

INSPECTORS REPORT

WASTE LICENCE REGISTER NUMBER 33-1

(1) Summary:

The facility consists of a landfill facility for the disposal of household, commercial, construction and demolition and industrial non-hazardous solid waste. The Corporation of Drogheda have also applied to operate a Civic Waste Facility where members of the public can deposit their household waste into a compactor and recyclable wastes into skips. A building in which recyclable waste can be further sorted is also proposed.

Name of Applicant	Corporation of Drogheda
Facility Name (s)	Drogheda Landfill
Facility Address	Collon Road, Mell, Drogheda, County Louth.
Description of Principal Activity	Landfill
Quantity of waste (tpa)	10,000 tpa at the Civic Waste Facility. Quantity of inert waste for landfill restoration to be agreed.
Environmental Impact Statement Required	No.
Number of Submissions Received	377
INSPECTOR'S RECOMMENDATION	The proposed decision as submitted to the Board be approved.

Notices	Issue Date(s)	Reminder(s)	Response Date(s)
Article 14 (2) (b) (ii)	25/5/98	30/6/98, 1/7/98, 5/8/98, 27/11/98, 15/1/99 and 12/2/99	29/6/98, 31/7/98, 11/9/98, 5/10/98, 21/10/98, 7/12/98, 11/2/99 and 26/2/99.
Article 14 (2) (a)	3/3/99		
Article 16	1/4/99		5/5/99, 21/6/99, 8/7/99 and 16/7/99.

Applicant Address	Corporation of Drogheda, Corporation Offices, Fair Street, Drogheda, County Louth.
Planning Authority	Corporation of Drogheda.
For Local Authority applicants, is the facility within its own functional area	Yes.
Is the facility an existing facility:	No, since the application was received after the prescribed date.
Prescribed date for application:	Prior to 1 st October 1997.
Date Application received:	27 th February 1998

FACILITY VISITS:

DATE	PURPOSE	PERSONNEL	OBSERVATIONS
27/3/98	Check site notice and site visit	Brendan Wall	Site Notice complies with Article 8
26/3/99	Site Visit	Brendan Wall	Observe site surrounds
23/8/99	Site Visit	Brendan Wall	Inspect site and surrounds

(2) Activity Summary

The facility is an unlined landfill which opened in 1983. It is currently operated on the principle of dilution and dispersion of the leachate generated. The facility is situated on a regionally important aquifer. Disposal has been onto the upper benches of a disused limestone quarry. The facility has no infrastructure to facilitate leachate collection, treatment or landfill gas management. The applicant proposes to operate the landfill facility for a further 5 years before closure. After closure the applicant intend to develop the area into recreational open space. The applicant also proposes to build a Civic Waste Facility in 2002. The first phase of this will provide for a recycling centre and public waste transfer area and the second phase a composting facility.

There has been considerable local opposition to the extension of the landfill as well as concerns about the way the facility has been operated. The extent of local concern is evident from the submissions received. There is evidence that the groundwater in the vicinity of the quarry is polluted as a result of the disposal activities. No measures are in place to prevent leachate entering the groundwater and in the absence of such measures there is the likelihood of further groundwater pollution. The karstic voids in the limestone provide a pathway for the migration of polluted groundwater off site.

The Proposed Decision recommends the grant of a licence subject to cessation of disposal at the landfill but provides for a Civic Waste Facility to be built at the site. In recommending the cessation of disposal, I consider that continued landfilling at the facility would not comply with the requirements of Section 40(4) of the Waste Management Act, 1996. In coming to this recommendation I have had regard to the following matters ;

- ⇒ the lack of leachate control measures ;
- ⇒ the absence of a commitment to upgrade the facility to meet BATNEEC standards;
- ⇒ the karstic nature of the underlying limestone and the extreme vulnerability of the underlying regional aquifer to pollution;
- ⇒ evidence of existing groundwater pollution and the likelihood of further pollution.
- ⇒ the requirements of the Groundwater Directive (80/68/EEC);
- ⇒ the likelihood of deterioration in water quality in the quarry lake;
- ⇒ the unsuitability of the site for the continued landfilling of waste ; and
- ⇒ the concerns about environmental pollution and nuisances expressed in the large numbers of submissions received.

On grant of the licence only inert waste for restoration of the landfill can be deposited at the landfill facility under *Class 4* of the Fourth Schedule. The amount of inert waste to be deposited must be agreed by the Agency. The Proposed Decision contains conditions to guard against environmental pollution and nuisances during the restoration of the landfill. The Proposed Decision also puts in place measures for dealing with future emissions of leachate and landfill gas and requires remediation of the existing groundwater pollution. Waste deposited at the Civic Waste Facility under Class 13 of the Third Schedule must be disposed off-site at an alternative appropriate facility.

(3) Class/Classes of Activity

The class(es) of activities for which the applicant has applied are marked below. The principal activity is indicated by (P), other activities by (X).

Waste Management Act, 1996			
THIRD SCHEDULE Waste Disposal Activities		FOURTH SCHEDULE Waste Recovery Activities	
1. Deposit on, in or under land (including landfill).	P	1. Solvent reclamation or regeneration.	
2. Land treatment, including biodegradation of liquid or sludge discards in soils.		2. Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).	X
3. Deep injection of the soil, including injection of pumpable discards into wells, salt domes or naturally occurring repositories.		3. Recycling or reclamation of metals and metal compounds.	X
4. Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.		4. Recycling or reclamation of other inorganic materials.	X
5. Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment.		5. Regeneration of acids or bases.	
6. Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule.		6. Recovery of components used for pollution abatement.	
7. Physico-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcination) which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 10 of this Schedule.		7. Recovery of components from catalysts.	
8. Incineration on land or at sea.		8. Oil re-refining or other re-uses of oil.	
9. Permanent storage, including emplacement of containers in a mine.		9. Use of any waste principally as a fuel or other means to generate energy.	
10. Release of waste into a water body (including a seabed insertion).		10. The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system.	X
11. Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.		11. Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.	X
12. Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.		12. Exchange of waste for submission to any activity referred to in a preceding paragraph of this Schedule.	
13. Storage prior to submission to any activity referred to in this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.	X	13. Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.	X

Class description. The applicant described the classes as follows.

Third Schedule;

Class 1: This is the principal activity and refers to the continued landfilling of non-hazardous waste at the Drogheda Landfill.

