



Comhairle Contae Mhaigh Eo

Áras an Chontae, Caisleán an Bharraigh, Contae Mhaigh Eo.

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Do Thag. / Your Ref.

Ár dTag. / Our Ref.

Licensing Unit
Office of Climate, Licensing & Resource Use
Environmental Protection Agency
Regional Inspectorate
INNISCARRA
County Cork

29th March 2010

Attn of: Ms Sonia Smith, Programme Officer

RE: Application Register Number – W0021-03
Sanitary Authority Response re. Section 52 of the Waste Management
Acts, 1996 to 2008

Dear Ms Smith,

I wish to acknowledge receipt of the correspondence regarding Section 52 of the Waste Management Acts, 1996 to 2008 [and Section 99E (3) and (4) of the Environmental Protection Agency Acts, 1992 and 2007] concerning consent to discharge in relation to the above named facility.

The completed Section 52 response form with respect to Waste Licence Application Reg. W0021-03 is attached to this correspondence. Mayo County Council, as the Sanitary Authority will consent to the discharge subject to the attached conditions.

Should you have any queries do not hesitate to contact the undersigned.

Yours sincerely,

Paddy Mahon,
Director of Services, Water Services
Mayo County Council

cc. Ms. Marie O'Connor, Senior Inspector, Environmental Protection Agency

Mayo County Council

Áras an Chontae, Castlebar, Co. Mayo. Tel: (094) 9024444 Fax: (094) 9023937

SANITARY AUTHORITY RESPONSE
re: SECTION 52 OF THE WASTE MANAGEMENT ACTS, 1996 to 2008

Name & Address of Sanitary Authority: Mayo County Council, Áras an Chonfae, Castlebar, County Mayo, For the Attention of: Administrative Officer.

Waste Reg. No. W0021-03

Waste Facility: Derrinumera Landfill Facility, Derrinumera/Drumilra (Townlands), Newport, County Mayo,

Waste Licence Applicant: Mayo County Council

Consent: Indicate Yes to one of the following statements:

Consent granted subject to the consent conditions outlined below	YES
Consent granted without conditions	-
Consent refused ^{Note 1}	-

Note 1 Where it is proposed to refuse permission the reasons for the refusal should be clearly outlined in the response.

GENERAL CONSENT CONDITIONS	Condition to be included (Yes/No)
1. No specified emission from the installation shall exceed the emission limit value set out in <i>Schedule B: Emissions Limits to Sewer</i> . There shall be no other emission to sewer of environmental significance.	YES
2. The licensee shall carry out such sampling, analyses, measurements, examinations, maintenance and calibrations as out in <i>Schedule C</i>	YES
3. Monitoring and analytical equipment shall be operated and maintained as necessary so that monitoring accurately reflects the discharge or emission.	YES
4. The licensee shall permit authorised persons of the Agency and the Sanitary Authority to inspect, examine and test at all reasonable times, any works and apparatus installed, in connection with the process effluent, and to take samples of the process effluent.	YES
5. All automatic monitors and samplers shall be functioning at all times (except during maintenance and calibration) when the activity is being carried on unless alternative sampling or monitoring has been agreed in writing by the Agency for a limited period. In the event of the malfunction of any continuous monitor, the licensee shall contact the Agency as soon as practicable, and alternative sampling and monitoring facilities shall be put in place. Prior written agreement for the use of alternative equipment, other than in emergency situations, shall be obtained from the Agency.	YES
6. The licensee shall record all sampling, analyses, measurements, examinations, calibrations and maintenance carried out in accordance with the requirements of this licence.	YES
7. The licensee shall provide safe and permanent access to all on-site sampling and monitoring points and to off-site points as required by the Agency.	YES
8. The licensee shall at no time discharge or permit to be discharged into the sewer any liquid matter or thing which is or may be liable to set or congeal at average sewer temperature or is capable of giving off any inflammable or explosive gas or any acid, alkali or other substance in sufficient concentration to cause corrosion to sewer pipes, penstock and sewer fittings or the general integrity of the sewer.	YES
9. In the event of any incident which relates to discharges to sewer, having taken place, the licensee shall notify the Agency, Local Authority and Sanitary Authority as soon as practicable after the incident.	YES.

ADDITIONAL GENERAL CONSENT CONDITIONS
in respect of discharges or emissions to sewers, in accordance with Section 52
of the Waste Management Acts, 1996 to 2008
(specify, if required)

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Limit Values for Process Effluent to Sewer

Schedule B: Emission Limits

Waste licence application Register No. W0021-03

Emission Point Reference No: SE1

Emission to (sewer description): EMISSION TO MAYO CO COUNCIL SEWER AT NEWPORT

Volume to be emitted: Maximum in any one day: 500 m³

Maximum rate per hour: 50 m³

Parameter <i>(delete parameters which are not applicable)</i>	Emission Limit Value	
	Daily Mean Concentration (mg/l)	Daily Mean Loading (kg/day)
BOD	25	12.5
COD	125	62.5
Suspended Solids	35	17.5
PH	7-9	
Temperature	25° C	
ADDITIONAL PARAMETERS <i>(if required)</i>		
AMMONIA (AM)	5	2.5
SULPHATES	800	400
OILS, FATS, GREASES (SEE NOTE 1)*	100	50

* NOTE 1: ADDITIONAL PARAMETERS AS PER TABLE 3.4.4 "PROPOSED DISCHARGE STANDARDS FOR TREATED LEACHATE" ATTACHED HEREWITH, WHICH FORMED PART OF WASTE LICENCE RENEW APPLICATION W0021-03.

Frequency of Monitoring Process Effluent to Sewer

Schedule C

Waste Licence application Register No. W0021-03

Emission Point Reference No: SE 1

Parameter <i>(delete parameters which are not applicable)</i>	Monitoring Frequency <i>(e.g. monthly, quarterly, annually)</i>	Sampling Type <i>(grab, composite)</i>
Flow to sewer	CONTINUOUS	—
Temperature	DAILY	—
pH	CONTINUOUS	—
BOD	MONTHLY	COMPOSITE
COD	WEEKLY	COMPOSITE
Suspended Solids	WEEKLY	COMPOSITE
ADDITIONAL PARAMETERS <i>(if required)</i>		
AMMONIA (AS N)	MONTHLY	COMPOSITE
SULPHATES	QUARTERLY	COMPOSITE
OILS, FATS, GREASES	QUARTERLY	COMPOSITE
(ADDITIONAL PARAMETER - SEE NOTE 1)* ¹⁰		

* MONITORING FREQUENCY + SAMPLING TYPE TO BE AS PER DETAILS TO BE PROVIDED IN REVISED WASTE LICENCE W0021-03, TO BE DETERMINED BY EPA.

