of the public and monitoring of waste deliveries.

The creation of the Recycling Park is not only environmentally sound, but is in line with the national policy to increase the number of Community Recycling Parks.

Figure 2.2 – Photograph of Navan Recycling Park



NOTES

1. LEVELS ARE GIVEN IN METRES AND RELATE TO O.S. DATUM (MALIN HEAD).

LEGEND

- SITE BOUNDARY LINE
- EXISTING GROUND LEVELS
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ISSUE	DESCRIPTION	DRN	CHG	AUTH CHK	APP
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PROJECT: WASTE MGMT FACILITY - CARRANSTOWN

TITLE: FIGURE 2.3
RECYCLING BRING BANK PARK
(PAGE 21 OF DOCUMENT 266-22-DR001A)

CLIENT REF.
CLIENT DRG No.
PROJECT No. 2666
A0 SCALE NTS
CONTR. DRG No. 2666-22-DR-002

2.3 Recycling Plant for Industrial Material

Deliveries of unsorted dry recyclable industrial and commercial waste will be accepted in a separate area within the waste acceptance hall, where items with the potential to be recovered or recycled will be separated. The waste recycling area will be maintained under negative air pressure to prevent odours being released.

For recycling to be possible it is important that there are no organics in the waste stream, as organics contaminate recyclable material and much of the sorting must necessarily be done by hand. A photograph of a similar plant operated by Indaver is contained in Figure 2.4.

The typical composition of recyclable waste is as follows:

- Paper
- Cardboard
- Plastics
- Wood
- Metals

The dry recyclable waste is discharged from the trucks in the recycling hall into the storage area, which is 5m below the level of the recycling hall. Large items, such as bulky pieces of wood or metal, are removed and put directly into containers.

The waste is then loaded into a hopper and is then passed through two screens. The first screen separates the coarse material (material greater than 300mm) and second screen separates the small particles, which contains mostly sand, minerals, some metals and other small fractions.

After screening the waste is spread out onto conveyors, from which metal items are automatically removed by magnetic separators. The metal is then put directly into containers and sent elsewhere for recycling. Paper, plastic, cardboard and wood are then manually picked out by sorters. These items are then either put in containers or baled, and sent onwards for recycling. The remaining, non recyclable waste will be sent to the waste bunker for incineration.

It is intended that one sorting line will be installed initially. After observation of the composition of the waste stream and just before the production has reached full capacity the second sorting line will be installed. The second line, and means of separating waste between the lines, will then be optimised to sort the type of waste arriving.

The plant will be designed to sort 20,000 tonnes of waste per annum, based on single shift operation.

The sorting plant will be operated by up to 16 personnel consisting of about 13 sorters, a foreman, a forklift driver and a front loader truck driver.

Figure 2.4 – Picture of Similar Recycling Plant Operated by Indaver

2.4 Waste to Energy Plant

The proposed plant is based on conventional grate incineration technology. This technology is proven and reliable and has been widely used in many countries world wide. The waste is tipped into a bunker prior to being fed into the furnace. In the furnace the waste is incinerated, producing heat, ash and combustion gases.

The flue gases are cooled, filtered, passed through scrubbers and reheated prior to discharge via the stack. The waste liquids produced by the scrubbers are used in the cooling process and a solid waste is produced, rather than an aqueous effluent, thereby eliminating any process water discharge from the facility.

The heat produced by the combustion of the waste will be used to generate steam, which will be used to drive a steam turbine and electrical generator. The plant will produce approximately 11 MW of electricity, or enough to power 16,000 homes.

2.4.1 Process Description

The waste to energy plant will consist of a number of main processes and items of plant as follows:

- Reception Process
- Combustion Process
- Energy Recovery Process
- Flue Gas Cleaning Plant
- Dioxin and Furan Removal Plant
- Ash Handling Plant

The grate furnace is the predominant technology used for incineration of municipal waste with over 500 plants in operation in Europe. This is a longstanding technology with which considerable advances have been made in incinerator technology in recent years, particularly with regard to emission control and flue gas cleaning. The design of the proposed plant has been optimised to include the latest technology to control emissions and to minimise environmental impacts.

Indaver currently operate a 200,000 tonnes per annum waste to energy plant in Beveren, Flanders based on the same technology. This plant has operated successfully for a number of years without any exceedence of emission limits. Due to the ongoing diversion of waste from landfill in Flanders, the plant's capacity is currently being extended to 350,000 tonnes per annum.

The nominal capacity of the plant is 150,000 tonnes of municipal waste per annum, assuming an average calorific value of 11 MJ/kg for the waste. A simplified schematic of the overall incineration process is shown in Figure 2.6 below. This shows how two individual furnaces and boilers, sized for 50% of the plant capacity, feed into a combined flue gas treatment system.

2.4.2 Reception

The waste trucks drive into the waste acceptance hall on arrival. Waste containing putrescible material or a high proportion of water cannot be sorted, and this type of waste will be discharged directly into the bunker. One of the waste discharge chutes, which normally remain closed, will be opened. The truck will then discharge the waste into the bunker. The waste acceptance area and discharge chutes of a similar plant in Belgium are shown in Figure 2.7.

The bunker is sized at 6,000 m^3, which is sufficient to allow the plant to accept waste during periods of shut down for maintenance and to continue operating over prolonged periods (e.g. long weekends) without deliveries.

Operators will use travelling grab cranes positioned over the bunker to blend the waste in the pit, so that despite the variety within the waste loads delivered, the feed to the furnace is relatively uniform. The grab cranes are also used for feeding the blended waste material to the furnace via hoppers at the highest point of the furnace. The feeding hoppers and feeding rams provide the seal between the high temperature furnace and the bunker pit.

To prevent the egress of odours from the waste acceptance hall and the waste recycling area they are maintained under negative pressure, (i.e. air will be drawn in through any opening rather than escaping out). This is effected by drawing some of the air for combustion from the waste bunker. The fact that the waste is stored in a contained area and under negative pressure ensures that there will be no windblown waste or odours emanating from the facility.

When both lines are shut down, typically for 1-2 days per year, the fans will be kept on-line for as long as possible to maintain the bunker under negative pressure. Any odours will then be discharged via the 40m stack. During these brief periods the waste in the bunker will be sprayed with odour suppressing chemicals to minimise odours.

Figure 2.6 Schematic Diagram of the Incineration Process

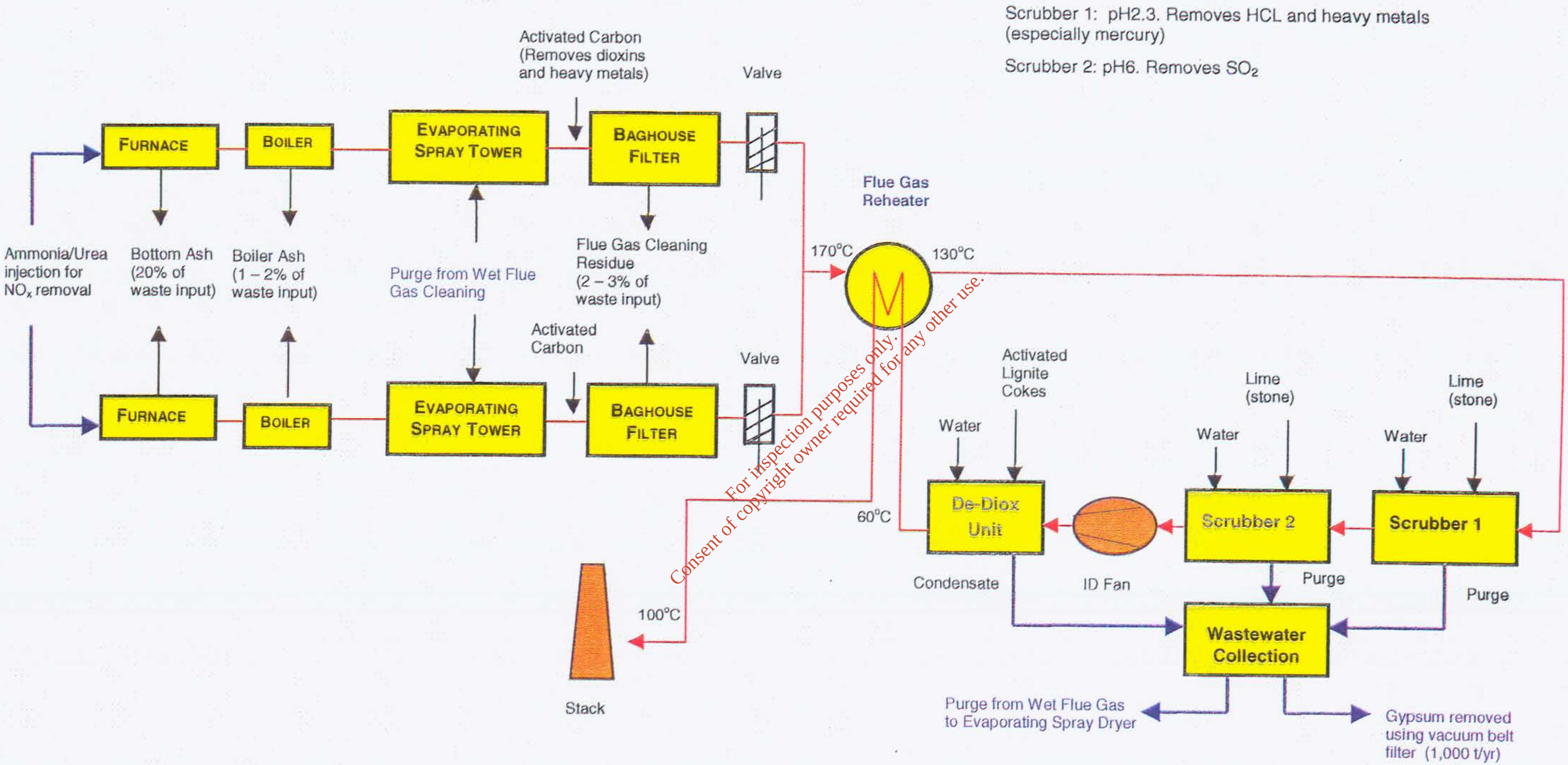

Figure 2.7 Waste Acceptance Hall of Similar Plant in Belgium

2.4.3 Energy Recovery

The plant will be equipped with two identical furnaces and boilers. The main reason for this is to increase the plant's availability, and to allow maintenance to be carried out on one furnace without interrupting the plant's capacity to accept waste. The waste is incinerated in the furnace and the hot combustion gases are used to generate steam in the boiler.