Class 13 : This activity refers to Civic Amenity deposits originally stored for recovery or recycling but ultimately landfilled due to contamination, lack of market etc.

Fourth Schedule;

Class 2 : This activity refers to the recovery of waste oils deposited at the proposed Civic Amenity Facility for recycling.

Class 3 : This activity refers to the recovery and recycling of metals deposited at the proposed Civic Amenity Facility.

Class 4 : This activity principally refers to the recovery and recycling of glass products deposited at the proposed Civic Amenity Facility. Also the recovery of inert rubble for internal road construction, and clay, subsoil, topsoil for reuse in bund construction and final restoration capping.

Class 10 : This activity refers to the composting or the spread of compost on the completed landfill cap as a soil conditioner, nutrient or top dressing.

Class 11 : This activity refers to the use of compost derived from waste on the landfill in accordance with Class 4 and 10 of this schedule, as detailed below.

Class 13: This activity refers to the temporary storage of waste for future collection and reuse or recycling off site. Recycling of Civic Amenity Wastes will not be an activity undertaken on the Drogheda Landfill site.

Activities recommended for licensing:

It is recommended that all the above activities, except for *Class 1* of the Third Schedule *Deposit on, in or under land (including landfill)* for which the applicant has applied for a waste licence, be licensed subject to the restrictions and conditions contained in the attached Proposed Decision. **The Proposed Decision requires the applicant to cease the deposit of non-hazardous waste by landfilling at the facility on grant of the licence because such an activity would not comply with the requirements of Section 40(4) of the Waste Management Act, 1996.** With the cessation of landfilling Class 13 of the Third Schedule provides for the storage of waste deposited at the Civic Amenity Centre prior to disposal off-site at an alternative appropriate facility.

(4) Facility Location

Appendix 1 contains a location drawing and a layout drawing showing the significant features of the facility.

The facility is situated in a disused limestone quarry complex located in the townland of Mell on the north western outskirts of Drogheda Town. Landfilling has been confined to the upper benches of the quarry and no filling has taken place in an excavation on site which is over 30m deep in places. The abandoned quarry excavation (12 ha) - around which landfilling has taken place - is now flooded to a depth of around 1.8m.

The quarry lake has cliffs to the north and north east of an average height of 20m and higher cliffs to the south and west of on average 34m.

The southern boundary of the facility adjoins the Cement Road and the western boundary adjoins the Collon Road. Several residential properties are located along the Collon Road and in the area called Mell to the north of the landfill facility. The closest properties to the landfill are located along the Collon Road - approximately 40m from the boundary of the facility. A travellers halting site is located adjacent to the south east boundary of the site. A number of residential housing estates are located within 500m of the south east and south west boundary of the facility.

(5) Waste Types and Quantities

The total quantities and types of wastes accepted at the facility are shown below.

YEAR	NON-HAZARDOUS WASTE (tpa)	HAZARDOUS WASTE (tpa)	TOTAL QUANTITY OF WASTE (tpa)
1997	75,350	Not Applicable	75,350
1998	86,000	Not Applicable	86,000
1999	will be restricted by the PD to 10,000tpa at the Civic Waste Facility and a quantity of inert waste for restoration of the landfill to be agreed.	Not Applicable	will be restricted by the PD to 10,000tpa at the Civic Waste Facility and a quantity of inert waste for restoration of the landfill to be agreed.

(6) Facility Operation/Management

- **Waste Acceptance Procedures**

The amount of inert waste to be deposited is limited by *Condition 8.2* to the amount agreed and required for use in restoration of the facility. *Condition 5.2* requires that procedures for waste acceptance are submitted to the Agency for agreement. Procedures are also required to be agreed on how the Civic Waste Facility is to be operated (*Condition 5.9.e*).

- **Waste Handling**

All waste entering and leaving the facility must be weighed and recorded (*Condition 3.13 & 3.14*). *Condition 5.9* requires that all waste accepted at the Civic Waste Facility must be handled in accordance with written procedures.

- **Nuisance Control**

Potential nuisances are controlled by *Condition 6 Environmental Nuisances*. Vermin will be controlled by appropriate baiting as specified in the application and provided for in *Condition 6.9*. *Condition 6.1* requires that weekly inspections are carried out and recorded. *Condition 4.17.1* requires that within three months all previously deposited waste must be covered by a temporary cover layer of at least 300mm. Within 3 months the licensee must have carried out a post closure clean up of the general environs in the vicinity of the facility (*Condition 6.4*). *Condition 10.6* deals with controlling fires which have been a problem at the facility. *Condition 4.9* requires that a wheel-wash be used to prevent the tracking of any materials onto the public road. Scavenging is not allowed at the facility and is prohibited by *Condition 5.4*. *Condition 5.9* puts in place controls to deal with potential environmental nuisances from the proposed Civic Waste Facility. These controls include time restrictions on the storage of waste.

- **Hours for Waste Acceptance**

For restoration of the landfill facility Monday to Friday 8.00am to 5.45pm and Saturdays 9.00am to 1.00pm (*Condition 5.5*). For the proposed Civic Waste Facility - Monday to Saturday 8.30am to 6.00pm, and Sunday 10.00am to 6.00pm (*Condition 5.9.1*). Any changes in these hours are subject to the written agreement of the Agency.

(7) Facility Design

- **Infrastructure;**

The fencing surrounding the facility is in places inadequate - especially along the Cement Road where gaps in the fence allow easy access. *Condition 4.3* requires that all defects in the existing fencing are rectified. *Condition 4.3.3* requires a review of site security and fencing upgrading. The proposed Civic Waste Facility includes a car park area, offices, waste inspection areas, provision of a waste compactor to receive waste from the general public and a recycling building for sorting of collected recyclable waste materials. The provision of this infrastructure, prior to any disposal or recovery of waste, and its maintenance is required by *Condition 4.18*.

- **Leachate Management;**

The site is unlined and the applicant has not proposed to carry out any future lining works. There are no technical precautions to prevent discharge of leachate to groundwater. The applicant proposes to continue operating the landfill on the principle of dilution and dispersal of the leachate and intends to minimise leachate generation by progressive capping. The amount of leachate generated is estimated to be in the order of 28,349m³ per annum.