SANITARY AUTHORITY CHARGES	
Charge per cubic metre of process effluent (per s32 of the Waste Management Acts, 1996 to 2008)	
Payment Frequency	
Annual Monitoring Costs	

Signed on behalf of Mayo County Council

P. M. L.

Date 29/3/10

Appendix 1

Copy of extracts from Waste Licence (Review) Application W0021-03 (forwarded to Mayo County Council from Environmental Protection Agency on 08 February 2010)

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WASTE Application Form

TABLE E.3(i): EMISSIONS TO SEWER(One page for each emission)

Emission Point:

Emission Point Ref. N ^o :	SE1
Location of connection to sewer :	Connection to public sewer via dedicated rising main from Derrinnumera LTF to outfall of Newport WWTP, Newport, Co. Mayo.
Grid Ref. (10 digit, 5E,5N):	E097,57 N294,26 (Approx. location - to be agreed)
Name of sewage undertaker:	Mayo County Council

Emission Details:

(j) Volume to be emitted			
Normal/day	Varies* m ³	Maximum/day	500 m ³
Maximum rate/hour	50 m ³		

* Please Note: The volume of leachate to be treated will vary with landfill activity and will reduce over time as waste dries with aging and as engineered landfill cells are capped off from rainfall ingress

(ii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (start-up /shutdown to be included):

Periods of Emission (avg)	60 min/hr	24 hr/day	365 day/yr
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WASTE Application Form

TABLE E.3(ii): EMISSIONS TO SEWER - Characteristics of the emission (1 table per emission point)

Emission point reference number : SE1

Parameter	Prior to treatment			As discharged			% Efficiency	
	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year
Please refer to Section 3.4 and Tables 3.4 and 3.4.5 of the Environmental Impact Statement								

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In December 2006, following unusually high rainfall levels, authorisation was received from the Environmental Protection Agency to temporarily transport untreated leachate from Derrinumera Landfill to Westport Wastewater Treatment Plant for treatment and subsequent discharge to Clew Bay.

In November 2001, Mayo County Council's application for the upgrade and expansion of the Castlebar WWTP was certified by An Bord Pleanála. An Bord Pleanála, in certifying the application, has made it a condition of such expansion that the importation of leachate there is discontinued when the new Castlebar WWTP is in place;

"No sewage sludge or landfill leachate from outside the expanded Castlebar Waste Water Treatment Plant shall be transported onto the site for processing at this location having regard to the limited assimilative capacity of the River system relative to the likely demands arising from within the Castlebar area."

In this regard Mayo County Council must source an alternative means for the treatment and disposal of the leachate generated in Derrinumera Landfill. Following best environmental practice it has been considered that the treatment of leachate should be conducted at the source and as such it is proposed to treat the leachate at Derrinumera Landfill. Once the leachate is treated (in accordance with the discharge standards as will be specified by the Environmental Protection Agency) it will need to be discharged to the receiving environment. There are three theoretical options, 1) discharge to groundwater, 2) discharge to the Glaishty River and 3) discharge to the nearest coastal waters (i.e. Newport). Option 1 is not considered appropriate due to the volumes being generated (maximum volume of leachate production expected to peak at 700 m³ per day, maximum discharge from LTF to be restricted to 500 m³ per day). Option 2 is not considered as appropriate due to the very low flow conditions in the Glaishty River. Option 3 is the best alternative solution and has been demonstrated in both this Environmental Impact Statement and in the Newport Sewerage Scheme Environmental Impact Statement to be an environmentally sustainable option.

3.3.2 CURRENT LEACHATE VOLUMES AT DERRINUMERA

At present the leachate held within the cut-off wall is collected in a lagoon. From the lagoon, the leachate is then pumped to, and stored in, 3 large identical pre-cast concrete collection tanks on site. Each tank has a volume of 297m³ (i.e. 10.4m diameter with a working depth of the order of 4m). In addition, the leachate collected from the lined cells is pumped directly to the holding tanks.

The waste body at Derrinumera has been surrounded by a 1.3km long, 600mm wide bentonite cut-off wall, keyed 0.5m into bedrock since 2001. The purpose of the wall is to stop leachate migration from the waste body in the unlined historical deposit and it also diverts upland surface water around the unlined waste. Low permeability flows in the bedrock are not, of course, prevented by the cut-off wall. This leachate flows to a balancing lined lagoon at

present, with a floor area of 860m² and a volume in the region of 3,600m³. This lagoon balances peaks in leachate production, which broadly mirrors rainfall, and provides a measure of settlement. Leachate is pumped from the lagoon to the three holding tanks from which the tankers are filled through a gantry loading system. The leachate is then taken off site to Castlebar WWTP for treatment.

The volumes to be handled and the strength of the constituents in the leachate, vary from winter to summer. Looking at the experience of 2001, 125m³/day approximately was transported in May and June and 130m³/day was tankered in September. Over the year an average daily leachate flow of 258m³/d was recorded, ranging from a minimum of 125m³/d to a maximum of 358m³/d. In 2002, which had been exceptionally wet, volumes as high as 650m³/d were removed in February and in November. In 2004 an average daily leachate flow of 269.7m³/d was recorded, and in 2005 the daily leachate flow averaged at 266.4m³/d. In the future, these volumes will change as cells are filled and capped off, with the maximum volume of leachate production, expected over the design life of the landfill, peaking at 700m³/d. Once the LTF has been commissioned, the maximum allowable discharge of treated leachate from the plant will be restricted to 500 m³ per day and the existing on-site lagoon will be utilised as a balancing facility when the daily leachate production exceed this volume. This figure has been used for design purposes.

