

<b>MEMO</b>			
<b>TO:</b>	Board of Directors	<b>FROM:</b>	Sara Kennelly
<b>CC:</b>		<b>DATE:</b>	17 <sup>th</sup> May 2001
<b>SUBJECT:</b> Technical Committee Report on Objections to Proposed Decision - Reg. No. 23-1.			

Application Details	
Applicant:	Cork County Council
Location of Activity:	Raffeen Landfill Site
Reg. No.:	23-1
Activities applied for under Waste Management Act 1996:	Third Schedule: Classes 1, 11, 12, 13 Fourth Schedule: Classes 2, 3, 4, 9,10, 11, 13
Proposed Decision issued on:	28/12/00
Objections received:	<ol style="list-style-type: none"> <li>1. 24/01/01 From the South Western Regional Fisheries Board</li> <li>2. 23/01/01 From Cork County Council</li> </ol>
Submissions on objections received:	<ol style="list-style-type: none"> <li>1. 23/02/01 From Cork County Council in response to objection from South Western Regional Fisheries Board.</li> </ol>
Inspector:	Maeve McHugh

### **Consideration of the objections and submissions on objections**

The Technical Committee (Sara Kennelly, Chairperson, Brendan Foley and Regina Campbell committee members) has considered all of the issues raised and this report details the Committee's comments and recommendations following examination of the objections.

### **Objections and submissions on objections received**

One objection was received from the South Western Regional Fisheries Board and one objection was received from the applicant, Cork County Council.

One submission was received from Cork County Council on the objection received from the South Western Regional Fisheries Board.

### **Objection 1: South Western Regional Fisheries Board**

#### ***Ground 1 Contravention of Legislation***

*The South Western Regional Fisheries Board considers allowing class 1 of the Third Schedule of the Waste Management Act, 1996 to continue at this facility is not in accordance with the provisions of the Waste Management Act 1996 which prohibits the holding, transport, recovery or disposal of waste in a manner which causes or is likely to cause environmental pollution. The South Western Regional Fisheries Board also*

*consider that this may also be contrary to the provisions of The EU Groundwater Directive 80/68/EEC.*

*They state that the continued use of this site for reception of wastes, which by their nature give rise to liquid effluents, should not be permitted.*

#### **Technical Committee's evaluation**

The Technical Committee notes the objector's comments and deals with both legislative instruments as follows:

##### Waste Management Act 1996:

The TC considers that the continuation of Class 1 of the Third Schedule of the Waste Management Act, 1996, namely the deposition of commercial and domestic waste, contravenes Sections 40(4)(a) and 40(4)(b) of the Waste Management Act 1996 as follows:

- a) the EU Groundwater Directive 80/68/EEC and the Local Government (Water Pollution) Act, 1977 (as discussed below) will be contravened and
- b) environmental pollution of the groundwater body beneath the landfilled area will occur.

For these reasons, the Technical Committee considers that the Agency should refuse Class 1 of the Third Schedule (Waste Disposal Activities) of the Waste Management Act, 1996 i.e. *Deposit on, in or under land (including landfill)*.

##### The EU Groundwater Directive 80/68/EEC:

The Technical Committee has assessed the groundwater and leachate monitoring results given in the waste licence application. Monitoring results show the presence of the List I substance Cadmium at each groundwater monitoring location (GW1 to GW6 inclusive) on at least one sampling occasion when sampled in 1998. Cadmium was present in levels ranging from 0.010 mg/l to 0.030 mg/l. These levels are high considering that the Drinking Water Regulations Maximum Admissible Concentration (MAC) for Cadmium is 0.005mg/l. Monitoring results show the presence of the List I substance Cyanide at each groundwater monitoring location (GW1 to GW6 inclusive) on at least one sampling occasion when sampled in 1998 and 1999. Cyanide was present in levels ranging from 0.002mg/l to 0.305 mg/l. The MAC for Cyanide is 0.05mg/l. It is evident that emission limit standards are being breached and that pollution of groundwater is occurring.

List II substances Lead and Nickel were present in the groundwater monitoring results in levels exceeding their respective MAC limits.