The waste from the bunker pit is fed into the furnaces, which fall to the ash bunker at ground level. The grate transport mechanism serves to transport the waste slowly from the feed point to the ash discharge. The rate at which the waste travels through the furnace can be controlled to optimise the combustion. The residence time for waste in the furnace is approximately one hour.

At the top of the furnace the moist waste undergoes an initial drying stage followed by a volatilisation stage, where the gaseous fractions are driven off. As the temperature increases further down the grate to about 300 °C the solid waste ignites and burns vigorously until the solid is fully devolatilised and all that remains is a carbonaceous char. The final section of the grate is the burnout section where the char is held for sufficient time to ensure complete combustion of the solid matter. The grate then discharges the resultant ash into a water bath.

The addition of combustion air to the furnace is controlled to ensure optimum conditions. This air takes the form of primary air, fed from below the grate, and secondary air fed over the grate. This ensures combustion of the volatile gases driven off. Sufficient combustion air will be added to ensure effective combustion of the waste.

In order to control emissions and comply with the EU Directive on Waste Incineration (89/369/EC - recently superseded by the newly adopted Directive on Waste Incineration) the first pass of the boiler is designed to ensure that the specified minimum residence time of 2 seconds at 850 °C, after the last air/fuel injection, is maintained. Natural gas is used to bring the furnace up to the specified temperature of 850 °C prior to start of the waste feed. The furnace temperature is continuously monitored and controlled to ensure that this minimum temperature is maintained and supplementary firing with natural gas can be used if necessary.

The concentration of dioxins after the first pass of the boiler is very low due to the 2 second residence time at 850 °C. In the second stage of the boiler the combustion gases are further cooled by heat exchangers within the boilers. During this cooling dioxins are formed particularly over the temperature range 400 °C to 200 °C. In order to minimise the formation of dioxins the following design measures will be implemented:

- Regular cleaning of heat transfer surfaces. The formation of dioxins is catalysed (speeded up) by the presence of metals, and copper in particular. Regular cleaning of surfaces reduces the amount of copper present to act as a catalyst.
- Rapid cooling over the range 400 °C to 200 °C. This is effected by increasing the velocity of the combustion gases through the section of the boiler where this cooling occurs. This increase in velocity accelerates heat transfer and cools the gases more rapidly.

The thermal energy generated by burning the waste is transformed into useful motive power and electricity with a conventional steam cycle. This basically consists of a boiler to generate steam, a steam turbine across which the steam is expanded to produce motive power and a condenser to condense the steam and dissipate the low grade waste heat.

The boiler uses the heat generated by the combustion of the waste to produce useful energy in the form of steam. The hot flue gases leaving the furnace at a minimum of 850 °C are used to generate steam at a pressure of 41 bar absolute and a temperature of 400 °C.

The production of steam is optimised by the provision of an economiser and superheaters in the boiler. Some 75% of the energy produced by the combustion of waste is recovered as steam in the boilers. While this is somewhat lower than with a power plant, the flue gases from the incineration process contain corrosive elements, which would attack the boiler components if steam was recovered over a wider temperature range, either at higher temperatures or at lower temperatures.

As with all boiler plant it is necessary to treat the feed water to the boiler to a high level of purity. A demineralisation plant is provided for this purpose to meet the demand for demineralised water of the order of 25 m^3/day. An equivalent volume of water is then purged from the boiler (blow down) to prevent the build up of salts in the steam circuit. This blow down is then used in the flue gas cleaning process. Some small amounts of boiler treatment chemicals are added to the boiler feed to prevent corrosion and scale build up in the steam circuit.

In the proposed plant, the steam from the two boilers will be expanded in a single steam turbine down to a pressure of 0.15 bar absolute. This low pressure maximises the energy recovery from the turbine, which is used to drive the generator set and give an electrical output of about 14 MW. As approximately 3 MW is required for electrical demand within the plant, the net electrical output from the plant for export to the national grid will be about 11 MW.

The steam from the turbine is condensed in an air cooled condenser. This maintains the low pressure at the turbine exhaust and dissipates the waste heat into the air via banks of heat exchangers similar to a car radiator. It was decided to use an air cooled condenser as this reduces the water requirement of the plant and also reduces the amount of effluent produced.

2.4.4 Flue Gas Cleaning

The flue gas leaving the boiler is still relatively hot at approximately 230 °C. The flue gas is further cooled in the evaporative spray towers to a temperature of about 170 °C.

The process effluents from the plant (e.g. scrubber effluent and boiler water treatment plant effluent) are recycled for use in the evaporative spray towers, thus reducing the plant's water use and eliminating process effluent. The salts contained in the water are dried by evaporation in the spray tower and collected in the baghouse filter as solid wastes for off site disposal (see Section 2.5.4).

The combustion of waste produces small quantities of emissions as follows:

- NOx
- Dust
- Poly Aromatic Hydrocarbons (PAHs)
- Acids (HCl, HF, SO_2, HI and HBr)
- Dioxins and Furans

There are a number of different technologies available for the treatment of flue gases, and an optimal combination of treatment systems was chosen to ensure that emission limit values would be met and indeed to achieve emission concentrations significantly below the limits. For example, the concentration of dioxins in the flue gases will be 90% below the limit value.

(a) NO_x - Urea/Ammonia Solution Injection

All combustion processes lead to formation of nitrogen oxides (NOx). This emission is formed partly from combustion of the nitrogen fraction in the waste feed and partly from the oxidation of nitrogen in the combustion air. The optimised combustion conditions in the furnace minimise the oxidation of nitrogen in the combustion air. However, to meet the strict NOx emission values set by the EU, DeNOx technology is used. This uses the reaction of ammonia and nitrogen oxides at high temperature to reduce the nitrogen oxides to nitrogen and water vapour. This reaction is achieved either by the injection of ammonia solution or urea into the furnace, the urea breaks down to form water and ammonia. The ammonia then reacts with NO_x to produce nitrogen and water. Throughout this process the NO_x levels are monitored to optimise the quantity of ammonia solution/urea injected and ensure that emission limits are not exceeded.

This technology of ammonia solution/urea injection into the furnace is called Selective Non Catalytic Reduction (SNCR). The alternative to this technology is Selective Catalytic Reduction (SCR), where the flue gases are heated to about 280 °C and react with ammonia over a catalyst. Due to the reheating of the flue gas this technology has the disadvantage of reducing the overall energy efficiency. SNCR is therefore the chosen technology for the proposed plant.

This is a proven technology, and experience has shown that the daily NO_x emission limit of 200 mg/m^3 can be attained with SNCR. In fact, it is expected that the NO_x emissions will be about 150 mg/Nm3. The impact of the NO_x emissions is addressed in Section 4.

(b) Dust – Baghouse Filter

The dust in the flue gas consists primarily of fly ash carried over from the boiler and also of dry residues from the evaporation of the process effluents in the evaporative spray towers . This will be removed by one of two baghouse filters. These will ensure that the strict EU limit on dust emissions is met.

Additionally, a small amount of activated carbon is injected into the flue gas leaving the evaporative cooler. The heavy metals and trace levels of organics in the flue gas, such as dioxins, PAHs and heavy metals, are removed by means of adsorption onto the carbon granules. These carbon granules and other particulates are then removed by filtration in the baghouse filter. The filtration residues form the fly ash component for disposal, as discussed in more detail in Section 2.5.4.

The alternative technologies to baghouse filters are cyclones and electrostatic precipitators. Both these systems have the advantage of lower cost and the ability to operate at a higher temperature, but they are not as effective as a baghouse filter. This system was chosen to reduce dust emissions to an absolute minimum.

(c) Acid Gases – Wet Scrubbers

The two separate flue gas streams leaving the baghouse filters are combined into a single gas stream for further gas cleaning in a system of two wet based scrubbers in sequence. The wet scrubbers will remove SO_2, HF and HCl, which are formed if sulphur, fluorine and chlorine are present in the waste stream.

The use of wet scrubbers cools the flue gases and saturates the gas with water. The lower temperature and high water content of the gas would lead to the formation of a visible plume from the stack if discharged directly.

The wet scrubbers use a calcium based neutralisation agent to remove acidic compounds and traces of heavy metals. The solution strength is continuously monitored and replenished to ensure the effectiveness of the chemical based gas cleaning. A predetermined purge of the solution is maintained to prevent the concentration of reaction salts rising. Gypsum, formed by the reaction of the lime and SO_2, is removed from this purge by filtration. The waste water purge is then recycled back to the evaporative spray tower.

It was decided to use two wet scrubbers in sequence using lime (or limestone) as the reagent. (Either lime or limestone can be used in the scrubbers and the reagent will hereafter be referred to as lime). Two scrubbers have a number of advantages over a single scrubber:

- Two scrubbers in sequence are better able to deal with peak concentrations and ensure a continuously low emission concentration,
- If one scrubber fails the second scrubber will allow emission limits to be met while the other is brought back on-line
- One of the scrubbers can be operated at a very low pH (c. 2) at which level the scrubber also removes heavy metals – especially mercury.

2.4.5 Dioxin and Furan Removal

Dioxins and furans are complex chlorinated hydrocarbon molecules which are formed as a consequence of any combustion process. As described previously the plant is designed to minimise the formation of dioxins, by maintaining the combustion gases at a high temperature (over 850 °C) for over 2 seconds and by rapidly cooling the gases from 400 °C to 200 °C. These measures reduce the dioxin concentration in the combustion gases to a low level. The flue gas cleaning process provides for a two stage dioxin removal process to reduce dioxin concentrations in the flue gas to 0.01 ng/m^3 (0.000 000 001 g/m^3).

While a single stage of dioxin and furan removal would be sufficient to meet the standards proposed by the EU, the plant will be equipped with a second stage to further reduce emissions. Indeed, the dioxin emissions will be lower than the new EU limit by a factor of 10.

The first stage of the removal involves the injection of activated carbon into the combustion gas duct, directly after the evaporative coolers. Activated carbon consists of small, porous carbon particles, which due to their porosity have a very large surface area. The large surface area helps to adsorb dioxins, furans, hydrocarbons and heavy metals.

In the second stage, the exhaust gas from the wet scrubbers undergoes a final gas cleaning step in an activated wet lignite coke filter. Lignite is derived from brown coal and can, in activated pellet form, be used to achieve final reductions in dioxin and furan levels. This filter will also remove acids, hydrocarbons and heavy metals and ensures that the emission levels will be below the limit values, even in the event of equipment failure.

