S52

Environmental Protection Agency

Headquarters, PO Box 3000
Johnstown Castle Estate
County Wexford, Ireland

Ceanncheathrú, Bosca Poist 3000
Eastát Chaisleán Bhaile Sheáin
Contae Loch Garman, Éire

T. +353 53 9160600
F. +353 53 9160699
E. info@epa.ie
W: www.epa.ie

LoCall: 1890 33 55 99

Mr Mick Lorigan
Director of Transportation & Water Services
Fingal County Council
PO Box 174
Fingal County Hall
Swords
County Dublin

4th September 2013 Reg No: W0009-03

Dear Mr Lorigan

I am to advise you that the Agency has received an application for a Technical Amendment to a Waste Licence from Fingal County Council, for a facility located at Balleally Landfill, Balleally, Lusk, Co. Dublin.

The Licensee proposes, as part of this application, to provide for the discharge of process effluent to a sewer, which the Licensee has stated is vested in, or controlled by, your Council. Process effluent includes trade effluent or other matter (other than domestic sewage or storm water). I enclose a copy of the Technical Amendment request, which detail proposed discharges.

The provisions of Section 52 of the Waste Management Acts, 1996 to 2013, provides that the Agency shall obtain the consent of the sanitary authority to the proposed discharge from an activity which involves the discharge of trade effluent or other matter (other than domestic sewage or storm water), to a sewer vested in or controlled by a sanitary authority.

In order to expedite the Agency's consideration of this Technical Amendment, I am to request your authority's consent to the proposed discharge/s. It should be noted that, your authority's consent may be subject to such conditions as your authority considers appropriate as provided for in Section 52 of the Waste Management Acts, 1996 to 2013 and Section 99E(3) of the Environmental Protection Agency Acts, 1992 and 2013. Your attention is drawn to paragraphs (3) and (4) of the attached copy of the relevant section of the Act. For your convenience please find attached a reply form including a list of draft conditions compiled by the Agency.

In accordance with paragraph (2) of this section of the Act, you are requested to forward your response within 5 weeks of the date of this letter. Please note that any decision given after the expiry period shall be invalid and in those circumstances the Agency may proceed to determine the application concerned as if consent was obtained. Brian Meaney is dealing with this matter and can be contacted at the Licensing Unit, Office of Climate, Licensing & Resource Use (Tel. No. 0539160600), if you have any queries.

Your co-operation in this matter is appreciated.

Yours sincerely,

Ann Kehoe
Programme Officer
Licensing Unit
Office of Climate, Licensing & Resource Use

Section 99E (3) & (4) of the Environmental Protection Agency Acts, 1992 and 2007

(3) Subject to subsection (4), a consent under subsection (1) may be granted subject to or without conditions and if it is granted subject to conditions the Agency shall include in the licence or revised licence concerned conditions corresponding to them or, as the Agency may think appropriate, conditions more strict than them.

(4) The conditions that may be attached to a consent by a sanitary authority under this section are the following and no other conditions, namely conditions-

(a) relating to-

(i) the nature, composition, temperature, volume, level, rate, and location of the discharge concerned and the period during which the discharge may, or may not, be made,

(ii) the provision, operation, maintenance and supervision of meters, gauges, manholes, inspection chambers and other apparatus and other means for monitoring the nature, extent and effect of emissions,

(iii) the taking and analysis of samples, the keeping of records and furnishing of information to the sanitary authority,

(b) providing for the payment by the licensee to the sanitary authority concerned of such amount or amounts as may be determined by the sanitary authority having regard to the expenditure incurred or to be incurred by it in monitoring, treating and disposing of discharges of trade effluent, sewage effluent and other matter to sewers in its functional area or a specified part of its functional area,

(c) specifying a date not later than which any conditions attached under this section shall be complied with,

(d) relating to, providing for or specifying such other matter as may be prescribed.

SANITARY AUTHORITY RESPONSE

re: SECTION 52 OF THE WASTE MANAGEMENT ACTS, 1996 to 2011

Name & Address of Sanitary Authority: **Fingal County Council, PO Box 174, Fingal County Hall, Swords, County Dublin.**

Waste Reg. No. **W0009-03**

Waste Facility: **Balleally Landfill, Balleally, Lusk, Co. Dublin,**

Waste Licence Applicant: *Fingal County Council*

Consent: Indicate Yes to one of the following statements:

Consent granted subject to the consent conditions outlined below	
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 *Schedule B: Emissions Limits to Sewer*. There shall be no other emission to sewer of environmental significance.	
2. The licensee shall carry out such sampling, analyses, measurements, examinations, maintenance and calibrations as out in *Schedule C*.	
3. Monitoring and analytical equipment shall be operated and maintained as necessary so that monitoring accurately reflects the discharge or emission.	
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.	
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.	
6. The licensee shall record all sampling, analyses, measurements, examinations, calibrations and maintenance carried out in accordance with the requirements of this licence.	
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.	
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.	
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.	

ADDITIONAL GENERAL CONSENT CONDITIONS in respect of discharges or emissions to sewers, in accordance with Section 52 of the Waste Management Acts, 1996 to 2011 *(specify, if required)*

Limit Values for Process Effluent to Sewer

Schedule B: Emission Limits

Waste licence application Register No. **W0009-03**

Emission Point Reference No: _____

Emission to *(sewer description)*: _____

Volume to be emitted: Maximum in any one day: _____ m^3

Maximum rate per hour: _____ m^3

Parameter *(delete parameters which are not applicable)*	**Emission Limit Value**	
	Daily Mean Concentration (mg/l)	**Daily Mean Loading (kg/day)**
BOD		
COD		
Suspended Solids		
PH		
Temperature		
ADDITIONAL PARAMETERS *(if required)*		

Frequency of Monitoring Process Effluent to Sewer

Schedule C

Waste Licence application Register No. **W0009-03**

Emission Point Reference No:_____

Parameter *(delete parameters which are not applicable)*	**Monitoring Frequency (e.g. monthly, quarterly, annually)**	**Sampling Type** *(grab, composite)*
Flow to sewer		
Temperature		
pH		
BOD		
COD		
Suspended Solids		
ADDITIONAL PARAMETERS *(if required)*		

SANITARY AUTHORITY CHARGES	
Charge per cubic metre of process effluent (per s52 of the Waste Management Acts, 1996 to 2011)	
Payment Frequency	
Annual Monitoring Costs	

Signed on behalf of Fingal County Council

_____ Date_____

Office of licensing and Guidance
Environmental Protection Agency
P Box 3000
Johnstown Castle Estate
Wexford

Environment Department
Waste Management Division
P.O. Box 174,
County Hall,
Swords,
Fingal,
Co. Dublin

An Roinn Seirbhísí Comhshaoil
Bosca 174,
Áras an Chontae,
Sord,
Fine Gall,
Contae Átha Cliath

FAO Brian B Meaney

27 June 2013

Re: Balleally Landfill Ref W009-03

Dear Sirs

Fingal County Council hereby apply for a amendment to our waste licence for Balleally landfill under section 42B of the Waste Management Act 1996-2012

We are seeking a change to condition 5.12 & 6.12 and the associated schedule C.6 of the waste licence.

The original licence provided for the discharge of treated leachate to Rogerstown Estuary. To this purpose a treatment plant was constructed, however it was unable to meet the discharge limits in the licence, particularly in regard to COD and as a result partially treated leachate and untreated leachate has been tankered to Ringsend Wastewater Treatment Works.

In 2010 and 2011 hydrodynamic and water quality modeling was carried out in the estuary to see if a higher discharge standard which could be met by the existing plant and allow the estuary to meet the statutory water quality objectives for the estuary. The results of this modeling were reasonably positive, however in discussions with the National Parks and Wildlife service and the Agency it was felt that the imminent construction of the new Portrane wastewater treatment plant serving among other town Lusk would provide the opportunity to discharge the leachate into the sewer and with treatment in the plant at Portrane discharge to the Irish Sea a less sensitive water body than Rogerstown Estuary. We therefore did not proceed with the licence change at that time

The new wastewater treatment plant at Portrane was constructed in 2012 and has now been operating for a year. There is now the opportunity to connect to the Portrane plant. Tenders have been sought to construct a new pipeline to the Lusk Sewer Network which is 750m from the landfill site

This application for a technical amendment is to discharge untreated leachate to the sewer network as the wastewater treatment plant has capacity to treat the leachate at much lower cost than the Council running a separate (and more difficult to operate) treatment plant at Balleally

There has been substantial testing of the leachate as part of its acceptance at Ringsend WWTP and a spreadsheet of the Ringsend results is attached. Separate monitoring has been carried out on site however the Ringsend testing is more extensive. However we have attached our testing of list I & II substances carried out in

The main consideration is the effect of the significant Ammonia load on the Portrane Plant. The proposed ammonia load from Balleally would amount to less 7% of the design load and 21 % of the current load.

Discussions have been had with the DBO contractor for the Portrane Plant regarding the ability of the plant to accept Leachate from Balleally. The contractor has confirmed that the plant currently has the capacity to accept the leachate. There main concern is that the flow of leachate would be kept relatively constant and the substantial storage provided by the tanks at Balleally will allow for this.

In the longer term it is possible that the Portrane plant will reach capacity due to development within its catchment area. However with the current outlook for development this is likely to be over 10 years away. In addition there will be no load coming from the cancelled Nevitt Landfill which was previously proposed and was permitted in the licence granted for that project (this was for partially treated leachate) in addition the strength and quantity of the leachate at Balleally landfill will reduce over time. However should the leachate from Balleally Landfill adversely affect the capacity of the Portrane plant to accept other permitted development over time it is open to the Water Services Authority to seek a review of the waste licence and to reallocate capacity at the Portrane plant. In that case Fingal County Council would be required to provide pretreatment.