3.4 LEACHATE TREATMENT: PROPOSED DEVELOPMENT

3.4.1 INTRODUCTION

This section describes a number of leachate related elements that are proposed for the Derrinumeru Landfill, which will include the construction and operation of a Leachate Treatment Facility (LTF) at Derrinumeru Landfill.

As this is a Design Build and Operate (DBO) project, the exact nature of leachate treatment processes or technologies will emerge from the procurement process and thus have yet to be agreed. As a result, the following process descriptions are generic in nature. For the leachate treatment process the EIS describes a sequencing batch reactor (SBR), since activated sludge processes work well with this type of leachate, but it shall include further polishing such as precipitation or membrane technology in order to achieve the required standards.

3.4.2 PROCESS DESIGN FOR THE LTF AND ANCILLARY WORKS

The design of the LTF and ancillary works, including any such elements of the existing leachate handling works as are retained, shall be in accordance with Best Available Techniques (BAT) and shall be such as to facilitate the operation, monitoring, sampling and maintenance of all processes and equipment. The process and equipment chosen shall have been used successfully in similar sized plants treating similar type leachates.

The LTF and ancillary works shall be designed and constructed in accordance with best national and international practices, and shall be operated to the requirements set out in the contract documents.

The design life of the permanent works including the refurbished elements of the existing plant shall be not less than the following:

Building and Civil Engineering Works	50 years
Main Plant Items	15 years
SCADA / Telemetry / PLC Equipment and Similar Items	10 years
Wearing Parts which normally require periodic replacement	5 years

The buildings and other civil engineering main structures will have a design life of 50 years, while mechanical plant items will have a design life of 15 years. The LTF and ancillary works again shall be provided and operated in accordance with the design figures given in Table 3.2.1., Section 3.2.2 above.

The final effluent discharge standards were determined by reference to Irish Legislation, European Directives, best management guidelines and also water quality modelling. The requirements for treated leachate from the leachate treatment plant will fall in line with the Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) Regulations, 2001 (S.I. No. 254/2001), which specify the following requirements:

- BOD₅ 25 mg/l;
- SS 35 mg/l;
- COD 125 mg/l.

Because of the salmonid status attached to the Newport River and Lough Furnace, both situated on the verge of Newport Bay, a concentration of 5 mg/l of Ammonia as N was derived based on compliance with the Quality of Salmonid Water Regulations, 1988(S.I. No. 293 of 1988), in order to ensure the protection of migratory fish species.

- Amm N 5 mg/l.

In addition, a standard for Faecal Coliforms of 2,000 Nr./100 ml is also proposed for the discharge due to the designation of the coastal waters off Newport as a Class A Shellfish Production Area.

In addition to the above standards, it has been anticipated that additional requirements are appropriate to be specified for the treated leachate to ensure the protection of the sensitive receiving environment of Newport Bay, associated water bodies, protected species and

habitats, (Refer also to Appendix 3, Volume IV). Details on additional requirements are given in Section 3.4.3.7 - *Treated Leachate Discharge Standards* and in Appendix 3, Volume IV. These requirements may be amended as the Environmental Protection Agency directs.

3.4.3 GENERAL DESIGN PHILOSOPHY FOR THE LTF AND ANCILLARY WORKS

The design for the LTF and ancillary works shall be based on the following overall design philosophy:

- (i) In order to facilitate maintenance, the leachate treatment plant and ancillary works shall be capable of operating without loss of standards during the planned maintenance downtime to be expected in normal operation, and the design must have contingent proposals to handle loads during annual or other major overhaul periods.

Where design proposals are based on the use of individual settlement tanks and aeration basins or individual units in general, the interconnecting pipework shall be configured such that, for example in a three stream process, any combination of primary elements can feed any combination of secondary elements, and any combination of secondary elements can feed any combination of tertiary elements, and so on;

- (ii) Leachate inlet and outlet arrangements, shall take all foreseeable buffer conditions into account, and make reasonable provision for breakdown and resumption of process plant;
- (v) A sufficient number of standby pumps, fans, air blowers, etc, shall be provided in order to ensure continuation of the leachate treatment in the case of equipment failures or breakdown. The standby equipment shall be to the same specification as the duty units, with automatic changeover, or be available in stock on-site if permanent installation of the standby facility is impractical.

The minimum number of standby units required is as follows:

Number of Duty Units	Standby Requirement
1	100%
2	50%
3	33%
4	25%

Non-essential utilities (shut down not critical for up to two days) do not require installed standby units. Replacements for all wearing or possible defective parts shall be held in stock on site.

- (vi) The Contractor shall be required to conduct a Hazard and Operability Study of each segment of the works and of the total works (including such elements of the existing leachate handling systems as are retained), and shall be required to include either in the capital works or by way of operational procedures any measures arising from the recommendations of such studies.

3.4.3.1 Stormwater Flows

All contaminated stormwater from the waste acceptance area, and runoff from the circulation roads and hard surfaces, which is not to be discharged to the surface water system around the landfill, and has been designated as 'grey water' by the EPA, shall be included in the leachate collection system. The DBO Contractor will be expected to manage the balancing capacity of the lagoon and holding tanks, so as to permit any necessary priority to be given to such stormwater flows as the pumping stations that handle it may require.

3.4.3.2 Leachate Treatment Units

The Contractor will be required to design and construct a Leachate Treatment Facility at the Sludge Hub Centre site in Derrinnumera. On the basis of water balancing of the landfill, the leachate volume to be treated has been calculated at 500m³ as a daily maximum. The contractor will be required to provide an appropriate volume of storage on-site, which will also allow any leachate discharges to tankers in the event of process failure or planned maintenance downtime of the Leachate Treatment Facility. The design of the LTF shall incorporate a suitable scouring system so that the LTF can be fully and automatically cleaned, and residues at the bottom of the various tanks removed.

3.4.3.3 Secondary and Tertiary Treatment

The contractor will be required to design, build and operate a suitable and complete secondary and tertiary treatment system in accordance with the parameters previously outlined.

The following process options will be considered for effective treatment of the leachate.

- Air stripping/aeration in lagoons or SBR processes;
- Reed beds;
- Rotating biological contactors;
- Membrane filtration;
- Chemical precipitation;
- Electrolytic oxidation;
- Reverse osmosis;

- Other proven systems.

