

Facility Information Summary

AER Reporting Year	2015
Licence Register Number	WO145-02
Name of site	Enva Ireland Ltd.
Site Location	Raffeen Industrial Estate, Ringaskiddy Road, Monkstown, Co. Cork
NACE Code	3832
Class/Classes of Activity	schedule of the waste management act. Class 13 of fourth schedule
National Grid Reference (6E, 6 N)	

A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year and an overview of compliance with your licence listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.

Site Performance: The company continues to demonstrate its commitment towards HSE management standards - the site maintains ISO14001 and OHSAS 18001. This ensures a standard approach is taking to managing activities from an environmental and safety aspect. There were no issues raised during the reporting period regarding maintenance to the standard.

progress: Transfer of waste oil to our Portlaoise office. Bulk transfer of waste oil has reduced in volume to last year. The battery transfer has ceased.

Infrastructure / EMP

Environmental Performance: There were no incidents or complaints in the reporting period.

Declaration:

All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured to meet licence requirements.

	
Signature Group/Facility manager (or nominated, suitably qualified and experienced deputy)	Date

Answer all questions and complete all tables where relevant

	Additional Information
No	

1 Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If you do not have licensed emissions and do not complete a solvent management plan (table A4 and A5) you do not need to complete the tables

Periodic/Non-Continuous Monitoring

SELECT	
SELECT	

2 Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of Table A1 below

3 Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist? AGN2

Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision thereof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments - reason for change in % mass load from previous year if applicable
	SELECT			SELECT		SELECT	SELECT	SELECT		
	SELECT			SELECT		SELECT	SELECT	SELECT		
	SELECT			SELECT		SELECT	SELECT	SELECT		
	SELECT			SELECT		SELECT	SELECT	SELECT		

Note 1: Volumetric flow shall be included as a reportable parameter

AIR-summary template		Lic No: WO145-02	Year 2015
Solvent use and management on site			
8 Do you have a total Emission Limit Value of direct and fugitive emissions on site? if yes please fill out tables A4 and A5		SELECT	
Please refer to linked solvent regulations to complete table 5 and 6			
Table A4: Solvent Management Plan Summary			
Total VOC Emission limit value			
Reporting year	Total solvent input on site (kg)	Total VOC emissions to Air from entire site (direct and fugitive)	Total VOC emissions as % of solvent input
			Total Emission Limit Value (ELV) in licence or any revision thereof
			Compliance
			SELECT
			SELECT
Table A5: Solvent Mass Balance summary			
(I) Inputs (kg)			
Solvent	(I) Inputs (kg)	Organic solvent emission in waste	(O) Outputs (kg)
		Solvents lost in water (kg)	Fugitive Organic Solvent (kg)
		Collected waste solvent (kg)	Solvent released in other ways e.g.
		Solvents destroyed onsite through	Total emission of Solvent to air (kg)
			Total

Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If you do not have licensed emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections	Yes
Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising only any evidence of contamination noted during visual inspections	Yes

Table W1 Storm water monitoring

Location reference	Location relative to site activities	PRTR Parameter	Licensed Parameter	Monitoring date	ELV or trigger level in licence or any revision thereof*	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Comments
SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT		SELECT	SELECT	
SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT		SELECT	SELECT	

*trigger values may be agreed by the Agency outside of licence conditions

Table W2 Visual Inspections-Please only enter details where contamination was observed.