The TC notes that the existing landfill areas within Raffeen landfill are unlined and that leachate, including List I and List II substances, is discharging directly to groundwater at this facility. The calculations shown in Appendix 1 demonstrate that the estimated post-dilution concentrations of List I substances Cadmium and Mercury in leachate discharging

to groundwater are 0.014mg/l and 0.0017mg/l respectively. The MAC for Mercury is 0.001 mg/l.

The TC consider that the groundwater monitoring results given in the waste licence application show that saline intrusion is not evident at the site with Chloride values within the Drinking Water Regulations MACs with the exception of three high results; two taken in June 1998 at GW1 and GW2 and one taken in February 1999 at GW4.

The TC recommends that the total annual tonnage of waste to be accepted at the facility is 40,000 of inert waste to be accepted for the purposes of restoration only.

We consider that the Agency should refuse Class 1 of the Third Schedule (Waste Disposal Activities) of the Waste Management Act, 1996 i.e. *Deposit on, in or under land (including landfill)*.

#### **Recommendation**

**There are 4 no. recommendations given in Appendix 2 attached.**

- (i) remove Class 1 of the Third Schedule;**
- (ii) amend Schedule G to include the waste acceptance criteria for inert waste;**
- (iii) add Schedule H, waste categories and quantities; and**
- (iv) add Part III waste activities refused and reason for refusal.**

#### **Ground 2 Geology and Hydrogeology of the Site**

*The objector states the following:*

- *the landfill is located in a disused quarry in a narrow valley through which a small watercourse flows in a north/south direction;*
- *the geology of the site is a mixture of sandstone, shales and fractured slate and the hydrology of the area introduce groundwater levels close to the surface of the site;*
- *in view of its geological and hydrological nature, this site is considered unsuitable for the operation of an un-contained waste disposal facility due to the sites high permeability with underlying deposits of fractured slates and shale; and*
- *these conditions allow contaminated liquid generated within the landfill to flow directly to ground waters and that onsite monitoring of ground waters have indicated that contamination is occurring.*

#### **Cork County Council's Submission**

The council states that groundwater level monitoring at the site indicates that the groundwater levels do not rise close to the current surface of the site. They also state however, that due to the topography of the valley and the ground profile in areas which were previously quarried, groundwater levels rise above the top of bedrock.

The council states that leachate levels in the waste are higher than adjacent groundwater levels indicating downward gradients. They say that this is backed up by the longterm monthly monitoring of groundwater levels and leachate levels at the site.

The council describes the exposed bedrock in the area as composed of brown to grey green, thinly bedded shales, slates, fine grained sandstones and siltstones. They state that evidence from the cored holes indicates that the bedrock underlying part of the landfill is highly fractured to a depth of 35m and that this changes towards the north where unweathered rock is closer to the surface. They further state that site investigation information obtained during the installation of the environmental monitoring boreholes indicates that the bedrock immediately underlying the site is weathered and fractured. They state that the rock quality improves with depth.

The council goes on to outline the leachate management proposal given in the waste licence application whereby they proposed that an existing surface water drainage collection pipe be converted to a leachate collection system which will run the full length of the site (north to south). The conversion works will involve the construction of a new surface water drainage system whereby the northern end of the leachate collection pipe will be sealed and disconnected from the existing surface water stream which is to be diverted as discussed in Ground 5. The depth of the existing drain is variable due to the landfilling of waste at the site however over much of the site it is considered to extend towards the base of landfilling and therefore they state that it should collect 40 – 50% of the leachate.

The leachate will be pumped to the leachate holding tank via a pump sump and an automatic level monitor will be installed to activate the pump when the leachate in the sump reaches a predetermined level.

The collected leachate will be transported off-site by tanker to Carrigaline.

### **Technical Committee's Evaluation**

The Technical Committee notes the comments from the objector and the response from the applicant. The site is an existing facility and has been in operation since 1985 and the Technical Committee considers that Condition 4.13 and Condition 9 of the Proposed Decision do not cater adequately for surface water, leachate management and groundwater management on site. The TC notes from the application that the collected leachate will be transported off-site by tanker to be discharged (with no treatment) to a marine outfall in Carrigaline.

The TC notes that it is stated in the EIS that groundwater levels range from 3m to 5m of the surface of the bedrock and that the levels in the waste appear to be slightly higher.