Five leachate borehole have been drilled into the waste. Three of these boreholes were found to be dry due to percolation of leachate through the limestone. Leachate collected from the other two boreholes revealed a variable composition but overall

the composition was consistent with typical leachates. A GCMS scan on a leachate sample revealed levels of chlorbenzene above the limit of detection (2ug/l), ethylbenzene of 2ug/l (above Dutch target value of 0.2ug/l) and xylenes of 28ug/l and 130 ug/l (above Dutch intervention value of 70ug/l).

Condition 9.1 requires leachate monitoring including levels. *Condition 4.15* requires the applicant to submit proposals for a leachate management system. The collected leachate can either be tankered for disposal at Drogheda Sewage Treatment Works or discharged to the proposed foul sewer. The Proposed Decision also requires that the applicant submit proposals for the installation of a cap over the entire facility in order to limit leachate generation (*Condition 4.17.2*).

- **Landfill Gas Management;**

Landfill gas extraction or flaring is not carried out at the facility. Landfill gas is presently allowed to vent to atmosphere in an uncontrolled manner. Annual quantities of gas production are estimated to be around 225,000m³. *Condition 4.16* requires that a proposal for the installation of a gas recovery or flaring system be submitted to the Agency within six months.

- **Capping System and slope stability ;**

Condition 4.17.2 specifies that a proposal must be submitted for a capping system for the facility. Waste has been deposited in a steep slope leading down to the edge of quarry cliffs. Monitoring by the applicant has not demonstrated any signs of instability or slippage. The continuation of the slippage monitoring programme is a requirement of *Condition 10.3*.

(8) Restoration and Aftercare

The final profile of the facility, and its restoration and aftercare is controlled by *Condition 8 Restoration and Aftercare*. The applicant propose to restore the landfill facility to public open space. The Proposed Decision requires the applicant to submit a revised Restoration and After-Care plan for agreement within six months which takes into consideration the closure of the facility and requirements of the licence (*Condition 8.1*). This plan must specify the final contours of the site, the quantity of inert waste required for restoration purposes and the proposed landscaping arrangements. Only inert waste necessary for implementation of the agreed restoration plan can be deposited at the landfill (*Condition 8.2*). The restoration of the site must have regard to the guidance contained in the EPA Landfill Manual on *Landfill Restoration and Aftercare* (*Condition 8.1*).

(9) Hydrogeology

The groundwater resource is regionally important with the aquifer comprising the South Lower Carboniferous aquifer. Overburden varies in depth from zero to 38 metres. Much of the overburden on the quarried benches would have been stripped

away and landfilling in places has been directly onto bare limestone. The water table lies some 27m to 47m below the landfill under a thick unsaturated limestone layer.

Groundwater movement is principally confined to fissure flow, however, karstic features are present and were encountered when drilling two boreholes at the southern end of the facility (BH9 & BH10). BH10 revealed a 6m water filled void 27m below the surface. The width and extent of these karst features is not known. The permeability of the rock from variable head permeability tests ranged from 2.2×10^{-5} to 2.1×10^{-7} m/s. The applicant has stated that groundwater downgradient of the facility is not used for human consumption. Submitted as part of the application was a study carried out by Weston-FTA Ltd for the Corporation of Drogheda. This study, which was carried out in 1995, considered the suitability of the site for further landfill development. The study recommended to the Corporation *that a policy decision be made to close and rehabilitate the existing landfill at the earliest feasible opportunity.*

Ten monitoring boreholes were drilled around the perimeter of the facility in February 1998 - three baseline / upgradient (BH1, BH2 & BH3), three intermediate (BH4, BH5 & BH7) and four downgradient (BH6, BH8, BH9 & BH10). Groundwater monitoring was first carried out at the facility in February 1998 and subsequently in August 1998, October 1998, January 1999 and April 1999. Upgradient baseline boreholes had nickel above the drinking water standard, whereas water leaving the facility had levels of cadmium, nickel, chromium, and lead above the drinking water standards (S.I. No.81 of 1988). While ammonia was elevated above the drinking water standards in some upgradient boreholes the concentrations were significantly higher in water leaving the facility. Chloride and potassium concentrations were elevated across all boreholes with the highest concentrations detected in the intermediate and downgradient boreholes. Elevated phenol was recorded in both upgradient and downgradient boreholes in the April 1999 sample. All boreholes had elevated iron and manganese.

The most significant result was for cadmium, which is a List I substance under the Groundwater Directive (80/68/EEC). The concentration of cadmium in both BH4 and BH10 was above the drinking water standards. The concentration measured in BH10 was on one occasion 26 times higher than the drinking water standard (0.13mg/l versus 0.005mg/l). The Local Government (Water Pollution)(Amendment) Regulations 1999 (S.I. No. 42 of 1999) specifies a standard of 0 (zero) mg/l for cadmium. Also for comparison the Dutch groundwater intervention standard for cadmium is 0.006 mg/l. BH10 also had elevated concentrations of ammonia, nickel, chromium, lead, barium, phenol and nitrite above the drinking water limits. The sample taken from BH10 represents the water quality flowing from the site through a 6m water filled karstic void. An additional borehole was installed to investigate, this borehole (BH11) also had elevated concentrations of leachate indicator parameters above the drinking water standards (including ammonia, conductivity, nitrite, nitrate & potassium).

The quarry lake is directly downgradient of a section of the landfill and acts as a receptor and dilution sump for leachate and contaminated groundwater migrating beneath the landfill.

Condition 9.4 requires the applicant to carry out further investigations into the extent of the karst features and the extent of downgradient groundwater contamination. Proposals for the remediation of the existing groundwater contamination are required under *Condition 4.15*. Groundwater monitoring is required by *Condition 9.1*. *Condition 9.3* requires the applicant to monitor any boreholes downgradient as far as the River Boyne (approximately 500m). *Schedule F (Tables F.4.2 and F.4.4)* specifies the groundwater analysis required. In light of the contamination found - and the vulnerability of the aquifer - monthly monitoring is required in certain cases. A decision can be taken by the Agency under *Condition 9.7* to alter the sampling frequency dependant upon the results found. The Proposed Decision only permits inert waste to be deposited at the facility for restoration purposes and therefore there should be no increase in contamination or environmental pollution attributable to future recovery of this inert waste in so far as relates to the site. In order to prevent discharges to groundwater the hardstanding area of the Civic Waste Facility must be bunded and built on an impervious base (*Condition 4.18*).