The Council would be open to trialing the discharge of leachate to the sewer in advance of a final decision by the Agency to determine this application

The following tables detail the loadings to the Portrane plant and the discharge limits sought for the Balleally Leachate Treatment Plant

Table 1 Design and current load figures for the Portrane Plant

	Design Load	Current Load
Flow m3/d	14,625	4,510
P.E.	65,000	18,840
BOD kg/d	3,900	1,146
COD kg/d	8,965	2,765
SS kg/d	4,357	1,353
Ammonia kg/d	978	288

Table 2 Discharge limits sought by Fingal County Council for the discharge from Balleally

	Discharge Limits Sought based on 90% ile concentrations and 150m3/d flow			For Information Average Loadings (ie average flow by average concentration)		
	concentration	loading	as a % of current flow/load	concentration	loading	as a % of current flow/load
	mg/l or m3/d	kg/d		mg/l or m3/d	kg/d	
Daily flow m3/d	150		3%	130		2.9%
Ammonia mg/l	800	120	42%	485	63.1	21.9%
BOD mg/l	150	22.5	2%	68	8.8	0.8%
COD mg/l	1100	165	6%	740	96.2	3.5%

The following are appended to this letter

- Table 3 Appended to this application gives results of the leachate from Balleally accepted at Ringsend from August 2011 to May 2013
- Table 4,5 & 6 List I and II substances analysis of the leachate from samples taken at Balleally on Sept 2009
- Table 7 give flow, BOD, COD and SS data for the Portrane WWTP from

- Also enclosed are details of the design of the Portrane plant from AECOM the DBO plant operator and a AECOM design report DR2259/3 for the Portrane plant.
- Map showing proposed discharge location to the sewer on Rogerstown Lane

Yours sincerely

John Daly
Senior Engineer
Waste Management Division
Tel 087 283 9186

Table 3 Results of Analysis from Dublin City Council Central Lab taken from leachate accepted at Ringsend WWTP

Date	Time	Sample Number	Aluminium	Ammonia	B.O.D.	C.O.D.	Cadmium	Chloride	Chromium	Conductivity (20°C)
			mg/l	mg/l as N	mg/l	mg/l	mg/l	mg/l	mg/l	µS/cm
24/08/2011	13:00	555462		1078.29		928		1528		12950
		571766	0.081	624.36	92	1640	< 0.004	1024	0.054	9590
04/11/2011	11:08	576897	0.183	309.64	310	512	< 0.004	568	0.018	5550
09/02/2012	11:11	602658	1.9	276.89	77	774	< 0.004	617	0.029	6650
10/02/2012	11:04	602929	0.712	685.05	120	1073	< 0.004	809	0.079	8870
28/02/2012	10:59	608119	0.449	509.01		931	< 0.004	662	0.054	8390
23/03/2012	12:04	615314	0.508	1006.29	92	1102	< 0.004	1177	0.15	12030
26/03/2012	10:59	615488	0.253	1000		1489	< 0.004	1201	0.145	11880
27/03/2012	10:50	615931	0.174	835.52		1269	< 0.004	996	0.104	10150
29/03/2012	10:55	616718		902.11	121	1322		1047		10760
27/06/2012	10:59	642213	0.114	394.66	53	673	< 0.004	528	0.051	6420
02/07/2012	12:01	643483	0.154	489.2		858	< 0.004	883	0.053	8410
18/07/2012	11:37	649047	0.124	553.89	52	809	< 0.004	676	0.055	7420
26/07/2012	11:57	651668	0.981	501.77	39	592	< 0.004	490	0.025	6000
08/08/2012	11:22	654863		502.26	46	692		730		7340
15/08/2012	14:34	657359	0.120	389.12	35	630	0.012	648	0.051	6330
05/09/2012	11:47	664358	0.150	794	48	793	< 0.004	361	0.089	7750
11/09/2012	12:10	666360	0.235	456.47		796	< 0.004	639	0.107	6560
13/09/2012	11:48	667267		479.76	117	793		678		7090
20/09/2012	11:55	669575		523.66	361	1430		704		6850
26/09/2012	12:18	672074	2.4	873.8	45	585	< 0.004	1347	0.066	5940
08/10/2012	12:23	675946	0.026	348.68		463	< 0.004	758	0.01	5610
10/10/2012	14:26	677041	0.071	349.85	29	548	< 0.004	828	0.024	6040
11/10/2012	14:50	677718	0.331	343.4	28	518	< 0.004	550	0.029	6060
15/10/2012	11:52	678490		495.94		680		711		7190
19/10/2012	10:53	679975	0.083	579.11	48	840	< 0.004	722	0.044	7920
23/10/2012	15:28	681566	0.121	497.76		714	< 0.004	867	0.043	7120
24/10/2012	11:51	681851	0.252	562.3		582	< 0.004	604	0.033	6630
02/11/2012	11:38	685131	0.300	409.52		646	< 0.004	549	0.042	6420
07/11/2012	11:50	686639	0.240	375.08	79	722	< 0.004	569	0.037	6410
19/11/2012	11:56	690859	1.5	547.9		822	< 0.004	725	0.366	7830
28/11/2012	12:20	694893	0.266	340.48	28	579	< 0.004	1374	0.029	5940
07/12/2012	13:05	698270	0.172	561.01	57	841	< 0.004	1485	0.052	7940
11/12/2012	12:23	699362	0.435	354.44		670	< 0.004	711	0.038	5820
19/12/2012	12:13	702423	0.407	715.84	44	764	< 0.004	654	0.053	7300
16/01/2013	11:35	709326		402.44	35	55		568		6690
18/01/2013	11:47	710647		472.71	52	830		617		7350
23/01/2013	11:49	712439		330.01	17	368		375		4600
24/01/2013	11:36	713127		263.44	197	911		564		4430
25/01/2013	11:55	713710		306.17	17	492		896		5580
30/01/2013	11:06	715156		633.93	83	1160		924		10090
06/02/2013	11:05	717977		388.41	25	650		557		6480
14/02/2013	14:23	721392		716.54	76	1208		856		9740
18/02/2013	10:58	722421		333.39		701		566		6090
20/02/2013	11:09	723574		235.9	12	328		379		4690
21/02/2013	11:55	724071		404.31	31	503		459		6040
27/02/2013	11:27	726239		310.27	55	624		486		5600
28/02/2013	11:19	726605		328.59	38	599		515		5870
04/03/2013	11:44	727732		268.25		567		1040		5670
12/03/2013	11:54	730592		223.37		403		418		4980
13/03/2013	12:40	730998		511.2		408		433		4830
14/03/2013	11:45	731431		203.7	14	380		1049		4770
19/03/2013	12:12	732343		740.13		899		1512		8070
21/03/2013	11:40	733198		472.45	45	681		1233		7620
25/03/2013	11:35	734190		447.88		724		1683		6860
26/03/2013	12:41	734700		219.93		358		374		3680
04/04/2013	11:14	736800		404.29	25	592		625		6400
11/04/2013	12:29	739583		447.48		600		759		6640
12/04/2013	12:23	740165		413.03		650		1250		6710
18/04/2013	11:53	742015		428.76	60	908		1054		6740
22/04/2013	12:02	742979		402.13		642		1061		6690
24/04/2013	12:24	743848		414.28	30	669		838		6740
26/04/2013	12:31	744972		432.24	32	659		772		6660
03/05/2013	10:59	747312		471	36	691		1112		7080
		Count		64	41	64	29	64	29	64
		Average		**489**	**68**	**740**		**803**	**0.0666**	**7040**
		Std Dev		199	71	288		318	0.0670	1825
		upper 90% ile		**744**	**160**	**1,108**		**1,211**	**0.15**	**9,378**

Table 6

Fingal County Council

White Young Green

Additional Monitoring Results - Leachate cells and treated leachate plant

Parameter	Unit	MAC	Cell 1 07/09/06	Cell 2 07/09/06	Cell 3 07/09/06	P1 a (Southern Boundary)	P1 b (Northern Boundary)	LTP
pH	pH Units	5.5-8.5	7.38	7.62	7.82	7.74	7.54	6.22
Conductivity	uS/cm	1000	11000	14000	18000	11000	11000	8000
Temperature	°C	-	-	-	-	-	-	-
Total Ammonia (as N)	mg/l	0.2	670.4	668.3	638.1	987.6	1002.6	47.3
Total Oxidised Nitrogen (as N)	mg/l	-	<0.3	<0.3	<0.3	<0.3	0.3	721.4
BOD	mg/l	5	1030	269	520	634	709	805
COD	mg/l	-	2000	1314	2128	1738	1178	1419
Total Suspended Solids	mg/l	50	155	30	108	41	101	65
Total Phosphorous	mg/l	*No Abnormal Change*	2.74	3.14	6.52	1.25	1.06	9.03
Sodium#	mg/l	150	950	1300	1700	1200	1150	1050
Chloride#	mg/l	30	959	1328	1760	1350	1341	1279

Shading = Value has exceeded MAC

European Communities Regulations SI 439 of 2000

Analysis conducted by Alcontrol Geochem Laboratories

indicator parameters

NDP = No Determination Possible

Table 4

Fingal County Council

White Young Green

Additional Monitoring - Pesticides

Sample Identity		Method Detection Limit	IGV	Cell 1	Cell2	Cell3	P1SB	P1NB	LTP
Dichlorvos**	ug/l	<0.01ug/l	0.001ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Mevinphos**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
alpha-BHC**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
beta-BHC**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
gamma-BHC (Lindane)**	ug/l	<0.01ug/l	0.1ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Diazinon**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Methyl parathion**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Heptachlor**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Fenitrothion**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Malathion**	ug/l	<0.01ug/l	0.01ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Aldrin**	ug/l	<0.01ug/l	0.0ug/l1	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Parathion**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Heptachlor epoxide**	ug/l	<0.01ug/l	0.001ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Endosulfan 1**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
p,p'-DDE**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Dieldrin**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Endrin**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Endosulfan 2**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
p,p'-DDD**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Ethion**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
p,p'-DDT**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Endosulfan sulphate**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
p,p'-Methoxychlor**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01
Azinphos methyl**	ug/l	<0.01ug/l	0.5ug/l	<0.02	<0.02	<0.05	<0.1	<0.2	<0.01