The TC notes the leachate management proposals outlined by the applicant in the application and that the applicant has estimated in their application and in their submission on the objection, that **only 40-50%** of the leachate generated on site will be collected by the proposed leachate control measures. As outlined in Appendix 1 of this report, even by Cork County Council's estimation, more than 20,000m<sup>3</sup> per annum of leachate would

discharge directly to groundwater even when their proposed leachate collection system is put in place.

The Technical Committee considers that the currently culverted surface water channel should be diverted within six months of the date of grant of the licence.

The Technical Committee recommends that Condition 4.13.4 should be added as below to provide for leachate collection, control and management.

### **Recommendation**

**Amend Condition 4.13.1 as follows:**

**Within six months of the date of grant of the licence, the licensee shall divert the culverted stream from a point upstream of the landfilled area and the diverted stream shall discharge to the tide at the existing stream outlet.**

**Add Condition 4.13.4 as follows:**

**Within twelve months of the date of grant of this licence, the licensee shall install leachate management infrastructure at the facility. The infrastructure shall provide for the extraction/collection of leachate from the waste and it's treatment either at the facility or a suitable treatment works.**

### **Ground 3 Surface Water Management**

*The objector states that*

- *Surface water quality above the facility is considered to be generally good however, downstream, contaminated water quality conditions are reflected by increased ammoniacal nitrogen levels and during the winter period emergent sewage fungus is evident reflecting increased organic concentrations.*

### **Cork County Council's Submission**

The council state that analysis of the surface water quality monitoring data for the site for 2000 does not indicate significant increased organic concentrations as a result of the landfill site. Elevated levels of ammoniacal nitrogen have been recorded both upstream and downstream of the site. There are a number of houses located downgradient of the landfill site (Raffeen Creek area). It is considered likely that effluent from these houses is discharging to the surface water. Monitoring data (surface water and groundwater) does not indicate a significant organic load. The monitoring results for total organic carbon in groundwater for Year 2000 indicate that the concentration of total organic carbon is greater upgradient of the site than downgradient on occasions.

### **Technical Committee's evaluation**

The TC notes that SW1 is located upstream of the site and ammoniacal nitrogen levels are lower at SW1 than SW2 and SW3 which are located downstream of the landfill.

The TC notes that under Condition 3.5 (g) of the Proposed Decision all environmental monitoring to be carried out (Condition 9.1) must be accompanied by an interpretation of the monitoring results.

**Recommendation**

No change.
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**Ground 4 Leachate Management**

*The objector states the following:*

- *all leachate generated within the site is released into the surrounding environment and without leachate containment methods being introduced on site, this will enter either ground or surface water bodies.*
- *Further refuse is deposited directly over bedrock with groundwater levels rising above the bedrock and into deposited refuse. These ground waters become directly contaminated and also result in leachate from the site migrating to surface waters.*
- *In order to effectively control and reduce pollution of ground and surface waters at this site, management of this waste facility should incorporate effective leachate collection, containment and disposal procedures and methods.*

**Cork County Council's Submission**

The council state that to date there is no leachate collection system operating at the site. The site is unlined therefore any leachate being generated on site must be either discharging to the groundwater or the surface water. Construction and demolition waste constitutes a significant proportion of the material being landfilled (67%). Therefore the volume of biodegradable or putrescible waste is low.

They state that the large proportion of construction and demolition waste that has been landfilled results in a lower strength of leachate being generated at the site. In addition the large volume of construction and demolition waste may be providing a degree of containment by reducing the volume of rainfall infiltrating through the waste body.

The council state that a comparison between the composition of the leachate versus that of the groundwater and surface water indicates that significant contamination is not occurring. They consider this to be due to the high clay content of the construction and demolition waste significantly reducing the pollution load or the high throughput of groundwater/surface water diluting the leachate. They further state that analysis of groundwater and surface water at the site to date does not indicate a significant impact on water quality (either groundwater or surface water) and give an example that the concentration of total organic carbon in the groundwater monitored during 2000 at GW1 is higher upgradient of the landfill than downgradient of the landfill.

The council state that the landfill site at Raffeen is located close to the groundwater discharge zone with discharge of groundwater to the estuary being likely. In addition they state that the bedrock beneath the site is considered to be a poor aquifer. Therefore the landfill site is not considered by the council to be having a significant adverse impact on groundwater quality.

