3. THE HUMAN ENVIRONMENT

3.1 Existing Environment

3.1.1 Land Use, Zoning & Housing

The site is located in the townsland of Carranstown approximately 3 km north-east of Duleek village. As can be seen from Figure 3.1, the land use in the area is predominantly agricultural with the exception of the Platin cement factory and its associated quarry located to the north-east of the proposed development site. A commercial freight railway line, used to transport freight for Tara Mines and Platin Cement, runs within 50-100 metres of the northern boundary of the site.

Just outside the area shown in Figure 3.1, Mount Hanover School lies about 1 km east of the proposed facility.

The area does not have any specific land zoning in either the existing (1994) or proposed (2000) Meath County Development Plan and is considered rural and agricultural. The development plans allow for industrial development in unzoned areas. One of the development objectives in the Development Plan for rural areas is to 'ensure that commercial and industrial proposals for rural areas are sustainable'.

3.1.2 Population

Meath is located in the fastest growing region in the country, the Mid-East region. Population has steadily increased in Meath throughout the 1990's and significant increases in population are expected over the next decade.

3.1.3 Employment

The Mid East region in which Meath is located is growing particularly strongly with increases in its output outperforming the Dublin area by a factor of almost 2:1.

3.1.4 Amenities and Tourism

The land in the immediate vicinity is predominantly privately owned agricultural land and therefore does not have significant amenity value for members of the general public. The closest natural recreational area to the development site is the area around Bellewstown Hill located about 4 km south of the site which has a listed viewing point over the area. Other natural recreational areas close to the development site are around Newgrange and Dowth Megalithic Cemetery and the Boyne River Valley located 4-5 km to the north west of the site.

The area immediately surrounding the site is not a significant tourist attraction. The Boyne Valley does have significant tourism potential for fishing and due to the archaeological value of the area.

3.2 Potential Impacts during Construction

3.2.1 Land Use, Zoning and Housing

Site clearance and construction on the development site will result in the loss of some land (ca. 25 acres) that was previously used for agricultural purposes. It is not predicted that the construction phase of the development will have any impact on land use in the surrounding area.

3.2.2 Health

The construction of the development is not predicted to have any potential impacts on the health of local residents.

3.2.3 Employment

The duration of the construction period will be between 18 and 24 months. During this period up to 300 workers, both skilled and unskilled will be employed on site. Where possible, local services and construction staff from the surrounding areas and counties will be used. Therefore the construction of the development will have a significant temporary positive impact on employment.

3.2.4 Amenities and Tourism

The construction phase of the development is not predicted to have any significant impact on the amenities or tourist potential of the site or surrounding area.

3.3 Operational Impacts and Mitigation

3.3.1 Land Use, Zoning and Housing

As with the construction phase the operation of the development will result in the change of use of some land (ca. 25 acres) that was previously used for agricultural purposes. The operation of the development is not predicted to have any significant impact on the land use of the surrounding areas, be it for agricultural, commercial or residential purposes, and is not predicted to have any significant impact on the housing in the surrounding areas.

3.3.2 Health

The proposed development will be designed and constructed in such a way as to minimise environmental impacts. The plant has been designed in accordance with BATNEEC and will be operated in an environmentally sound manner.

3.3.3 Employment

The facility will employ a permanent staff of approximately 50 people and will therefore have a positive impact on employment in the area. Goods and services required during the operation of the plant will be sourced locally where possible which will have a further positive impact on the local economy and employment in the area.

During the consultation process, concerns over the effects of air emissions on agricultural practices in the area were raised. There are over 500 incinerators of this type in operation throughout Europe, both in industrial and rural locations. The EU emission limits and the World Health Organisation (WHO) guidelines have been developed to prevent any impacts from emissions, either on health, the environment in general, or on agriculture. By operating well below these limits Indaver Ireland will ensure that there will be no adverse impact on agricultural practices, or on employment in agriculture, in the surrounding area.

3.3.4 Amenities

As previously discussed the development site and surrounding area does not possess any significant amenity value or noteworthy scenic value, and therefore operation of the development is not predicted to have any significant impact on the amenity value of the area.

A minor loss of amenity will be experienced by immediate neighbours due to a loss of open space.

Due to its slight visual impact (see Section 6) and generally minor impact the proposed facility will not have any significant impact on the tourism potential of the surrounding areas.

The provision of the community recycling park will add to the amenity of the area.

3.4 Conclusions

The proposed site was selected on the basis of objective technical and environmental selection criteria as detailed in Section 2.8. Although the site is not zoned in either the 1994 Development Plan or the Draft Development Plan, both plans accept the suitability of rural sites for industrial and other development.

4. AIR QUALITY

4.1 Introduction

This section assesses the potential impacts of the Waste Management Facility on air quality. The main emissions to air are the flue gases from the waste to energy plant.

Air Dispersion Modelling has been carried out to assess the effect of atmospheric emissions from the stack during the operation of the waste to energy plant on ground level concentrations (GLCs) of various air emissions. The predicted Ground Level Concentrations were then compared to Air Quality Standards (set by the EU and the World Health Organisation) to assess the potential impact on air quality.

Another source of potential air emissions from the facility would be odours from the waste collection areas. The waste bunker which will receive all incoming waste to be treated in the waste to energy plant will be maintained under negative pressure to prevent any odorous emissions by treating them in the waste to energy plant. As the waste recycling plant and community recycling park will accept dry recyclable wastes the issue of odours does not arise.

4.2 Existing Environment

TMS Environmental Services were commissioned to carry out a survey of air quality at the site, which indicated that the background air quality is good, and is typical of a rural area.

4.3 Potential Construction Impacts

Construction activities on site including excavation and earthmoving could result in the generation of dust. Transportation of loose materials that are not properly contained on or off site could also result in dust generation as would the transfer of mud/soil from the wheels of construction traffic onto surrounding roads.

The following mitigation measures will be put in place to minimise any dust generation and thus prevent any significant impacts on air quality:

- Good housekeeping and site management including the proper storage of spoil/loose materials on site
- Wheel washing of all vehicles leaving site
- Proper containment of loose materials that are transported on or off site

4.4 Potential Impacts During Operation

The proposed plant has one main emission point, the 40m stack, through which the combustion gases are discharged after cleaning. The discharge will potentially contain a number of substances, the emission of which is regulated by EU and Irish legislation, and for which ambient air quality standards are specified.

The concentration of these substances in the flue gas will be well below the EU limits. Indeed the dioxin concentration will be only 10% of the EU limit.

4.4.1 Air Quality Standards

The substances emitted from the plant occur generally in the environment, being produced by a range of sources such as cars, open fires, boilers etc. However, at high ambient concentrations, they have the potential to adversely affect the environment and human health.

Because of this various bodies such as the WHO, the European Union, and the National Authority for Occupational Safety and Health have carried out a great deal of research into the effects of these substances. Arising out of this research, ambient air quality standards have been set for the various substances. Air Quality Standards are concentrations below which there is no impact on human health and on the environment.