Table 5

Fingal County Council

White Young Green

Additional Monitoring - Volatile Organic Compounds

Trace Organics (VOCs)	Unit	Cell 1	Cell 2	Cell 3	P1 -SB	P1 - NB	LTP	EPA IGVs
Date		07/09/06	07/09/06	07/09/06	07/09/06	07/09/06	08/09/06	
Dichlorofluoromethane	µg/l	<1	<1	<1	<1	<1	<1	-
Chloromethane	µg/l	<1	<1	<1	<1	<1	<1	-
Vinyl chloride	µg/l	<1	<1	<1	<1	<1	<1	-
Bromomethane	µg/l	<1	<1	<1	<1	<1	<1	-
Chloroethane	µg/l	<1	<1	<1	<1	<1	<1	-
Trichlorofluoromethane	µg/l	<1	<1	<1	<1	<1	<1	-
1,1-Dichloroethene	µg/l	<1	<1	<1	<1	<1	<1	-
Dichloromethane	µg/l	<1	<1	<1	<1	<1	<1	10
trans-1,2-Dichloroethene	µg/l	<1	<1	<1	<1	<1	<1	-
1,1-Dichloroethane	µg/l	<1	<1	<1	<1	<1	<1	-
2,2-Dichloropropane	µg/l	<1	<1	<1	<1	<1	<1	-
tert-butyl methyl ether	µg/l	67	102	45	<1	<1	<1	-
cis-1,2-Dichloroethene	µg/l	<1	<1	<1	<1	<1	<1	-
Bromochloromethane	µg/l	<1	<1	<1	<1	<1	<1	-
Chloroform	µg/l	<1	<1	<1	<1	<1	<1	12
1,1,1-Trichloroethane	µg/l	<1	<1	<1	<1	<1	<1	500
1,1-Dichloropropene	µg/l	<1	<1	<1	<1	<1	<1	-
Carbontetrachloride	µg/l	<1	<1	<1	<1	<1	<1	-
1,2-Dichloroethane	µg/l	<1	<1	<1	<1	<1	<1	3
Benzene	µg/l	8	6	7	6	4	<1	10
Dibromomethane	µg/l	<1	<1	<1	<1	<1	<1	-
1,2-Dichloropropane	µg/l	<1	<1	<1	<1	<1	<1	-
Bromodichloromethane	µg/l	<1	<1	<1	<1	<1	<1	-
Trichloroethene	µg/l	<1	<1	<1	<1	<1	<1	70
cis-1,3-Dichloropropene	µg/l	<1	<1	<1	<1	<1	<1	-
trans-1,3-Dichloropropene	µg/l	<1	<1	<1	<1	<1	<1	-
1,1,2-Trichloroethane	µg/l	<1	<1	<1	<1	<1	<1	-
Toluene	µg/l	**20**	**68**	**34**	<1	<1	<1	10
Dibromochloromethane	µg/l	<1	<1	<1	<1	<1	<1	-
1,2-Dibromoethane	µg/l	<1	<1	<1	<1	<1	<1	-
Tetrachloroethene	µg/l	<1	<1	<1	<1	<1	<1	40
Chlorobenzene	µg/l	<1	<1	<1	6	<1	<1	1
Ethylbenzene	µg/l	**24**	**13**	**14**	6	<1	<1	10
Xylenes (Total O,M, and P)	µg/l	**53**	**24**	**20**	**5**	<1	<1	10
Bromoform	µg/l	<1	<1	<1	<1	<1	<1	-
Styrene	µg/l	<1	<1	<1	<1	<1	<1	-
1,1,2,2-Tetrachloroethane	µg/l	<1	<1	<1	<1	<1	<1	-
o-Xylene	µg/l	18	12	10	<1	4	<1	-
1,3-Dichloropropane	µg/l	<1	<1	<1	<1	<1	<1	-
Isopropylbenzene	µg/l	<1	<1	<1	<1	<1	<1	-
Bromobenzene	µg/l	<1	<1	<1	<1	<1	<1	-
2-Chlorotoluene	µg/l	<1	<1	<1	<1	<1	<1	-
n-Propylbenzene	µg/l	<1	<1	<1	<1	<1	<1	-
4-Chlorotoluene	µg/l	<1	<1	<1	<1	<1	<1	-
1,3,5-Trimethylbenzene	µg/l	13	8	9	2	5	<1	-
4-Isopropyltoluene	µg/l	<1	<1	<1	<1	<1	<1	-
1,2,4-Trimethylbenzene	µg/l	3	2	2	4	4	<1	-
1,2-Dichlorobenzene	µg/l	<1	<1	<1	<1	<1	<1	10
1,3-Dichlorobenzene	µg/l	<1	<1	<1	<1	<1	<1	-
sec-Butylbenzene	µg/l	<1	<1	<1	<1	<1	<1	-
tert-Butylbenzene	µg/l	8	7	28	<1	<1	<1	-
1,4-Dichlorobenzene	µg/l	<1	<1	<1	<1	<1	<1	-
n-Butylbenzene	µg/l	<1	<1	<1	<1	<1	<1	-
123-Trichloropropane	µg/l	<1	<1	<1	<1	<1	<1	-
1,2-Dibromo-3-Chloropropane	µg/l	<1	<1	<1	<1	<1	<1	-
1,2,4-Trichlorobenzene	µg/l	<1	<1	<1	<1	<1	<1	0.4
Hexachlorobutadiene	µg/l	<1	<1	<1	<1	<1	<1	0.1
Naphthalene	µg/l	<1	**5**	**8**	**10**	**8**	<1	1
1,2,3-trichlorobenzene	µg/l	<1	<1	<1	<1	<1	<1	

LEGEND
EPA IGVs = Environmental Protection Agency (EPA) Guidelines (2003)
Results are shaded in bold where they exceed the EPA Guideline Value

White Young Green Ireland
Environmental Consultants
Job No. CE05022

Portrane, Dol Portrane, Donabate, Rush & Lusk WWTS - DBO Contract
Liquid Stream Plant Flows and Sampling Results - O&M Phase

Updated on: 18/02/2013

AECOM

Date	WWTW Influent Flows			Influent Concentration				Loading	WWTW Effluent Flows		Effluent Concentration				SBR 1	SBR 2	SBR 1	SBR 2	Notes
24/09/2012	8,459	2,209	10,668		581		260		3,915	4,933		5	12						**Start of O&M Period.**
25/09/2012	9,801	8,521	18,322		75		59		16,835	8,801		7	21	270	3,188	3,576	2,345	2,631	Estimated sampling water depth = 3.45m.
26/09/2012	11,929	8,222	20,151		89		51		20,106	3,135		15	13	110					
27/09/2012	9,167	2,985	12,152	45.00	88	0.51	48	547	17,010	0	10.00	15	12	150					
28/09/2012	10,443	192	10,635						9,983	0		12	7						
29/09/2012	8,230	0	8,230						6,929	0									
30/09/2012	5,265	18	5,283						4,635	0									
01/10/2012	7,735	0	7,735						6,809	0		8	4						
02/10/2012	5,995	0	5,995		369		161		5,394	0		8	3	22					
03/10/2012	5,851	0	5,851						5,586	0		6	2	56					
04/10/2012	5,279	0	5,279	114.00	240	0.48	116	602	4,558	0		8	3	12					
05/10/2012	4,518	0	4,518		407		164		4,665	0		21	13						
06/10/2012	4,663	0	4,663						3,910	0									
07/10/2012	4,663	0	4,663						3,910	0									
08/10/2012	6,728	0	6,728		458		150		6,076	0		17	1						
09/10/2012	4,607	15	4,622						3,981	0		14	4	26					
10/10/2012	4,600	0	4,600	243.00	563	0.43	254	1,118	4,224	0	4.00	16	1	15					
11/10/2012	6,433	692	7,125		536		229		5,918	0		21	3	6					
12/10/2012	6,295	0	6,295						5,794	0		25	4						
13/10/2012	4,161	0	4,161						4,197	0									
14/10/2012	6,812	15	6,827						5,787	0									
15/10/2012	7,397	28	7,425		363		140		7,045	0		13	6						
16/10/2012	7,898	250	8,148		215		85		7,413	0		13	2						
17/10/2012	9,990	1,218	11,208	141.00	287	0.49	142	1,580	9,945	0	4.00	8	2	55					
18/10/2012	12,259	240	12,499		89		45		13,536	0		22	6	250					
19/10/2012	8,242	119	8,361		187		73		7,388	0		8	5						
20/10/2012	5,717	0	5,717						5,761	0									
21/10/2012	8,937	0	8,937						7,675	0									
22/10/2012	5,948	0	5,948		251		91		5,089	0		16	6						
23/10/2012	5,578	0	5,578		343		155		5,143	0		16	3	10					
24/10/2012	5,495	0	5,495	203.00	383	0.53	170	1,115	4,991	0	3.00	20	2	14	2,832	3,324	2,083	2,445	Estimated sampling water depth = 3.45m.
25/10/2012	5,255	0	5,255		438		215		4,524	0		36	4	15					
26/10/2012	4,804	0	4,804		410		161		4,641	0		28	4						
27/10/2012	4,186	15	4,201						3,785	0									
28/10/2012	5,335	0	5,335						4,863	0									
29/10/2012	4,662	0	4,662						4,248	0									Bank holiday.
30/10/2012	5,733	0	5,733		407		154		5,288	0		11	2	4					
31/10/2012	4,896	0	4,896	430.00	632	0.68	298	2,105	4,493	0	11.00	26	11	42					
01/11/2012	5,077	0	5,077		1,102		551		4,523	0		10	5	20					
02/11/2012	3,281	0	3,281		463		217		2,986	0		12	3	36					
03/11/2012	4,787	0	4,787						4,370	0									
04/11/2012	5,608	115	5,723						4,368	0									
05/11/2012	6,316	0	6,316		382		185		6,530	0		18	3						
06/11/2012	4,714	0	4,714		428		187		4,016	0		17	2	88					
07/11/2012	4,603	46	4,649	259.00	460	0.56	199	1,204	4,117	0	5.00	14	4	92					
08/11/2012	4,643	0	4,643		741		392		4,316	0		22	3	65					
09/11/2012	4,679	0	4,679		351		182		4,308	0		11	3	64					
10/11/2012	3,648	0	3,648						3,149	0									
11/11/2012	5,475	0	5,475						5,058	0									
12/11/2012	5,475	0	5,475		347		165		5,058	0		10	1	30					
13/11/2012	4,556	0	4,556		406		179		3,923	0		17	6	41	2,874	3,290	2,114	2,420	Estimated sampling water depth = 3.45m.
14/11/2012	4,628	0	4,628	221.00	495	0.45	225	1,023	4,028	0	4.00	14	2	65					

Portrane, Dol Portrane, Donabate, Rush & Lusk WWTS - DBO Contract
Liquid Stream Plant Flows and Sampling Results - O&M Phase