(10) Emissions to Air

Emissions to air include landfill gas and dust. In addition there is potential in the future for emissions of the combustion products of landfill gas. In response to a request from the Agency, landfill gas piezometers (LG1-8) were installed at locations around the perimeter of the facility close to buildings. The results submitted for monitoring carried out on seven dates between October 1998 and June 1999, along with monitoring at the groundwater monitoring boreholes (BH1-11), revealed no evidence of any off-site landfill gas migration. All results were below the trigger level of 1% v/v methane. Gas monitoring has also been carried out from the leachate monitoring boreholes (L1-5) installed within the waste mass. These boreholes revealed methane concentrations in the range of 26.4 to 65.7 % v/v.

A study on whether any additional landfill gas migration monitoring boreholes or gas migration control measures are required after capping of the facility must be submitted within six months (*Condition 9.13*). *Condition 7.1* sets emission limits for landfill gas detected in buildings. *Condition 7.5* sets trigger levels for landfill gas detected on or in the immediate vicinity of the facility. Landfill gas monitoring requirements are set out in *Condition 9.1*.

Dust monitoring has been carried out over a four month period from one monitoring point close to the site security hut (DG2). Two other monitoring gauges at the facility were repeatedly vandalised. The dust deposition rates measured varied from 130 to 378 mg/m²/day. These reading were taken within the facility and are not representative of the facility boundary. However, they do indicate the potential for nuisances caused

by dust and the need for mitigation measures. *Condition 6.7* requires that during dry weather water must be used for dust abatement. Dust monitoring requirements are established under *Condition 9.1*. Monitoring points must be positioned at the boundary such that they are representative of dust emissions to the Cement and Collon Road. *Condition 3.1* requires further action, including investigations and remedial action to be taken if trigger levels or emission limits are exceeded.

(11) Noise Emissions

There are two main sources of noise at the facility (1) site machinery and (2) vehicles depositing waste. Noise monitoring was carried out at the three nearest noise sensitive locations during normal working hours at which there was no discernible site noise. Noise emissions are anticipated to decrease in line with the decreasing amount of waste being deposited at the facility. Despite the fact that the Civic Waste Facility is proposing to open on Sundays it is anticipated that the limited activity at the facility will not generate any significant change in the current noise levels. Noise emission limits are established by *Condition 7.1*. *Condition 7.4* requires that there shall be no clearly audible tonal component in noise emissions from the facility. Noise monitoring of the facility is required by *Condition 9.1*

(12) Emissions to Sewer

There are currently no emissions to sewer. The applicant propose to divert all surface run off from the proposed Civic Waste Facility to a new sewer which will connect to the Drogheda Sewage Treatment Works. In future leachate could also be diverted to sewer under the requirements of *Condition 4.15*. Emissions limits and monitoring requirements have been established by the Sanitary Authority and are included in the Proposed Decision as *Condition 7.7 and Condition 9.1*. Clarification and amendment (if necessary) of the volumes to be discharged must be submitted and agreed under *Condition 7.7.3*. An oil interceptor is also required under *Condition 7.7.12*.

(13) Emissions to Surface Water

The 12 hectare quarry lake is the main surface water feature. This lake is fed mainly by groundwater flowing from beneath the landfill. Surface water monitoring commenced at the facility in August 1998 with further samples taken in October 1998, January 1999 and April 1999. Samples were taken from the quarry lake (SW1 & SW3) and from another nearby quarry lake (SW2) to the north east of the boundary of the landfill. The results revealed diffuse contamination of the quarry lake.

A revised ecological study submitted at the request of the Agency showed that the quarry lake is of significance as a water bird habitat. The study revealed the presence of aquatic plants typical of eutrophic conditions. Fish are present in the lake and the invertebrates found were mainly pollution-tolerant species, however, two species of water beetle were found which are scarce in Ireland. It was noted in the study that these

two beetles “are of conservation significance, although are likely to disappear as leachate pollution of the lake increases”.

I consider that further landfilling of non-hazardous waste (other than inert waste) at the facility, in the absence of leachate collection system, is likely to lead to deterioration in surface water quality. *Condition 9.1* requires surface water monitoring. *Condition 9.11* requires an annual ecological survey of aquatic flora and fauna. *Condition 4.18* requires that surface water collected from the hardstanding areas of the proposed Civic Waste Facility must be diverted to the foul sewer.

(14) Other Significant Environmental Impacts of the Development

None.

(15) Waste Management, Air Quality and Water Quality Plans

No relevant air quality plans exist. The requirements of the Water Quality Management Plan for the Boyne Catchment have been considered in the evaluation of this licence application. Louth County Councils draft waste management plans were also considered, namely (1) *Waste Management Plan 1987 - Draft Report* and (2) *Special Waste Management Plan 1992 - Draft Report*.

(16) Submissions/Complaints

377 submissions were received in relation to the facility. A list of the submissions received is given on the attached report from the Waste Licence Application Administration system. The 377 submissions received related to 100 individual pieces of correspondence received by the Agency. I have had regard to the submissions in making my recommendation to the Board. From the many personal comments in submissions it is apparent that many local residents have been significantly impacted by emissions and nuisances caused by the landfill facility - particularly flies, odours and smoke. The vast majority of submissions are calling for the immediate or phased closure of the landfill.

Below I have summarised the main concerns raised in the submissions. The specific details in some submissions are highlighted to give an overview of the concerns raised. Not all submissions are mentioned by name, however, all were equally considered. The date shown in brackets refers to the date on the correspondence received. Where the correspondence was not dated, the date it was received by the Agency is shown.

1. Flies

Concern about infestations of flies was the most common issue raised with 72 submissions covering this issue. The submissions from Anne McEntee (24/3/99) and Eavan Brady (24/3/99) highlight the serious problems experienced by local residents. Anne McEntee's submission outlines the nightmare of trying to keep babies bottles clean. Eavan Brady's says that last year her son had a serious head operation and could not let be let out to play for

fear of the flies causing infections. Many local residents complained that because of the flies they were not being able to open their windows or patios. Many noted that they were concerned about the health implications of such large numbers of flies. A submission from Claire Carlton (4/8/99) reports that because of the flies they were unable to sleep. From the more recent submissions it appears that the fly problem may not be as severe this year as last year but there is now concern expressed about the frequency at which the landfill is being sprayed with insecticide.