4.4.2 Assessment of Impact of Emissions

(a) Air Dispersion Modelling

There is a defined and recognised procedure for assessing the impacts of emissions from a stack called Air Dispersion Modelling. Air Dispersion Modelling is a well developed and approved science, which uses complex equations and detailed meteorological data to calculate predicted ground level concentrations from an emission source.

Basically, the ground level concentration depends on the stack height, proximity to buildings, concentration of substance of interest, temperature of discharge and weather conditions.

The Industrial Source Complex (ISC 3) computer model was used to carry out the dispersion modelling. This model was developed by the US Environmental Protection Agency in conjunction with the American Meteorological Society and is the model the Irish EPA use when assessing impacts from point source emissions.

When the model was run over a range of stack heights it was found that the predicted ground level concentrations were significantly below the most stringent Air Quality Standards for a stack height of 40m. A detailed assessment of the effect of the emissions through this stack found that the impact will be insignificant.

This detailed assessment included an analysis of the impact of the plant together with emissions from the nearby Platin Cement Factory and the proposed Marathon Power Plant.

4.4.3 Dioxins

(a) General

The emissions of dioxins from incineration processes is often considered the most controversial element associated with the project. The term 'dioxins' refers to a family of complex molecules containing carbon, hydrogen, oxygen and chlorine, which are formed as a natural consequence of combustion processes.

Dioxins have since been found in thousands of year old redwoods and bentonite clays. Both these sources easily pre-date the advent of industrial processes and the presence of dioxins can be explained by natural events such as wood fires.

Concern over dioxins first arose when employees in pesticide production plants developed chloracne (a severe skin disease with acne-like lesions that occur mainly on the face and upper body) due to exposure to very high concentrations of dioxins. The news that dioxins are lethal to some experimental animals such as the guinea pig in minute concentrations added to concerns.

By far the majority of toxicologists are of the opinion that entry of dioxins and furans into the environment and subsequently into the human food chain needs to be reduced as a precautionary measure. Over the past two decades the European Commission has implemented wide ranging legislation aimed at directly or indirectly reducing or controlling the release of dioxins into the environment, with the objective of reducing human exposure and protecting human health.

(b) Sources of Dioxins.

Since the onset of the Industrial Revolution a variety of processes have combined to create today's dioxin inventories. Some of the main sources include municipal waste incineration, sinter plants, coal combustion, iron and steel plants, non-ferrous metals operations and clinical waste incineration. However, other non-industrial processes, such as cars and domestic peat and wood fires, also contribute to dioxins in the environment.

Waste incineration has historically been a major contributor to total dioxin emissions, an example being the EU commissioned dioxin inventory which found that, of the total (5749 g I-TEQ) EU dioxin emissions in 1994, 2300 g I-TEQ were from municipal & clinical incineration. With the EU limit of 0.1 g I-TEQ, their contribution is expected to fall from 40% to 0.3%.

Although dioxin inventories published to date have not included Ireland, the next stage of the EU dioxin inventory will include an assessment of dioxin emissions in Ireland. It is understood that combustion of wood and peat are identified as being the main source in Ireland. These sources account for an estimated 20 g/year of the total estimated 25 g/year.

(c) Emissions from the Proposed Facility

A single stage of dioxin removal is sufficient to meet the new EU limit of 0.1 ng/m^3. This is usually achieved by activated carbon injection, which absorbs dioxins, hydrocarbons and heavy metals. However the proposed plant will be equipped with an activated wet lignite coke filter, which acts to reduce emissions even further. As a result, the dioxin emissions from the plant will be guaranteed to be 0.01 ng/Nm^3 or 10% of EU standard.

The total dioxin emissions from the plant will be 0.01 g/year or 1/40 of 1% of the estimated dioxin emissions from wood and peat combustion in Ireland. It is therefore concluded that the contribution of the proposed plant to total dioxin levels will be insignificant.

4.5 Conclusions

It is concluded that the impact of emissions to air from the proposed facility will be insignificant.

5. NOISE

5.1 Existing Environment

A continuous noise survey, carried out by Eanna O'Kelly & Associates noise consultants, at the site indicated that noise levels in the area are relatively high due to noise from traffic on the R152.

5.2 Potential Impacts During Construction

During construction noisy activities will be confined to the daytime and the contractor will employ best practice to minimise noise emissions and ensure compliance with all relevant regulations and standards.

During plant commissioning periods, any tests or procedures which are known to be potentially noisy such as the testing of boiler safety valves, will be carried out during daytime hours only. Construction noise is therefore not expected to have any additional impact on the receiving environment at night-time.

5.3 Potential Impacts During Operation

During operation there will be a number of noise sources at the plant such as the air cooled condenser and turbine. In order to reduce noise emissions all buildings will be provided with acoustic cladding and all air intakes and safety valves will be equipped with silencers. Indaver Ireland will ensure at the detailed design stage of the project that noise emissions from the plant will comply with the noise emission limits set by the Environmental Protection Agency. These limits are lower than the background noise levels at the site and a significant impact will therefore not arise.

6. LANDSCAPE & VISUAL IMPACTS

6.1 Existing Environment

The proposed site is contained within a predominantly agricultural landscape, and is designated as an area of visual quality VQ 11 – Rural and Agricultural, as defined in the Meath County Draft Development Plan, 2000. The closest listed view is Bellewstown Ridge (V16 of the 1994 Development Plan and the Draft Development Plan).

The Boyne Valley is designated as a world heritage site and is of archaeological importance and is also designated as an area of scientific interest and an Area of High Natural Beauty and High Amenity in the Meath County Development Plan. However the Boyne valley is not in the same landscape envelope as the proposed development site.

The landscape within which the proposed site is located is not significant or valued in a regional or national context. The nearby cement works and its proximity to Drogheda and Dublin somewhat detract from its rural quality.

6.2 Impacts During Construction

During the construction stage the existing landscape will suffer visual intrusion due to construction works, moving of construction machinery, storing construction material and soil for spreading on completion of the development. This intrusion will be short term and will be similar to that caused by any typical construction site.

The existing hedgerows on the boundary with the R152 will be removed to allow for construction of the entrance and widening of the road. These will be replaced with a berm (earth mound 2-3 m high) planted with species typical of those existing in the area.

These impacts will be minor and temporary.

6.3 Impacts During Operation

Most of the elements of the proposed development will be of relatively small scale and will have no impact from outside the site boundary. The building enclosing the waste to energy plant will be the largest structure on the site and will have the greatest potential visual impact. This building will be up to 30m tall and will include a 40m stack, but will be located at the lower, rear section of the site, which will reduce its apparent scale when seen from the surrounding area. The exhaust gases are heated to 100 °C to reduce the formation of a visible plume at the stack discharge.

The site will be extensively landscaped, including the planting of native species of trees and shrubs (50,000 saplings), and the creation of berms along the eastern boundary and the boundary with the road. These landscaping measures will minimise the impact of the facility, and should render it unnoticeable to passing traffic after the planting has matured. This is demonstrated by the photomontages from the road shown in Figures 6.1 and 6.2.

6.4 Conclusions

The site lies within an area of lowland undulating landscape which, as defined in the Meath Draft Development Plan, can effectively absorb development. It can however be viewed from other more vulnerable landscapes with a low visual absorption capacity such as Bellewstown Ridge.