Updated on: 18/02/2013

AECOM

Date	WWTW Influent Flows			Influent Concentration			Loading	WWTW Effluent Flows		Effluent Concentration			SBR 1	SBR 2	SBR 1	SBR 2	Notes
15/11/2012	4,606	15	4,621		462		210		4,239	0		10	2	42					
16/11/2012	4,353	0	4,353		455		221		3,926	0		14	2	56					
17/11/2012	3,496	0	3,496						3,225	0									
18/11/2012	5,174	0	5,174						4,601	0									
19/11/2012	8,905	302	9,207		426		203		8,367	0		10	1	19					
20/11/2012	6,249	0	6,249		322		161		5,696	0		19	4	700					
21/11/2012	5,226	0	5,226	163.00	342	0.48	137	852	4,564	0	5.00	14	1	5,100					UV plant malfunction experienced.
22/11/2012	6,350	0	6,350		405		169		5,664	0		7	4	210					
23/11/2012	5,075	0	5,075		333		144		4,867	0		21	5	110					
24/11/2012	4,350	0	4,350						3,972	0									
25/11/2012	8,365	87	8,452						7,786	0									
26/11/2012	13,516	6,109	19,625		166		66		17,791	2,781		14	4	260					
27/11/2012	10,706	2,040	12,746		106		50		12,595	0		16	8	300					
28/11/2012	7,850	0	7,850	105.00	242	0.43	88	824	7,450	0	5.00	10	5	930					
29/11/2012	6,700	25	6,725		161		32		6,080	0		12	2	70					
30/11/2012	6,191	0	6,191		387		136		5,623	0		9	3	25					
01/12/2012	5,189	0	5,189						4,494	0									
02/12/2012	5,921	0	5,921						5,282	0									
03/12/2012	7,248	0	7,248		312		125		6,601	0		10	1	21					
04/12/2012	5,790	0	5,790		364		139		5,389	0		18	7	6					
05/12/2012	6,085	0	6,085		354		127		5,444	0		14	6	1					
06/12/2012	5,885	21	5,906		350		153		5,205	0		7	3	14					
07/12/2012	7,236	0	7,236		314		170		6,807	0		6	5	98					
08/12/2012	5,488	0	5,488						4,979	0									
09/12/2012	6,156	0	6,156						5,505	0									
10/12/2012	6,311	0	6,311		240		114		5,920	0		8	2	12					
11/12/2012	5,254	224	5,478		440		234		4,624	0		18	4						
12/12/2012	5,226	16	5,242	183.00	354	0.52	159	959	5,011	0	5.00	16	6	37					
13/12/2012	5,436	56	5,492		363		179		5,135	0		16	3	57					
14/12/2012	6,482	16	6,498		333		156		5,795	0		25	3	25					
15/12/2012	4,474	21	4,495						3,617	0									
16/12/2012	6,544	39	6,583						5,736	0									
17/12/2012	6,447	17	6,464		367		187		6,068	0		13	4	36					
18/12/2012	5,469	23	5,492		380		144		4,967	0		22	3	15	4,038	2,918	2,970	2,147	Estimated sampling water depth = 3.45m.
19/12/2012	6,623	18	6,641		406		184		5,940	0		17	2	34					
20/12/2012	7,058	319	7,377		304		157		6,885	0		25	8	27					
21/12/2012	6,566	0	6,566		168		50		6,016	0		20	2	120					
22/12/2012	6,224	0	6,224						5,041	0									
23/12/2012	7,653	20	7,673						7,151	0									
24/12/2012	6,752	0	6,752						6,020	0									
25/12/2012	7,302	11	7,313						6,586	0									
26/12/2012	7,302	11	7,313						6,586	0									
27/12/2012	4,175	80	4,255						3,951	0									
28/12/2012	6,486	0	6,486						5,780	0									
29/12/2012	6,834	0	6,834						5,995	0									
30/12/2012	4,285	0	4,285						4,069	0									
31/12/2012	6,100	17	6,117		115		95		5,433	0		20	11						
01/01/2013	5,542	0	5,542						4,922	0									
02/01/2013	5,049	0	5,049	87.00	176	0.49	65		4,583	0	10.00	24	15						
03/01/2013	6,248	0	6,248	298.00	419	0.71	131	1,862	5,554	0	2.00	31	18	57					
04/01/2013	4,465	0	4,465		517		208		3,911	0		42	10	31					
05/01/2013	3,566	0	3,566						3,360	0									

Portrane, Dor Portrane, Donabate, Rush & Lusk WWTS - DBO Contract
Liquid Stream Plant Flows and Sampling Results - O&M Phase

Updated on: 18/02/2013

AECOM

Date	WWTW Influent Flows			Influent Concentration			Loading	WWTW Effluent Flows		Effluent Concentration			SBR 1	SBR 2	SBR 1	SBR 2	Notes
06/01/2013	6,178	0	6,178					5,258	0								
07/01/2013	5,583	0	5,583		636		332	4,944	0		19	8					
08/01/2013	4,923	0	4,923		519		195	4,743	0		22	7	30				
09/01/2013	4,370	0	4,370	366.00	978	0.37	483	1,599	4,109	0	6.00	28	5	80				
10/01/2013	4,686	0	4,686		984		618		4,303	0		17	9	85				
11/01/2013	4,775	0	4,775		641		318		4,276	0		15	2	47				
12/01/2013	3,894	19	3,913						3,122	0								
13/01/2013	4,724	0	4,724						4,374	0								
14/01/2013	6,394	0	6,394		791		408		5,474	0		44	13	100				
15/01/2013	4,693	0	4,693		550		316		4,379	0		36	7	92				
16/01/2013	4,828	0	4,828	227.00	616	0.37	323	1,096	4,282	0	5.00	23	3	85	4,092	4,872	3,010	3,584	Estimated sampling water depth = 3.45m.
17/01/2013	5,223	0	5,223		846		510		4,282	0		22	4	31					
18/01/2013	9,438	1,785	11,223						9,492	0									
19/01/2013	11,273	2,053	13,326		194		130		13,393	0		15	4						
20/01/2013	13,616	670	14,286		169		71		13,105	0		15	9	29					
21/01/2013	10,118	22	10,140		286		109		9,786	0		14	6		4,350	4,886	3,200	3,594	Estimated sampling water depth = 3.45m.
22/01/2013	8,044	0	8,044		126		78		6,649	0		10	2	1					
23/01/2013	7,190	0	7,190	118.00	286	0.41	134	848	6,771	0	7.00	7	6	65					
24/01/2013	6,595	0	6,595		309		161		5,877	0		15	5	48	3,710	4,420	2,729	3,251	Estimated sampling water depth = 3.45m.
25/01/2013	6,629	0	6,629		377		181		5,748	0		12	7	37					
26/01/2013	11,106	5,175	16,281		215		121		14,977	0		10	4						
27/01/2013	15,953	113	16,066		134		59		14,563	0		13	9						
28/01/2013	6,847	0	6,847		242		120		6,186	0		79	20	970					
29/01/2013	8,783	21	8,804		250		116		8,108	0		27	8	85	3,820	4,744	2,810	3,490	
30/01/2013	8,341	0	8,341	118.00	258	0.46	133	984	7,412	0	6.00	16	6	31					
31/01/2013	8,225	0	8,225		252		119		7,252	0		14	5	51	4,344	4,732	3,195	3,481	
01/02/2013	7,267	0	7,267		102		53		6,473	0		7	4	29					
02/02/2013	6,536	0	6,536		289		155		5,875	0		9	2						
03/02/2013	6,777	0	6,777		285		124		6,195	0		13	3	9					
04/02/2013	6,782	0	6,782		195		77		5,956	0		14	3	5					
05/02/2013	6,318	36	6,354		652		176		5,321	0		22	6	30					
06/02/2013	5,720	0	5,720	154.00	366	0.42	191	881	5,226	0	5.00	11	10	10					
07/02/2013	6,632	0	6,632		464		246		5,787	0		21	2	8					
08/02/2013	6,118	0	6,118		250		89		5,719	0		14	2	30					
09/02/2013	7,127	0	7,127						6,095	0									
10/02/2013	12,647	3,784	16,431						15,225	0									
11/02/2013	11,255	51	11,306		119		57		10,765	0		10	9	111					
12/02/2013	8,686	21	8,707		211		89		7,656	0		29	4	26					
13/02/2013	9,865	22	9,886	118.00	272	0.43	105	1,167	8,665	0	9.00	14	8	30					
14/02/2013	8,373	0	8,373		126		35		7,379	0		24	7	16	4,370	4,394	3,215	3,232	
15/02/2013	7,155	0	7,155		280		116		6,565	0		27	6	64					
16/02/2013	6,799	0	6,799						5,707	0									
17/02/2013	6,324	0	6,324						5,760	0									
18/02/2013	5,895	0	5,895		461		271		5,346	0		21	7	3					
19/02/2013	5,559	0	5,559		430		235		4,592	0		23	6	61					
20/02/2013	5,444	0	5,444	175.00	301	0.58	201	953	4,997	0	9.00	27	10	910	3,832	4,420	2,819	3,251	
21/02/2013	5,150	0	5,150		361		184		4,597	0		19	5	47					
22/02/2013	4,957	0	4,957		797		367		4,548	0		29	7	148					
23/02/2013	4,932	0	4,932						4,664	0									
24/02/2013	4,917	0	4,917						4,080	0									
25/02/2013	4,575	0	4,575		358		93		4,246	0		20	7	230					
26/02/2013	4,531	0	4,531		690		325		3,935	0		27	5	193					

Portrane, Dol Portrane, Donabate, Rush & Lusk WWTS - DBO Contract
Liquid Stream Plant Flows and Sampling Results - O&M Phase

Updated on: 18/02/2013

AECOM

Date	WWTW Influent Flows			Influent Concentration				Loading	WWTW Effluent Flows		Effluent Concentration			SBR 1	SBR 2	SBR 1	SBR 2	Notes
27/02/2013	4,495	0	4,495	266.00	563	0.47	331	1,196	3,806	0	12.00	31	6	137				
28/02/2013	4,376	0	4,376		675		344		4,194	0		30	6	129				
01/03/2013	4,382	0	4,382		618		316		3,573	0		11	6	613				
02/03/2013	4,723	0	4,723		586		257		4,333	0		16	6	79				
03/03/2013	4,709	0	4,709		448		293		4,131	0		19	7	816				
04/03/2013	4,585	0	4,585		839		512		3,824	0		15	7	649				
05/03/2013	3,705	0	3,705		700		311		3,908	0	5.00	30	4	66				
06/03/2013	5,409	285	5,694	298.00	784	0.38	380	1,697	5,147	0		25	5	77				
07/03/2013	6,600	68	6,668		753		403		6,206	3		23	10	76				
08/03/2013	7,787	0	7,787		459		256		7,702	0		30	9	1,733				
09/03/2013	6,212	0	6,212		210		299		5,702	0		29	4	50				
10/03/2013	5,603	0	5,603		246		296		5,614	0		22	7	18				
11/03/2013	5,164	0	5,164		514		259		4,667	0		25	5	54				
12/03/2013	4,956	0	4,956		461		260		5,017	0		23	6	110				
13/03/2013	4,808	0	4,808		354		188		4,832	0		17	9	41				
14/03/2013	4,788	0	4,788	242.00	574	0.42	278	1,159	4,204	0	3.00	30	10	15				
15/03/2013	4,598	0	4,598		473		269		4,635	0		31	3	24				
16/03/2013	4,717	0	4,717		391		186		4,236	0		24	4	21				
17/03/2013	5,211	21	5,232		379		206		5,394	0		18	3	61				
18/03/2013	5,284	0	5,284		285		124		4,732	0		22	3	55				
19/03/2013	5,006	0	5,006		369		116		5,068	0		16	4	31				
20/03/2013	5,769	0	5,769		420		250		5,353	0		20	9	32				
21/03/2013	5,463	21	5,484	138.00	245	0.56	122	757	4,721	0	7.00	28	14	19				
22/03/2013	10,150	8,219	18,369		431		243		16,649	4,851		18	4					
23/03/2013	13,426	6,331	19,757		513		369		18,202	717		40	18	7				
24/03/2013	9,961	0	9,961		288		307		9,098	0		41	34	12				
25/03/2013	7,875	0	7,875		200		117		6,576	0		11	5	11				
26/03/2013	6,941	0	6,941		92		66		6,222	0		15	11	29				
27/03/2013	6,475	26	6,501		282		144		5,350	0		29	7	6				
28/03/2013	5,978	0	5,978	132.00	272	0.49	122	789	5,457	0	7.00	49	4	41				
29/03/2013	5,890	0	5,890		286		146		4,766	0		20	3	8				
30/03/2013	5,481	0	5,481		321		150		4,854	0		30	5	6				
31/03/2013	5,185	1	5,186		422		213		4,252	0		25	5	7				
01/04/2013	5,088	0	5,088		387		181		4,577	0		27	14	8				
02/04/2013	4,917	0	4,917		422		152		3,916	0		33	5	2	2,970	1,648	2,185	1,212	
03/04/2013	4,829	0	4,829		462		251		4,220	0		27	6						
04/04/2013	4,669	0	4,669		318		199		4,136	0		24	4	16					
05/04/2013	4,680	0	4,680	102.10	185	0.55	102	478	3,662	0	2.00	25	3	1					
06/04/2013	4,682	0	4,683		327		144		4,125	0		29	4	4					
07/04/2013	4,729	0	4,729		396		200		3,758	0		24	6	4					
08/04/2013	4,583	0	4,583		667		317		4,049	0		31	5	12	2,608	3,206	1,918	2,358	
09/04/2013	4,525	0	4,525		549		308		4,001	0		30	5	7					
10/04/2013	4,511	0	4,511		506		299		3,609	0		29	8	10	2,674	2,858	1,967	2,102	
11/04/2013	6,626	109	6,734	249.20	757	0.33	425	1,678	5,873	0	5.00	35	6	4					
12/04/2013	5,236	0	5,236		433		108		4,655	0		28	4	23					
13/04/2013	5,374	0	5,374		420		213		4,410	0		21	5	3					
14/04/2013	5,405	0	5,405		549		294		4,668	0		21	5	2					
15/04/2013	4,835	0	4,835		406		233		3,857	0		28	8	26	3,220	2,994	2,369	2,202	
16/04/2013	4,696	0	4,696		434		238		3,981	0		20	3	17					
17/04/2013	4,549	0	4,549		493		274		4,126	0		26	8	14					
18/04/2013	5,286	21	5,307	207.00	510	0.41	316	1,099	4,194	0	7.00	30	8	18	3,140	2,988	2,310	2,198	
19/04/2013	4,597	0	4,597		542		367		4,078	0		34	10	17					