The tendering contractor will offer the system that he considers to be the most economically advantageous, and which consistently achieves the required treated leachate standards.

The selected process system will meet with the following general requirements:

(i) Aeration Systems:

Aeration systems will be required to be fine bubble diffused aeration systems. Surface aeration systems will not be acceptable.

(ii) Air Blowers:

Variable speed air blowers will be required. These will be designed to cater for peak BOD loadings of up to 500 mg/l and will be designed with space for the addition of one further blower unit.

(iii) Aeration Control:

In order to obtain optimum process conditions, the aeration capacity will be controlled by measurement equipment of the constituents' oxygen and/or ammonium and/or nitrate in the separate aeration tanks. In addition, timers and/or the influent flow measurement may be used as input signals for the aeration control strategy.

(iv) SBR Systems:

Where an SBR type system is proposed, it shall where possible be based on tanks with similar dimensions to the tanks already provided. A flow-balancing tank will be a requirement in conjunction with any SBR system proposed by intending Contractors. The flow balancing tank will be required to accommodate pump operation variation with peaks of up to 1.25 times average flow, and to provide mixing for sludge supernatants with the leachate.

(v) Process Modification:

Process modifications will be considered which:

- a) Are designed to achieve required treated leachate standards and stated noise and odour emissions standards;
- b) Incorporate measures to reduce the impact of the development on the environment.

However, no leachate treatment process will be acceptable from the procurement process that is not based on proven technology. A process based on proven technology is defined as a process which:

- Has been demonstrated to have at least three (3) years satisfactory use at reference sites with stable process conditions;

- Has been employed successfully on at least three leachate treatment plants of similarly sized loadings and modules as proposed, treating a similar effluent to that of Derrinmera and achieving the effluent standards required;

A high standard of operator safety and comfort will be required by the incorporation of good access, equipment lifting devices, separate storage facilities for chemicals, ventilation and lighting to all operating areas, machinery guards, proper electrical insulation facilities, noise suppression and insulation, stairs, handrails, covers, etc.

3.4.3.4 Sludge Thickening and Dewatering

As stated in Section 3.2.4, there will be a system for thickening and dewatering of surplus sludges generated from the leachate treatment process itself.

The dewatering system will be designed using new or existing equipment or a combination of both, which will produce a dewatered sludge with a minimum dry solids content of 17.5% or within a suitable range above this point consistent with the landfill licence. The proposed dewatering system will be provided complete with a fully enclosed dewatered sludge handling system. In accordance with the 'Management of Water Treatment Sludges' Circular, dated February 2005, surplus sludge arising from the leachate treatment process will be dried batchwise in order to minimise the end volume of sludge and to improve stability and handleability for placing on the landfill.

3.4.3.5 Instrumentation Control and Automation

There will be a system of instrumentation, control and automation on the leachate treatment plant that is consistent with the efficient operation of the process. The instrumentation will also provide data that will enable both the operator and the County Council to verify the basis for operational charges.

The DBO Contractor will share the existing weighbridge system at the site with the landfill operator. In addition to weighing the waste going to landfill, the weighbridge will be used for weighing of any chemical or nutrient deliveries to the site.

At each flow metering point, the contractor shall provide a suitably valved bypass to allow calibrated flow meters to be installed, which can be used to verify the accuracy of the main online meter from time to time. The contractor will be required to include for the provision of suitable calibration meters and for their re-calibration at regular intervals during the lifetime of the plant.

3.4.3.6 Monitoring and Sampling

To ensure that the optimal process control is maintained, monitoring equipment and sampling facilities shall be provided. The influent flow from the leachate lagoon and effluent from the leachate treatment works shall be monitored and automatically sampled as specified. Sampling facilities (for “grab” samples) shall be provided after every process step in the liquid stream and in the sludge stream.

Monitoring facilities shall be provided for the following operating parameters:

Inlet works	Flows and levels including separate measurement of return flows
SBR or Aeration Tanks (if included)	DO, COD Ammoniacal N MLSS Power Consumption Pressure at Air Blowers
Primary and Final Settlement Tanks (if included)	Sludge Blanket Level (High / Low)
Sludge Thickener (if included)	Sludge Levels (High / Low)
All Pump Discharge Points	Flows

3.4.3.7 Treated Leachate Discharge Standards

The final effluent discharge standards were determined by reference to Irish Legislation, European Directives, best management guidelines and also water quality modelling. The Second Schedule Parts 1 and 2 of the Environmental Protection Agency Act 1992 (Urban Wastewater Treatment) Regulations, (S.I. No. 419) 1994, (Amended by S.I. No. 254, 2001), set out the discharge limits and percentage reductions for urban wastewater and it is proposed to take these limits as working standards for the treated leachate produced at the site.

While Part 1 of these regulations are directly applicable to the proposed discharge, Part 2 of the regulations set standards for total phosphorus and nitrogen discharge levels to sensitive waters. The waters off the Newport coast are not classified as sensitive in the Urban Waste Water Treatment Regulations (2001). As such, no legislative requirement exists for the provision of advanced treatment for nitrogen and phosphorous removal. The lack of any observed problem with green or brown algae blooms in the coastal waters off Newport indicates that there is no eutrophic tendency in the waters. Given these considerations the provision of advanced secondary treatment for nitrogen and phosphorous removal is not considered necessary for the proposed wastewater treatment plant.

The minimum number of samples to be taken is related to the size of the treatment plant and shall be collected at regular intervals during the year. The number of samples taken would be twelve annually, for the purposes of determining compliance with the discharge standards,

but more frequent sampling is expected of a competent Contractor as part of good operation and maintenance practice on the Leachate Treatment Facility.

The maximum number of samples that may fail the requirements, expressed in concentrations or percentage reductions in the Second Schedule, Part I of S.I. 254 (2001), is specified in the Table to the Fifth Schedule of S.I. 254 (2001). This corresponds to a 95-percentile pass regime.