The character of the landscape and views from these views are already influenced by the Platin Cement Factory and associated quarry, which lends an industrial character to the landscape.

Given this industrial character, and the distance to these elevated views, it is considered that the impact of the proposed development will not be significant.

Figure 6.1: Photomontage from R152, immediately south of the proposed entrance

Figure 6.2: Photomontage from R152, near Duleek

7. TRAFFIC

7.1 Existing Environment

The development site is located on the north side of the R152 regional road between Drogheda and Duleek. To the south-west of the site the R152 forms a junction with the R150 which provides a link to the N1 at Julianstown and the N2 north of Balrath. The planned new M1 interchange will be about 2km north of the proposed site. Traffic counts carried out indicated that the road network is operating within capacity.

7.2 Potential Impacts During Construction

During construction there will be up to 300 personnel working on site and up to 50 deliveries by heavy commercial vehicles (hcv) each day.

Atkins McCarthy Consulting Engineers were commissioned to carry out a Traffic Impact Assessment. A computer model of traffic flow predicted that there will be no significant impact in terms of increased traffic on the R152 and surrounding roads or in terms of delays at the junction into the site. Any effects will therefore be minor and temporary.

7.3 Potential Impacts During Operation

7.3.1 Predicted Traffic Flows

The predicted two way traffic generated by the proposed waste management facility is shown in Table 7.1 below.

Table 7.1 Anticipated traffic movements due to the development

Activity	Daily Operational Period (two-way)	Peak Hour (two-way)
Employees	111 cars	34 cars
Waste to Energy	122 hcvs	15 hcvs
Industrial Waste Sorting	22 hcvs	4 hcvs
Community Recycling Park	134 cars	6 cars

The Traffic Impact Assessment carried out by Atkins McCarthy indicated that the impact of the increased traffic flow on the R152 and surrounding roads would be minor, being an increase of c. 7% over existing traffic flows on the road.

7.3.2 Site Entrance

Junctions with this level of traffic are not generally provided with turning lanes, acceleration or deceleration lanes. However, in order to allow traffic enter and leave the site without interfering with other traffic it is proposed to construct a deceleration lane, a right hand turning lane, and a climbing lane at the entrance.

In addition, a footpath (2m wide) on the northern side of the R152 at the development site and a pedestrian refuge island at the proposed entrance will be constructed.

Subject to discussions with Meath County Council, Indaver Ireland will provide lighting along the portion of the R152 adjoining the site. Also, subject to discussions with the local Gardai, Indaver Ireland will provide, or fund the provision of, a speed camera on the R152 in the vicinity of the site entrance.

7.3.3 Other Developments on the R152

There are a number of other developments either planned or proposed along the R152 as follows:

- M1 Drogheda bypass motorway
- Proposed Marathon Power Plant
- Proposed AgriPark at Duleek
- Industrial Park at Duleek

The M1 motorway is planned to be opened in 2004. Traffic surveys for various public road schemes have indicated that significant volumes of traffic are avoiding congestion along the N1 between Drogheda and Dublin by using the R152 to link with the N2 north of Ashbourne. When the M1 is opened it is therefore to be expected that traffic flows on the R152 will decrease as traffic is attracted to the new motorway.

The proposed AgriPark is predicted to give rise to significant traffic flows. However the peak flows from the AgriPark will not coincide with the peak flows due to the proposed Waste Management Facility, and much of the traffic associated with the AgriPark will use the R150 and the R152 south of Duleek.

The proposed Marathon Power Plant will result in a similar amount of construction traffic to the proposed Waste Management facility over a predicted period of about 2 years. The level of traffic associated with the operation of the power station is insignificant.

If the construction of the proposed Waste Management facility were to coincide with the construction of Marathon Power Plant, there would potentially be a temporary impact on traffic flows on the R152 as the road would approach its capacity under these conditions.

In order to reduce any potential impact Indaver Ireland will implement a traffic management plan which will include the provision of buses from major population centres for construction employees and by the provision of cycle parks and showers for locally based employees wishing to cycle.

7.4 Conclusions

A detailed assessment of the potential impacts of the traffic due to the development indicated that the impact on traffic would be insignificant. The facility will be provided with a high quality entrance to prevent any delays, and a traffic management plan will be implemented to ensure there will be no impacts during construction.

8. GEOLOGY, SOILS AND HYDROGEOLOGY

8.1 Existing Situation

KT Cullen & Company were commissioned to investigate the condition of soil and groundwater at the proposed site. Their survey found that both the soil and groundwater are free of contamination.

The aquifer is considered to be regionally important, moderately productive and moderately vulnerable. The moderate vulnerability rating is due to the impermeable nature of the overlying soil.

A preliminary pump test indicated that a borehole could easily yield up to 20 m^3/hour of water.

8.2 Potential Impacts

The only potential impact both during operation and construction would be for a spillage to reach the ground, and contaminate the soil and groundwater. In order to prevent such an incident, all substances with the potential to cause contamination will be stored in isolated, dedicated bunded areas. This will effectively eliminate the potential for contamination of ground or groundwater.

It is proposed to install a permanent borehole on site, from which up to 15 m^3/hour of groundwater may be abstracted. The investigation carried out by KT Cullen indicates that this water can be abstracted without creating any significant impact.

9. SURFACE WATER

9.1 Existing Environment

There are no surface water features such as rivers, streams, lakes or ponds on the development site. There are a number of drainage ditches on site running alongside the field hedgerow boundaries.

All of the drainage ditches on site feed into a wet drain which runs from a point on the western boundary of the site into a ditch in a field to the south-west of the development site. This ditch is located approximately 150 metres from the site boundary and eventually drains into the River Nanny. The ditch is approximately 1.5m wide by 2m deep and appears to be dry during the summer months.

The River Nanny runs in an easterly direction approximately 2 km south of the development site and surface water in the vicinity of the site appears to drain naturally through land drains, following the natural topography of the landscape towards the river. The river is not a designated salmonid river under the 1988 European Communities (Quality of Salmonid Waters) Regulations but a number of angling clubs use the river for trout fishing.

9.2 Potential Impacts During Construction

If the ditch that feeds into the River Nanny became contaminated as a result of construction activities on site there could a negative impact on the River Nanny.

During construction the ditch could become contaminated as a result of an uncontained spillage of polluting substances or the discharge of large amounts of soil / silt from the site into the drain. To prevent this all oils and chemicals will be stored in safe bunded areas and silt traps will be installed to prevent the wash out of silt and mud.

9.3 Potential Impacts During Operation

The plant will not produce any process effluent and the only discharge will be surface water, which will go through an oil and petrol interceptor prior to being stored in an underground water storage tank. About 10 m^3/hour of rain water can be used in the process and the storage tank will have a storage capacity of 1,500 m^3. This will ensure that, even in a worst case storm, only a small quantity of excess water will be discharged to the ditch and removing any potential for flooding due to runoff from impervious areas on site.