Portrane, Dol Portrane, Donabate, Rush & Lusk WWTS - DBO Contract
Liquid Stream Plant Flows and Sampling Results - O&M Phase

Updated on: 18/02/2013

AECOM

Date	WWTW Influent Flows			Influent Concentration			Loading	WWTW Effluent Flows		Effluent Concentration			SBR 1	SBR 2	SBR 1	SBR 2	Notes
20/04/2013	4,688	0	4,688		416		267		3,736	0		29	6	3					
21/04/2013	4,707	0	4,707		358		142		3,890	0		25	4	9					
22/04/2013	4,396	0	4,396		426		253		3,924	0		28	8	6					
23/04/2013	4,403	0	4,403		591		209		3,383	0		24	6	63					
24/04/2013	4,957	0	4,957		478		209		4,636	0		27	6	23	2,958	3,680	2,176	2,707	
25/04/2013	6,710	0	6,710	188.50	324	0.58	211	1,265	5,889	0	5.00	28	4	123					
26/04/2013	5,068	0	5,068		421		352		4,177	0		27	3	283					
27/04/2013	4,833	0	4,833		573		114		4,242	0		30	3	186					
28/04/2013	4,827	0	4,827		445		244		3,792	0		25	4	138					
29/04/2013	4,490	0	4,490		549		314		3,941	0		31	4	284					
30/04/2013	4,432	0	4,432		560		298		3,893	0		20	5	255			@BWL 3.2m	@BWL 3.2m	
01/05/2013	4,315	0	4,315	278.10	618		302	1,200	3,363	0		31	3		3,176	3,658	3,424	3,944	
02/05/2013	4,349	0	4,349	**243.50**	575	0.42	301	**1,059**	3,745	0	4.40	29	3						
03/05/2013	4,412	0	4,412	264.15	587		358	1,165	3,440	0		30	6						
04/05/2013	4,410	0	4,410	245.70	546		255	1,084	3,955	0		23	3						
05/05/2013	4,227	0	4,227	234.45	521		228	991	3,633	0		30	4						
06/05/2013	4,493	0	4,493	204.30	454		197	918	3,458	0		25	6						
07/05/2013	4,148	0	4,148	193.05	429		231	801	3,688	0		24	6						
08/05/2013	4,972	0	4,972	195.75	435		276	973	4,138	0		24	2		3,168	3,702	3,416	3,991	
09/05/2013	5,076	21	5,097	**221.60**	619	0.36	281	**1,129**	4,489	0	2.04	36	2						
10/05/2013	5,270	0	5,270	179.10	398		283	944	4,257	0		18	2						
11/05/2013	5,064	0	5,064	253.80	564		298	1,285	4,447	0		23	5						
12/05/2013	4,822	0	4,822	252.90	562		310	1,219	3,994	0		24	6						
13/05/2013	4,882	0	4,882	230.85	513		295	1,127	4,080	0		22	3						
14/05/2013	4,634	0	4,634	278.10	618		213	1,289	4,172	0		39	6						
15/05/2013	4,441	0	4,441	**294.70**	1,330	0.22	570	**1,309**	3,459	0	2.39	21	3						
16/05/2013	4,188	0	4,188	**190.00**	580	0.33	276	**796**	3,761	0	2.55	36	2						
17/05/2013	4,021	0	4,021	248.85	553		223	1,001	3,315	0		17	2						
18/05/2013	4,166	0	4,166	205.20	456		201	855	3,583	0		23	4						
19/05/2013	4,192	0	4,192	261.00	580		218	1,094	3,496	0		22	3						
20/05/2013	4,239	0	4,239	314.55	699		383	1,333	3,405	0		23	5						
21/05/2013	4,086	0	4,086	290.70	646		251	1,188	3,453	0		28	2						
22/05/2013	4,043	0	4,043	**271.20**	841	0.32	431	**1,096**	3,675	0	3.03	25	4						
23/05/2013	4,105	0	4,105	**518.30**	1,895	0.27	1,124	**2,128**	3,680	0	2.67	19	6						
24/05/2013	3,954	0	3,954	366.30	814		426	1,448	3,841	0		32	8		3,786	4,114	4,082	4,435	
25/05/2013	4,106	0	4,106	217.80	484		197	894	3,586	0		25	6						
26/05/2013	4,015	0	4,015	288.90	642		295	1,160	3,874	0		27	4						
27/05/2013	6,354	21	6,375	306.45	681		321	1,954	5,947	0		21	4						
28/05/2013	4,546	126	4,672	67.95	151		139	317	4,526	0		16	4		3,744	3,648	4,037	3,933	
29/05/2013	7,058	0	7,058	**161.00**	571	0.28	301	1,136	6,614	0	3.04	31	1						
30/05/2013	4,606	35	4,641	**207.70**	671	0.31	400	**964**	4,396	0	3.31	27	2						
31/05/2013	4,236	0	4,236	112.05	249		159	475	3,668	0		20	2		3,386	3,586	3,651	3,866	
01/06/2013	4,207	0	4,207	245.70	585		336	1,034	4,142	0		15	6						
02/06/2013	3,965	0	3,965	503.16	1,198		633	1,995	3,497	0		12	2						
03/06/2013	4,083	0	4,083	213.78	509		258	873	3,774	0		45	6						
04/06/2013	4,153	0	4,153	333.48	794		362	1,385	3,901	0		19	6	50					
05/06/2013	4,052	0	4,052	289.38	689		306	1,173	3,411	0		31	4	63					
06/06/2013	3,904	0	3,904	**241.00**	720	0.33	287	**941**	3,818	0	3.00	30	5	289	3,674	4,316			
07/06/2013	4,000	0	4,000	284.76	678		378	1,139	3,411	0		30	6	180					
08/06/2013	3,950	0	3,950	258.72	616		285	1,022	3,795	0		20	8	291					
09/06/2013	4,037	0	4,037	231.84	552		291	936	3,773	0		19	3	263					
10/06/2013	3,873	0	3,873	220.50	525		290	854	3,393	0		23	6	271	3,608	3,640			

Portrane, Dol Portrane, Donabate, Rush & Lusk WWTS - DBO Contract
Liquid Stream Plant Flows and Sampling Results - O&M Phase

Updated on: 18/02/2013

AECOM

Date	WWTW Influent Flows			Influent Concentration			Loading	WWTW Effluent Flows		Effluent Concentration			SBR 1	SBR 2	SBR 1	SBR 2	Notes
11/06/2013	5,626	0	5,626	*270.06*	643	350	*1,519*	5,295	0	22	9	1,000					
12/06/2013	5,109	0	5,109	*199.50*	475	299	*1,019*	5,133	0	48	9	900					
13/06/2013	6,046	0	6,046	**162.00**	412	0.39 269	***979***	5,487	0	3.80 30	12	300	3,658	3,840			
14/06/2013	5,225	0	5,225	*182.28*	434	237	*952*	5,060	0	27	10	78					
15/06/2013	6,362	0	6,362	*189.42*	451	299	*1,205*	5,890	0	23	6	56					
16/06/2013	5,071	157	5,228	*235.62*	561	343	*1,232*	5,417	0	40	18	298					
17/06/2013	6,518	0	6,518	*238.98*	569	392	*1,558*	5,728	0	40	19	200					
18/06/2013	5,062	0	5,062	*352.80*	840	583	*1,786*	4,893	0	24	7	44	3,406	3,442			
19/06/2013	4,656	0	4,656	*221.34*	527	239	*1,031*	4,494	0	24	6	284					
20/06/2013	4,433	0	4,433	**207.00**	676	0.31 397	***918***	3,854	0	5.20 34	16	156					
21/06/2013	4,051	263	4,314	*230.58*	549	340	*995*	3,990	0	26	7	79					
22/06/2013	4,388	54	4,442	*261.66*	623	259	*1,162*	4,423	0	42	14	203					
23/06/2013	4,229	0	4,229	*198.24*	472	210	*838*	3,703	0	27	10	80					
24/06/2013	4,121	0	4,121	*246.12*	586	297	*1,014*	3,989	0	26	6	142					
25/06/2013	3,922	0	3,922	*248.64*	592	320	*975*	3,605	0	34	8	101	2,762	2,708			
26/06/2013	3,993	0	3,993	*222.18*	529	259	*887*	3,645	0	16	2	41					
27/06/2013	4,110	0	4,110	**292.40**	567	0.52 259	***1,202***	3,941	0	9.74 39	13	78					
28/06/2013	3,879	0	3,879	*270.48*	644	293	*1,049*	3,386	0	36	2	1,800					
29/06/2013	3,828	0	3,828	*304.08*	724	393	*1,164*	3,672	0	45	13	15					
30/06/2013	3,961	0	3,961	*271.74*	647	311	*1,076*	3,764	0	55	11	13					
Totals	**134,814**	**474**	**135,288**					**126,284**	**0**								
Averages	**4,494**	**16**	**4,510**	**254**	**613**	**0** **326**	**1,130**	**4,209**	**0**	**5**	**30**	**8**	**269**	**3,422**	**3,589**	**#DIV/0!**	**#DIV/0!**	

Average Influent BOD:COD Ratio 0.48

Average PE Loading (based on sampled BOD) 18840.70

Average PE Loading (based on estimated BOD from COD) 22,196

Average Daily Flow to Treatment (m^3) 4509.60

Average Daily Solids (kg) 1469.38

AECOM DESIGN BUILD IRELAND LTD.