2.4.6 Emissions Monitoring and Stack Discharge

The furnace and gas cleaning plant will be operated under negative pressure generated by the discharge fan located adjacent the stack. This ensures that the only emissions from the plant will be those fully treated and discharged through the stack.

Flue gas monitoring equipment will be installed to monitor emissions. This will consist of continuous monitors and regular grab sampling according to the specifications laid down in EU and Irish legislation for incineration plants. A calibration and maintenance programme will be implemented for the upkeep of this monitoring equipment. Additionally sample points and access will be available to EPA personnel to complete their independent inspection and monitoring programme.

Although it is not a requirement of EU or Irish legislation the monitoring equipment will include a state of the art continuous dioxin sampler. This sampler will allow the average rate of dioxin emissions to be monitored continuously, giving average dioxin emission concentrations and mass emission rates over a one or two week period.

The stack height of 40 meters has been designed in accordance with the applicable EU design codes to ensure that the discharge will not lead to any adverse impact on air quality. The dispersion modelling of the emissions from this stack are addressed in Section 4 of this EIS.

Prior to discharge, the cleaned gas leaving the lignite coke filter is then passed through the heat exchanger to increase its temperature from 60 °C to 100 °C. This increase in temperature reduces the formation of a visible plume at the stack discharge.

2.4.7 Solid Wastes

Ash is recovered from the incineration plant, in the form of bottom ash from the grate of the furnace, boiler ash from the boiler and flue gas cleaning residues from the baghouse filter located after the waste heat boiler.

The bottom ash, which is at high temperature, is quenched in a water bath prior to transfer to the ash bunker, which is contained within a closed building. Ash from the bunker is transferred into special covered trucks within the building. This will prevent any windblown ash escaping from the plant. The bottom ash will be sent for reuse or to landfill (see Section 2.8).

The boiler ash and the flue gas cleaning residues will be sent to the solidification plant where they are mixed with cement and water and placed in bags. The boiler ash will be sent to landfill and the flue gas cleaning residues will be sent to hazardous landfill (see Section 2.5.4).

The gypsum recovered from the wet scrubbers can either be used (if a market is found either in the construction or plasterboard industries) or sent to non hazardous landfill (see Section 2.5.4).

2.5 Operation

2.5.1 Introduction

(a) Community Recycling Park

The Community Recycling Park will be open to the public six days a week (from 8 am to 6:30 pm Monday to Friday and 8 am to 2 pm on Saturday), and will accept a broad range of different recyclable wastes. Based on the experience of a similar park in Navan it is expected that about 3,500 cars will use the park each month. It is expected that 2,000 tonnes/annum of recyclable domestic waste will be collected by the facility.

The community recycling park will use a small quantity of water for hand washing and toilet facilities and electricity for lighting.

(b) Recycling Plant for Non Hazardous Waste

The recycling plant will operate each time a delivery of recyclable waste is received. Although it may operate at any time of the day it will mainly be operated from 8am to 6:30pm Monday to Friday and from 8am to 2pm on Saturdays. Depending on sources of waste and the market for recyclable materials, it is expected that some 20,000 tonnes of waste will be processed by the recycling plant each year, with 16,000 tonnes being sorted for recycling.

(c) Waste to Energy Plant

The proposed facility will accept waste between 8am and 6pm five days a week and between 8am and 2pm on Saturdays throughout the year. Each line of the waste to energy plant will operate 24 hours a day for 7,500 hours/annum, being shut down for maintenance for the remainder of the time. However, the shutdown periods will be staggered so that the plant will be able to accept and dispose of waste on a continuous basis. One of the primary design objectives is to ensure that waste can be accepted on a continuous basis and this is why it was decided to base the design on two furnaces and two boilers, with an appropriately sized waste bunker.

The waste to energy plant will burn non hazardous commercial, industrial and household waste which is currently being disposed of to landfill, thus avoiding the production of landfill gas and leachate. In doing so it will produce useful energy in the form of electricity, thereby contributing to a reduction in the consumption of fossil fuels. The incineration process will produce an inert ash residue, much of which will be suitable for use as fill for road construction or for daily cover of landfill sites. A small quantity of hazardous waste will be produced, primarily as a result of the flue gas cleaning process (see Section 2.4.4). This will be solidified and will be disposed of to hazardous waste landfill, either in Ireland or abroad.

2.5.2 Process Inputs and Outputs

The major input to the process is waste for incineration and the major outputs are flue gas, ash and electricity. These are listed together with other inputs and outputs in the following Table which also shows the Section in which they are addressed.

Table 2.1 Process Inputs and Outputs

Input	Section	Outputs	Section
Waste	2.5.3	Ash	2.5.4
Water	2.5.5	Electricity	2.5.6
Natural Gas	2.5.6	Stack emissions	2.5.6

The plant will not produce any process effluent as any effluents will be recycled for use in the cooling spray tower, thus reducing the plant's overall water requirement. These effluents will consist primarily of effluent from the scrubbers, wash waters (from washing items of plant) and effluent from the boiler water treatment plant. Rain water will be collected on site for use in the process, reducing the water requirement and providing attenuation in the event of a storm.

2.5.3 Sources of Waste

During operation, the plant will accept waste from a variety of sources and for a variety of disposal and recycling options as follows:

Table 2. 2 Sources of Waste

Source	Disposal/recycling option
Municipal and industrial unsorted solid waste	Incineration with energy recovery
Dry recyclable commercial and industrial waste	Sorting for recycling and residue for waste to energy
Domestic recyclable waste	Accepting for recycling and dispatch for recycling elsewhere

Some 15 million tonnes (EPA National Waste Database) of municipal and industrial waste are produced in Ireland every year. Of this over 2 million tonnes is municipal waste, and about 1.75 million tonnes (or over 90%) of this waste are disposed of to landfill. EU, national and regional waste policy is saying that this dependence on landfill must be dramatically reduced.

The target market for the proposed plant is the four north eastern counties of Meath, Louth, Monaghan and Cavan. In the north east region over 500,000 tonnes of industrial and commercial waste (draft Waste Management Plan for the North East Region) are produced annually. The majority of this waste currently goes to landfill.

The proposed incineration plant is designed to burn 150,000 tonnes of waste per annum under normal operating conditions. This is less than 30% of the waste currently produced in the north east region.

The major part of this waste will be accepted from commercial and industrial enterprises and private waste collection companies. Indaver will also be bidding for Local Authority waste contracts if and when they arise.

As there are two furnaces and two boilers which can be operated independently of each other and each furnace can be operated at 60% of its nominal capacity, the plant can be operated at between 20 tonnes/hr (150,000 tonnes/year) with two furnaces and 6 tonnes/hr (45,000 tonnes/year) with one furnace at 60% capacity. There is therefore no technical impediment to operating the plant significantly below its nominal design capacity.

The Community Recycling Park for domestic waste will accept and dispatch the waste for recycling without charge for the local community's benefit. However, the waste sorting facility and the waste to energy plant will operate on a commercial basis. Indaver Ireland will accept waste from commercial enterprises, and will sort the dry recyclable waste for businesses that do not have the space to separate the waste at source.

2.5.4 Solid Waste Residues

(a) General

While the type and quantity of ash produced from any solid waste incineration process is dependant on the nature of the waste feed, experience has shown that with a typical mix of industrial, commercial and municipal waste approximately 250 kg of solid waste residue is produced per tonne of waste (see Figure 2.6). There will be four solid waste residues collected from the proposed waste to energy plant:

- Bottom ash
- Boiler ash
- Gypsum
- Flue gas cleaning residues

The bulk at about 20% of waste input (by weight) or 30,000 tonnes (as dry material) per annum is bottom ash, mainly consisting of inert material such as sand, glass, scrap and stones.

About 1-2% or 1,500 to 3,000 tonnes per annum will be collected as boiler ash. Some 3-4% or 4,500 to 6,000 tonnes per annum of the waste input will be collected as flue gas cleaning residue and gypsum. The process flow diagram in Figure 2.6 shows from what part of the process the different solid residues arise.

The indirect impacts associated with the disposal or reuse of these solid residues is addressed in Section 2.8.

(b) Use and Disposal of the Ash

The decision on whether or not the ash is hazardous will be made by referring to the classification set out in the European Waste Catalogue (EWC). If the ash does not contain the properties listed in H1 – H14 of the 'Waste Catalogue and Hazardous Waste List' and Annex III of Directive 91/689/EEC it is non hazardous and is suitable for disposal in a non hazardous waste landfill.

A leachate test on the ash will be carried out so that the results can be compared with the requirements of the Directive. This will ultimately determine if the ash is suitable or unsuitable for non hazardous landfill disposal in accordance with the Landfill Directive (99/31/EC) and Directive 91/689/EEC.

(Leachate is the aqueous effluent produced by rainwater on landfill sites and generally contains a high concentration of dissolved solids. A leachate test involves filtering water through ash and then analysing water for the above properties).

<u>Bottom Ash</u>

The bottom ash will consist of silicates, minerals, metal pieces, glass, compounds, as well as incompletely burned carbon compounds. It will be non hazardous and is often used as a road fill following treatment in an ash recycling plant. Any metals will be recovered from the bottom ash using magnetic sorting. These metals will then be sent for recycling.

It is the intention of Indaver Ireland to proactively identify potential uses for the bottom ash. This material is suitable for use in road construction and such a use would be in accordance with government policy on re use of waste. Although there is no Irish or European legislation or standard governing the quality of ash for use in roads, if the ash is to be used for road construction it must generally be of better quality than if it were to be disposed of in landfill. This improvement in quality can be achieved by treating the ash in an ash recovery plant. In Germany the quality of ash for use in road construction is defined by the Federal Work Group on Waste (LAGA) based on leachate tests.

If no market can be found for the bottom ash, it will be disposed of to a suitably licensed non hazardous landfill site.

Other than classification as hazardous, inert or otherwise, there is no Irish or EU standard for the quality of ash disposed of to landfill. Landfill for inert waste is for wastes that exhibit a slight organic content and which release a very low level of pollution in the leaching test. It is expected that the bottom ash will be suitable for disposal to this type of landfill.

Figure 2.8 below indicates the German standards for the quality of leachate required of ash for use in construction and for ash to be disposed of in landfill for inert waste.