They state that due to the nature of landfilling carried out on the site to date it is not considered feasible to retrofit a complete leachate containment system at the site. However they propose that a leachate collection system be installed which should significantly reduce the volume of leachate migrating off site.

#### **Technical Committee's evaluation**

The TC agrees with the objector that there is no leachate containment at the facility and that the groundwater is polluted and remediation measures must be put in place. See TC evaluation under Grounds 1 and 2 above.

#### **Recommendation**

**See recommendation under Grounds 1 and 2 above.**

#### **Ground 5. Condition 4.13 of the Proposed Decision**

*Condition 4.13 refers to Surface Water, Ground Water and Leachate Management*

*This condition only requests that a feasibility study on the option to collect leachate in the culverted surface water pipeline be undertaken.*

- a) *this proposal will only deal with 40-50% of the leachate generated on site*
- b) *there is no guarantee that this option will be effective or can be implemented*
- c) *the remaining 50-60% of leachate will remain uncontrolled*
- d) *the stream, which this culvert currently services, will require to be re-channelled. This issue has not been addressed.*

*The discharge of leachate to groundwater has not been dealt with.*

#### **Cork County Council's Submission re: d) above.**

Cork County Council proposed to commence work shortly on the stream diversion at Raffeen landfill site. A new pipeline (750mm diameter) is to be constructed along the edge of the existing landfill site from where it shall exit the site and shall run along the western edge of the public road to discharge to the tide at the existing stream outlet.

#### **Technical Committee's evaluation**

See evaluation under Grounds 1 and 2 above.

**Recommendation**

See recommendation under Grounds 1 and 2 above

**Objection 2: Cork County Council**

The issues raised in the objection are addressed below.

**Ground 1 Condition 4.2.1**

*The objector states that, as the active life of the site is limited, the installation of a 2.1m high fence along the western site boundary (away from the public road) is considered unnecessary. It is proposed that substantial fencing shall be installed on the perimeter of the civic amenity centre.*

**Technical Committee's evaluation**

The Technical Committee notes the comments and considers that the Condition be changed as follows:

**Recommendation**

Amend Condition 4.2.1 to read:

**Within six months of the date of grant of this licence, the licensee shall carry out a review of the site security arrangements for the site and submit to the Agency for its agreement a report to include any improvements considered necessary,**

**Ground 2 Condition 4.8**

*The objector states that the timeframe for the installation of the wheelwash is considered insufficient. To allow time for the preparation of the specification, EPA approval of the specification, appointment of contractor and installation of wheelwash, they request an extension of the time frame from three to six months from the date of issue of the licence.*

**Technical Committee's evaluation**

The Technical Committee notes the objector's comments and considers that six months is a more appropriate timeframe in this instance.

**Recommendation**

Amend Condition 4.8 as follows:

*Within six months of the date of grant of this licence the licensee shall establish and maintain a wheelwash at the facility in accordance with the specification to be agreed in*



*advance with the Agency. Unless otherwise agreed with the Agency the location of the wheelwash shall be shown on Drawing No. D1/1 Rev A.*

**Ground 3. Condition 4.13.2**

*The objector requests that the EPA consider granting permission for the recirculation of leachate at the site. They say that recirculation would assist biodegradation and lead to more rapid stabilisation.*

**Technical Committee's evaluation**

The Technical Committee considers that, as this is an unlined site and there is direct discharge of List I and List II substances to groundwater, recirculation of leachate is inappropriate.

**Recommendation**

**No Change.**

**Ground 4. Condition 4.13.3**

*The objector states that there are currently three groundwater monitoring boreholes outside the site boundary. Borehole GW1 is upgradient of the site and two boreholes are located to the west of the site boundary. In addition, GW6 is located within the site boundary at the southern end of the site. Therefore they state that the existing groundwater monitoring boreholes are considered adequate in monitoring groundwater quality within and in the vicinity of the site. They state that it is not possible to install the additional monitoring boreholes within the current site boundary due to access difficulties for site investigation plant and therefore additional groundwater monitoring boreholes would have to be installed outside of the landfill site boundary. They envisage considerable difficulty in obtaining permission from the adjacent landowner and state that, in order to install a permanent monitoring structure a right of way would be required and a compulsory purchase order may be required. They state that this work is unlikely to be achievable within the existing four month time frame and therefore request an extension to the time limit for compliance.*

**Technical Committee's evaluation**

The Technical Committee considers the requirement for more groundwater monitoring boreholes in this instance is not necessary as GW5 and GW6 are bedrock monitoring wells and the TC consider that they are sufficient to monitor groundwater. The TC also notes that the nature of the ground at the facility would make installation of such wells very difficult for the applicant.