The existing ditches on site will be regraded and rerouted to maintain the existing surface runoff regime from areas outside of the site and from some of the non hardstanding area on site. The remaining non hardstanding area on site will drain, via land drains, into the water storage tank. The construction of the proposed development will not therefore alter (increase or decrease) significantly the quantity of water currently draining via the ditches.

All potentially polluting substances stored on site will be stored in contained areas, which will ensure that, in the unlikely event of a spillage, it is contained within a safe area.

10. CLIMATE

10.1 Introduction

The proposed waste to energy plant will produce approximately 11 MW of electricity, or enough to power 16,000 homes, to the electricity distribution system.

Atmospheric emissions from the thermal treatment of waste include emissions of sulphur dioxide (SO_2), oxides of nitrogen (NO_X) and carbon dioxide (CO_2), all of which can in sufficient amounts have a negative impact on climate. Emissions of SO_2 and NO_X can lead to acid rain resulting in the acidification and degradation of ecosystems. Both CO_2 and nitrous oxide (N_2O) are greenhouse gases and can contribute to global warming.

10.2 Acidification

The power generation sector is the single largest contributor to emissions of SO_2 and is a significant contributor to total NO_x emissions. The problem of acidification and degradation of ecosystems arising from these emissions have long been recognised.

The proposed plant will result in low levels of SO_2 and NO_x emissions and will in fact produce less NO_x and SO_2 per unit electricity that is currently produced, on average, by power stations in Ireland. It will therefore contribute towards controlling acid gas emissions, reducing acidification problems and helping Ireland meet its obligations under international agreements.

10.3 Global Warming

There is a consensus in the scientific community that there is a real and existing problem arising from emissions of CO_2 and other greenhouse gases. As a consequence an international agreement has been signed whereby developed countries must limit their greenhouse gas emissions to set levels. Ireland is bound to limiting its increase in greenhouse gas emissions to 13% above 1990 levels by 2010. However it is widely believed that without positive action emissions will considerably exceed this limit.

The proposed plant will produce electricity from a renewable source, which is one of the main targets of Irish and European greenhouse gas abatement policy. Furthermore, when waste is disposed of to landfill, large quantities of methane are produced, which is a potent greenhouse gas (12 times more powerful than CO_2). By treating the waste in a waste to energy plant, an inert ash is produced, avoiding the formation of large quantities of methane.

The proposed facility will therefore assist in controlling greenhouse gas emissions.

11. FLORA AND FAUNA

11.1 Existing Environment

Biosphere Environmental Services (BES) were commissioned by Project Management to carry out a baseline flora and fauna study at the proposed site to assess the potential impact of the development on flora and fauna.

The site has for a long period been intensively managed for agricultural purposes. This has resulted in limited habitats and the flora and fauna present are represented by a few common species which are typical of the agricultural habitat. No rare, threatened or legally protected plant species or fauna of ecological significance were observed within the site.

A limited number of bird species were recorded due to the low diversity of habitats on the site. The species included woodpigeon, blackbird, chaffinch, robin, wren, blue tit, coal tit and chiffchaff all of which are typical species of agricultural areas with hedgerows.

The low habitat diversity within the site results in the mammalian fauna being represented by only a few common species. Rabbits were observed at the site and signs of foxes and brown rats were noted at several locations within the hedgerows and ditches.

No part of the site or its immediate surroundings is covered by a scientific or conservation designation or proposed designation as recognised by Duchas the Heritage Service.

11.2 Potential Impacts

During construction, the site will be cleared and any flora and fauna contained therein will be disturbed.

The removal of this arable habitat during construction is not predicted to have significant ecological impacts. Mitigation measures will be taken to prevent any further damage to hedgerows during construction and to protect the watercourses in adjacent fields.

The proposed waste to energy facility has been designed using the Best Available Technology (BAT) to minimise the concentrations of potential emissions. Emissions from the facility are not predicted to have any significant negative impact on flora and fauna in the surrounding areas. The development will not therefore have any significant ecological impacts.

A problem with vermin is often associated with waste management facilities, particularly landfills. As the waste bunker and the waste sorting plant will be enclosed within the waste acceptance hall, the potential for vermin to be associated with these aspects of the facility will be minimised. To further mitigate potential impacts a comprehensive rodent control plan will be put in place.

The community recycling park will be maintained clean and well managed, and as no putrescible kitchen waste will be accepted, the problem of vermin does not arise.

12. CULTURAL HERITAGE

12.1 Existing Environment

Archaeological Development Services were commissioned to carry out an archaeological survey of the site. To establish the existing environment of the site ADS carried out a field inspection, journal & documentary research and research on maps of the area.

Although the site is located in a region of historical importance, no known archaeological monuments are recorded on the proposed site in the County Meath Sites & Monuments Record or elsewhere.

The ground was examined for the presence of archaeological artefacts. No archaeological remains or artefacts were identified during the field walk, nor was there any evidence of archaeological remains in the trial pits dug on site as part of the soils survey.

12.2 Potential Impacts

On the basis of the study, carried out by ADS, there is no evidence of clearly defined archaeological activity on the proposed site. However, the proximity of known archaeological sites suggests archaeological features could survive below ground.

It is therefore proposed that all topsoil stripping and groundworks be monitored by an archaeologist licensed under the terms of the National Monuments Act 1930, as amended. Archaeological discoveries will be immediately reported to the Keeper of Irish Antiquities, National Museum of Ireland, and to Dúchas – The Heritage Service. This will minimise the impact of the development.

13. MATERIAL ASSETS

13.1 Introduction

This section assesses the potential impacts of the development on the material assets of the development area including assets of human origin (infrastructure and utilities) and assets of natural origin and identifies measures to mitigate against any significant impacts.

13.2 Existing Environment

The road infrastructure in and around the vicinity of the proposed development is quite well developed. The R152 secondary road which runs past the site connects to the N1 and the N2, and the M1 Northern Motorway will pass about 2km north of the site.

A mains water supply running along the R152 road supplies many of the residential dwellings in the area. The limestone aquifer in the area is also used by a number of groundwater abstractors.

A 110 kV power line runs over the development site (which will be re-routed around the site) and there are 38 kV substations located in Duleek and Rathmullen. A natural gas line runs under the development site.

There is no sewerage line in the immediate vicinity of the development site.

The two principal assets of natural origin are the underlying bedrock which a number of quarries in the area exploit and also the limestone aquifer which supplies groundwater to various abstractors in the area.

13.3 Construction Impacts and Mitigation

The only potential impact during construction will be due to construction traffic. However, the Traffic Impact Assessment shows that the road network has sufficient capacity to accommodate construction traffic.

As there will no be significant impacts on the material assets of the area no mitigation measures are required.

13.4 Operational Impacts and Mitigation

The material assets of the area including infrastructure will be utilised by the development in a sustainable manner.

The facility will have a positive impact on electrical infrastructure, adding 11 MW of locally generated power into the distribution system. It will result in a minor increase in traffic on the R152, but this is not predicted to have a significant impact.

In other respects the impact on material assets will be insignificant.

13.5 Conclusions

Construction and operation of the development will not have any significant impact on the material assets on the area. As the development will export electricity to the distribution system it will have an overall positive impact on material assets in the area.