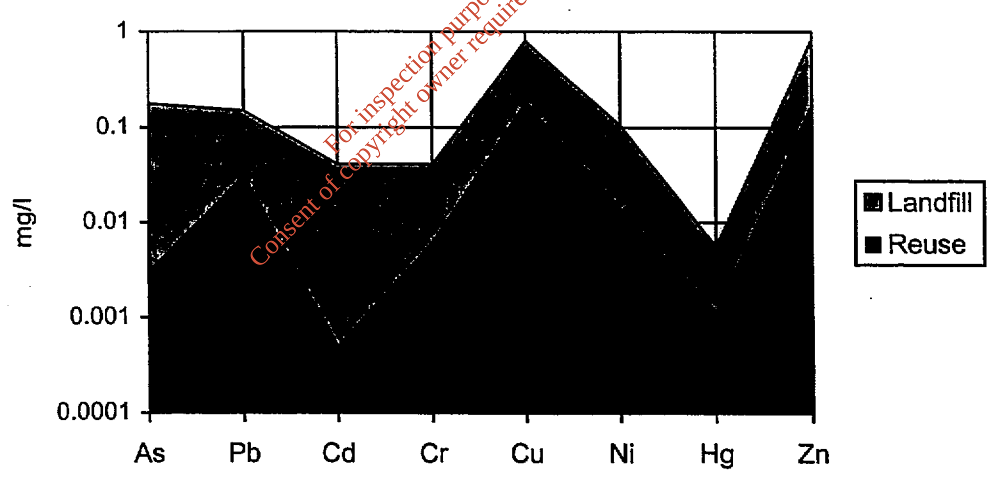

Figure 2.8 Quality Standards for Ash Leachate

<u>Boiler Ash</u>

The boiler ash will consist of compounds that will be carried over in vapour or particulate form from the combustion chamber. It will contain a higher concentration of heavy metals than the bottom ash and will therefore be solidified with cement prior to disposal to landfill. Leachate tests will be carried out to determine whether the boiler ash should be disposed of to hazardous landfill or non hazardous landfill. It is expected that, based on experience elsewhere in Europe, the boiler ash will be suitable for non hazardous landfill.

Flue Gas Cleaning Residue

The material collected in the baghouse filter will contain particulates not collected as boiler ash. It will also contain salts from the cooling spray tower (essentially solid residues from the flue gas cleaning process) and activated carbon. This residue will be classified as hazardous waste and as such must be disposed of in a hazardous waste landfill. Prior to disposal this residue will be solidified with cement.

Although it is an objective of the draft EPA National Hazardous Waste Management Plan to develop hazardous waste landfill capacity in Ireland there is currently no such capacity. If, at the time of commissioning of the waste to energy plant there is no landfill capacity, the fly ash will be exported for final disposal pending the establishment of a hazardous waste landfill in Ireland either by Indaver or by another party.

Indaver Ireland's sister company MinChem has over 20 years experience of collecting hazardous waste in Ireland and exporting it for disposal.

Gypsum

Gypsum removed from the purge from the wet flue gas cleaning prior to its injection into the evaporative spray tower. This can be recycled for use or disposed of to landfill if no market can be found. About 1,000 tonnes of gypsum will be recovered from the purge each year. The gypsum can be used in the construction industry, if a market exists, and is suitable for disposal to non hazardous landfill.

2.5.5 Water Supply and Use

(a) Raw water supply

As the plant uses an effluent free flue gas cleaning process and an air cooled condenser rather than cooling towers it has a significantly lower water requirement than would otherwise be the case. The major water requirement will be for flue gas cleaning. Process water (for steam cycle), domestic potable water and water for cleaning account for the rest of the demand. The expected water requirements are listed in Table 2.3 following:

Table 2.3 Water requirement

Use	Quantity (m^3/hr)
Flue gas cleaning	10
Process (steam cycle)	1
Domestic supplies	3
Cleaning	1
Total	**15**

The raw water requirement will be supplied by retaining rain water, groundwater abstraction and a small supply of potable water from the local water main. Of the 15 m3/hr, up to 10 m^3/hour of rainwater can be used in the process if available, with the balance being supplied from the groundwater abstraction (see Section 9). 1m^3/hr will be supplied from Meath County Council's water main on the R152 for potable supplies.

2.5.6 Other Inputs and Outputs

(a) Electricity Production

The incineration plant will convert the thermal energy produced by the combustion of the waste into electricity, some of which will be used by the plant itself with the remainder (11 MW nominal) being exported to the national grid. This will supply over 80 GWh of renewable electricity per annum, which will contribute to reducing Ireland's Greenhouse Gas emissions (see Section 10).

(b) Natural Gas Consumption

The plant will use natural gas at start up to bring the furnaces to the required operating temperature of 850 °C. Natural gas may also be occasionally required as a supplementary fuel to maintain the temperature if waste of an exceptionally low calorific value is received. In fact an automatic control system will bring natural gas on line should the temperature approach 850 °C.

This low gas demand can be supplied from the low pressure BGE pipeline running along the R152.

(c) Emissions

The emissions from the plant will consist of:

- Emissions to air discharged through the stack. These emissions and their potential impacts are detailed in Section 4.
- Noise emissions from various items of plant. The potential impact of noise emissions is addressed in Section 5.
- There will be no process effluent produced by the plant. The only aqueous discharge will therefore be rainwater runoff from hardstanding areas. Most of this will be collected and used as process water, with the remainder being discharged as described in Section 9.

Potential emissions include:

- Odours from the Community Recycling Park and waste acceptance hall and waste recycling hall– Section 4
- Noise emissions from steam safety valves – Section 5

2.5.7 Site Management and Personnel

When completed and fully operational, the plant will employ approximately 50 permanent personnel, some of whom will work in shifts as the plant will be operational 24 hours per day. Employed personnel will be split between the following functions:

- Management and Administration
- Operations
- Maintenance
- Quality Control and Assessment
- Shift operators for the waste to energy plant
- Sorters for the recycling plant

Initially, senior managerial staff will be sourced from experienced personnel either in Belgium or Ireland. All other staff will be recruited locally prior to start-up.

Key staff will be recruited prior to commissioning and will be trained at a similar plant in Belgium. Training will also be carried out in co-operation with equipment designers and suppliers. By doing this, the operators will become familiar with the equipment and learn first hand from the equipment's design engineers.

The plant's staff will be responsible for routine maintenance and inspections of the plant, maintenance budget planning, procurement of services and materials, managing and supervising repairs and overhauls, the upkeep of the management information system (MIS) and updating and renewing environmental and operating permits.

Major machinery repairs and plant overhauls which cannot be done by the plant's staff will be subcontracted out to either local contractors or to the plant's equipment suppliers. On such occasions the hiring of special expertise or specialised equipment will be required.

Through careful preparation and training, Indaver Ireland's staff will be prepared for every stage of construction and commissioning and operation of the proposed facility.

2.5.8 Health and Safety

(a) General

The operation of the waste to energy plant involves hazards such as quantities of combustible material, storage of chemicals, high voltage power lines and equipment, high pressure steam etc. During the design phase of the plant a Hazard and Operability study will be carried out. This is a systematic method of identifying hazards and assessing mitigation measures. Prior to start-up a comprehensive set of standard operating procedures will be drawn up for operation of the plant which in addition to the training provided will minimise risk. Additionally, in compliance with the 1989 Health and Safety at Work Act Indaver Ireland will draw up a safety statement covering operation of the plant and appoint safety representatives from the plant workforce.

The following measures (based on the experience of successful operation of Indaver's plant in Flanders) will be implemented to improve safety and minimise the risk of emergency situations.

- The plant design will be carried out according to standards, design codes, laws, good practices and experiences by skilled people.
- The design will be reviewed to check for safety hazards in steady and non-steady state conditions and for operability.
- Backup systems for pumps, computers, power supply, instruments etc will be provided for critical situations.
- A fire detection and fire fighting systems will be installed (fire eyes, guaranteed pressurised water network, synoptic with alarms).
- The design will be discussed with the local fire officer and Indaver's insurance company.
- A thorough interlock system will automatically shut down the plant in a safe manner in the event of equipment failure.
- The installations will be commissioned according to a schedule that provides also the testing of safety systems.
- The installations will be inspected by safety officers before starting up.
- The installations will be well maintained and cleaned.
- Indaver applies strict rules on safety such as a Working Permit System, training of operators and staff and provision and use of personal protection equipment.

(b) Emergency Response

A Site Emergency Plan will be prepared prior to start-up which sets out the response measures to be taken by personnel in the event of an emergency. These measures will be designed to ensure maximum protection for the site employees, site visitors and people in other premises near the site, to limit property damage and to minimise impact on site operations and the environment. The Site Emergency Plan will have four basic components:

<u>Prevention</u>

Prevention involves identifying potential hazards and then taking measures to remove the hazard, or reduce the potential for the hazard and its adverse effects.

<u>Preparedness</u>

Emergency planning, training programmes, emergency drill and exercise programmes are integral components of an effective preparedness programme. The site will have a dedicated 'emergency response team' which will be given specific training. Evacuation routes will be defined and all personnel will be aware of them.

Response

Response activities address the immediate and short term effects of an emergency. The site will be occupied on a continuous basis except during shut-down periods when there will be a maintenance and security presence on site.

Recovery

Recovery activities and programmes involve restoration of site services and systems to normal status.

(c) Fire Systems

The entire plant will be designed and provided with adequate fire protection and detection systems consistent with local fire authorities requirements. Indaver Ireland are in consultation with the Meath County Council Fire Officer to ensure that the fire protection and fire fighting system are in accordance with his requirements.

The fire protection system will be based on tried and tested systems which are provided in existing waste to energy plants. The systems for fire fighting shall include but not be confined to:

- Fixed water extinguishing
- Smoke detectors
- Fire alarm system
- On site water storage
- Manual call points
- Smoke ventilation
- Hydrants and hose reels
- Dry rising mains
- Fire extinguishing devices

The plant will be divided into fire areas and fire cells. In general every building forms a separate fire area and inside that area there will be fire cells. Special attention shall be paid to fire barriers and penetration seals in separating walls and floors all over the plant. These measures will help prevent the spread of fire within the plant.

The fire alarm system will cover the entire plant, with local detectors manual call points, local alarm bells, remote alarm and fire alarm/control panel. The main buildings will be fitted with dry rising mains, and hydrants will be located in such a way that any area of the buildings will be covered by at least two jets from hoses. In general outdoor hydrants will be installed every 50 meters around the plant.