The treated wastewater shall be assumed to conform to the relevant parameters if, for each relevant parameter considered individually, samples of the water show that it complies with the relevant parametric value in the following way:

- (a) For the parameters specified in the Second Schedule Part I of S.I. 254 (2001), a maximum number of samples that are allowed to fail the requirements, expressed in concentrations and/or percentage reductions in that Table and that sub-paragraph, is specified in the Table below to the Fifth Schedule;
- (b) For the parameters of the Second Schedule Part I expressed in concentrations, the failing samples taken under normal operating conditions must not deviate from the parametric values by more than 100%.

Table 3.4.2 Second Schedule, Part I of S.I. 254 of 2001

Parameter	Standard	Minimum Percentage Reduction	Reference Method of Measurement
Part I			
BOD ₅	25 mg/l	70-90	Homogenized, unfiltered, undecanted sample. Determination of dissolved oxygen before and after five-day incubation at 20°C ± 1°C, in complete darkness. Addition of a nitrification inhibitor
Suspended Solids	35 mg/l	90	-Filtering of a representative sample through a 0.45 µm filter membrane. Drying at 105°C and weighing. -Centrifuging of a representative sample (for at least five mins with mean acceleration of 2,800 to 3,200g), drying at 105°C and weighing
COD	125mg/l	75	Homogenized, unfiltered, undecanted sample Potassium dichromate

Table 3.4.3 Fifth Schedule of S.I. 254 of 2001

Series of Samples taken in any Year	Maximum Permitted Number of Samples which Fail to Conform
4 - 7	1
8 - 16	2
17 - 28	3
29 - 40	4
41 - 53	5
54 - 67	6
68 - 81	7
82 - 95	8
96 - 110	9
111-125	10

Because of the salmonid status attached to the Newport River and Lough Furnace, both situated on the verge of Newport Bay, a concentration of 5 mg/l of Ammonia as N was derived based on compliance with the Quality of Salmonid Water Regulations, 1988(S.I. No. 293 of 1988), in order to ensure the protection of migratory fish species.

- Amm N 5 mg/l.

In addition, a standard for Faecal Coliforms of 2,000 Nr./100 ml is also proposed for the discharge due to the designation of the coastal waters off Newport as a Class A Shellfish Production Area. (A standard for Faecal Coliforms of 2,000 Nr./100 ml, as proposed for the discharge of Newport WWT treated effluent, has also been proposed for the discharge of treated leachate).

In addition to the above standards, it has been anticipated that additional requirements are appropriate to be specified for the treated leachate to ensure the protection of the sensitive receiving environment of Newport Bay, associated water bodies, protected species and habitats, (Refer also to Appendix 3, Volume IV). There are no specific guidelines recommending the quality of landfill leachate prior to or after treatment. The establishment of discharge standards as required for the treated leachate in accordance with the Waste Licence Review is a function of the Environmental Protection Agency under the Protection of the Environment Act, 2003, Waste Management Act, 1996, Environmental Protection Agency Act, 1992 and associated regulations. This Waste Licence is currently being reviewed by the Environmental Protection Agency.

In obtaining a complete reference list of standards appropriate to substances which could potentially be contained within the treated leachate and which present a potential risk, a

number of publications and guidances were referenced in addition to consultations with the Environmental Protection Agency and Bord Iascaigh Mhara, including:

- Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) Regulations, 2001 (S.I. No. 254 of 2001);
- Quality of Salmonid Water Regulations, 1988 (S.I. No. 293 of 1988);
- United States Food and Drug Administration, *National Shellfish Sanitation Program Standards* (USFDA, 1995),
- Water Framework Directive 2000/60/EEC;
- European Communities Directive concerning the quality of bathing waters (76/160/EEC and 2006/7/EC) and related statutory instruments;
- European Communities Directive concerning the health conditions for the production and placing on the market of live bivalve molluscs (91/492/EEC);
- Dangerous Substances Regulations, 2001 (S.I. No. 12 of 2001);
- Environmental Protection Agency *Towards Setting Guidelines Values for the Protection of Groundwater in Ireland, Interim Report* (EPA, 2003); and,
- European Communities (Quality of Shellfish Waters) Regulations, 2006 (S.I. No. 268 of 2006).

The European Communities (Quality of Shellfish Waters) Regulations, S.I. No. 268 of 2006 specifies limits for eleven categories of parameters however it could be considered that the limit values specified in the regulations may not cater for every possible substance present in the treated leachate. Whilst the project team engaged in consultation with the Environmental Protection Agency and Bord Iascaigh Mhara during the environmental impact assessment process regarding additional environmental quality standards for treated leachate in the context of the proposed receiving waters, there was no information available with regard to what these environmental quality standards would be set at. In the absence of this information, the only approach available to the project team in selecting appropriate discharge standards for treated leachate was on the basis of a literature review of existing environmental quality standards as enshrined in national legislation. In many cases recommended environmental quality criteria in international publications were less than existing background levels in the Irish environment or there was an insufficient dataset for assessment of background levels on a national basis. When assessing the appropriateness of these discharge standards, it should be noted that ultimately the Environmental Protection Agency will be required to establish the discharge standards for the treated leachate being discharged from Derrinnumera landfill as part of the Waste Licence Review process which is currently on-going.

From the preliminary hydrodynamic modelling the minimum dilution factors available under the worst-case scenario (or minimum) dispersion conditions at the preferred outfall location is 18.6 (Refer to Section 5.1 Hydrodynamic Modelling of the Proposed Outfall, Appendix 3, Volume IV of this statement). Based on the validity modelling exercise with the worst case wind conditions affecting Inner Newport Bay and Lough Furnace, the minimum dilution factors

available at this outfall A is 913. To this extent, in assessing appropriate discharge values for specific 'risk' determinands, it was considered that the most conservative approach would be to apply a factor of 18.6 to the target environmental quality standard. It is stressed that this was the minimum dilution factors available for a limited time (i.e. 30 minutes during the tidal cycle) after which available dilutions significantly increase. To this extent the calculated discharge limits for the treated leachate are included below in *Table 3.4.1 Proposed Discharge Standards for Treated Leachate*. This table presents the discharge concentration to be attained in the treated leachate (subject to Environmental Protection Agency licensing), the predicted concentration at the edge of the initial mixing zone and the appropriate relevant Irish statutory limit.