14. INTERACTION OF FACTORS

There will be interactions between a number of environmental factors discussed previously and these interactions have been addressed in the individual sections. The most significant possible interactions are between the following potential impacts and the human environment:

- Air Quality
- Landscape
- Noise
- Traffic

The interaction between the different environmental factors have been addressed in the preceding sections of the Non Technical Summary. Taking into account all of the environmental impacts of the development and interactions between the different environmental factors, the development will not have a significant negative impact on the environment. Where negative impacts have been identified, mitigation measures will be put in place to minimise them.

The development will have a positive impact in terms of contributing to the development of sustainable waste management practices and providing a source of renewable energy in line with EU and Government policy.

Appendix 2

Response to Question 2, 3, 4 & 5 from AWN

Question 1:

"Provide completed Tables 1.1 Air Emissions and 1.2 Air Emissions Characterisation for the back-up generator (emission point reference A2.1 given in Attachment H1.4, Drawing No. 2666-22-DR-009). Provide details on any emissions and the impact of such emissions on the environment from operating this generator. Provide details on the monitoring of any such emissions from this generator."

Response:

The back-up generator is expected to run only when both the national grid and the Carranstown incinerator are down. A monthly "test run" of the back-up generator will be carried out for one hour per month. Therefore, the back-up generator is expected to run at most for 12 hours per year. Emissions of NOx, TOC and CO from the back-up generator are detailed in Table 1. For comparison, average emission rates of NOx, TOC and CO from the incinerator are also detailed. Annual emissions from the back-up generator are negligible compared to those from the incinerator. In particular, annual emissions of NOx from the back-up generator are only 0.0006% of those from the incinerator.

Table 1 Air Emission Values From Indaver Ireland, Carranstown, Co. Meath

Daily Average Values	Incinerator: Expected Operating Values		Back-up Generator	
	Emission Rate (g/s)	Emission Rate (tonnes/annum)(1)	Emission Rate (g/s)	Emission Rate (tonnes/annum)(2)
Gaseous & vaporous organic substances expressed as total organic carbon (TOC)	0.035	23	0.27	0.012
Nitrogen Oxides (as NO_2)	5.25	3402	0.44	0.019
Average Value	**Emission Rate (g/s)**	**Emission Rate (tonnes/annum)(1)**	**Emission Rate (g/s)**	**Emission Rate (tonnes/annum)**
Carbon Monoxide	0.7	454	0.004	0.0002

(1) Tonnes per annum for incinerator calculated based on operating conditions of 24 hours per day at design volume flow for 7500 hours/annum.

(2) Tonnes per annum for back-up generator calculated based on operating conditions of 12 hours/annum.

Question 2:

"The maximum air volume to be discharged from emission point reference A1.1 appears to be listed differently in different sections of the application...Please reconcile these figures and confirm that the dispersion model used the correct value."

Response:

The maximum air volume flow from emission point reference A1.1 was 150,980 Nm^3/hr, and the typical air volume flow was 126,000 Nm^3/hr (both are normalised to 273 K, 11% O_2 and 0% H_2O).

Question 3:

"The Cumulative Impact Assessment in Section H1.2 was carried out for NO_2 and SO_2. This should also be carried out for particulates and dioxins."

Response:

Cumulative Impact Assessment for Particulates and PCDD/PCDFs

A cumulative impact assessment for PCDD/PCDFs and particulates has been carried out and is detailed below. The impact of nearby sources was examined where interactions between the plume of the point source under consideration and those of nearby sources can occur. These include:

a. the area of maximum impact of the point source,
b. the area of maximum impact of nearby sources,
c. the area where all sources combine to cause maximum impact[1,2].

The approach taken in the cumulative assessment followed the USEPA recommended Prevention of Significant Deterioration (PSD) Increment approach[2] as outlined in Section 1.2 of the Air Quality Chapter of the EIS.

The current location would be considered a Class II area and thus the PSD applicable to Class II areas has been applied in the current case. Due to the variations in pollutant averaging times and standards between the USA and the EU, only relative PSD can be derived. The relative PSD, as a percentage of the respective National Ambient Air Quality Standards (NAAQS), has be applied to the corresponding EU ambient air quality standards in order to calculate an equivalent PSD increment for Ireland. In the current context, the PSD increment has been applied to zones where significant overlap occurs between plumes from each of the sources. The PSD increment has not been applied per se, as existing facilities were not designed to this standard.

The project's impact area is the geographical area for which the required air quality analysis for PSD increments are carried out. The USEPA has defined the "impact area" as a circular area with a radius extending from the source to the most distant point where dispersion modelling predicts a significant ambient impact will occur irrespective of pockets of insignificant impact occurring within it. Within this impact area, all nearby sources should be modelled, where "nearby" is defined as any point source expected to cause a significant concentration gradient in the vicinity of the proposed new source.

In order to determine compliance, the predicted ground level concentration (based on the full impact analysis and existing air quality data) at each model receptor is compared to the applicable ambient air quality limit value or PSD increment. If the predicted pollutant concentration increase over the baseline concentration is below the applicable increment,

and the predicted total ground level concentrations are below the ambient air quality standards, then the applicant has successfully demonstrated compliance.

When an air quality standard or PSD increment is predicted to be exceeded at one or more receptors in the impact area, it should be determined whether the net emissions increase from the proposed source will result in a significant ambient impact at the point of each violation, and at the time the violation is predicted to occur. The source will not be considered to cause or contribute to the violation if its own impact is not significant at any violating receptor at the time of each violation. In relation to nearby sources, Platin Cement is the only significant nearby source of particulates and PCDD/PCDFs. Modelling of particulate and PCDD/PCDF emissions from Marathon Power was not deemed necessary.

The cumulative impact assessment has been carried out to assess the impact of emissions from Indaver Ireland on the surrounding environment. As such, several conservative approximations have been made in regards to the operating details and physical characteristics of the surrounding sources and of Indaver Ireland. In particular, the PCDD/PCDF emissions from Indaver have been modelled at their emission limits, which are significantly higher than their typical emission levels. In addition, all particulate emissions from Platin Cement are assumed to be PM_{10}, and have been modelled at their IPC emission limits under maximum operation. PCDD/PCDF emissions from Platin Cement were estimated using the dioxin and furan emissions inventory recently prepared for the EPA[3]. The guidance for assessing cumulative impacts includes assessing everywhere off-site, including within the site boundary of all nearby sources[2]. Thus, the results outlined in this chapter, in regards to emissions from nearby sources, may apply to areas on-site within each source (and thus will not fall under the domain of ambient legislation) and will also most likely overestimate the impact of these sources in the surrounding environment.

PM_{10}

The cumulative impact of particulates has been assessed in Table 2. Each individual source has been modelled both separately and as part of the cumulative assessment. Emissions data for the sources used in the cumulative assessment is detailed in Tables 4-5.

The impact of nearby sources has been examined where interactions between the plume of the point source under consideration and those of nearby sources may occur. These locations were:

1) the area of maximum impact of the point source,
2) the area of maximum impact of nearby sources,
3) the area where all sources combine to cause maximum impact[2].