Fire water will be stored on site in a 2,000 m3 storage tank. This tank will serve to store process water and fire water. The bottom 2/3 (about 1,300 m3) of the tank will be dedicated for fire water. There will be fire water pumps to circulate the water around the fire fighting system in the event of a fire. These pumps can be activated from a number locations around the site.

(d) Potential Hazards and Mitigation

Waste bunker

The greatest potential for fire arises in the waste bunker, where localised heating can occur due to decomposition of organic material or as a result of hot ash in the waste leading to isolated fires. Decomposition of waste can raise the temperature to 75 °C, drying the waste and causing it to smoulder. Incoming ashes from domestic fires wrapped in other waste can retain their heat. When waste in the bunker is moved these ashes could be exposed to air and could start to smoulder.

As the waste bunker is permanently monitored by the crane operator, a fire can be detected at an early stage by the operator of the mechanical grab. Should the crane operator fail to detect a fire, automatic fire detection systems will activate an alarm in the control room. However, a localised fire can usually be more quickly detected by the human eye than by the fire detection systems installed.

In the event of a fire, it is usually quite simple to lift the part of waste on fire into the hoppers from whence it goes into the furnace. This waste is then covered by placing another layer of waste into the hopper.

Should the fire become uncontrollable by this method, the fire can be put out using one of a number of water cannons. The crane operators will be trained in fire fighting techniques. All firewater will be contained within the bunker, eliminating the need for a firewater retention pond (see Section 9).

A number of design considerations will prevent flame back flow from the furnaces through the hopper into the bunker. First of all the furnace is kept underpressure. Secondly the waste feeding hopper is always filled to a minimum level generating a waste plug ball between furnace and bunker. This level is measured and safeguarded by interlocking. Finally, a valve in or on the hopper closes automatically in case of fire or other safety initialising signals.

Grate Furnace

The waste to energy plant is provided with detailed control and safety systems. Interlocks shut down the installation automatically as soon as a dangerous situation is detected. For an emergency shut down all air and waste supply is stopped, completely dousing any fire within about 20 minutes. In this event all gases will continue to be discharged through the stack via the flue gas cleaning plant.

In the event of failure of the main control computer or of the supply of utilities (air, electricity) the plant is automatically shut down in a safe manner.

Steam Production

The design of steam circuit will be carried out according to all legislative and good practice guidelines to minimise hazards. An emergency energy supply will keep one boiler feedwater pump in operation to keep the water level in the boiler above a minimum. This avoids overheating of the boiler.

Flue Gas Cleaning

The main hazard is too high a flue gas temperature at the outlet of the boiler. This can cause damage to the baghouse filters and ignite the activated carbon. To prevent this, the temperature will be controlled and in the event of a temperature threshold being exceeded the plant will automatically shut down.

There is no potential for fire in the activated lignite coke as this system works in wet conditions.

2.6 Construction & Commissioning

2.6.1 General

It is expected that construction work at the site will commence early in 2002 and that construction and commissioning of the plant will take approximately 18 to 24 months depending on the availability of contractors and labour. The civil engineering, building and associated finishing work is expected to extend over most of the two year period, peaking around the end of the first year.

The following sections outline the levels of staffing, equipment and traffic that are anticipated during the construction period and would be normal for a project of this size. Emissions likely to arise during the construction phase are also discussed in this section.

It is Indaver Ireland's intention to minimise the environmental impact of the construction activity by specifying high standards of housekeeping, ensuring appropriate attention to environmental issues within the construction contracts and by ongoing monitoring of performance during construction.

2.6.2 Construction Staffing and Equipment

A temporary construction compound will be located within the site which will provide all the necessary temporary facilities such as portacabins, toilets and washing facilities, carparking and laydown areas, etc.

The peak level of site activity will probably be about nine months before the end of the project, when the installation of plant and equipment approaches it's peak and significant work on building and landscaping aspects is still going on. It is estimated that the total site workforce will reach a peak of about 300 at this time.

Work will be carried out from Monday to Friday, with normal working hours being 07:00 to 19:00. During certain stages of the construction programme, some night and weekend working will be required but this will be kept to a minimum and will be carried out in consultation with local residents if any inconvenience to residents is envisaged.

Construction equipment used will be typical of a project of this scale and will consist of heavy duty earthmoving and excavating equipment, gravel and concrete trucks, mobile cranes and hoists.

2.6.3 Emissions During Construction

(a) Atmospheric Emissions

The only gaseous emissions expected during construction are those from internal combustion engines. There may be minor dust and particulate emissions during dry weather conditions. Site construction roads will be brushed and sprayed with water as appropriate in order to alleviate any dust problems in dry weather and wheel washing facilities will be provided on site to prevent mud or dirt being carried off site.

(b) Noise

Noise will be generated during the construction phase due to the use of excavators, pile-driving equipment, trucks, drills, etc. Construction noise will occur for a limited period, between 18 and 24 months. Emission levels will vary and the character of the noise will change during this period, and it is difficult to predict the exact character and level of noise which will be generated during any particular stage of construction. Construction will be limited to certain days of the week and specified hours in each day.

(c) Waste

During the construction phase, both solid and liquid wastes will be generated. Solid waste will consist of rocks and soil from site clearance and excavation, builders waste and packaging. Some rock and soil may be used as fill on site or will be disposed of off site along with other solid waste by a licensed waste disposal contractor.

Only small amounts of liquid wastes are anticipated. Sanitary waste from toilets and washing facilities will be connected to temporary sewerage facilities. Waste paints, solvents and oils will be stored in drums in a temporary bunded area prior to disposal/recycling off site by a licensed waste disposal/recycling company.

(d) Lighting

Some additional lighting will be required at the site, particularly during working hours in the winter months. This will be minimised to that required for site safety purposes. Only continuous lighting required for security purposes will be provided at night-time.

(e) Visual Impact

Visual impact during construction will be short term arising from the use of cranes to facilitate lifting machinery, excavators and earth moving equipment.

2.6.4 Construction Traffic

During construction, traffic will be generated due to the movements of the following on and off site:

- Indaver Ireland Personnel
- Contractors
- Material/Equipment Deliveries
- Visitors

Access for site traffic will be via the R152. A temporary hardstanding area for carparking will be provided within the construction compound.

A traffic impact assessment was carried out for the project by Atkins McCarthy and the potential impacts of construction traffic are addressed in Section 7. It is estimated that during the peak period of construction, transport of construction employees to and from the site will generate a total two-way daily traffic volume of 250 vehicles. The peak hour period for traffic generated will be from 7:00 to 8:00 am each morning. Peak two-way daily traffic volumes generated by deliveries to the site will be of the order of 50 vehicles per day.

2.7 Decommissioning

The waste processing facility has a projected life span of 25-30 years, though this may be extended. Should circumstances arise whereby it becomes necessary to shut down the facility, then Indaver Ireland will ensure that any negative environmental impact is minimised. This 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 disposed of/recycled through appropriate registered contractors.
- Plant equipment, machinery etc. will be cleared out post final operation, dismantled and stored under suitable conditions until it may be sold, or if a suitable buyer cannot be located, disposed of/recycled 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 decommissioning will not arise.

A detailed decommissioning plan will be submitted to the Environmental Protection Agency as part of the application for an IPC Licence.

2.8 Related Developments and Indirect Impacts

2.8.1 Ash Disposal

As described in Section 2.5.4 the waste to energy plant will produce three distinct residues:

- Bottom Ash
- Boiler Ash
- Flue Gas Cleaning Residues.

This ash will total approximately 25% by weight (on a dry basis) of the waste and 10% by volume. Therefore, as the plant will burn waste which currently goes to landfill, it will lead to a significant immediate reduction in the volume of material going to landfill.

(a) Bottom Ash

As described in Section 2.5.4 the bottom ash is suitable either for use in road construction or for disposal to non hazardous, inert landfill.

If it is possible to use the bottom ash as construction material, Indaver Ireland will ensure that any ash going for re-use complies with relevant standards. This will ensure that its use will not have any adverse impacts.

If a demand for the bottom ash cannot be found it will be disposed of to non-hazardous landfill. There are currently nine Local Authority landfill sites in the four counties in the north east region and some five private landfills. The draft Waste Management Plan for the North East region recognises that, as some of the Local Authority landfill sites are reaching the end of their life, there is a need for new landfill sites.

However, in the absence of a waste to energy plant as envisaged in the draft plan, the requirement for new landfill capacity would be much greater than the anticipated requirement. This is because the volume of ash produced by a waste to energy plant is only 10% of the volume of waste.

Due to the inert nature of the ash it will have lesser adverse impacts than untreated waste which is currently being landfilled.

Indaver Ireland will ensure that the disposal site which is used is well managed and appropriately licensed under Ireland's Waste Management Licensing regime.

(b) Boiler Ash

The boiler ash will account for a small proportion of the plant's solid waste residues, about 3,000 tonnes per annum. This will have a higher concentration of heavy metals and dioxins than the bottom ash and is not suitable for use as construction material. These metals and dioxins will be contained in the landfill and will not have any impact on the environment.

To reduce the leachability of the ash, it will be solidified using cement. This will further reduce the potential impacts of disposal by landfill.

Indaver Ireland will ensure that this ash is disposed of to a licensed landfill with appropriate management and leachate collection practices. The final destination of the boiler ash, either to hazardous or non hazardous landfill, will be decided on the basis of leachate tests as described in Section 2.5.4.

(c) Flue Gas Cleaning Residues

The flue gas cleaning residues will contain high concentrations of salts and slightly elevated concentrations of heavy metals and dioxins. This residue will therefore be classified as hazardous waste and will have to be disposed of to a hazardous waste landfill.

The lining, leachate collection and general management requirements are much more onerous for hazardous landfill than for non-hazardous landfill. These measures will ensure that there will be no adverse impact due to the disposal of the flue gas cleaning residues. Furthermore, their residues will be solidified with cement to mitigate any potential impact.

Although it is an objective of the draft EPA Hazardous Waste Management Plan to have hazardous waste landfill capacity in Ireland there is, as yet, no hazardous waste landfill. Consequently all hazardous waste is currently exported for disposal.

If this situation persists at the time of commissioning of the plant, the flue gas cleaning residues will be exported for disposal.

However, the preferred disposal route is to a hazardous waste landfill in Ireland.

2.8.2 Grid Connection

The waste to energy plant will export electricity to the local electrical distribution system via 20 kV overhead lines either to Rathmullan Substation about 2.5km north of the site or Duleek substation about 2km south of the site. These lines are routinely installed throughout the country and do not have the visual impact and Electro Magnetic Fields associated with high voltage lines. Indeed, planning permission is not required for 20 kV lines. The final route for the lines will be determined by the ESB after consultation with land owners.