When referencing the table below, please note the following:

1,000 microgrammes = 1 milligramme

1,000 milligrammes = 1 gramme

1,000 grammes = 1 kilogramme.

Additional Screening Values for Receiving Environment

Given the extremely low levels of contaminants predicted to be discharged in the treated leachate, there is no short-term negative impact predicted in the environment. Pre- and post-discharge monitoring will be implemented such that all specified standards are met in order to safeguard the quality of water in the Bay. In addition to the monitoring requirements for treated leachate as specified by the Environmental Protection Agency in the Waste Licence for Derrinunera Landfill, biannual monitoring of the receiving waters, sediment, fish and shellfish tissue at sites adjacent to the proposed discharge and moving away from the discharge will be implemented to safeguard the ecological integrity and in particular the favourable conservation status of the receiving environment in the short, medium and long-term. The development and implementation of this monitoring programme will be conducted in consultation with the relevant state and semi-state bodies (i.e. Environmental Protection Agency, Mayo County Council, Department of Environment, Heritage and Local Government and the Department of Communications, Marine and Natural Resources [including the Marine Institute]) with input from local stakeholders. When considering the above, consultation will be engaged in with the EPA as the establishment of discharge standards for the treated leachate is a function of the Environmental Protection Agency under the Protection of the Environment Act, 2003, Waste Management Acts, 1996-2003, Environmental Protection Agency Act, 1992 and associated regulations through the Waste Licensing Review process. This process is currently on-going.

When assessing the results of the biannual monitoring programme referred to above, the following 'early warning limits' as specified hereunder in *Table 2.4.2 Proposed Screening Criteria for Receiving Environment* will be referenced, in addition to any limits specified through the Waste Licensing process for Derrinunera landfill by the Environmental Protection Agency. It should be noted that the development of appropriate standards for the

receiving environment are subject to change (influencing factors include new legislation and the outcome of new scientific research) and as such the relevant standards will be reassessed on an annual basis. It should also be noted that in the event of elevated results being detected in the receiving environment, that the source of such elevated results may not necessarily arise from the discharge of treated leachate – the purpose of the biannual monitoring programme will be to confirm the capability of the receiving environment to continue to accept discharges of treated leachate.

It should be noted that the results of this Biannual Monitoring Programme will be forwarded to the Environmental Protection Agency for consideration as part of their Waste Licence enforcement activity at Derrinmera Landfill. Should the results of the Monitoring Programme indicate that alternative limits or controls are required at the Leachate Treatment Facility or the landfill in general, Mayo County Council will implement same in agreement with the Environmental Protection Agency.

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Table 3.4.4 Proposed Discharge Standards for Treated Leachate

Determinand	Concentration in Discharge of Treated Leachate	Concentration in Receiving Waters Post Initial Mixing Zone (20 M x 20 M grid) Min. Dilutions 18.6*	Irish Regulatory Standard	Reference	Name of Standard
GENERAL					
PH	7-9 pH units	-	7-9 pH units	S.I. No. 268 of 2006	EC (Quality of Shellfish Waters) Regulations, 2006
BOD	25 mg/l	-	25 mg/l	S.I. No. 254 of 2001	Urban Waste Water Treatment Regulations, 2001
COD	125 mg/l	-	125 mg/l	S.I. No. 254 of 2001	Urban Waste Water Treatment Regulations, 2001
Ammonia (as N)	5 mg/l	-	-	-	-
Suspended Solids	35 mg/l	-	-	-	-
Faecal Coliforms	2,000 per 100 ml	-	35mg/l	S.I. No. 254 of 2001	Urban Waste Water Treatment Regulations, 2001
Phenol	0.5 ug/l	-	-	-	-
Colour	Deviation of <10 from background	Deviation of <10 from background	Deviation of <10 from background	S.I. No. 268 of 2006	EC (Quality of Shellfish Waters) Regulations, 2006
Salinity	<40 PSU	2.15 PSU	<40 PSU and less than 10% increase in background	S.I. No. 268 of 2006	EC (Quality of Shellfish Waters) Regulations, 2006
Dissolved Oxygen	Average Equal or Greater than 70% Min. 60%	-	Average Equal or Greater than 70% Min. 60%	S.I. No. 268 of 2006	EC (Quality of Shellfish Waters) Regulations, 2006
Total Petroleum Hydrocarbons	No visible film No harmful effects on shellfish	-	No harmful effects on shellfish	S.I. No. 268 of 2006	EC (Quality of Shellfish Waters) Regulations, 2006
Polychlorinated Biphenyls (sum ICES 7 CBs: PCBs 28, 52, 101, 118, 138, 153 and 180)	0.30 microgrammes per litre	0.016 microgrammes per litre	0.30 microgrammes per litre	S.I. No. 268 of 2006	EC (Quality of Shellfish Waters) Regulations, 2006
DISSOLVED METALS					
Arsenic	40 (max.) microgrammes per litre	2.15 microgrammes per litre	40 microgrammes per litre	S.I. No. 268 of 2006	EC (Quality of Shellfish Waters) Regulations, 2006
	20 (avg.) microgrammes per litre		20 microgrammes per litre	S.I. No. 12 of 2001	Water Quality (Dangerous Substances) Regulations 2001
Cadmium	5 microgrammes per litre	0.27 microgrammes per litre	5 microgrammes per litre	S.I. No. 268 of 2006	EC (Quality of Shellfish Waters) Regulations, 2006

* This is indicative of conditions at low water spring tide. Dilutions at all other phases of the tide are greater than this.