In the area of the maximum impact of Indaver Ireland (Grid Co-ordinate 306500, 271100), the impact from Platin Cement was minor. In relation to the 90.1th%ile of 24-hour concentrations, the cumulative impact at this point was 6% of the limit value in the absence

of Indaver Ireland. In the presence of Indaver Ireland, the assessment indicated that there is no significant cumulative impact, with concentrations remaining at 6% of the limit value at this point.

The annual average cumulative assessment was likewise minor at the area of the maximum impact of Indaver Ireland (Grid Co-ordinate 306500, 271100). The overall impact leads to an increase of 1% in the annual average levels leading to a cumulative level of 3% of the limit value.

In the area of the maximum impact of Platin Cement, the impact from Indaver Ireland was very small. In relation to the 90.1th%ile of 24-hour concentrations, the impact of Indaver Ireland at the point of maximum impact of Platin Cement was less than 1% of the limit value.

The annual average cumulative assessment was likewise minor at the area of the maximum impact of each individual source. The overall impact leads to an increase of less than 1% in the annual average level for Platin Cement.

PCDD/PCDFs

The cumulative impact of PCDD/PCDFs has been assessed in Table 3. Each individual source has been modelled both separately and as part of the cumulative assessment. Emissions data for the sources used in the cumulative assessment is detailed in Tables 4-5.

In the area of the maximum impact of Indaver Ireland (Grid Co-ordinate 306455, 271004), the impact from each source was minor. In relation to the annual concentration, the cumulative impact was 0.0002 fg/m^3 in the absence of Indaver Ireland, at the location of the maximum impact from Indaver Ireland Ltd. In the presence of Indaver Ireland, the assessment indicated that the cumulative annual concentrations would be 4.90 fg/m^3 at this location. Hence there is almost no overlap in PCDD/PCDF concentrations from the two sources at this location.

In the area of the maximum impact of each nearby source, the impact from Indaver Ireland was very small. In relation to the annual concentration, the impact of Indaver Ireland at the point of maximum impact of Platin Cement was 0.59 fg/m^3. Because the levels of PCDD/PCDFs from Platin Cement are negligible at the location of the maximum impact from Indaver Ireland Ltd., in the region where both sources combine to cause the maximum impact, the levels are equivalent to those from Indaver Ireland alone.

REFERENCES

(1) USEPA (2003) Guidelines on Air Quality Models, Appendix W to Part 51, 40 CFR Ch.1
(2) USEPA (1989) Prevention of Significant Deterioration
(3) EPA (2000) Inventory of Dioxin & Furan Emissions to Air, Land and Water in Ireland for 2000 & 2010 – URS Dames & Moore

Table 2 Assessment of Cumulative Impact of Particulate Emissions (as PM_{10}) ($\mu g/m^3$)

Pollutant	Platin Cement	Indaver Ireland	All Sources Except Indaver	Significance Criteria	All Sources	Limit Value[1]
Impact of each source at Indaver Maximum – 90.1th%ile of 24-hour Averages	2.95 (306500, 271100)	-	2.95 (306500, 271100)	12.5[2]	3.06 (306500, 271100)	50
Impact of each source at Indaver Maximum – Annual Average	0.68 (306500, 271100)	-	0.68 (306500, 271100)	10[2]	1.18 (306500, 271100)	40
Indaver Impact At Maximum of Each Source – 90.1th%ile of 24-hour Averages	0.20 (306300, 271900)	-	-	12.5[2]	0.20 (306300, 271900)c	50
Indaver Impact At Maximum of Each Source – Annual Average	0.051 (306300, 271900)	-	-	10[2]	12.1 (306300, 271900)	40

(1) Directive 1999/30/EC

(2) PSD Increment for PM_{10} applicable in the current application (except for the All Sources scenario).

Note: Grid co-ordinates are National Grid co-ordinates and refer to the location of local maximum

Note: Input information on nearby sources is given in Tables 4-5

Table 3 Assessment of Cumulative Impact of PCDD/PCDF Emissions (fg/m^3)

Pollutant	Platin Cement	Indaver Ireland	All Sources Except Indaver	All Sources	Limit Value
PCDD/PCDF Annual Average	0.135 (305000, 273000)	4.90 (306455, 271004)	0.135 (305000, 273000)	4.90 (306455, 271004)	-
Impact of each source at Indaver Maximum – Annual Average	0.0002 (305000, 273000)	-	0.0002 (305000, 273000)	4.90 (306455, 271004)	-
Indaver Impact At Maximum of Each Source – Annual Average	0.592 (305000, 273000)	-	-	4.90 (306455, 271004)	-

Note: Grid co-ordinates are National Grid co-ordinates and refer to the location of local maximum
Note: Input information on nearby sources is given in Tables 4-5

Table 4 Source Emission Data for Emissions from Indaver Ireland used for Cumulative Assessment

Stack Reference	Stack Height (m)	Exit Diameter (m)	Cross-Sectional Area (m^2)	Temperature (K)	Max Volume Flow (Nm^3/hr)	Exit Velocity (m/sec actual)	Concentration (mg/Nm^3)	Mass Emission (g/s)
Maximum	40	2.0	3.14	373	150980	20.5	PM_{10} – 10 Dioxins – 0.1 ng/m^3	PM_{10} – 0.42 Dioxins – 4.2E-9

Table 5 Source Emission Data For Emissions from Platin Cement used for Cumulative Assessment (1)

Stack Reference	Stack Height (m)	Exit Diameter (m)	Cross-Sectional Area (m^2)	Temperature (K)	Max Volume Flow (Nm^3/hr)	Exit Velocity (m/sec actual)	Concentration (mg/Nm^3)(2)	Mass Emission (g/s)(2)
Kiln 1	106.7	2.3	4.15	513	96,000	12.1	PM_{10} – 120 Dioxins – 0.060 ng/m^3	PM_{10} – 3.2 Dioxins – 1.6E-9
Kiln 2	103.3	3.7	10.8	397	299,000	11.2	PM_{10} – 120 Dioxins – 0.061 ng/m^3	PM_{10} – 0.42 Dioxins – 5.1E-9
Raw Mill 1	32	1.20	1.13	305	62000	17.0	PM_{10} – 100	PM_{10} – 1.72
Coal Mill 1	30	0.71	0.40	303	12000	9.34	PM_{10} – 100	PM_{10} – 0.33
Coal Mill 2	45	1.00	0.79	319	31000	12.8	PM_{10} – 100	PM_{10} – 0.86
Cement Mill 1	30	0.71	0.40	302	14500	11.3	PM_{10} – 100	PM_{10} – 0.40
Cement Mill 2	30	0.96	0.72	303	24000	10.2	PM_{10} – 100	PM_{10} – 0.67
Cement Mill 3	30	0.96	0.72	303	24000	10.2	PM_{10} – 100	PM_{10} – 0.67
Cement Mill 2 Sep	29	2.00	3.14	299	143000	13.8	PM_{10} – 50	PM_{10} – 1.99

(1) Taken from EIS for the site, and also IPC Licence No.268.