Response

I consider that the residents in the local area have been subjected to severe nuisances from flies resulting from the operation of the facility. The Agency wrote to the Corporation on the 1/7/98 advising the Corporation to give urgent attention to the concerns raised by the local community with a view to implementation of appropriate measures to eliminate nuisances. The cessation of disposal at the landfill (*Condition 1.1*) and the waste covering requirements under *Conditions 4.17.1* effectively means that flies should not be a future problem at the facility. *Condition 6.9* requires that flies do not give rise to nuisance at the facility and in the event of complaints a review of the control measures used must be carried out. Operations of the Civic Waste Facility are controlled under *Condition 5.9*.

2. Fires

63 submissions indicated that fires, or more correctly smoke from fires, are an ongoing problem at the facility. Many submissions report that smoke has caused a nuisance to local residents as far as Drogheda Town centre. Fires were reported to the Agency on dates in March and April 1999. Besides the smoke a problem also mentioned was ash blowing from the fires. 15 submissions were received from Nora Rafferty - representing a local residents group called the Drogheda Milk Bottle Club - over the period 18/3/99 to the 19/8/99. In many of these submissions Mrs Rafferty outlines her concerns about the persistent problem of fires and smoke at the facility and is not satisfied with the Corporations response to dealing with this problem. Michael McKeon, Secretary of the Louth Green Party (30/3/99), states that "the Emergency Response Procedure of calling out the fire brigade is outrageous". It is alleged in submissions that one source of fires is trespassers burning the rubber off cables to recover the copper.

Response

The submission from Nora Rafferty dated the 3/5/99 regarding fires at the landfill was treated as a complaint. The response received from the Corporation (28/5/99) indicated that they were going to review site security and in consultation with the Assistant Chief Fire Officer establish a written procedure to improve response times for dealing with fires. *Condition 10.6* covers fires and requires that all fires are treated as an emergency, immediate action taken and the appropriate authorities notified. *Condition 10.6* also requires a proposal on how the Corporation intend dealing with an onsite underground fire. A review of site security to prevent trespassers is required under *Condition 4.3.3*.

3. Odours

The problem of odours arising from the landfill facility was raised in 61 submissions. Comments in the submissions received include "the fumes were nothing short of disgusting" (Caroline O'Neill, 3/7/98) and "the smell means that we have to keep our doors closed" (Maria Cambell, 23/3/99). Victor and Irene Clark (24/3/99) mention that the smell was particularly bad in March of this year and state that "our daughter and grand children in Dublin [when they visit] are inclined to get sick when the smell is strong and so leave early

which is sad for us". The submission from Mr. Murphy (28/9/98) mentions that "many people were of the opinion that smells appeared to be of dead animals". More recently Nora Rafferty (4/8/99) reported that the "odour emanating from the landfill was overpowering, for myself my husband, two children as we set out for what we expected to be a pleasant walk.....".

Response

Condition 1.1 requires the cessation of disposal of non-hazardous waste at the landfill facility and Condition 8 requires the restoration of the site. Condition 4.17 requires that the existing deposited waste is covered to minimise the generation of odours. Control of any odours from landfill gas is covered by Condition 4.16 which requires a landfill gas management system to be installed. Condition 5.9 controls activities at the Civic Waste Facility in order to minimise the generation of odours.

4. Other Environmental Nuisances

Other issues and concerns about environmental nuisances raised include concerns about rats - this concern was raised in 27 submissions. Submissions allege that rats are seen in the area on a daily basis. Mr. Murphy (28/9/98) mentions "that residents were scared for their children at the large number of rats seen climbing apple trees and entering private gardens". Claire Carlton (4/8/99) states that the landfill is costing them " a lot of money for rat poison, fly spray and paper". Concerns about scavenging birds were raised in 9 submissions. Particular concerns raised include the number of birds and birds dropping waste materials in the surrounding area. The submission from Mr. Murphy (28/9/98) mentions a syringe being dropped by birds. Fouling of clothes on washing lines by birds was also raised in a submission from Anne McEntee (24/3/99). Litter, the lack of control measures for litter and litter falling from vehicles using the facility were issues raised in 10 submissions. The submission from a local farmer Mr. Peter Downey (2/4/99) raised serious concerns about the impact of windblown litter. He reported that in "the last number of years numerous stock deaths can be attributed to consumption of plastics, that have been carried on the wind into the feeding groundsThe Drogheda Corporation has not provided adequate prevention measures, to ensure that it does not occur again" and says that while the Corporation have promised that all plastic would be removed this has not been the case. Mr. Downey also outlines research that many industrial chemicals (including many common plastics, pesticides, and by-products of combustion) mimic hormones which he considers has direct relevance to Drogheda landfill. He has requested that the EPA "test soil in the area for these harmful plastics".

Response

Conditions 6.1 to 6.9 provide for the control of environmental nuisances. The closure of the landfill to the disposal of municipal and household waste will greatly minimise the attraction for rats and scavenging birds. Should any complaints be received about rats or litter then under Condition 6.9 the licensee has to carry out a review of the control measures used and amend them if necessary. A clean up of the litter surrounding the facility including any litter on Mr. Downey's land (subject to his permission) is a requirement of Condition 6.4. The environmental monitoring required is in line with that specified in the recently adopted Landfill Directive and therefore monitoring for plastic contamination is not considered necessary. Condition 4.18 and 5.9 put in place measures that ensure that the operation of the Civic Waste Facility will not cause problems with vermin or litter.