Table 3.4.4 Proposed Discharge Standards for Treated Leachate (continued)

Determinand	Concentration in Discharge of Treated Leachate	Concentration in Receiving Waters Post Initial Mixing Zone (20 M x 20 M grid) Min. Dilutions 18.6*	Irish Regulatory Standard	Reference	Name of Standard
DISSOLVED METALS (continued)					
Chromium	30 (max.) microgrammes per litre 15 (avg.) microgrammes per litre	1.61 microgrammes per litre	30 microgrammes per litre	S.I. No. 268 of 2006	EC (Quality of Shellfish Waters) Regulations, 2006
Copper	10 (max.) microgrammes per litre 5 (avg.) microgrammes per litre	0.54 microgrammes per litre	15 microgrammes per litre	S.I. No. 12 of 2001	Water Quality (Dangerous Substances) Regulations 2001
Lead	20 (max.) microgrammes per litre 5 (avg.) microgrammes per litre	1.00 microgrammes per litre	10 microgrammes per litre	S.I. No. 268 of 2006	EC (Quality of Shellfish Waters) Regulations, 2006
Mercury	0.40 microgrammes per litre	0.02 microgrammes per litre	5 microgrammes per litre	S.I. No. 12 of 2001	Water Quality (Dangerous Substances) Regulations 2001
Nickel	50 (max.) microgrammes per litre 25 (avg.) microgrammes per litre	2.69 microgrammes per litre	20 microgrammes per litre	S.I. No. 268 of 2006	EC (Quality of Shellfish Waters) Regulations, 2006
Silver	10 microgrammes per litre	0.54 microgrammes per litre	0.40 microgrammes per litre	S.I. No. 268 of 2006	Water Quality (Dangerous Substances) Regulations 2001
Zinc	200 (max.) microgrammes per litre 40 (avg.) microgrammes per litre	10.75 microgrammes per litre	50 microgrammes per litre	S.I. No. 12 of 2001	EC (Quality of Shellfish Waters) Regulations, 2006
STANDARD IONS					
Cyanide	10 microgrammes per litre	0.54 microgrammes per litre	10 microgrammes per litre	S.I. No. 268 of 2006	Water Quality (Dangerous Substances) Regulations, 2006
Fluoride	1500 microgrammes per litre	80.65 microgrammes per litre	1500 microgrammes per litre	S.I. No. 12 of 2001	Water Quality (Dangerous Substances) Regulations, 2001
VOLATILE ORGANIC COMPOUNDS					
Dichloromethane	10 microgrammes per litre	0.54 microgrammes per litre	10 microgrammes per litre	S.I. No. 12 of 2001	Water Quality (Dangerous Substances) Regulations, 2001
Toluene (Methylbenzene)	10 microgrammes per litre	0.54 microgrammes per litre	10 microgrammes per litre	S.I. No. 12 of 2001	Water Quality (Dangerous Substances) Regulations, 2001
Xylene (Dimethylbenzene)	10 microgrammes per litre	0.54 microgrammes per litre	10 microgrammes per litre	S.I. No. 12 of 2001	Water Quality (Dangerous Substances) Regulations, 2001
TRIAZINE HERBICIDES					
Alazine	1 microgramme per litre	0.054 microgrammes per litre	1 microgrammes per litre	S.I. No. 12 of 2001	Water Quality (Dangerous Substances) Regulations, 2001

Substance	1	0.054	1	S.I. No. 12 of 2001	Water Quality (Dangerous Substances) Regulations, 2001
Simazine	microgrammes per litre	microgrammes per litre	microgrammes per litre	S.I. No. 12 of 2001	Water Quality (Dangerous Substances) Regulations, 2001
ORGANOTIN COMPOUNDS					
Tributyltin	0.001 microgrammes per litre	0.00005 microgrammes per litre	0.001 microgrammes per litre	S.I. No. 12 of 2001	Water Quality (Dangerous Substances) Regulations, 2001

* This is indicative of conditions at low water spring tide. Dilutions at all other phases of the tide are greater than this.

In the table above, where two standards are specified, e.g. the dissolved metal Arsenic, the requirement is that the limit value specified in European Communities (Quality of Shellfish Waters) Regulations, 2006 should be considered the maximum value and the limit value specified in the Water Quality (Dangerous Substances) Regulation, 2001 should be considered as the average value.

Compliance with discharge standards will be as per the detail of interpretation specified in the revised Waste Licence granted to Derrinnumera Landfill by the Environmental Protection Agency.

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Table 3.4.5 Proposed Screening Criteria for Receiving Environment

Determinand	Screening Criteria for Receiving Waters	Source	Screening Criteria for Shellfish Tissue (mg/kg)	Source
pH	7 - 9 pH units	S.I. No. 268 of 2006	Not Applicable	Not Applicable
Temperature	Differential from background levels less than 2 degrees celsius	S.I. No. 268 of 2006	Not Applicable	Not Applicable
Colouration (after filtration)	Differential from background levels of less than 10 milligrammes per litre	S.I. No. 268 of 2006	Not Applicable	Not Applicable
Suspended Solids	Differential from background levels of less than 30%	S.I. No. 268 of 2006	Not Applicable	Not Applicable
Salinity	Mandatory Less than 40 practical salinity units and differential from background levels less than 10%	S.I. No. 268 of 2006	Not Applicable	Not Applicable
Dissolved Oxygen	Guide 12-38 practical salinity units 80% (average value)	S.I. No. 268 of 2006	Not Applicable	Not Applicable
Total Petroleum	No visible film or deposit on shellfish or waters not harmful effects on shellfish	S.I. No. 268 of 2006	Not Applicable	Not Applicable
Hydrocarbons	100 faecal coliforms per 100 millilitres	S.I. No. 268 of 2006	Equal to or less than 300 in the shellfish flesh and intervalvular fluid	S.I. No. 268 of 2006
Faecal Coliforms	0.30 microgrammes per litre Polychlorinated Bi-phenyls	S.I. No. 268 of 2006	Mandatory 300 microgrammes per kilogramme wet weight @ 1 percent lipid	S.I. No. 268 of 2006
Organohalogenated Substances			Guide 100 microgrammes per kilogramme wet weight @ 1 percent lipid	
Tributyltin	0.001 microgrammes per litre	S.I. No. 12 of 2001	Not Applicable	Not Applicable
Atrazine	1 microgramme per litre	S.I. No. 12 of 2001	Not Applicable	Not Applicable
Simazine	1 microgramme per litre	S.I. No. 12 of 2001	Not Applicable	Not Applicable
Standard Ions				
Cyanide	10 microgrammes per litre	S.I. No. 12 of 2001	Not Applicable	Not Applicable
Fluoride	1500 microgrammes per litre	S.I. No. 12 of 2001	Not Applicable	Not Applicable
Volatile Organic Compounds				
Dichloromethane	10 microgrammes per litre	S.I. No. 12 of 2001	Not Applicable	Not Applicable
Toluene	10 microgrammes per litre	S.I. No. 12 of 2001	Not Applicable	Not Applicable
Xylene	10 microgrammes per litre	S.I. No. 12 of 2001	Not Applicable	Not Applicable
Dissolved Metals				
Arsenic	40 microgrammes per litre	S.I. No. 268 of 2006	30 mg per kg dry weight	S.I. No. 268 of 2006
Cadmium	5 microgrammes per litre	S.I. No. 268 of 2006	5 mg per kg dry weight	S.I. No. 268 of 2006