The existing 110 kV lines traversing the site may be diverted around the site's boundary as part of the development. This would be the subject of a separate planning application by the ESB.

2.8.3 Gas Supply

The plant will use small quantities of natural gas for start up and potentially for auxiliary firing. However, the demand is not large and gas can be supplied from the nearby low-pressure gas pipeline running along the road (R152).

2.9 Need for the Development and Alternatives

2.9.1 Introduction

A total of 15 million tonnes of waste were produced in Ireland in 1998, some 2 million tonnes of which consisted of municipal waste (National Waste Database, 1998). The municipal waste comprised 1,220,856 tonnes of household waste, 754,797 tonnes of commercial waste and 80,999 tonnes of street cleaning waste. Over 90% of this waste is sent to landfill (96.8% of household waste and 81.3% of commercial waste). It is generally accepted that landfilling of waste is the least desirable waste management strategy. Indeed the EU Landfill Directive (which was due to be enacted in Ireland by July 2001) – 1999/31/EC limits the amount of biodegradable waste going to landfill. Targets are set for progressively reducing the quantity of biodegradable municipal waste going to landfill as follows (related to 1995 data):

- 25% reduction by 2006
- 50% reduction by 2009
- 65% reduction by 2016

Current waste management practice is obviously far removed from the targets set by the Landfill Directive and significant changes in practices will need to be implemented in the near future.

Government policy on Waste Management is set out in the 'National Sustainable Development Strategy' (1997) and in 'Waste Management – Changing Our Ways' (1998).

The main thrust of the policy is to reduce national dependence on landfill. The targets set by government policy are as follows:

Waste Management – Changing Our Ways

Targets

- Diversion of 50% of overall household waste away from landfill;
- A minimum of 65% reduction in biodegradable waste going to landfill;
- The development of waste recovery facilities employing environmentally beneficial technologies;
- Recycling of 35% of municipal waste;
- Recycling of at least 50% of construction and demolition waste within a five year period, with a progressive increase to at least 85% over fifteen years;
- Reduction in the number of landfills; and
- An 80% reduction in methane emissions from landfill.

The National Waste Management Policy underlines the regional approach to waste management and various regions in Ireland are required to prepare Waste Management Plans. The draft Waste Management Plan for the North East was published in November 1999, and has been approved by the Councillors in Counties Meath, Monagahan and Cavan. This plan recommends and Integrated Waste Management Strategy consisting of minimisation, reuse, recycling, composting/digestion, thermal treatment and landfill.

2.9.2 Alternative Waste Management Strategies

The technical solution proposed for the plant is the combustion of waste using conventional grate furnaces with energy recovery in the form of electrical generation. While there are no examples of this technology in Ireland as of yet, it is widely practised in European countries as a disposal option. Figure 2.9 shows the waste management strategies for biodegradable municipal waste (BMW) in a number of European countries.

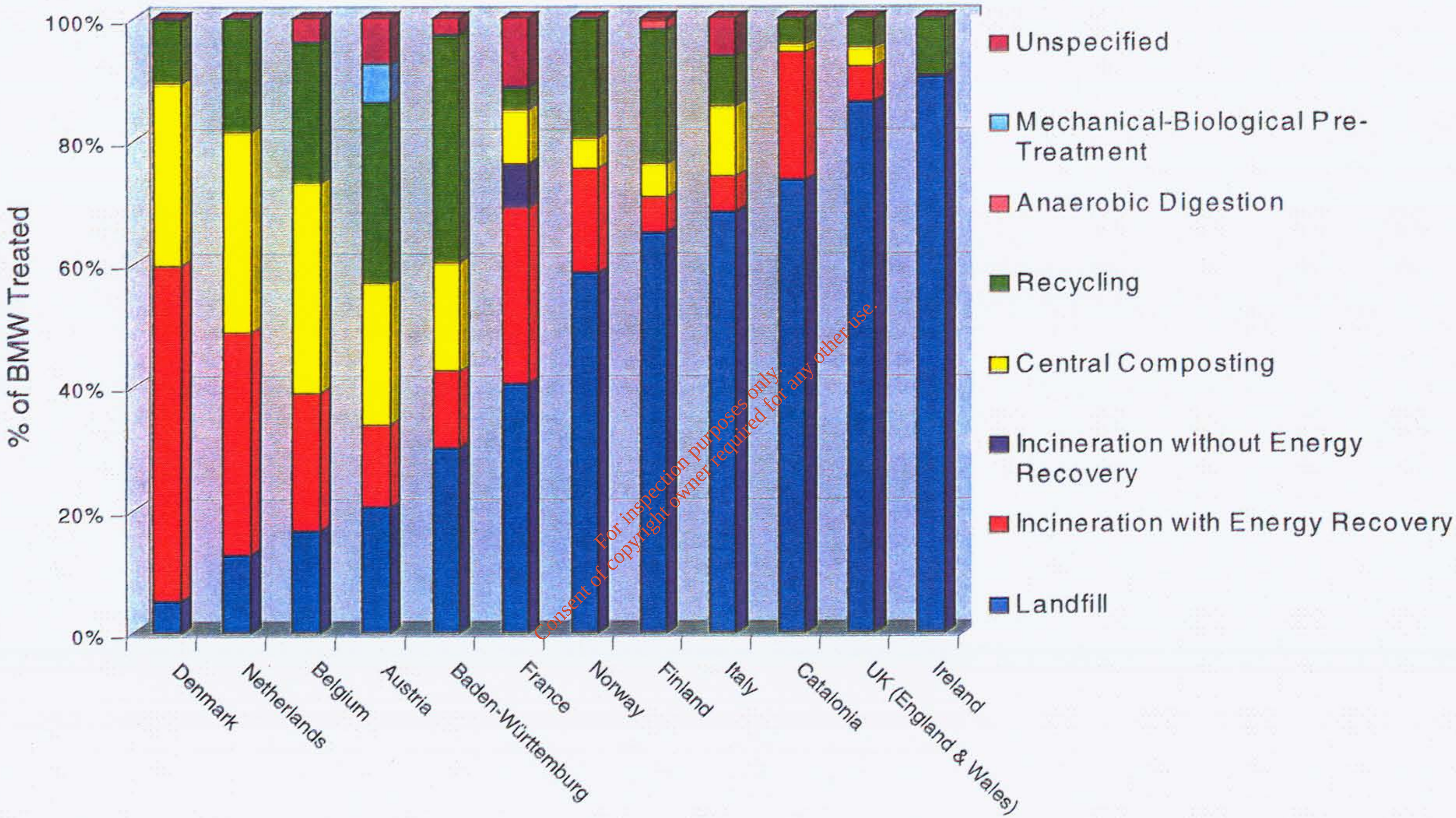

Figure 2.9 – Waste Management strategies for Biodegradable Municipal Waste (BMW) in European Countries

In 1996 it was estimated that there were some 2,400 waste incineration facilities world-wide, the majority being of grate furnace design.

There are however alternatives to conventional grate incineration for waste management. These are best addressed within the European Union's policy on waste, given in the 5th Action Plan on the Environment (93/C 138/56). The strategy includes a hierarchy of waste management options in which primary emphasis is laid on waste prevention, followed by promotion of recycling and reuse, and then by optimisation of final disposal methods for waste which is not reused. The objectives for municipal waste are:

- Prevention of waste (closing of cycles)
- Maximal recycling and reuse of material
- Safe disposal of any waste which cannot be recycled or reused in the following ranking order:
    - combustion as fuel
    - incineration
    - landfill

These objectives will be addressed in detail in the next Sections.

2.9.3 Prevention of Waste

Prevention of waste is the cornerstone of all waste policies. The proposed development is a commercial operation with commercially appropriate charges for waste disposal. Therefore the 'Polluter Pays' principle applies. This principle allocates the cost of pollution to producers and consumers rather than to society at large. The charges applied will therefore act as an incentive for the minimisation of waste at source.

A frequent charge levied against the incineration of municipal waste is that they require large quantities of waste, in particular waste of high heating value, and that this leads to disincentive for the prevention and recycling of waste. As the proposed plant will incinerate only 30% of the waste generated in the north east region, over 70% of waste is available for other waste management options including recycling.

Practical experience in Germany indicates that the extent of recycling is more intensive in regions with incineration plants. In part this is due to a higher level of environmental awareness, but the higher disposal costs associated with incineration, which regulate against excessive production of waste, are also a factor. Similar results have been found in other countries (e.g. Austria and Denmark) which use incineration within their waste management policy.

Indaver have a successful history of promoting waste prevention initiatives and Indaver Ireland provide a public information service on the means of preventing waste. The first publication produced was a home composting guide, which was distributed at all information days and public meetings and can be ordered or downloaded from their website (www.Indaver.ie). A copy of this brochure is contained in Attachment 2.

2.9.4 Maximal Recycling and Reuse of Material

The charges applied for the disposal of waste at the facility will act as an incentive for recycling and reuse. Recycling and reuse includes segregation and recycling of the usable fraction of waste and the composting of organic material fractions. The European Union itself has set the target of recycling/reuse of paper, glass and plastics of at least 50%. Indeed the level of segregation and recycling currently practised in Ireland, at 3.2%, lags considerably behind our European neighbours and the targets set in Government Policy are very ambitious.

Flanders achieves one of the highest recycling rates of all western countries with a recycling rate of 58.9% in 1998. This grew from a rate of 18.3% in 1991 through a combination of regulations, agreements and taxes and has resulted in a decrease of 35% in waste to be incinerated or landfilled. A successful system of selective collection of recyclables, based on door to door collection and Community Recycling Parks, has facilitated this decrease. However, despite this very successful increase in recycling rates, the Flemish authorities recognise that there is a need for both incineration and landfill in their overall waste management strategy.

Germany has one of the most developed waste management infrastructures in Europe. As far back as 1990 the German Department of the Environment addressed the issue of recycling in its publication on the importance of municipal incineration within waste disposal policy. The German government found that a responsible minded public, and a consequent recycling of material, led under optimum conditions to a weight reduction in private household waste (ca. 250 kg/capita per year) of 20 – 25%.

These figures, while actually achieved in some areas, relied on exceptional collection systems. Additional reductions in weight could be achieved through the intensification of home composting and the collection of biowaste (organic kitchen and garden wastes) with municipal composting. The resultant total weight reduction in private household waste with collection of biowaste lies at 38 – 49 % when 80 % of the citizens are connected to the system. That is, with maximum recycling rates and a separate collection for organic waste, less than a 40% reduction in waste for final disposal is considered attainable.