(2) Dioxin emissions calculated based on EPA Inventory of Dioxin & Furan Emissions for Ireland[3]

Question 4:

"An assessment of the annual average impact of SO_2 from the emission point reference A1.1 should be included."

Response:

The annual average results for SO_2 are included in Table 6. An annual average limit of 20 $\mu g/m^3$ for SO_2 is applied for the protection of vegetation in highly rural areas away from major sources of SO_2 such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Annex VI of EU Directive 1999/30/EC identifies that monitoring to demonstrate compliance with the SO_2 limit for the protection of vegetation should be carried out distances greater than:

- 5 kilometers (km) from the nearest motorway or dual carriageway
- 5 km from the nearest industrial installation
- 20 km from a major urban conurbation or more than 5km from other built-up areas

As a guideline, a monitoring station should be indicative of approximately 1000 km^2 of surrounding area. Indaver Ireland Ltd. does not consider the Directive limit for the protection of vegetation should be applied in this case, given the nearby presence of an industrial installation (the site itself) and the presence of a built-up area, Duleek within 5km. Nevertheless, the predicted annual average SO_2 levels reach only 33% of the limit value for the protection of vegetation.

Table 6 Dispersion Model Results – Sulphur Dioxide

Pollutant / Scenario	Background ($\mu g/m^3$)	Averaging Period	Process Contribution ($\mu g/m^3$)	Predicted Emission Concentration ($\mu g/Nm^3$)	Standard[1] ($\mu g/Nm^3$)
SO_2 / Maximum	4	99.7th%ile of 1-hr means	52	60	350
		99.2th%ile of 24-hr means	20	24	125
		Annual Average	2.6	6.6	20
SO_2 / Design	4	99.7th%ile of 1-hr means	20	28	350
		99.2th%ile of 24-hr means	7	11	125
		Annual Average	1.0	5.0	20
SO_2 / 50% of maximum	4	99.7th%ile of 1-hr means	42	50	350
		99.2th%ile of 24-hr means	15	19	125
		Annual Average	2.3	6.3	20

(1) Directive 1999/30/EC

Question 5:
"Please indicate what reference 28 refers to on p.8 of 35 of Appendix 1.2 of Section H1.2."

Response:
Reference 28 refers to:

UK DETR (1998) Review & Assessment: Pollutant-Specific Guidance, The Stationary Office.

Appendix 3

Flora & Fauna

SECTION 11- FLORA AND FAUNA

Introduction

This section assesses the potential impacts of the development on the flora and fauna of the proposed site and the surrounding area. A baseline ecological survey was carried out to determine the existing flora and fauna on the development site. The potential impacts of the construction and operational phases of the development are considered with respect to flora and fauna and mitigation measures are outlined to minimise any significant impacts identified.

Existing Environment

Introduction

Biosphere Environmental Services (BES) were commissioned by Project Management to carry out a baseline ecological survey of the proposed development site in order to assess whether the development would have an impact on any existing flora and fauna on the site.

To this end a site survey was carried out on 11th June 2000 which comprised a thorough examination of the entire site. The areas immediately surrounding the site were also examined, though in lesser detail. The survey methodology consisted of systematically walking the entire site and recording plant species and vegetation types present, with particular emphasis placed on the hedgerows within and around the site.

The birds and mammals observed on the site were recorded, as were any signs of activity or nesting. During the survey, particular attention was given to identifying the presence, or otherwise, of habitats or species which are legally protected under Irish and European legislation.

The listings and maps of sites of conservation importance (Natural Heritage Areas, Special Areas of Conservation, Special Protection Areas) maintained by Duchas, The Heritage Service as well as the standard literature were checked with reference to the site and surrounding area.

Habitats and Flora

The site is in an area which has for a long period been intensively managed for agricultural purposes and comprises four agricultural fields with hedgerows and/or treelines forming the field boundaries. The habitats present are grassland, (both meadow and pasture), hedgerows and ditches. There are no natural or semi-natural habitats, such as woodlands, marshes, streams or rock outcrops, within the site. A map showing the location of the habitats on the site is included in the full report in Attachment 10.
Meadow grassland is the principal habitat type at the site as it occupies the largest area of the agricultural fields with grazed pasture occupying the remainder.

Hedgerows of varying quality form the field boundaries of the site. The hedgerows are comprised almost entirely of hawthorn, with ash occurring as the main tall tree species. Some of the hawthorn trees are very mature, up to 15m high and a few of older trees have a heavy ivy cover. Some of the hedgerows have very significant gaps and many of the hedgerows have poor structural development, with no noticeable understorey or ground layer. Where an understorey does occur it is usually dominated by brambles, nettles, thistles and hogweed.

The hedgerow which marks the townland boundary is accompanied by a wide ditch (ca. 2m width in places). At the time of the survey the ditch was damp in places and some typical shade species such as lords and ladies and hart's tongue fern were noted within the ditch. One of the internal hedgerows is also accompanied by a wide ditch which was dry at the time of the survey.
No rare, threatened or legally protected plant species, as listed in the Irish Red Data Book were found at the site or have been known to occur in the general area in the past.

The main ecological interest at this site lies in the hedgerows although they can be considered of limited ecological value due to the low species diversity and poor structure. However, the hedgerows do provide some value to local wildlife in what can generally be considered an intensive agricultural landscape.

No part of the site or its immediate surroundings is covered by a scientific or conservation designation as recognised by Dúchas, The Heritage Service. The closest site of conservation importance is the Duleek Commons proposed Natural Heritage Area (pNHA) located over 2 km to the south west. Two other pNHA's, one of which is also a proposed Special Area of Conservation (pSAC) are located on the River Boyne, approx. 5 km to the north-west of the site.

Birds
A limited number of bird species were recorded due to the low diversity of habitats on the site. The species included woodpigeon, blackbird, chaffinch, robin, wren, blue tit, coal tit and chiffchaff all of which are typical species of agricultural areas with hedgerows. Most of these species would probably nest. A rookery (ie a colony of nesting rooks) was noted in an ash tree located in one of the hedgerows on the western boundary of the site and a further rookery was noted in some ash trees just west of the site. As the survey was carried out in June any winter migrant species which may occur were not recorded. While this is a survey limitation, it is considered unlikely that any rare or scarce bird species would occur in the survey area during winter due to the low diversity and intense management of the habitats present.

Mammals, amphibians and reptiles
The low habitat diversity within the site results in the mammalian fauna being represented by only a few common species. Rabbits were observed at the site and signs of foxes and brown rats were noted at several locations within

the hedgerows and ditches. The hedgehog, pygmy shrew and long-tailed field mouse are all typical species of agricultural habitats and are likely to occur at the site. No signs of badgers were found during the survey although it is considered possible that badger setts could occur within the ditch system associated with two of the hedgerows. If evidence of badgers is found prior to construction, Duchas will be informed and appropriate provisions to relocate the badgers will be made in consultation with Duchas. The habitats at the site are not considered suitable for the common frog or the common lizard.