**Recommendation**

**Remove Condition 4.13.3.**

**Ground 5. Condition 4.14.1**

*The objector requests that the installation of a passive gas collection system be considered in view of the remaining short lifespan for landfill at the site.*

**Technical Committee's evaluation**

The Technical Committee notes the objector's comments regarding the remaining short lifespan of the site but considers that landfill gas generation continues long after the landfilling of waste has finished. Gas monitoring results given in the EIS submitted with the application give methane levels of up to 66% v/v and this indicates that considerable quantities of landfill gas are being generated at the site. In addition to this it is estimated that approximately 500,000 tonnes of waste has been deposited at this site, with some borehole logs showing up to 10.5m depth of domestic waste, hence the Technical Committee consider that active flaring is required at this site. The Technical Committee also notes that the applicant proposed an active flaring system in their application and EIS.

**Recommendation**

<b>No change.</b>
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**Ground 6 Condition 4.14.5**

*The objector states that it is not possible to position perimeter gas monitoring boreholes within the existing site boundary. In order to ensure that the boreholes are installed outside of previously landfilled areas it will be necessary to install the boreholes in adjacent lands. Permission will have to be obtained from adjacent landowners. This may lead to difficulties, as the installation of a permanent monitoring structure would require a right of way. In addition a compulsory purchase order may be required in the event of objections from the landowners. This work is not achievable within the three month time frame. Therefore an extension to the time limit for compliance is requested.*

**Technical Committee's evaluation**

The Technical Committee considers that the agreement of the landowners should be sought should it be necessary for monitoring wells to be drilled external to the facility boundary. The Technical Committee considers that three months is an adequate timeframe in which to submit the proposed locations of the gas monitoring wells for agreement. The Technical Committee considers that the licensee should install these wells within six months of the date of grant of the licence.

**Recommendation**

**Amend Condition 4.14.5 to read as follows:**

*Within six months of the date of issue of the licence, the licensee shall install five additional perimeter gas monitoring boreholes; one at the southern perimeter, two on the western perimeter and two on the eastern perimeter.*

**Ground 7. Condition 4.15.2**

*With regard to the capping specification given in Condition 4.15.2, the objector requests that the EPA consider a reduction in the combined thickness of the top soil and subsoil layer to 500mm.*

**Technical Committee's evaluation**

The Technical Committee notes that no reason is given for this objection and considers the specification for the final capping system as specified in Condition 4.15.2 meets the requirements of the Landfill Directive and the EPA Landfill Manuals on Restoration and Aftercare and Landfill Site Design and that it is appropriate for this facility.

**Recommendation**

**No change.**

**Ground 8 Condition 5.11**

*Cork County Council wishes to add the following items for collection at the Civic Amenity Facility: batteries, textiles, waste oils and household hazardous waste. The new EPA manual on "Landfill site Design" includes for such items in the Typical Civic Facility Layout (Fig. 4.4).*

**Technical Committee's evaluation**

The Technical Committee has no difficulty with the acceptance of the items specified as long as suitable infrastructure and acceptance procedures are in place. However the TC considers that the Condition as written allows for this requirement in the wording "*unless otherwise agreed with the Agency*".

**Recommendation**

**No change.**

**Ground 9 Condition 9.11**

*The objector states that this area is outside the current landfill site boundary and outside of the ownership of the council and it may not be possible to gain access to the property for the installation of permanent environmental monitoring structures. They also state that, in order to install a permanent monitoring structure, a right of way would be required and a compulsory purchase order may be required and that this work is not achievable within the existing three month time frame. Therefore they state that, as a minimum, an extension to the time limit for compliance is required. However they also state that they consider the installation of these additional environmental monitoring locations unnecessary.*

**Technical Committee's evaluation**

See Technical Committee's evaluation to Ground 6 above.