DESIGN REPORT No. DR2259/3 Rev A

DATE: 30/03/10 SUBJECT: Portrane, Donbate, Rush & Lusk WWTS SHEET NO: 1 of 19

BY: MOB CHKD: Portrane WWTW SBR Design JOB NO: J2259

Introduction

This report reviews the design for the secondary treatment system proposed for Portrane WWTW. **This report has been revised as the fill decant cycle will be used for 3 basin maintenance operation (rather than no fill during the decant phase of the cycle).**

Design Standards, Internal/External

Calculations

The treatment process is required to contain sufficient flexibility to allow the maximum treatment capacity to be gradually increased from 50% of the current capacity up to the design capacity over the Contract Period. The current required capacity is estimated as having a PE of 25,000.

The following table gives a summary of Performance Requirements (as per specification clause 9.6.3.7):

Design Parameter		Current	Design
Design Population, PE		25,000	65,000
Loading to WWTP (kg BOD/day)		1,500	3,900
Expected maximum fluctuation in daily BOD load, relative to observed average		250%	200%
Dry weather flow (m^3/day)		5625	14625
Expected Maximum fluctuation in daily flow relative to observed average		200%	150%
Peak Flow to WWTP, l/s		225	770
Final Effluent Standards:	BOD (mg/l)	25	25
	COD (mg/l)	125	125
	SS (mg/l)	35	35

The maximum daily BOD load that the Contractor is required to handle is:

3900 x 200% = 7800 kg/day (this will be catered for in the aeration requirements which will be the subject of a separate report).

The maximum daily flow that the Contractor is required to handle is:

14625 x 150% = 21937.5m^3/day (responses to Tender queries Item 66)

The influent suspended solids, TN and ammonia loadings have not been given in the Employer's Requirements. The suspended solids loading is taken as 300mg/l which is typical for domestic sewage (though slightly higher than the analytical results given in Section 21 of the specification). The Total Nitrogen and Ammonia loads are based on the average TN:BOD and Ammonia:BOD ratios calculated from the analytical results given in Section 21 of the specification. These are 0.375 and 0.251, respectively (which is higher than typical for domestic sewage).

Therefore the design influent parameters used for Portrane WWTW are as follows:

DWF	14625m^3/day
FFT	43875m^3/day (3 DWF)
BOD	3900kg/day
SS	4387.5kg/day
TN	1462.5kg/day
Ammonia	978.9kg/day

It is assumed that the load includes the contribution from any waste liquids received at the site at the tanker reception facilities.

Return Liquors

Allowance has to be made in the design calculations for the additional loads due to return liquors. These are primarily from the thickeners, dewatering unit and preliminary treatment washwater. The maximum hourly supernatant flow is estimated as 142m^3/h (see Appendix 1) and is based on dewatering for 10 hour/day, 5 days/week.

The BOD and SS loading contribution from the return liquors is taken from the tender stage mass balance (to be reviewed). These loadings are 279.8kg/day and 290.7kg/day, respectively. These values are based on BOD and SS concentrations of 500mg/l in the return liquors from the thickeners and dewatering unit. The TN and Ammonia values for the return liquors are taken as 5% of the influent loadings.

Total Loads

Therefore the total flows and loads used for the SBR design are as follows:

DWF	18033m^3/day (includes return liquors – the SBR design uses the maximum hourly flow over 24 hours)
FFT	47283m^3/day (3.23 DWF) – 547.3 l/s
BOD	4179.8kg/day
SS	4678.2kg/day
TN	1535.6kg/day
Ammonia	1027.8kg/day

Basin Sizing

The activated sludge system proposed is based on the use of sequencing batch reactors. 4 No. SBR tanks are proposed. Flow to the SBR tanks is distributed in a flow distribution chamber using weirs with actuated penstocks for isolation purposes.

Influent to each SBR basin is mixed with returned activated sludge (RAS) biomass from Zone 3 of the basin and passes initially through a captive selector reactor (Zone 1). This zone provides the appropriate floc loading rate to optimize sludge settleability and is not aerated during normal operation. Zone 1 is fitted with a series of baffles to prevent short circuiting of the influent and the RAS.

The mixed wastewater and RAS then enters Zone 2 from Zone 1 via a submerged overflow weir and then continues to Zone 3, via an underflow baffle. Zone 2 acts as an area of high loading in case of overloading of Zone 1 in peak conditions and also prevents disturbance of the sludge blanket during settling, while the tanks are filling.

After a period of aeration followed by settling, clear effluent is removed from the surface of the basin by using a decanter and settled sludge is removed from the bottom using the surplus activated sludge (SAS) pump. Surplus sludge is pumped to the SAS Storage Tank.

A decanter length of 14.5m is provided for each basin. The decant period will be on a time basis. There are two decant sequences: 1 hour during the standard 4 hour cycle and 37.5 minutes during the shorter 2.5 hour high flow cycle. At the end of the cycle the decanter is driven to the park position above top water level, where it operates as an emergency overflow.

The size of the SBR tanks for Portrane is based on the sizes of the Phase 2 tanks at Balbriggan (where the 2 No. Phase II tanks were sized for 38182 PE). This uses a fill-settle time of 58 minutes for the 2.5 hour high flow cycle.

The basin dimensions are 42.6m long (allowing for a 300mm wide baffle wall between Zones 2 and 3) × 18m wide, with a TWL of 5.01m (see Appendix 2 for calculation results sheet). The BWL is 3.39m.

The proposed dimensions yield a Sludge Age of 13.7 days and an F/M ratio of 0.1 for four basin operation at design loadings.

The zone dimensions are as for the Phase 2 Balbriggan Skerries tanks, giving the percentage volume in Zones 1, 2 and 3 as 6.3%, 17.3% and 76.4%, respectively.

Specification clause 15.3.3.2 (as per amendment No. 1.3) requires design calculations also to be based on operating scenarios whereby tanks are taken out of service for maintenance purposes.

It is now proposed to use a fill decant cycle for three basin maintenance operation. This will allow the use of the same TWL and BWL as for 4 basin operation, rather than no filling during the decant phase of the cycle which would require an increase in depth between TWL and BWL to accommodate the maximum flow to full treatment. Filling during decant has been carried out on other sites though it is not the preferred treatment option, however taking a basin out for maintenance is expected on rare occasions and would be a planned operation.

The Sludge Age is **10** days and F/M ratio is **0.14** in this case (see Appendix 3 for results sheet).

Therefore the same decanter level settings can be retained for 3 basin operation as for 4 basin operation.

The decanter length will be as required for the 4 basin design, i.e. 14.5m. This was sized based on a removal rate of approximately 38 l/s/m weir length. For 3 basin operation at the maximum flow the removal rate with a 14.5m long decanter will be approximately 50.3 l/s/m weir length which may have the potential to disturb the sludge blanket. However, taking a basin out of service should be for planned maintenance which should be carried out during dry periods and every effort should be made to limit return liquor flows.

The current treatment capacity (CTC) is the capacity of the WWTP as determined by the Liaison Monitoring Committee (LMC). The LMC will review the status of the CTC at various times during the contract period and will vary the CTC as required by the catchment served (specification clause 12.5.3). 2 No. SBR basins will be in operation to provide the current BOD treatment capacity (at the current design flowrates). See Appendix **4** for results sheet.

Levels

At tender stage the following levels were proposed within the tank:

TWL	11.443mOD (corresponding to a TWL of 5.01m)
BWL	9.823mOD (corresponding to a BWL of 3.39m)
Floor level	6.433mOD

Based on the finished ground level of 9.35mOD proposed at tender stage, the floor level is 2.917m below ground.

These levels will be confirmed on completion of the Plant Hydraulics report.

The above levels will also apply for three basin maintenance operation using the fill decant cycle.

Sludge Production Formula

The maximum sludge production formula given in our tender submission was as follows (based on influent loadings):

If SS > BOD then

$0.918 \times BOD + [SS \times 1.066 - BOD \times 1.072] \times 0.625$

If SS $\leq$ BOD then

$0.918 \times BOD$

For the design influent loadings the following maximum sludge production is calculated:

$0.918 \times 3900 + [4387.5 \times 1.066 - 3900 \times 1.072] \times 0.625 = 3890 kg/day$

From the SBR design spreadsheet a value of 3886kg/day is calculated therefore the maximum sludge production formula given is valid.

Ancillary Equipment

The SAS pumps, RAS pumps and air blowers will be the subject of separate reports.

Other issues

The SBR tanks at Portrane WWTW will be covered as odour removal is a specified requirement. GRP housing will be provided at the flow splitter chamber and at each of the decanters for ease of access to equipment. 2 No. further access opes (1200mm ×1200mm) are proposed at each of Zones 2 and 3 for each tank, as was agreed with the operations department at tender stage. Therefore visual inspection of the process will be more difficult than at other sites with open tanks.

Other smaller opes will be required in the roof for pipework, ductwork and instrumentation.

Significant Environmental Impacts/Effects on Environmental Review

The impacts/effects will be reviewed when the Environmental Review has been completed.

Appendices

1. Return Liquor Estimate
2. SBR design results for 4 basin operation
3. SBR design results for 3 basin operation – **fill during decant**
4. SBR design results for 50% of initial loading
5. Hazard Identification/ Risk Assessment

Conclusions

1. The influent suspended solids, TN and ammonia loadings have not been given in the Employer's Requirements. The suspended solids loading is taken as 300mg/l which is typical for domestic sewage. The Total Nitrogen and Ammonia loads are based on the average TN:BOD and Ammonia:BOD ratios calculated from the analytical results given in Section 21 of the specification.
2. The activated sludge system proposed is based on the use of sequencing batch reactors. 4 No. SBR tanks are proposed. Flow to the SBR tanks is distributed in a flow distribution chamber using weirs with actuated penstocks for isolation purposes.
3. The size of the SBR tanks for Portrane is based on the sizes of the Phase 2 tanks at Balbriggan (where the 2 No. Phase II tanks were sized for 38182 PE). This uses a fill-settle time of 58 minutes for the 2.5 hour high flow cycle.
4. The basin dimensions are 42.6m long (allowing for a 300mm wide baffle wall between Zones 2 and 3) × 18m wide, with a TWL of 5.01m. The BWL is 3.39m. The proposed dimensions yield a Sludge Age of 13.7 days and an F/M ratio of 0.1 for four basin operation at design loadings.
5. **It is now proposed to use a fill decant cycle for three basin maintenance operation which will allow the use of the same TWL and BWL as for 4 basin operation.**

6. The Sludge Age is **10** days and F/M ratio is **0.14 for three basin maintenance operation using a fill decant cycle**.
7. Therefore the **same decanter level settings can be retained for 3 basin (maintenance) operation as for 4 basin operation.**
8. The decanter length will be as required for the 4 basin design, i.e. 14.5m. This was sized based on a removal rate of approximately 38 l/s/m weir length. For 3 basin operation at the maximum flow the removal rate with a 14.5m long decanter will be approximately 50.3 l/s/m weir length which may have the potential to disturb the sludge blanket.
9. 2 No. SBR basins will be in operation to provide the current BOD treatment capacity (at the current design flowrates).
10. At tender stage the following levels were proposed within the tank:

TWL	11.443mOD (corresponding to a TWL of 5.01m)
BWL	9.823mOD (corresponding to a BWL of 3.39m)
Floor level	6.433mOD

Based on the finished ground level of 9.35mOD proposed at tender stage, the floor level is 2.917m below ground. These levels will be confirmed on completion of the Plant Hydraulics report.