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comments
			SELECT		
			SELECT		

Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)

3 Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below

No	Additional Information
SELECT	

4 Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring External/Internal Lab Quality Assessment of results checklist

SELECT	
--------	--

Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)

Emission reference no:	Parameter/ Substance/Note 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision thereof ^{Notes 1 & 2}	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)	Comments
SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT		SELECT	SELECT	SELECT	SELECT			
SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT		SELECT	SELECT	SELECT	SELECT			

Note 1: Volumetric flow shall be included as a reportable parameter
 Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

Bund/Pipeline testing template

Bund testing dropdown menu click to see options

Are you required by your licence to undertake integrity testing on bunds and containment structures? If yes please fill out table B1 below listing all new bunds and containment structures on site. In addition to all bunds which failed the integrity test all bunding structures which failed including mobile bunds must be listed in the table below, please include all bunds outside the licensed testing period (mobile bunds and chemstore included)

- 1 Please provide integrity testing frequency period
 - 2 Does the site maintain a register of bunds, underground pipelines (including stormwater and foul), Tanks, sumps and containers? (containers refers to "Chemstore"
 - 3 How many bunds are on site?
 - 4 How many bunds are on site?
 - 5 How many of these bunds have been tested within the required test schedule?
 - 6 How many mobile bunds are on site?
 - 7 Are the mobile bunds included in the bund test schedule?
 - 8 How many of these mobile bunds have been tested within the required test schedule?
 - 9 How many sumps on site are included in the integrity test schedule?
 - 10 How many of these sumps are integrity tested within the test schedule?
- Please list any sump integrity failures in table B1**
- 11 Do all sumps and chambers have high level liquid alarms?
 - 12 If yes to Q11 are these failsafe systems included in a maintenance and testing programme?
 - 13 Is the Fire Water Retention Pond included in your integrity test programme?

Additional Information

Bund testing carried out in January 2014, all passed the bund test. No new bunds added.

Yes	3 years	7	0	0	0	No	No
Yes		0	0	0	0	SELECT	SELECT
No		0	0	0	0	No	No

Table B1: Summary details of bund/containment structure integrity test

Bund/Containment structure ID	Type	Specify Other type	Product containment	Actual capacity	Capacity required*	Type of integrity test	Other test type	Test date	Integrity reports maintained on site?	Results of test	Integrity test failure explanation -<50 words	Corrective action taken	Scheduled date for retest	Results of retest (if in current reporting year)
SELECT	SELECT					SELECT			SELECT	SELECT		SELECT		

* Capacity required should comply with 25% or 110% containment rule as detailed in your licence
 Has integrity testing been carried out in accordance with licence requirements and are all structures tested in line with BS8007/EPA Guidance?
 15 Are channels/transfer systems to remote containment systems tested?
 17 Are channels/transfer systems compliant in both integrity and available volume?

Pipeline/underground structure testing

Are you required by your licence to undertake integrity testing* on underground structures e.g. pipelines or sumps etc? If yes please fill out table 2 below listing all underground structures and pipelines on site which failed the integrity test and all which have not been tested within the integrity test period as specified

Please provide integrity testing frequency period

*Please note integrity testing means water tightness testing for process and foul pipelines (as required under your licence)

Table B2: Summary details of pipeline/underground structures integrity test

Structure ID	Type system	Material of construction:	Does this structure have secondary containment?	Type of secondary containment	Type integrity testing	Integrity reports maintained on site?	Integrity test failure explanation -<50 words	Corrective action taken	Scheduled date for retest	Results of retest (if in current reporting year)
SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT				SELECT

Please use commentary for additional details not answered by tables/ questions above

		Comments
1	Are you required to carry out groundwater monitoring as part of your licence requirements?	yes
2	Are you required to carry out soil monitoring as part of your licence requirements?	no
3	Do you extract groundwater for use on site? if yes please specify use in comment section	no
<p>Do monitoring results show that groundwater generic assessment criteria such as GTVs or IGVs are exceeded or is there an upward trend in results for a substance? If yes, please complete the Groundwater Monitoring Guideline Template Report (link in cell G8) and submit separately through ALDER as a licensee return AND answer questions 5-12 below.</p>		no
5	Is the contamination related to operations at the facility (either current and/or historic)	no
6	Have actions been taken to address contamination issues? If yes please summarise remediation strategies proposed/undertaken for the site	N/A
7	Please specify the proposed time frame for the remediation strategy	N/A
8	Is there a licence condition to carry out/update ELRA for the site?	yes
9	Has any type of risk assessment been carried out for the site?	yes
10	Has a Conceptual Site Model been developed for the site?	no
11	Have potential receptors been identified on and off site?	no
12	Is there evidence that contamination is migrating offsite?	no
		Please enter interpretation of data here