**Recommendation**

<b>No change.</b>
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Signed \_\_\_\_\_

Sara Kennelly

Technical Committee Chairperson

## Appendix 1

### Assessment of potential for leachate contamination of groundwater

The existing landfill areas within Raffeen landfill are unlined and there is evidence of direct discharges of leachate including List I/II substances to groundwater occurring at this facility. The TC notes that Cork County Council have estimated in their application that only 40-50% of the leachate generated on site will be collected by the proposed leachate control measures.

The calculations below demonstrate that leachate generated within the Raffeen landfill has the potential to discharge at a dilution rate of 0.95 x leachate concentration to groundwater. The conclusion drawn from the calculations is that there is minimal dilution of leachate generated within the facility prior to discharge to groundwater. This is demonstrated by a comparison of the concentrations of a range of specific list I/II substances in leachate and groundwater as provided in the application and shown in Table 1 of this Appendix.

#### Conclusions

1. The Technical Committee considers that the groundwater beneath the site is polluted.
2. The TC notes that the levels of Nickel and Lead in the leachate exceed the guidelines given in the Water Quality (Dangerous Substances) Regulations, 2001 (S.I. No. 12 of 2001) with exceedances for Nickel levels ranging from 57 to 178 µg/l and those for Lead ranging from 11 to 108 µg/l. The guideline for Nickel is 8 – 50 µg/l and that for Lead is 5 -10 µg/l depending on water hardness.

**Note: The figures below present the worst case scenario. Any assumptions made are indicated.**

#### *1. CALCULATION OF LEACHATE GENERATED PER YEAR (Q1)*

##### *i. Area of Existing Landfill = 45,000m<sup>2</sup>*

*The total area of the facility is 7.3ha but the landfill footprint is 4.5ha.*

##### *ii. Annual Rainfall = 1000 mm*

**iii. Evapotranspiration = 0**

Assumed as zero which is the worst case scenario and is considered best practice in landfill design (reference EPA Landfill Manual, Landfill Design).

**iv. Waste Absorptive Capacity = 1,500 m<sup>3</sup>/yr**

A waste absorptive capacity of 0.025 per tonnes of waste is assumed in order to present the worst case scenario. The annual quantity of waste accepted at the facility for disposal per annum is 60,000 tonnes. It should be noted that the annual tonnage of domestic/commercial waste is 20,000 in the PD with the remaining 40,000 being inert waste.

**v. Surface Water Runoff**

Infiltration of 100% is assumed. While some cover has been applied to the existing landfill, this material is locally quarried rock of high permeability.

**vi. Time Period = Twelve months**

**vii Leachate Production Estimate for Existing Landfill**

A: Active Tipping Area = 45,000 m<sup>2</sup> x 1m/yr = 45,000 m<sup>3</sup>/yr

B: Absorption = 60,000 tpa x 0.025 = 1,500 m<sup>3</sup>/yr

**Annual Leachate Production = A – B = 43,500 m<sup>3</sup>/yr**

**2. CALCULATION OF GROUNDWATER FLOW BENEATH THE LANDFILL (Q)**

Groundwater throughput is calculated as follows:

$$Q = k.b.w. dh/dx$$

Where: b = aquifer thickness, taken in this case to be 20m (estimated from cross-sections in the EIS)

w = landfill width, taken as 100m taken at the widest section of the landfill in the direction of groundwater flow .

k = permeability of aquifer, taken as  $1.4 \times 10^{-5}$  m/s

dh/dx = hydraulic gradient =  $36/570 = 0.063$

**dh**= hydraulic gradient (taken between C9 and C10 from Drawing No. Raffeen Section A-A' in the EIS Volume 5). **(36m)**.