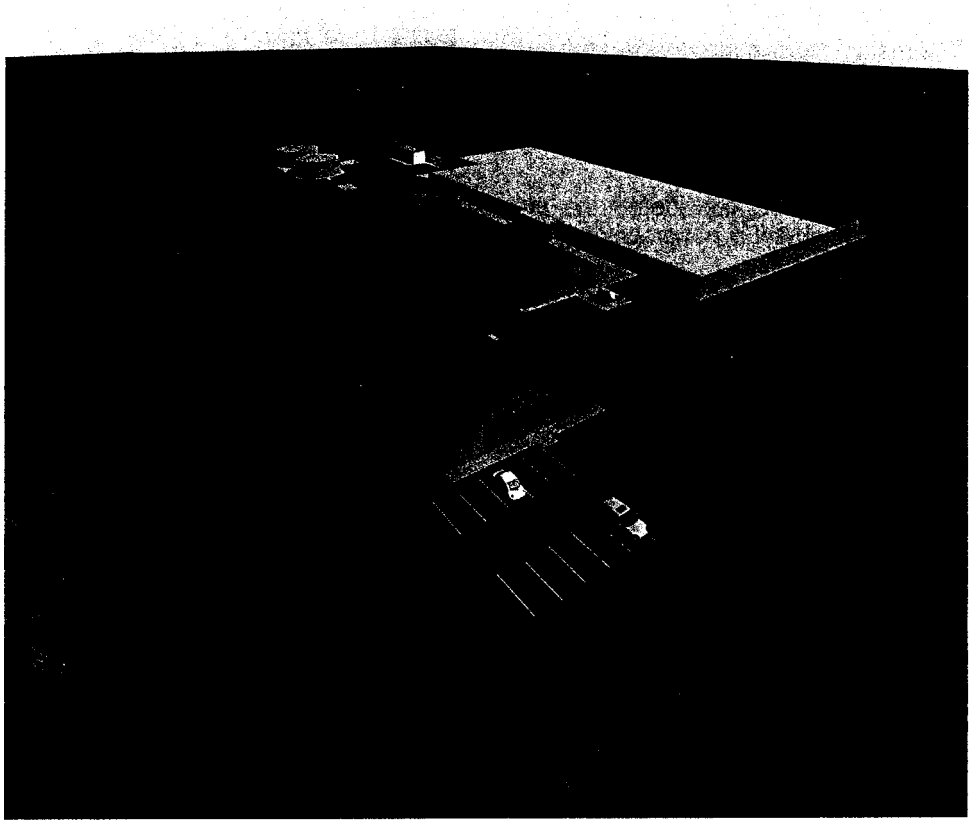
These levels will also apply for the three basin maintenance operation using the fill decant cycle.

Hazard Identification / Risk Assessment

See Appendix **5**.

Volume 3 - Section 1 – Portrane Waste Water Treatment Plant

Item 1 – Design Capacity



JUSTIFICATION OF TENDER DESIGN

Our design not only offers excellent value for money, but also an effective wastewater treatment solution that minimises odour and noise emissions, uses energy efficient processes, has a compact footprint and is visually unobtrusive.

Our selections for processes and equipment were driven by a commitment to provide a good quality operational plant at low cost, taking into consideration the Employers Requirements (ER) and Planning Constraints arising from the EIS.

We have chosen processes that Earth Tech Ireland Ltd. are experienced in operating to ensure the smooth and efficient operation of the plant during the 20 year operations period.

All of our selected processes and equipment have also taken into consideration the Operation and Maintenance Requirements and indeed the Capital Replacement Frequency of the plant to ensure that the whole life cost of the project is optimised for the Client.

The main drivers in our design are:

ODOUR

Process selection considered the impact on odour generation. For this reason primary settlement is not proposed, as primary sludge has significant odour potential.

Our design contains all odours and extracts foul air for subsequent treatment thereby removing the potential for odour nuisance to the area and ensuring the boundary odour limits are adhered to at all times.

More details on our proposed Odour Abatement Measures are included in Item 6.4 of this section of our tender submission.

NOISE

All major plant items are housed in process buildings and further acoustically enclosed where necessary to ensure acceptable noise limits prevail at the boundary as prescribed by the Client.

ENERGY EFFICIENCY

Inherent in our proposals is the selection of drive motors and process plant based on efficiency and reduced kW ratings. Energy efficient processes have been selected to not only offer value to the Employer, but also to reduce the carbon footprint of the proposed WWTP.

JUSTIFICATION OF PROPOSED PROCESSES

INLET WORKS

We propose the Eimco Combined Inlet System (CIS) which combines screening and grit removal in a single tank. This leads to savings in both space requirements and civil costs. Our proposal includes for screening and grit removal of all influent flows as this reduces the potential for solids deposition in the storm tank.

STORMWATER TREATMENT

Flows in excess of FFT are diverted to the storm tank.

Cleaning of the storm tanks is by tipping buckets. This is a reliable and effective method of tank cleaning, especially in tanks of this size. It has the added advantages of low power usage and the minimum of operation and maintenance input.

PRIMARY TREATMENT

It is not proposed to provide primary settlement for the works. Primary sludge is by its nature unstable. The movement and treatment of primary sludge tends to generate odours. On plants of this size, the costs benefits achieved in the secondary treatment are not sufficient to outweigh the increased building costs, operational costs and the odour nuisance potential associated with the handling of primary sludge.

SECONDARY TREATMENT

A number of options were considered for the Biological Treatment Process in order to meet the specified final effluent requirements:

- Membrane Plant
- Standard Activated Sludge Plant
- Sequencing Batch Reactor Plant

A membrane plant has the advantage of producing a very high effluent quality, however, there are significant capital costs. The operating costs are also high due to the high cost of replacement membranes, the large power usage for membrane air scour and the requirement to screen the influent to the membrane plant to 3mm.

Conventional Treatment using aeration and final settlement tanks was also considered. This has high capital costs due to the construction of a larger number of tanks and associated sludge pumping stations.

Sequencing Batch Reactors (SBRs) provide the optimum solution for this application as the requirement for final settlement tanks is eliminated.

The SBR system proposed is our own Earth Tech CASS (Cyclic Activated Sludge System) plant. This system has been used extensively on similar applications and details of reference plants are given below. It also gives us the benefit of substantial in-house expertise and experience on the plant proposed. This will ensure that both the design and operation of the plant proceed smoothly, without depending on third party expertise.

UV TREATMENT

Both in-line and open channel UV treatment units were considered for Portrane WWTW. Although an in-line unit has a lower capital cost, an open channel unit is proposed here as it has a lower pressure drop and provides for easy access to the UV lamps for cleaning and replacement.
Though medium pressure lamps were also considered, low pressure lamps are proposed due to the lower power consumption.
Vertical and horizontal UV treatment modules were examined during the tendering period. Vertical modules are proposed as these allow maintenance without lifting the modules out of the water, thus allowing simpler and safer lamp replacement. The staggered lamp arrays also assure the disinfection path even in the case of lamp failure.

A serpentine weir was selected to maintain the level in the channel due to the low headloss and the absence of moving parts. This type of weir is currently operating successfully at Wexford and Skerries WWTWs.

SLUDGE TREATMENT

A number of options were considered for sludge thickening. A drum thickener or belt thickener has relatively high maintenance and operator input, a high washwater requirement and it does not perform well with variable feed. It also requires a separate poly make up system.

Picket Fence gravity Thickeners are proposed for waste activated sludge thickening. These are a simple, reliable thickening device requiring minimal operator input. The Picket Fence Thickener also has low power consumption, requires no poly or washwater and provide integral sludge storage potential.

For sludge dewatering, both decanter centrifuges and belt presses were considered. A decanter centrifuge was chosen as this has a smaller footprint, provides a more consistent dry solids product in a clean environment, with the minimum of operator input. ETIL have extensive experience of this equipment and general maintenance can be carried out by our own staff.

DESIGN CALCULATIONS

A Mass Balance for the proposed process at design loading is also attached.

MAIN TREATMENT PROCESS

Preliminary Treatment		
Peak Inlet Flowrate	770	l/s
No. of fine screens	2	
No. of duty screens (for max. flow)	2	
Screen capacity/ screen (to allow for washwater)	404	l/s
Grit capacity	808	l/s
Storm flow	262.19	l/s

Storm Tank		
Maximum storm flows	262.19	l/s
No. of storm tanks	1	
Total tank volume	2268	m^3
Total Retention time @ max. flow	2.4	hours

Activated Sludge Plant - Design Basis		
FLOWS		
Total Dry Weather flow	17783	m^3/d
Peak diurnal flow at DWF	22171	m^3/d
Total flow to full treatment	47033	m^3/d
Return Liquors (max. instantaneous over 24 hours)	3158	m^3/d
INFLUENT (at dry weather flow including return liquors)		
BOD concentration	235	mg/l
	4180	kg/day
SS concentration	263	mg/l
	4678	kg/day
TKN concentration	88	mg/l
	1566	kg/day
EFFLUENT (at dry weather flow)		
BOD concentration	25	mg/l
SS concentration	35	mg/l
BASIN DESIGN		
No. of basins	4	
Effective basin length	42.3	m
Basin width	18	m
Basin depth	5.5	m
Normal cycle time	4	hours
High flow cycle time	2.5	hours
High flow cycle decant time	37.5	minutes
TWL	5.01	m
BWL	3.39	m
MLSS at TWL	3493	mg/l
Total Waste Sludge	3891	kg/day
Skimmer weir length	14.5	m
SOR per basin	294	kg O_2/h
SOR per basin - 200% BOD peak	445	kg O_2/h

Activated Sludge Plant - Design Loading		
No. of basins operating	4	
Sludge Age	14	days
F/M	0.1	

Activated Sludge Plant - Current Loading		
No. of basins operating	4	
Sludge Age	35	days
F/M	0.04	

Activated Sludge Plant - Basin out of service for scheduled maintenance		
No. of basins operating	3	
Sludge Age	10	days
F/M	0.143	