5. Water Quality - Groundwater and Surface Water

92 of the submissions mention concerns about groundwater contamination and several in particular point out the vulnerability of area. Aine Walsh from Earthwatch Drogheda (4/4/99) states that the “The fact that the dump is unlined and there is no leachate management plan in operation at the moment is a matter of grave concern which needs urgent attention”. The submission from Mr Michael McKeon from the Green Party (30/3/99) raises concerns about compliance with Articles 3 and 4(1) of the Groundwater Directive. The submission from Mr. Murphy (28/9/99) reports that their private water scheme is slightly contaminated. Maeve Healy and Ken O’Heiligh (31/3/99) mentions that they are supplied with water from the Ballymakenny Group Water Scheme which is within about 1 mile of the landfill. They have requested the EPA to ensure (a) that noxious waste be excluded, (b) a leachate collection system installed,(c) prevent the lake being used for leachate containment and (d) that the Ballymakenny Water Group scheme is monitored. A submission signed by 63 residents (1/4/99) outlines concerns about groundwater quality based on a paper from Rachel’s Hazardous Waste News entitled “Superfund—Part 3: Groundwater Cleanup is harder than previously thought”. The residents note that “the Drogheda Corporation openly admit that pollution has occurred in this - water table. They have not made any attempts to clean up this contamination or prevent it from occurring again....If dumping is to continue on this site - the site is going to contaminate to a greater extent the groundwater”. They also request the EPA to carry out independent water sampling and testing in areas [listed in the submission] near the landfill. A submission from Ms.Nuala Ahern M.E.P. (5/7/99), outlines concerns about contamination of the private water scheme supplying the Mell area and reports that local people were advised to boil their water. The submission from Michael Rafferty (25/5/99) outlines concerns about “leachate seeping into the groundwater which will obviously increase the risk of water contamination”. 14 submissions raise concerns about contamination of the quarry lake and it’s use as a leachate sump. The submission from Owen Murphy and Geraldine O’Reilly (26/3/99) mentions that “seepage into the water-table is, and will continue as further waste is disposed of at this tip-head” and they do not accept “that seepage into the water of this quarry, is (As stated in the Report and Application) beneficial to the fauna and natural plant life”. The Eastern Regional Fisheries Board (17/8/99) asks the EPA to ensure maximum protection of all surface water and groundwater as the landfill is relatively close to the River Boyne. They also asked to be informed of any serious discharges of leachate that may pose a threat to fisheries.

Response

The groundwater monitoring results submitted by the applicant has indicated that the groundwater beneath the landfill has been impacted by leachate. I consider that continued operation of the landfill in the absence of any technical measures to prevent leachate entering the groundwater would lead to a contravention of the Groundwater Directive. Leachate control is covered under *Condition 4.15* which requires a proposal on the feasibility of installing a leachate management system. An investigation into the extent of groundwater contamination is required under *Condition 9.4* and existing groundwater contamination must be remediated under *Condition 4.15*. Capping of the facility as per *Condition 4.17* will ensure that leachate generation is minimised. Extensive groundwater and surface water monitoring is specified under Schedule F. An annual ecological study of the quarry lake is a requirement of *Condition 9.11*. The applicant has stated that no wells are known to be located downgradient of the facility which is widely serviced by a mains supply. The source of the *Ballymakenny* water scheme mentioned is upgradient of the facility. Monitoring of any new private supplies or any wells for 500m downgradient of the facility as far as the River Boyne, and 250m upgradient of

the facility, is a requirement of *Condition 9.3*. A copy of the submission from Nuala Ahern M.E.P. regarding concerns about private water quality in the Mell area was forwarded to Louth County Council and the Corporation of Drogheda as the responsible authorities in this instance. Under *Condition 3.8* the Eastern Regional Fisheries Board must be notified of any incident which relates to discharges to surface waters.

6. Leachate Collection

Concerns about the lack of a leachate collection system were raised in 68 submissions. The submissions from Aine Walsh (Earthwatch, 4/4/99) and Michael McKeon (Louth Green Party, 30/3/99) outline concerns about the underlying limestone offering no resistance to the percolation of leachate and the resultant pollution of the quarry and groundwater. Meave Healy and Ken O'Heiligh (31/3/99) request that "a comprehensive drainage system be installed all around the dump below base level and that all leachate / leeching and run-off from the dump be channelled into a container / reservoir, from which it can be tested, treated and disposed of" and also that the practice of using the quarry lake for leachate containment is rectified.

Response

Condition 4.15 requires a proposal on the feasibility of installing a leachate management system. Capping of the entire facility to minimise leachate generation is a requirement of *Condition 4.17*.

7. Landfill Gas

Concerns about landfill gas were raised in 15 submissions. Owen Murphy and Geraldine O'Reilly (26/3/99) outline their concerns about gas emissions and consider that the contingency measures are inadequate in the event of ignition of the gas. Specific points were raised in the submission from Michael McKeon of the Green Party (30/3/99). He states that a "valid licence should specify total emission limits for methane because of its global warming potential and emission limits for other toxic elements of landfill gas". He also states that there should be ambient concentration limits for toxic components of landfill gas and considers that the EPA should not exclude the health impacts on workers on the landfill site. The submission from Earthwatch (4/4/99) states that there is no methane venting facilities and "these are imperative for the health and safety of the dump and surrounding people, wildlife and landscape". A submission signed by 59 residents (1/4/99) outlines concerns about the impact of emissions on air quality. The submission quoted American research indicating that VOC's including chlorinated solvents can be emitted from landfills. Sandra Govern (5/4/99) writes that the dump is constantly on fire due to the build up of gas and Drogheda Corporation have made no attempts to install vents. Ms. Govern states that "these gases have been known to cause cancers in people living in the proximity of dumps".

Response

Condition 4.16 requires the installation of a landfill gas management system to either flare the gas or use the gas to generate electricity. Extensive landfill gas monitoring is required under Schedule F. Monitoring for VOC's from the gas vents installed in the waste mass is a requirement of the licence (Table F.1.2). The results obtained can be compared to relevant ambient standards. The issue of workers health and safety is outside the remit of the Agency's waste licensing functions. Emission limits for landfill gas are specified in Schedule G.

8. Environmental Pollution (other than nuisance and water pollution)

Concerns about the disposal of asbestos waste and fibreglass were raised in 67 submissions. The submission signed by 66 residents (recd 7/4/99) mentions that the facility still accepts rubble and waste which can contain asbestos and fibreglass. Enclosed with this submission was an article taken from Rachel's Hazardous Waste News entitled "New Air Pollution from Landfills : Asbestos and Fibreglass Hazards". The residents have also called for independent dust and air monitoring. Concern about potential toxic substance present in emissions from the facility was raised in 192 submissions. Biological air pollution concerns were raised by Michael McKeon (30/3/99). Slippage of the waste mass was raised in two submissions, in the submission from Owen Murphy and Geraldine O'Reilly (26/3/99) they note their concerns that further waste disposal above the existing heights is "no longer seen by our residents as Landfill, but rather a creation of artificial waste mounds and hills, which will add to the danger of Land Slippage". Four submissions mentioned dust. A submission from Sean Murray (25/5/99) outlines concerns about the increase in dust emissions from the facility. In his view it appears that while covering of waste has improved the problem of dust emissions has worsened.