This experience is mirrored by the experience in Canberra Australia (population 300,000 urban dwellers). The 'Australian Capital Territory – No Waste by 2010' programme has been actively promoting minimisation and recycling. Their initiatives have included provision of separate recycling bins with compartments, promotion of composting and public information programmes. The programme has achieved a 42% reduction in waste going to landfill in five years (1994 – 1999) from over 400,000 tonnes/year to just under 250,000 tonnes/year. However in latter years the rate of reduction has levelled off and there was in fact an increase in the amount of waste going to landfill between 1998 and 1999 when over 250,000 tonnes of waste was landfilled.

Disregarding agricultural waste, 516,000 tonnes of waste is produced in the four north east counties. The Draft Waste Management Plan for the North East Region depicts a number of integrated Waste Management Strategies. It is projected that the maximum recycling rate ranges from 43% to 51% with between 49% and 57% being left for final disposal or a combination of thermal treatment and final disposal. The proposed waste to energy plant will treat less than 30% of this waste.

The proposed facility will promote the recycling of waste through the provision of a community recycling park and the waste sorting plant. However, while recycling and reuse play a major role in an integrated waste strategy, experience in Europe and Ireland is that a disposal option is required for 40 to 60% of the waste produced. Therefore the total recycling option, where no disposal through incineration or similar technologies is required, has not proven in practice to be feasible.

2.9.5 Combustion as Fuel

The combustion of waste in incineration plant dates back more than a 100 years, with the first example in Europe going into operation in England in 1876. However these units were little more than covered bonfires with correspondingly high emission rates and no energy recovery. By the 1920's the technology had advanced with the development of automated grate firing and particulate removal. During the 1970's concern over the effects of acid gas emissions grew and incinerators began to be fitted with acid gas abatement systems. Concern over dioxins grew in the 1980's and 1990's and dioxin removal systems are now an essential part of a waste to energy plant.

Thus the modern waste to energy plant is a sophisticated refinement of a technology that has developed over 100 years, and incorporates flue gas cleaning and energy recovery. Indeed, it is estimated that up to 50% of the plant investment is in the flue gas cleaning and residue treatment plant.

The proposed plant where waste that cannot be reused or recycled will be incinerated to recover as much of the energy content of the waste as possible, is in line with EU policy. The energy content of waste is similar to that of peat or about one third that of coal. The proposed development, as discussed in Section 2, contains energy recovery in the form of electrical production through use of a steam turbine. The combustion principle of the design, using a moving grate furnace followed by steam recovery and flue gas cleaning, is the standard for waste incineration in Europe, comprising most of the 500 waste thermal treatment plants.

This current best technology for the low emission disposal of waste includes the production of electricity, and where possible heat for district heating. The electrical generation efficiency of this design is about 20%, which is low compared with efficiencies of about 37% that can be achieved with coal burning technology or about 57% with modern natural gas combined cycle gas turbine plants.

This relatively low efficiency is due to the fact that combustion of waste can lead to corrosive flue gases that attack boiler components. It is thus not possible to recover steam at either high temperature, or very low temperatures as the boiler components would be attacked by the corrosive flue gases. The steam output from the boiler is thus reduced leading to a reduced electrical output from the steam turbine and generator set. Furthermore, waste incinerators need to operate with a higher quantity of excess air than power plants in order to meet the lower emission limits.

A number of options are being investigated to improve the energy recovery of waste incineration. One of these options is the use of superheaters that allow steam to be generated at a higher temperature and pressure. However these technologies are not proven, and are thus not suitable for this plant.

A number of novel technologies are at the research stage to utilise the low grade heat available from waste incineration. These include the Kalina cycle, an ammonia and water based system, and the upgrade of gas turbine fuel (synthesis gas) by chemical change. These technologies are however still in the development stage.

2.9.6 Alternative Waste to Energy Technologies

By far the most promising technologies as an alternative to grate incineration are the advanced thermal conversion technologies of pyrolysis and gasification for energy from solid waste. Gasification is the conversion of a solid or liquid feedstock into gas by partial oxidation under the application of heat and sometimes water. The gas can then be used as fuel in boilers, combustion engines or gas turbines. Pyrolysis is the thermal degradation of a material in the complete absence of an oxidising agent (typically air). The by-products can then be used as a fuel for energy production.

The International Energy Agency (IEA), of which Ireland is a member, has published a booklet on Advanced Thermal Conversion Technologies for Energy from Solid Waste. This booklet is available free of charge from the Irish Energy Centre, whose web site is www.irish-energy.ie. The review concludes that pyrolysis and gasification technology is at the point of transition between research and development and commercial phases. It states that, from the data available, the indications are that advanced thermal conversion technologies will have similar costs, may have lower environmental emissions and there are prospects for higher levels of energy recovery.

These technologies are still being commercially proven, and indications are that they require a more uniform and pre-treated waste stream. To achieve the full potential for energy recovery from these advanced thermal technologies combustion of the char produced is required in a downstream waste to energy or similar facility. The carbon content of the char is also too high to meet future EU limits for landfilling, and unless payment can be received for use of this char as a fuel substitute the operating cost of the facility is higher than with conventional waste incineration.

Furthermore, pyrolysis and gasification both produce toxic, flammable gas that can cause intoxication and explosive conditions in case of leaks. This increases the hazard associated with the plant and also the capital investment costs. Given that these advanced thermal conversion technologies do not as of yet have a sufficient track record in full scale commercial operation, they were not considered suitable for the multi-purpose requirements of the proposed project.

With regard to the design of the combustion section of the incineration plant fluidised beds do exist as an alternative to conventional grate furnaces.

In a fluidised bed system the waste is pre-treated, usually by shredding, with the resulting particulates and fluidised sand bed suspended in an upward airflow in the combustion chamber. This ensures uniform combustion conditions and is particularly suitable for efficient combustion of low grade fuels. An example being peat or sewage sludge combustion, where it is now the industry standard. For waste combustion fluidised bed systems are common in Japan, and there are a number of examples in operation in Europe.

Fluidised bed is particularly suited for the combustion of wet sludges and material of a low calorific value, which are not planned for the proposed plant. Furthermore, a fluidised bed furnace requires a pre-treatment of the waste, which is easier with dry wastes than with the typically wet waste (c. 40% moisture) waste expected to be received by the proposed plant. The technology also has a less extensive reference list than grate furnaces. It was on the basis of these considerations that the more established grate furnace technology was chosen for the proposed plant.

2.9.7 Incineration

Incineration without energy recovery has not been considered for this project as energy recovery as discussed above represents the Best Available Technology.

2.9.8 Landfill

Landfill of waste represents the lowest level of the waste hierarchy given by the EU. Methane, which is a potent greenhouse gas, is produced with odorous by-products through the decomposition of biodegradable matter in a landfill. While landfill gas collection systems can capture up to 50% of this gas for energy generation, significant quantities of gas are dissipated to the environment. Additional problems arise from degradation by-products in the aqueous run-off from the landfill (leachate), which presents a pollution threat to ground water and surface water, while litter and vermin will have an impact unless well managed.

2.9.9 Conclusions

Over 90% of municipal waste in Ireland currently goes to landfill. This situation is not environmentally sustainable and must be changed to comply with the requirements of the EU landfill Directive. The Government's waste policy is firmly based on the waste management hierarchy and an integrated approach to waste management. Its targets are to reduce the amount of household waste going to landfill by 50% and to reduce by 65% the amount of biodegradable waste going to landfill.

Attaining these targets will require a seismic shift in waste management practices on a national, regional and personal level and will require a balanced, integrated waste management strategy rather than one simple solution. The optimum strategy will necessarily include all elements of the waste management hierarchy – from prevention to final disposal.

Claims that all waste can be recovered and recycled have not been borne out by the experience of countries with a much more developed waste management strategy (and higher levels of public awareness) than Ireland such as Germany, Flanders and Australia. Indeed the Government's target of recycling of 35% of municipal waste is quite ambitious. This means that, even in a highly optimised waste management strategy, a proportion of the waste remains for final disposal.

Waste to Energy plants (or thermal treatment plants) are higher up on the waste hierarchy than landfilling and mainly produce inert waste with only 10% of the volume of the original waste. Diversion from landfill is part of the Government's policy on waste, a policy which has been echoed in all the regional Waste Management Plans – most notably that for the North East Region.

Waste to Energy plants also provide a renewable source of energy and the construction of such a plant is in line with EU and national policy to promote renewable energy sources.

2.10 Site Selection

2.10.1 Selection Criteria

The site selection exercise was carried out over an extended period of time using technical and environmental criteria. The technical criteria included those factors which are seen as essential to the project by Indaver Ireland, namely

- Proximity to Centres of Waste Production – Centre of Gravity of Waste Production
- Proximity to Transport Infrastructure (National Roads)
- Proximity to Electrical Distribution System
- Appropriate zoning/land use
- Availability of sites

Other technical and environmental criteria have been published for waste management facilities, most notably in:

1. Site Selection for New Hazardous Waste Management Facilities, WHO, 1993. (Although this publication relates to hazardous waste management facilities, many of the site selection criteria contained therein can be usefully applied to non hazardous facilities.)

2. Feasibility Study on Thermal Treatment Options for the North East Region, DOELG, 1999.

These criteria, which are detailed in the following sections were adopted for the site selection exercise.

(a) WHO Criteria

The WHO suggest a four step site selection procedure which is summarised in Table 2.4.

Table 2.4 – WHO Site Selection Criteria

Step 1 – Eliminate unsatisfactory Areas	Step 2 – Highlight Promising Areas
Coastal Areas Subject to Floods	Industrial areas
Coastal wetlands	Sites of existing Waste Management Facilities
Areas with limestone deposits	Compatible public lands
Areas with subsurface mining	Abandoned properties
Areas critical for Aquifer recharge	Lands with major highway access
Lands designated for preservation	Lands near waste generators
Areas of high well yield	
Areas of reservoir watersheds	
Step 3 – Assess Promising Areas in Detail (environmental and human impacts)	**Step 4 - Evaluate and Rank Sites**
Riverine areas subject to floods	Population Density
Freshwater wetlands	Response time of rescue squads and emergency services
Areas with flood hazards relating to a dam	Whether the site includes critical habitats or areas of potential mineral developments
Coastal areas for shellfish and fishing	Groundwater and soil characteristics
Areas upstream of water supply intakes	Slope
Areas of special significance	Access to sewers
Visual corridors of scenic rivers	Transport restrictions
Existing developed areas	Structures along transport corridors
Areas for which non industrial development is planned	Whether the area contains historic sites
Agricultural districts	Visual impact
	Feasibility of acquisition

While these criteria relate to hazardous waste facilities, and many of the criteria are more applicable for a landfill site than a waste to energy plant, their application potential sites provided a useful objective assessment of the site's suitability.