**dx**= distance between equipotential lines of the groundwater **(570m)**

$$\begin{aligned} Q &= 17.6 \times 10^{-4} \text{ m}^3/\text{s} \\ &= 2,318 \text{ m}^3/\text{yr} \end{aligned}$$

### 3. CONCENTRATION OF LEACHATE IN GROUNDWATER

$$\text{Dilution Rate} = Ql/(Q+Ql)$$

Where Ql = leachate generated over twelve months

Q = leachate throughput over twelve months

$$= 0.95$$

**This indicates that there is minimal dilution of leachate generated within the facility prior to direct discharge to groundwater.**

The estimated dilution rate of 0.95 obtained indicates that leachate generated within the landfill has the potential to discharge directly to groundwater at concentrations equivalent to 0.95 x concentration of leachate. Table 1 below illustrates the range of concentrations of specified List/II substances in leachate

**Table 1: Estimated Concentration of List I/II substances in groundwater post-dilution**

List I Substance	Maximum level detected in leachate	Concentration post dilution	Maximum level detected in Groundwater
Cadmium	0.015 mg/l <sup>Note 1</sup>	0.014 mg/l	0.030 mg/l <sup>Note 2</sup>
Mercury	0.0018 mg/l <sup>Note 3</sup>	0.0017 mg/l	Below limit of detection (<0.0003mg/l)
Cyanide	0.034 mg/l <sup>Note 4</sup>	0.032 mg/l	0.305 mg/l <sup>Note 5</sup>

**Note 1: Concentration detected at monitoring location G & L 4 in December 1998**

**Note 2: Concentration detected at monitoring location GW6 in January 1998**

**Note 3: Concentration detected at monitoring location G & L4 in August 1998**

**Note 4: Concentration detected at monitoring location G & L3 in January 1998**

**Note 5: Concentration detected at monitoring location GW1 in February 1999**



## Appendix 2

### *Recommendation to Ground 1 of Objection 1*

**There are (iv) parts to this recommendation:**

- i. Amend Part I Activities Licensed:** Remove Class 1 of the Third Schedule.

### *Part I Activities Licensed*

In pursuance of the powers conferred on it by the Waste Management Act, 1996, the Environmental Protection Agency (the Agency) proposes, under Section 40(1) of the said Act to grant this Waste Licence to Cork County Council to carry on the waste activities listed below at Raffeen, Co Cork subject to eleven conditions, with the reasons therefor and the associated schedules attached thereto set out in the licence.

*Licensed waste disposal activities, in accordance with the Third Schedule  
of the Waste Management Act, 1996*

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

*This activity is limited to mixing of different kinds of waste materials or capping materials with other wastes at the active tipping area.*

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

*This activity is limited to the storage of waste at the Civic Waste Facility*

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

*This activity is limited to storage of waste at the Civic Amenity Site prior to transport offsite to an alternative appropriate facility or storage or waste quarantine area.*

**ii. Amend Schedule G as follows:**

**SCHEDULE G CRITERIA FOR THE ACCEPTANCE OF INERT WASTE**

*G.1 Acceptable Waste*

Recovery

Only the wastes in Table G.1.1 are acceptable for recovery at the facility, unless otherwise agreed with the Agency.

Table G.1.1 Waste for Recovery

WASTE	
Topsoil	Solid Road Planings, Solid Tarmacadam, Solid Asphalt
Subsoil	Brickwork
Stone, Rock and Slate	Natural Sand
Clay	Concrete
Pottery and China	Timber
Metals	

## G.2 Acceptance Criteria

The general characterisation and testing must be based on the following three level hierarchy:

### Level 1: Basic Characterisation

This constitutes a through determination, according to standardised analysis and behaviour testing methods, of the short and long-term leaching behaviour and/or characteristic properties of the waste.

### Level 2: Compliance Testing

This constitutes periodical testing by simpler standard analysis and behaviour-testing methods to determine whether a waste complies with condition and /or specific reference criteria. The tests focus on key variables and behaviour identified by basic characterisation.

### Level 3: On-site verification

This constitutes rapid check methods to confirm that a waste is the same as that which has been subjected to compliance testing and that which is described in the accompanying documents. It may merely consist of a visual inspection of a load of waste before and after unloading at the landfill site.

All waste loads must provide the following information (if available) :

Waste owner	Amount of waste
Source and origin of waste	Existing data on the waste
Description of the waste	Physical form
Waste Type and EWC code	Colour
Type of process producing the waste	Odour

All wastes accepted for disposal at the landfill shall undergo the Level 3: On-site verification at a minimum.

In addition to the above a representative load from every excavation/demolition/waste removal works is subjected to a comprehensive assessment which must satisfy Level 1 characterisation.