Response

Only inert waste can be deposited at the landfill for restoration purposes. Condition 5.9.d prohibits the disposal of asbestos waste at the Civic Waste Facility. Biological air pollution is not considered a concern given that the landfilling is to cease. Condition 10.3 requires the licensee to carry out slope stability monitoring. Schedule F put in place an extensive monitoring programme to monitor emissions including landfill gas and dust. Emission limits for dust are specified in Schedule G. Condition 6.7 requires spraying roads etc. with water during dry weather to keep down dust emissions.

9. Health Concerns

Many of the submissions - 299 in total - mentioned or highlighted concerns about the health impacts of emissions from the facility. Items highlighted in submissions included concerns about disease spread by flies and rats, concerns about the health implications of smoke from the fires, concern about traffic carrying infected material from the facility, concern about potential toxic emissions and concerns about increase in Meningitis and Viral type illnesses. Two submissions from Dr. Aidan Quinn a consultant radiologist (4/7/99 & 22/3/99) expressed concern about the health effects on the local population and that "the long-term potential teratogenic effects which have been highlighted with other landfill sites world-wide do not appear to have been taken into account". The Department of Health and Children (24/6/98) forwarded a complaint they received to the Agency which expresses concern about possible health risks from flies and rats. Sandra Govern (5/4/99) states that "many recent studies have given you the EPA clear evidence that landfills and dumps cause cancers in local people living within a mile of an existing landfill. A recent USA study states that you have a 12% greater chance of having a child with a handicap and or a form of disability. The study also went on to state that women (up to 63% chance) have a far greater chance of having a miscarriage - if you live within a mile of a dump - the study went on to say that pregnant women should avoid and even move away from dump sites". A submission signed by 82 residents (2/4/99) objects to the waste licence application based on research into (1) birth defects, (2) children born to women living near old dumps have higher risk of birth defects and (3) landfill study finds low birth weight in babies, and adult cancers. A submission from 63 residents (1/4/99) outlines concerns about groundwater pollution and mentions that "recent scientific research from the US has shown that you have a greater risk of cancer and birth defects - if you live with in a mile of a dump - the river Boyne is only

hundreds of yards from this landfill". A submission received from Martin Phelan and signed by 56 others (recd 31/3/99) outlines concerns about a "real risk to children born near dumps" and liner leakage. Mr. Phelan also asked a number of questions on the current operation of the facility. Attached with Mr. Phelan's submission were reports taken from Rachel's Hazardous Waste News entitled (1) Leachate from Municipal Dumps has same toxicity as leachate from hazardous waste dumps (Aug, 1988), (2) Children born to women living near old dumps have a higher risk of birth defects, (3) New evidence that all landfills leak and (4) A report from the Environmental Research Foundation entitled Landfills are Dangerous (Sept. 1998). These reports point out that there is "ample evidence that the municipal waste landfill leachates contain toxic chemicals in sufficient concentration to be potentially harmful as leachate from industrial waste landfills". The reports mention that VOC's were found in gases from landfills in studies carried out. Nora Rafferty outlines concerns about the health impacts of the facility (29/7/99, 15/6/99) and mentions a Lancet report linking health effects and landfill sites, she also outlines concerns about drinking water in the Drogheda area (26/5/99) and believes that the landfill has a part to play in "disturbing" health statistics for the area.

Response

The various conditions in this licence will require the applicant to ensure that the restoration of the landfill meets BATNEEC standards and the recommendations in the Landfill Directive. The monitoring specified in Schedule F of this licence will ensure that the emissions from the facility are closely monitored. Monitoring of List I/II substances in groundwater and VOC's (non-methane hydrocarbons) in landfill gas is a requirement of this licence. In relation to health impacts it should be noted that the Health Board was one of the public bodies notified under Article 18 of the Waste Management (Licensing) Regulations, 1997 (S.I. No.133 of 1997).

10. Location of facility and proximity to residential areas

Many of the submissions raised the view that the landfill was located too close to residential areas and point out that the town of Drogheda is expanding in the general area of the landfill with more houses planned for the area. Mr. Murphy (28/9/98) has concerns that it is "irresponsible for any local authority to continue a policy of dumping waste in the centre of a growing population". Dr. Aidan Quinn (22/3/99) states that "he finds it hard to believe that it is not a health hazard to have a rubbish dump with the resulting vermin, odours, insect infestation and water table pollution within a 5-mile radius of a major population centre". In another submission from Dr. Aidan Quinn (29/3/99) he asks about the minimum distance between a dump and a residential area and understands that the EU are setting a minimum distance of 2000 metres. Sheila Harrington Smith (18/8/99) mentions that "it is unacceptable to expect residents to agree to the operation of a dump in a built up area". Many other submissions express similar views and in total 91 submissions raise this issue.

Response

Condition 1.1 requires cessation of disposal activities at the landfill. Condition 8 requires the restoration of the landfill facility.

11. Traffic

The traffic resulting from the increased waste intake was raised in 66 submissions. Noise from road traffic using the site was raised in 3 submissions. Nuisance from traffic generally in the form of vehicles carrying mud onto the public road was raised in 12 submissions. Mr. Murphy (28/9/98) says that a new motorway is being constructed and will result in traffic increases. Also over the past two years she says that the traffic using the facility has

increased and waste falling off open vehicles is a road safety hazard. Sandra Govern (5/4/99) believes that the condition of the road is such that “there is going to be an accident on this road before the year is out”. She writes that the current road cleaning is not enough and the Corporation “do not clean the roads properly”. The need for a system to disinfect lorries leaving the facility was raised by Sean and Linda Murray (recd 29/3/99).