(b) Feasibility Study for North East Region

The Feasibility Study on Thermal Treatment Options for the North East Region adopts a two stage site selection process of short listing and assessment, using the following criteria:

Short listing:

- Proximity to Origin of Waste
- Transport links with surrounding region
- Proximity to Potential Energy Users

Assessment:

- Cross border possibilities
- Site availability
- Transfer stations
- General considerations

These criteria are specifically designed for evaluating sites for thermal treatment plants in the North East Region and were therefore applied to the site selection exercise.

2.10.2 Alternative Locations Considered

An overall screening exercise was carried out with a view to finding suitable locations within the north east region. This preliminary screening involved the application of the above criteria, namely:

- Indaver's technical selection criteria.
- Steps 1&2 of the WHO selection procedure (where the criteria are applicable to non hazardous waste to energy facilities)
- Shortlisting criteria from the Feasibility Study for the North East

The most important criteria for selection of the general area in which to locate a Waste Management Facility are

a. the Centre of Gravity of waste production, that is to select the area where the haul distance to bring waste to the facility is minimised.

b. Existing industrial character and suitability for industrial development

c. Availability of Sites

(a) Centre of Gravity

In order to calculate the centre of gravity of waste production it was assumed that waste arisings in a town is approximately proportional to the population of that town. The total haul distance at any location is then estimated by:

- Multiplying the population of any given town by the distance of the town from the location (kilometers) for each town to give estimated tonne kilometer haul distance.
- Adding the estimated tonne kilometers haul distance calculated for each town to give the estimated total tonne kilometer haul distance.

The total estimated haul distance was calculated for each of the major towns in the north east. The estimated haul distance (to transport all waste from each of the other towns) for the towns is shown in Table 2.5 below and a detailed calculation is contained in Appendix B.

Table 2.5 Estimated haul distance to major towns in the north east region

Location	Population	% of Total Waste	Estimated Total Tonne Kilometres
Drogheda	25,282	20.81	**4,074,374**
Dundalk	30,195	24.85	4,496,021
Navan	12,810	10.54	4,669,212
Cavan	5,623	4.63	9,053,356
Monaghan	5,842	4.81	8,023,972
Duleek	1,731	1.42	**4,343,593**
Bailieborough	1,529	1.26	5,672,020
Kingscourt	1,190	0.98	4,719,136
Coothill	1,822	1.5	7,163,060
Belturbet	1,248	1.03	9,991,317
Ardee	3,791	3.12	**3,975,693**
Ashbourne	4,999	4.11	5,946,420
Laytown	3,678	3.03	5,254,130
Kells	3,542	2.92	4,997,747
Dunboyne	3,080	2.53	6,942,144
Dunshaughlin	2,139	1.76	6,082,512
Trim	4,405	3.63	6,154,026
Carrickmacross	3,617	2.98	4,770,540
Castleblaney	2,808	2.31	5,886,574
Clones	2,170	1.79	9,473,218

As can be seen from Table 2.5 above, the areas around which the haul distance is minimised are Ardee, Drogheda and Duleek.

In calculating the above tonne miles, the type of roads (motorway, primary routes, secondary roads etc) was not considered. This does not adequately weigh the selection process in favour of sites close to major transport routes (motorways and primary roads), and will tend to underestimate the suitability of sites located close to such roads.

The proximity of the M1 (Drogheda bypass) to the Drogheda and Duleek areas would allow access via motorway to Dundalk which is the largest population centre in the north east region. The Drogheda area also has the second largest population in the north east.

Ardee is also well positioned to provide motorway links to both Dundalk and Drogheda.

(b) Industrial Character

A major consideration in selecting the most appropriate location was to select an area with an existing industrial character. As no large scale industry is located in Ardee, it was not further considered.

The Platin Cement Factory is located some 5 km south of Drogheda and 2 km north of Duleek, and the existing character of the landscape is industrial in character.

The suitability of the Platin area for industrial development was confirmed by the decision of Meath County Council (which was subsequently upheld by an Bord Pleanala) to grant planning permission for the development of a power plant in the area.

(c) Availability of Sites

On the basis of the above criteria it was concluded that the Platin area was ideally suited for the development of a waste management Facility. A number of particular sites were chosen for detailed investigation and the land owners were approached.

A site in Carranstown was found to be suitable based on the following, as well as satisfying the above selection criteria:

- Lack of designation as a National Heritage Area or a Special Area of Conservation.
- Topography of site, to allow the large building structures to be built on lower ground, thus reducing the visual impact.
- Low population density and distance to large residential development.
- Access to the R152 and sufficient road frontage to allow a suitable junction to be built.
- Proximity to electrical distribution system.

2.10.3 Detailed Assessment of the Carranstown Site

The Carranstown site is evaluated with respect to the selection criteria in the following sections. Section (a) relates the suitability of the site to the WHO Guideline Criteria while Section (b) evaluates the site according to the criteria used in the Waste Management Plan for the North East.

(a) WHO Criteria

The following Table (2.6) ranks the proposed site according to the criteria specified by the WHO guidelines. Many of the criteria specified in the guidelines are obviously designed for landfill sites and the applicability of the criterion to the proposed facility is therefore indicated.

As can be seen the site meets the criteria specified by the WHO, where applicable. Where the site does not rank highly with respect to any criterion, the Section where potential impacts are addressed is referenced.

Table 2.6 – Proposed Site Ranked According to WHO Selection Criteria

Step 1 – Eliminate unsatisfactory Areas	Applicability of Criteria	Sensitivity of Site	Step 2 – Highlight Promising Areas	Applicability of Criteria	Ranking of Site
Coastal Areas Subject to Floods	Low[1]	Low	Industrial areas	High	High[4]
Coastal wetlands	Low[1]	Low	Sites of existing Waste Management Facilities	High	Low
Areas with limestone deposits	Low[3]	High	Compatible public lands	Low	Low
Areas with subsurface mining	Low[1]	Low	Abandoned properties	Low	Low
Areas critical for Aquifer recharge	Low[1]	Low	Lands with major highway access	High	High[5]
Lands designated for preservation	High	Low	Lands near waste generators	High	High[6]
Areas of high well yield	Low[1]	Medium[2]			
Areas of reservoir watersheds	Low[1]	Medium[2]			

Notes:

1) These Criteria are mainly applicable to landfill sites
2) The aquifer is considered Locally Important – see Section 9 for assessment of impacts
3) This criterion is mainly applicable to landfill sites. The potential impact of the plant on limestone reserves is addressed in Section 9.
4) Due to proximity to Platin Cement and the proposed power station
5) The R152 is a National Road with the capacity to accommodate traffic generated and the site is located 2km south of the planned M1 interchange – see Section 7 for assessment of impacts
6) The site is centrally located with respect to centres of waste production

Step 3 – Assess Promising Areas in Detail (environmental and human impacts)	Applicability of Criteria	Sensitivity of Site	Step 4 - Evaluate and Rank Sites	Applicability of Criteria	Ranking of Site
Riverine areas subject to floods	Low	Low	Population Density	High	High
Freshwater wetlands	Low	Low	Response time of emergency services	Low[4]	Medium
Areas with flood hazards relating to a dam	Low	Low	Critical habitats or potential mineral developments	High	High
Coastal areas for shellfish and fishing	Low	Low	Groundwater and soil characteristics	Medium	Medium
Areas upstream of water supply intakes	Low	Low	Slope	High	High
Areas of special significance	High	Low	Access to sewers	Low	Low
Visual corridors of scenic rivers	High	Low[1]	Transport restrictions	High	High
Existing developed areas	High	Medium[2]	Structures along transport corridors	High	Medium
Areas for which non industrial development is planned	High	Medium	Whether the area contains historic sites	High	High
Agricultural districts	High	High[3]	Visual impact	High	High
			Feasibility of acquisition	High	High

Notes:

1) The potential visual impact on the Boyne Valley is addressed in Section 6
2) The proximity to Platin Cement and the proposed power station is a positive factor in this respect
3) The impact on land use in the area is addressed in Section 3
4) The plant will have its own fire fighting team and will be independent of external emergency services

(b) Feasibility Study for North East Region

The proposed site is evaluated according to the selection criteria as follows. In order to compare the assessment to that carried out in the feasibility study the proposed site is ranked according to the same methodology.

Proximity to Origin of Waste

The centre of gravity of waste production in the north east is very close to the proposed site.

Transport links with surrounding region

The proposed site is adjacent to, and has significant road frontage onto, the R152 regional road. This road is in a good condition, has a large capacity for traffic and connects into the existing N1 and N2 national primary routes. Furthermore, it is a short distance from the proposed new M1 motorway which is due to be finished by the time the facility would be commissioned. The site therefore has excellent transport links with the north east area.

Proximity to Potential Energy Users

The site is in close proximity to 110 kV power lines and to 38 kV power lines. It is also adjacent to Platin Cement – proximity to cement plants is specifically mentioned in the feasibility study. It is therefore relatively simple to export the electricity generated and it may be possible to identify a heat demand in the future.

Cross border possibilities

Indaver Ireland do not anticipate that the proposed facility would accept waste generated in Northern Ireland.

Site availability

As the Meath County Development Plan allows for industrial development on 'white land', there is a good deal of land available for development.

Transfer stations

As for proximity to waste, the proposed site is located centrally with respect to the major towns in the north east.

General considerations

The site, while located close to some residential dwellings is not located 'very close to any major residential areas'. While the site is not specifically zoned for industrial use, the proximity to the Platin Cement factory gives the area an industrial character, as was acknowledged by Meath County Council in the planning report of the proposed power station nearby.

As described above the site is on the R152 and has good transport links via the N1, N2 and planned new motorway.

2.10.4 Conclusions

The proposed site was chosen after a comprehensive site selection exercise based on objective criteria. It meets all the evaluation criteria it has been subjected to: technical project related criteria, WHO criteria and criteria suggested in the feasibility study on thermal treatment options for the north east region.