Summary

The site is located in an area which has for a long period been intensively managed for agricultural purposes. This has resulted in a limited number of habitats on the site and consequently a low diversity of flora and fauna. The types of flora and fauna encountered on the site are typical of the agricultural area in which the site is located. The main ecological interest at the site lies in the hedgerows which although of limited ecological value due to the low species diversity and poor structure do provide some value to local wildlife. No rare, threatened or legally protected plant species were encountered on the site and no part of the site or its immediate surroundings is covered by a scientific or conservation designation as recognised by Duchas, The Heritage Service.

Construction Impacts and Mitigation

Site clearance and construction on the site will involve the removal of some of the existing habitats. A large section of the land under meadow and pasture will be built upon. All of the hedgerows that mark the internal boundaries within the site will be removed and the hedgerow that borders the R152 road will removed to accommodate a site entrance and road widening. During the construction phase it is possible that some of the remaining hedgerows and ditches could be damaged by earthworks or machinery on site.

The removal of the meadow and pasture grassland habitats is not considered significant as these habitats are of negligible scientific interest and have little conservation value and therefore no mitigation measures are required. The internal hedgerows to be removed have negligible to low ecological value based on the survey and therefore their removal is not predicted to have a significant impact. Therefore no mitigation measures are required. The planting of a new hedgerow along the north-west boundary of the site parallel to the railway line will partly compensate for the loss of these hedgerows. Measures will be taken during the construction phase to prevent the remaining hedgerows from being damaged. Care will be taken while machinery is operating in the vicinity of the hedgerows and building materials will not be stored within 10 m of the hedgerows. Any sensitive areas will be protected with temporary fencing. Any accidental damage will be repaired using the same tree and shrub species that are already present (ash, hawthorn).

During landscaping of the site preference will be given to the planting of native tree and shrub species most of which will already be established in the general vicinity and it is proposed to enhance the wildlife value of the site by

planting species which are useful to wildlife. Landscaping is discussed in greater detail in Section 6.

A wet drain in the field adjacent to the western boundary of the site feeds into a tributary of the River Nanny and it is possible that contaminated water could enter the wet drain during the construction phase. Silt traps will be used to prevent any suspended solids from entering the drain. Any potentially polluting substances such as oil, paints or other chemicals will be stored on site in properly bunded areas. These mitigation measures should prevent any contaminated water from entering the drain.

Operational Impacts and Mitigation

A problem with vermin is often associated with waste management facilities, particularly landfills. As the waste bunker and the waste sorting plant will be enclosed within the waste acceptance hall, the potential for vermin to be associated with these aspects of the facility will be minimised. To further mitigate potential impacts a comprehensive rodent control plan will be put in place.

The community recycling park will be maintained clean and well managed, and as no putrescible kitchen waste will be accepted, the problem of vermin does not arise- *further to condition 3 of planning permission from An Bord Pleanala the community recycle park will not be developed onsite*

Atmospheric emissions from waste to energy plant will consist of NO_X, SO_2, metals and dioxins. Emissions of NO_X and SO_2 could contribute to acid rain which can cause acidification and degradation of ecosystems. These emissions can have local and transboundary effects. Emissions of dioxins and metals could also have a negative impact on flora and fauna as these chemicals can be toxic at certain concentrations.

Air dispersion modelling (see Section 4) has predicted a maximum annual average ground level concentration of 18 $\mu g/m^3$ NO_X and 6.6 $\mu g/m^3$ SO_2. EU Directive 99/30/EC relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air sets Ground Level Concentration limit values for the protection of human health and the environment. These limit values will begin to come into effect from July 2001 and onwards. The Directive specifies an annual limit value for the protection of vegetation of 30 $\mu g/m^3$ NO_X and a limit value for the protection of ecosystems of 20 $\mu g/m^3$ SO_2. As the predicted concentrations of NO_x and SO_2 are well below the European limit values it is unlikely that atmospheric emissions from the proposed waste to energy plant will have any negative impacts on the surrounding habitats and ecosystems. Therefore, no further mitigation measures are required other than the design considerations described in Section 2.2 and Section 4.

The maximum annual average ground level dioxin concentration resulting from Indaver is predicted to be 0.005 pg/m3 (i.e. under maximum operating conditions). This predicted concentration is significantly less than typical

background concentrations measured throughout Europe and those measured by the survey on site (0.028 pg/m3 to 0.046 pg/m3). Given that the plant willnot significantly increase background concentrations of dioxins, there will not be any significant impact on dioxins in vegetation.

A fully copy of the BES report is included in Attachment 10. In addition in Appendix 3 of response to article 14(2)(b)(ii) of the Waste Licensing Regulations, Article 13 Compliance, please find confirmation from Biosphere Environmental Services that the ecology assessment has been completed and is consistent with the air dispersion model completed by AWN.

Conclusions

The site is located in an area which has for a long period been intensively managed for agricultural purposes. This has resulted in a limited number of habitats on the site and consequently a low diversity of flora and fauna. The types of flora and fauna encountered on the site are typical of the agricultural area in which the site is located. The construction and operation of the proposed development is not predicted to have a significant negative impact on flora and fauna and mitigation measures will be put in place to prevent any negative impacts occurring.

Biosphere Environmental Services

29 La Touche Park, Greystones, Co. Wicklow

Tel/Fax (01) 2875249 Mobile 087 2309906 E-mail maddenb@eircom.net

BES

For attention of:
Ms Laura Burke,
Indavar Ireland,
4 Haddington Terrace,
Dun Laoghaire,
Co Dublin.

29th April 2003

Re. Waste Management Facility, Carranstown
Possible Impacts on Habitats in Surrounding Areas by Air Emissions

Dear Ms Burke,

In regards to the query re. possible impacts on habitats within the path of the air emission plume, I can confirm that there are no habitats of significant conservation importance within this area. The habitats present are predominantly pasture grassland, arable land and hedgerows, all widespread habitats of low conservation value.

The nearest designated site of conservation importance is Duleeks Common proposed Natural Heritage Area (site code 1578) which lies approximately 2 km to the south–west of the proposed development site. This is shown by the air dispersion modelling analysis (carried out by Project Management Ltd. and AWN Consultants) to be outside of the range of the air emission plume. Two further sites of conservation importance are located along the River Boyne, the Boyne River Islands Candidate Special Area of Conservation (site code 1862) and Dowth Wetlands proposed Natural Heritage Area (site code 1862). Both of these sites are situated approximately 4 km north-north-west of the proposed development site and are also outside of the range of the air emission plume.

Re. possible impacts on the common species of flora and fauna within the path of the air emission plume, I note that studies carried out by Project Management Ltd. and by AWN Consultants show that all the maximum predicted ground level concentrations of emissions were found to be below Irish and EU air quality standard limits and WHO guideline values. Furthermore, the cumulative emissions from the waste to energy plant and the two other developments in the vicinity did not cause the maximum predicted ground level concentrations of emissions to reach air quality standard limit values and guidelines. As the projected emissions will be well within national and international limit values, I would consider that there would be no significant impacts by air emissions on the flora and fauna within the general area or on designated sites for conservation in the region.

Yours sincerely,

Dr Brian Madden

Appendix 4

Heat Balance

Heat Balance for Carranstown Incinerator