Response

Until the final restoration is completed the potential for noise emissions from traffic still exists although the information submitted in the application indicates that traffic is unlikely to represent an excessive impact. *Condition 7.4* specifies that there should be no clearly audible tonal or impulsive component in the noise emissions from the activity at the facility boundary. Annual noise monitoring is specified under *Schedule F. Condition 4.9* requires an operational wheelwash to prevent tracking of mud out onto the road. *Condition 6.2* specifies that any material deposited on the road must be removed without delay. General concerns about road safety do not fall under the remit of waste licensing and are responsibility of the local authority and the Gardai.

12. Operation and Infrastructure

The use of the facility to dispose of waste from outside the area controlled by the Corporation and the Council was raised in 92 submissions. Several of the submissions were particularly concerned about the facility being used as a landfill for waste from Dublin. Concerns were raised about the types of waste accepted in 80 submissions. Some mentioned specific concerns such as the disposal of medical waste (June Horgan, 29/3/99 and Gerry Floyd, recd 9/4/99) and asbestos (Sandra Govern, 5/4/99). Inadequate covering and the lack of cover material was a concerns raised in 13 submissions including a submissions from Nuala Ahern M.E.P (12/6/98). The submission from Michael McKeon (31/3/99) mentions that there is not enough covering material to carry out daily covering of waste. Other concerns raised include the poor landscaping of the facility and removal of screening bunds (9 submissions), site security - including inadequacy of the fencing and disposal of waste at night (3 submissions), concern about flooding of the road in front of the facility as there is no drainage ditch (1 submission) and increased tonnage's accepted at the facility (5 submissions). Michael McKeon (30/3/99) mentions that there are two dumping sites and two entrances - one on the Collon Road and one on the North Road.

Response

Condition 1.1 requires the cessation of waste disposal at the landfill. *Condition 8* put in place a restoration scheme for the facility. The restoration scheme must include measures to prevent road flooding (*Condition 8.6*). *Condition 4.3* requires a review of security and replacement of fencing. Disposal of waste is limited to the times specified in the licence (*Condition 5.5 and 5.9*). Waste acceptance procedures for accepting inert waste at the landfill for restoration purposes, and waste at the Civic Amenity Facility, are required under *Conditions 5.2 and 5.9.e* respectively. Only one entrance and dumping site exits - the entrance on the North road is to a separate waste facility operated by Jumbo Bins.

13. Civic Amenity Facility

The submission from Owen Murphy and Geraldine O'Reilly (26/3/99) mention concerns about the tail-backs from traffic entering the proposed Civic Waste Facility and disruption of traffic on a proposed new road artery leading to the motorway. They recommend that the facility is set in the interior of the tip-head and not as proposed. Ann Keely and Councillor Godfrey of Mellifont Part Residents Association (7/10/98) list issues about which they have

received complaints - one of which is the “proposal for recycling plant. Mr. Murphy (28/9/98) in a submission signed by residents mentions that they are in favour of segregation of waste and recycling. Ann Walsh from Earthwatch Drogheda considers that recycling is required and favours a kerbside type system with collected material brought to a central recycling facility. She also notes that composting could save landfill space and provide a useful end product.

Response

I consider that the location of the proposed civic waste facility is satisfactory. General concerns about road safety and traffic management do not fall under the remit of waste licensing and are the responsibility of the local authority.

14. Legislation and Waste Licensing Procedures

89 of the submissions claimed that the site was either not managed properly or not complying with guidance and legislation. A request for a public meeting on the application - and for this to be made a part of the licensing process - was requested in 191 submissions. Michael McKeon (30/3/99) requested that the Agency specify publicly how the issue of a proposed licence would guarantee that there would be no risk to groundwater, people or community and how the facility is made safe from causing environmental pollution. Public questioning of Corporation officials was also requested. Sheila Smith (1/4/99) asked for details on oral hearings.

The submission from Blathnaid Quinn (22/3/99) mentions that “despite Drogheda Corporation having failed to apply for an extension within the appropriate time frame they appear to granted the same”. Michael McKeon (30/3/99) believes that a proposed licence would be in breach of Articles 3 and 4(1) of the Groundwater Directive and Section 40(4) of the Waste Management Act, 1996. He also believes that there should be better public participation in the licensing system. He states that the proposed licence must contain the substantial details of the licensing regime for the activity for in order to have a meaningful right to object under the Waste Management Act, 1996. His concern is that the information submitted leaves almost all the environmentally important information out and they have no idea of the final plan and remediation of the site. Another concern raised by Mr. McKeon is that standards have not been prescribed under Article 40(4) of the Waste Management Act and in the absence of such standards the Agency cannot be satisfied that the activity will not cause environmental pollution. He also list items which should have been produced by the Corporation of Drogheda including an Environmental Management Programme, Mass Balance of Specified Substances and Trigger Limits.

Brian Murray (23/3/99) considers that the facility is being operated to generate income and is concerned that the local authority management remains silent on the whole issue. Dr. Quinn (29/3/99) asks whether there is any cut-off at which an EIS needs to be made prior to granting a waste licence. Mr. Peter Gordon (7/4/99) objects on the grounds that the Louth County Manager would prefer to see the dump closed but cannot because finance for alternatives would be difficult. Sandra Govern (5/4/99) says that Corporation and the Council have ignored requests from the general public to clean up the pollution. Nora Raffery in 15 submissions to the Agency outlines a variety of concerns about the management of the landfill and want’s to see the Corporation change its ways and implement a waste management plan. Mrs Raffery has also written to the European Commission on the matter. Nuala Ahern M.E.P. (12/6/98) alleges that the “dump does not seem to have any plan or

management person responsible for its upkeep". Sheila Harrington Smith (18/8/99) says that the Corporation have been aware that they must find an alternative site and she believes that the County Manager is not prepared to compromise and find a workable alternative.

Response

The processing of the application has been in accordance with procedures set out in the Waste Licensing Regulations and Waste Management Act, 1996. The waste intake was greater than 25,000 prior to the introduction of the EIS Regulations in 1989 and therefore an EIS is not required. A public meeting of the type requested was not considered appropriate. The Waste Licensing Regulations allow for members of the public to object to any Proposed Decision and request an oral hearing in relation to their objection. The various conditions of this licence will ensure that the landfill restoration works and the operation of the proposed Civic Waste Facility will be managed to a higher standard than in the past.

Signed: _____

Dated: _____

Brendan Wall
Inspector, Environmental Management & Planning

APPENDIX 1

SITE LOCATION & LAYOUT DRAWINGS