The comprehensive assessment must at a minimum include the following:

1. A chemical analysis of a representative sample. At least one sample per 1,500 tonnes or portion thereof must be taken for chemical analysis for each excavation or demolition works. However, if the comprehensive assessment is undertaken prior to the commencement of excavation or clearance activity, the licensee may reduce the number of samples for chemical analysis to one for each 7,500 tonnes or portion thereof. The sampling location must be identified on a sampling grid and enclosed in the comprehensive assessment.
2. An evaluation of the acceptability of **the recovery** of the waste at the landfill including observance of limits for total pollutants contents in Schedule G.4 below.
3. A statement of any pre-treatment requirement (if any).
4. Evidence that the waste displays no hazardous properties upon **acceptance** at the facility.

If as a result of examinations undertaken in the course of excavation or clearance activity, the suspicion of contamination should arise, the type and concentration of the contamination must be determined, and its extent established through additional sampling.

Wastes of unknown origin or with insufficient waste description must be subjected to a chemical analysis.

In addition to the assessment above representative samples upon delivery of wastes must be taken for compliance testing purposes (Level 2). The tests shall focus on key variables and behaviour identified by the chemical analysis.

A representative sample shall be taken from one in every 100 loads of waste accepted at the facility. This sample shall be subjected to Level 2 testing. Part of this sample shall be retained at the facility for three months and be available for inspection/analysis by the Agency.

### G.3 Limit values for pollutant content for inert waste landfills.

The following limit values relate to the average amount of constituent substances in the waste. The mean value of all individual measuring values from one bulk sample must not exceed the limit value concerned.

Parameter	Limit Value ( mg/kg dry mass, not including pH value and Electrical Conductivity)	
	Total Pollutant Contents	Eluate
PH		6 –13
Electrical conductivity		300
Dry residue		25,000
Arsenic (as As)	200.0	0.75
Aluminium (as Al)		20.0
Barium (as Ba)		20.0
Lead (as Pb)	500.0	2.0
Boron (as b)		30.0
Cadmium (as Cd)	10.0	0.5
Chromium, total (as Cr)	500.0	2.0
Chromium, hexavalent (as Cr)		0.5
Cobalt (as Co)	100.0	2.0
Copper (as Cu)	500.0	10.0
Nickel (as Ni)	500.0	2.0
Mercury (as Hg)	3.0	0.05
Silver (as Ag)		1.0
Zinc (as Zn)	1500.0	20.0
Tin (as Sn)		10.0

Ammonium (as N)		40.0
Chloride (as Cl)		5000.0
Cyanide, easily liberatable (as Cn)		1.0
Fluoride (as F)		50.0
Nitrate (as N)		500.0
Nitrite (as N)		10.0
Phosphate (as P)		50.0
Sulphate (as SO4)		5000.0
TOC (as C)	30,000.0 <sup>1</sup>	500.0
Total hydrocarbons	100.0	50.0
EOX		3.0
Total PAH <sup>2</sup>	2.0	

<sup>1</sup> The TOC limit value is complied with as long as the loss on ignition does not exceed 5% per weight.

<sup>2</sup> For determining the total of PAH, the following 6 compounds must be added to a sum: flouranthene, benzoic(a)pyrene, benzoic(b)flouranthene, benzoic(k)flouranthene, benzoic(g,h,I)perylene, indenoic(1,2,3,-c,d)pyrene.

**iii. Insert Schedule H Waste Acceptance as follows:**

**H.1 Waste Acceptance**

**Table H.1 Waste Categories and Quantities**

WASTE TYPE	MAXIMUM (TONNES PER ANNUM)
Inert Waste	40,000
<b>TOTAL</b>	40,000

**iv. After Schedule H insert *Part III: Activities Refused* as follows:**

### ***Part III: Activities Refused***

In pursuance of the powers conferred on it by the Waste Management Act, 1996, the Environmental Protection Agency (the Agency) proposes, under Section 40(1) of the said Act to refuse the following classes of activity.

*Refused waste disposal activities, in accordance with the Third Schedule  
of the Waste Management Act, 1996*

*Class 1:* Deposit on, in or under land (including landfill).

*Reason: Waste activities shall be limited to recovery and restoration to prevent discharge of List I substances to the groundwater as required by Section 40(4) of the Waste Management Act (1996).*