Table 1: Upgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/Substance	Methodology	Monitoring frequency	Maximum Concentration++	Average Concentration+	GTV's*	Upward trend in pollutant concentration over last 5 years of monitoring data
							SELECT**	SELECT
							SELECT	SELECT

.* where average indicates arithmetic mean

++. maximum concentration indicates the maximum measured concentration from all monitoring results produced during the reporting year

Table 2: Downgradient Groundwater monitoring results

Date of sampling	Sample location reference	Parameter/Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	GTV's*	Upward trend in yearly average pollutant concentration over last 5 years of monitoring data
							SELECT**	SELECT
							SELECT	SELECT

Table 3: Soil results

Date of sampling	Sample location reference	Parameter/ Substance	Methodology	Monitoring frequency	Maximum Concentration	Average Concentration	unit
							SELECT
							SELECT

Where additional detail is required please enter it here in 200 words or less

Environmental Liabilities template

Lic No:

WO145-02

Year

2015

[Click here to access EPA guidance on Environmental Liabilities and Financial provision](#)

		Commentary
1	ELRA initial agreement status	Submitted and agreed by EPA
2	ELRA review status	Review required and completed
3	Amount of Financial Provision cover required as determined by the latest ELRA	161,625
4	Financial Provision for ELRA status	Submitted and not agreed by EPA;
5	Financial Provision for ELRA - amount of cover	161,625
6	Financial Provision for ELRA - type	bond
7	Financial provision for ELRA expiry date	Pending approval.
8	Closure plan initial agreement status	Enter expiry date
9	Closure plan review status	Not determined yet
10	Financial Provision for Closure status	sure plan submitted and not agreed by EPA
11	Financial Provision for Closure - amount of cover	Review required and completed
12	Financial Provision for Closure - type	SELECT
13	Financial provision for Closure expiry date	30,500
		bond
		Enter expiry date
		Pending approval.
		Not determined yet

Environmental Management Programme/Continuous Improvement Programme template

Lic No: WO145-02 Year 2015

Highlighted cells contain dropdown menu click to view

		Additional Information	
1	Do you maintain an Environmental Management System (EMS) for the site. If yes, please detail in additional information	Yes	Enva Ireland Ltd are accredited to ISO 14001.
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	Yes	
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	Yes	
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	Yes	

Environmental Management Programme (EMP) report

Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Additional improvements	Review integrity of yard and warehouse flooring, implement any improvements where identified	80%	Diversion chamber lined, chemical resistant seal put on section of the warehouse.	Operations Manager	Increased compliance with licence conditions
SELECT		SELECT		SELECT	SELECT
SELECT		SELECT		SELECT	SELECT

1 Was noise monitoring a licence requirement for the AER period?
If yes please fill in table N1 noise summary below

Yes

2 Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table G?

Yes
No
Enter date
No

3 Does your site have a noise reduction plan

4 When was the noise reduction plan last updated?

5 Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?