UV Treatment		
Maximum flow	2765	m^3/h

SLUDGE TREATMENT PROCESS

Sludge Production		
Waste Activated Sludge Production	3891	kg/day
Average dry solids content	0.80%	
WAS volume	486.4	m^3/day

SAS Storage		
No. of tanks	1	
Liquid volume	364	m^3
Retention	0.75	days

Waste Activated Sludge Thickening		
No. of Thickeners	2	
No. of duty Thickeners	2	
Diameter	10.1	m
Solids loading rate	1.0	kgDS/m^2h
Minimum dry solids content	2.50%	
Side wall liquid depth	4	m
Floor slope	7.5	°
Hopper slope	60	°
Hopper top diameter	1.4	m
Hopper base diameter	0.7	m
Tank volume	677.5	m^3
Sludge thickened to	2.5%	
Sludge volume	155.6	m^3/day
Assumed supernatant depth	1.5	m
Sludge storage volume available	437.1	m^3
Actual sludge retention available in PFT	2.8	days

Waste Activated Sludge Thickening - current loading		
Solids production	1496	kg/day
No. of Thickeners	2	
No. of duty Thickeners	2	
Diameter	10.1	m
Solids loading rate	0.4	kgDS/m^2h

Sludge Dewatering		
Minimum cake solids	22%	
No. of hours dewatering per week	100	
Solids loading required	272.4	kg/h
Diameter	10.1	m
No. of dewatering units	2.0	
No. of standby dewatering units	1	
Maximum dewatering unit capacity	500	kg/h

Polyelectrolyte dosing		
Total solids	272.4	kg/h
Poly dosing rate	8	kg/h
Poly make-up concentration	0.5%	
Poly required	2.2	kg/h
Poly make-up unit flow	435.8	l/h
Poly make-up unit size	1000.0	l/h

Dewatered Sludge Quantities		
% Dry solids	22.0%	
Volume of sludge per week	123.8	m^3/week

REFERENCE SITES

INLET WORKS

The combined inlet works system is designed and supplied by Eimco (Jones and Attwood), with whom Earth Tech Ireland have worked closely for many years. The components of the combined inlet works are standard Eimco (Jones & Attwood) equipment, i.e. screens, grit pumps, grit classifier etc. Earth Tech Ireland have successfully installed combined inlet works systems at Moycullen, Wexford, South Tipperary Grouped Wastewater Schemes and Balbriggan Skerries.

- Moycullen STW: CIS system for 4,000 P.E.
  Commissioned: 2003
  Client: Galway County Council
- Wexford STW: CIS system for 30,000 P.E.
  Commissioned: 2003
  Client: Wexford County Council
- Carrick-on-Suir STW: CIS system for 11,000 P.E.
  Commissioned: 2004
  Client: Tipperary County Council

- Ballbriggan Skerries STW: CIS system for 70,000 P.E.
  Commissioned: 2007
  Client: Fingal County Council

STORM TANKS

Earth Tech have used tipping buckets for storm tank cleaning at:

- Greystones STW: Storm tank 44 m x 25 m x 5.623 m.
- Wexford STW: Storm tank 45 m x 12.3 m x 6.5 m.
- Skerries WWTW: Storm tank 25.325m x 6m x 5.3m.
- Tralee STW: Storm tank 26.7 m x 16.5 m x 6.2 m.
- Moycullen STW: Storm tank 14.5 m x 6.0 m x 5.3 m.
- Navan STW: Storm tank No. 1 21.3 m x 10.5 m x 3.88 m.
  Storm tank No. 2&3 26 m x 10.2 m x 5.313 m.

SBR

The secondary treatment system proposed is the Earth Tech "CASS" system. This system has been developed by our sister company. There are over 150 installations world-wide including Osberstown STW. Earth Tech Ireland have installed CASS systems at Balbriggan Skerries, Headford, Ballymoney and Rosslare. We are also currently constructing the WWTW for New Ross, where a two basin CASS SBR system will be provided.

- Ballbriggan Skerries STW (Phase 1): CASS SBR for 30,000 P.E
  Commissioned: 2007
  Client: Fingal County Council
- Ballbriggan Skerries STW (Phase 2): CASS SBR for 40,000 P.E
  Commissioned: 2008
  Client: Fingal County Council
- Headford STW: CASS SBR for 3,500 P.E
  Commissioned: 2007
  Client: Galway County Council
- Ballymoney WWTW: CASS SBR for 40,650 P.E
  Commissioned: 2008
  Client: Water Services N.I.
- Rosslare STW: CASS SBR for 7,700 P.E
  Commissioned: 2008
  Client: Wexford County Council

UV TREATMENT

The proposed UV Treatment units are manufactured and supplied by LIT. A reference list of previous LIT installations is attached.

SLUDGE DEWATERING

The proposed dewatering units at Portrane are Noxon centrifuges (supplied by Solids Technology). A reference list of previous Noxon installations for the proposed machine is attached. We are currently commissioning Noxon centrifuges at Portlaoise STW.

ADEQUACY OF PROCESSES TO ACHIEVE REQUIRED STANDARDS

We have chosen processes with which we have a wealth of experience from an operational and maintenance perspective.
All processes & equipment proposed by Earth Tech for use in the Portrane WWTW have been used successfully on other plants (reference site information given above and attached).

ABILITY OF PROCESSES TO COPE WITH FLOW AND LOAD FLUCTUATIONS

The Activated Sludge Process selected for the site is a particularly robust and stable process. It is easy to operate and is resilient to shock loads. The plant as designed is sufficiently flexible to cater for under and over-loading. The 4 No. duty blowers are rated to provide sufficient aeration for short term BOD load peaks of up to +200%. Turndown has been provided on critical plant such as pumps and aeration systems. The sludge age in the plant will be in excess of 10 days and this biomass provides excellent resilience to shock loads. The CASS SBR activated sludge process has a long track record and has proved itself as a most reliable method of consistently meeting effluent standards.

ABILITY OF PROCESSES TO COPE WITH GROWTH IN LOAD

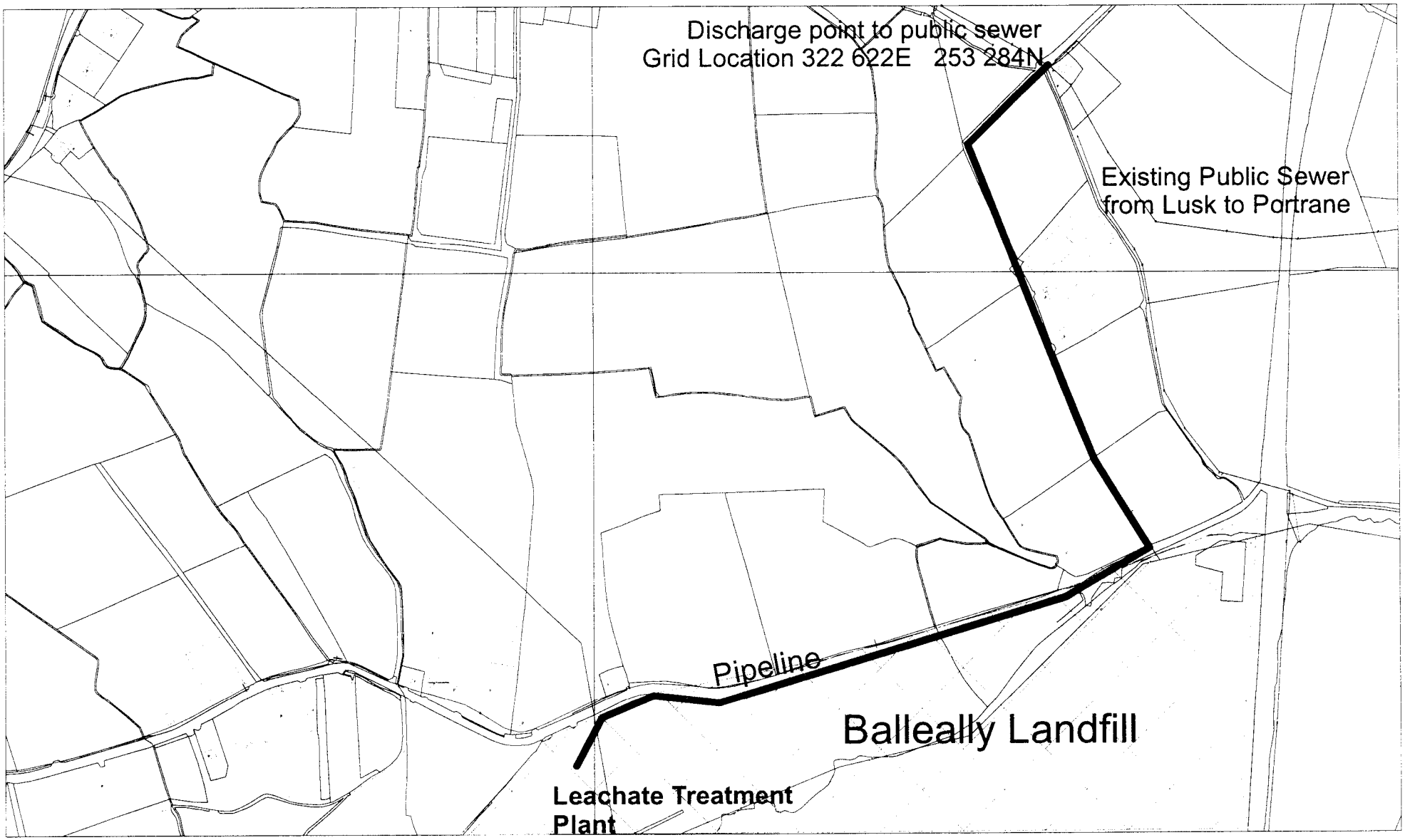
The design calculations (given above) show operating parameters at both current and design flows.

It is proposed to operate the SBR plant in four basin mode for the current capacity. 2 No. duty blowers have been provided for each pair of basins. This will allow additional aeration turndown at low influent loads. For underloading conditions, the

process control systems will react by reducing the blower output. The oxygen uptake rate in the process is measured by means of a dissolved oxygen probe in each basin. If there is a reduction in load to the basin, the oxygen uptake of the mixed liquor organisms will be less, hence for a given air flow rate, the recorded process dissolved oxygen concentration will start to increase. The control system responds to the increase in dissolved oxygen by reducing the output of the blower system until the dissolved oxygen concentration falls to the desired level. In this way energy efficient operation is maintained under varying load conditions.
If long term influent loads are less than the minimum output of the aeration blowers then the control system can be adapted to operate the blowers on a run/dwell basis.

Therefore the plant is adequately configured to treat from 50% of current capacity to design load.

The SBR plant at Skerries is currently operating at loads less than design but consistently achieving the final effluent discharge standards (results attached).



Sept 2013

Scale 1:5,000

Fingal County Council
Balleally Landfill
Licence W009-03
Proposed Leachate Pipeline