Chromium	30 microgrammes per litre	S.I. No. 268 of 2006	0 mg per kg dry weight	S.I. No. 268 of 2006
Copper	10 microgrammes per litre	S.I. No. 268 of 2006	400 mg per kg dry weight	S.I. No. 268 of 2006
Mercury	0.4 microgrammes per litre	S.I. No. 268 of 2006	1 mg per kg dry weight	S.I. No. 268 of 2006
Nickel	50 microgrammes per litre	S.I. No. 268 of 2006	5 mg per kg dry weight	S.I. No. 268 of 2006
Lead	20 microgrammes per litre	S.I. No. 268 of 2006	7.5 mg per kg dry weight	S.I. No. 268 of 2006
Zinc	200 microgrammes per litre	S.I. No. 268 of 2006	4,000 mg per kg dry weight	S.I. No. 268 of 2006
Silver	10 microgrammes per litre	S.I. No. 268 of 2006	15 mg per kg dry weight	S.I. No. 268 of 2006
Organoleptic Parameters				
Taste	No impairment of taste in shellfish flesh			

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3.4.3.8 Treated Leachate Discharge Pipeline

It is proposed to deliver the treated leachate to the outfall of the proposed Newport WWTP via a pumped rising main on the selected route shown on Drawing No. 1908-2200, Volume III. The treated leachate pipeline will terminate at the head manhole on the outfall of the Newport WWTP treated effluent discharge. The confluence point will be downstream of the Newport sewage treatment process but within the site boundary of the proposed Newport waste water treatment plant. It should be noted that leachate will not be discharged into the Newport town collection system. It should also be noted that it is not proposed that leachate be treated in the proposed Newport Waste Water Treatment Plant as appropriate treatment facilities will be provided at Derrinnumera Leachate Treatment Facility in accordance with Environmental Protection Agency requirements enforced through the Waste Licence for the landfill.

The pipeline will be constructed in 200mm Nominal Diameter HPPE or HDPE, and will be laid in trench in the road margin over most of its route. The pipeline will have minimum cover of 0.9m from finished ground level to the crown of the pipe, but cover may exceed this where the pipeline is graded in a varying ground profile. The proposed pipeline length will be approximately 8 km. The pipe will be laid along the R311 for the majority of it's length, passing the townlands of Derrinnumera, Carton, Cullmore, Clooneshil, Drumlong and Newport Town on it's proposed route. Refer to Section 4.2.4.3 for pipeline construction methodology.

As a result of the above arrangement to pump treated leachate a distance of some 8km to Newport, the provision of a Treated Leachate Pumping Station at Derrinnumera will be necessary. The DBO Contractor appointed for the Sludge Hub Centre, will design and construct this station, including the provision and maintenance of standby pumping plant and telemetry to monitor the pumps. Once the station has been commissioned, it will be operated by the DBO Contractor, who will be required to assume full responsibility for its operation.

The Contractor will be obliged to maintain this pumping station so that it remains in proper working order on a 24hr/7 day week basis. In order to provide for breakdown situations and subsequent resumption of process plant, key spares necessary for the operation of the leachate treatment plant and pumping station must be held on site by the Contractor.

3.5 FACILITY ACCOMMODATION AND LABORATORY FACILITIES

A facility manager's office would be provided in the proposed facility control building. The central composting process computer is normally located in the composting building, along with a control room housing PLC-equipment. Canteen, toilet/shower/changing facilities would be provided within the proposed control building, as well as a storage area for sampling equipment and spare parts of small equipment (e.g. for ventilators, temperature sensors).

Certified laboratories would normally carry out extensive analyses of leachate, waste and compost samples, off-site. The proposed control building will also be equipped with a small laboratory where basic parameters (e.g. dry solids, volatile solids, pH) can be measured, as part of the process control measures. A stove and a small oven for drying samples will form the main equipment, along with pH and temperature metres, a conductivity metre, etc.

3.5.1 INTERACTION WITH EXISTING LANDFILL

As the proposed Sludge Hub Centre (SHC) and Leachate Treatment Facility (LTF) will be sited at the existing Derrinumera Landfill Facility, a number of elements of the existing site infrastructure will be shared. Some elements will be extended/modified to accommodate the proposed developments, namely:

- *Site security:* The security fencing will be extended to include the external boundary of the proposed SHC and LTF. The security fencing will be extended chain-link fencing;
- *Site roads:* The sites roads will be extended to convey traffic from the site entrance/weighbridge to the proposed SHC and LTF. The road construction specification will be the same as the one used for existing roads in the landfill facility;
- *Fire control:* The existing fire control infrastructure will be extended to service the proposed development. This will involve the installation of additional fire hydrants adjacent to the SHC and the LTF;
- *Foul and surface water drainage systems:* Both systems will be extended to cover the proposed development;
- *Lighting & CCTV:* The existing site lighting and CCTV system will be extended to cover the proposed development.

Other elements of the site infrastructure that will be shared with the proposed development include:

- The weighbridge;
- The wheelwash; and
- Plant storage and garage.

Proposed Water Supply

As there is a restricted water supply at present at Derrinumera Landfill (max. 10 m³/hr), there will be a requirement to source an alternative supply to cater for necessary process waters for sludge drying and composting, along with the requirement to meet domestic needs of the staff facilities.

Since the Islandeady Group Water Scheme (GWS) is the closest water source being sufficient to meet the future requirements of the SHC and LTF facility, it is proposed to connect to this scheme via a watermain extension. A new section of watermain will be laid in the grass margin of the R311 as far as the landfill facility. In the interests of safety during pipeline