Table N1: Noise monitoring summary										
Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA ₉₀	LA ₁₀	LA _{max}	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night)?
03.09.15	10.05 - 10.35	N1		48	44	50	No	SELECT	Road traffic from N28, B	SELECT
03.09.15	12.52 - 13.22	N1		54	43	49	No		Road traffic from N28, Background birdsong	
03.09.15	15.37 - 16.07	N1		58	47	52	No		Road traffic from N28, Background birdsong	
03.09.15	9.33 - 10.03	N2		56	49	59	No		Road traffic from N28, Background birdsong, faint r	
03.09.15	12.20 - 12.50	N2		54	48	57	No		Road traffic from N28, Background birdsong, faint r	
03.09.15	15.05 - 15.35	N2		55	51	58	No		Road traffic from N28, Background birdsong, faint r	
03.09.15	9.00 - 9.30	N3		59	49	62	No		Road traffic from N28, Background birdsong	
03.09.15	11.48 - 12.18	N3		60	46	62	No		Road traffic from N28, Background birdsong	
03.09.15	14.33 - 15.03	N3		59	48	62	No		Road traffic from N28, Background birdsong	
03.09.15	10.40 - 11.10	N4		57	47	60	No		Road traffic from N28, Background birdsong	
03.09.15	12.49 - 13.19	N4		56	47	60	No		Road traffic from N28, Background birdsong	
03.09.15	15.02 - 15.32	N4		59	52	62	No		Road traffic from N28, Background birdsong	
03.09.15	08.15 - 08.45	N5		78	58	83	No		Road traffic from N28, Background birdsong	
03.09.15	11.13 - 11.43	N5		78	57	83	No		Noise location next to road so traffic is the only sou	
03.09.15	13.59 - 14.29	N5		79	56	84	No		Noise location next to road so traffic is the only sou	

*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

SELECT

If noise limits exceeded as a result of noise attributed to site activities, please choose the corrective action from the following options?

<p style="text-align: center;">** please explain the reason for not taking action/resolution of noise issues?</p>	
<p>Any additional comments? (less than 200 words)</p>	

Additional Information

NO

Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below

Table 1 Complaints summary

Date	Category SELECT	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective actions <20 words	Resolution status	Resolution date	Further information
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
	SELECT				SELECT		
Total complaints open at start of reporting year							
Total new complaints received during reporting year							
Total complaints closed during reporting year							
Balance of complaints end of reporting year							

Incidents

Additional Information

NO

Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below

*For information on how to report and what constitutes an incident

What is an incident?

Table 2 Incidents summary

Date of occurrence	Incident nature SELECT	Location of occurrence SELECT	Incident category*please refer to guidance SELECT	Receptor SELECT	Other cause(please specify) Cause of incident SELECT	Activity in progress at time of incident SELECT	Communication SELECT	Occurrence SELECT	Corrective actions<20 words	Preventative action <20 words	Resolution status SELECT	Resolution date	Likelihood of recurrence SELECT
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT			SELECT		SELECT
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT			SELECT		SELECT
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT			SELECT		SELECT
	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT	SELECT			SELECT		SELECT
Total number of incidents current year													
Total number of incidents previous year													
% reduction/increase													



Environmental Protection Agency

| PRTR# : W0145 | Facility Name : Enva Ireland Limited (Cork) | Filename : W0145_2015V2.xls | Return Year : 2015 |

Guidance to completing the PRTR workbook

PRTR Returns Workbook

Version 1.1.19

REFERENCE YEAR	2015
-----------------------	------

1. FACILITY IDENTIFICATION

Parent Company Name	Enva Ireland Limited
Facility Name	Enva Ireland Limited (Cork)
PRTR Identification Number	W0145
Licence Number	W0145-02

Classes of Activity

No.	class_name
-	Refer to PRTR class activities below

Address 1	Unit 9
Address 2	Raffeen Industrial Estate
Address 3	Raffeen
Address 4	Monkstown
	Cork
Country	Ireland
Coordinates of Location	-8.36503 51.8335
River Basin District	IESW
NACE Code	3832
Main Economic Activity	Recovery of sorted materials
AER Returns Contact Name	Jamie Barry
AER Returns Contact Email Address	jbarry@enva.ie
AER Returns Contact Position	Operations Manager
AER Returns Contact Telephone Number	0214387220
AER Returns Contact Mobile Phone Number	0862607472
AER Returns Contact Fax Number	0214387299
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	18
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
5(a)	Installations for the recovery or disposal of hazardous waste
5(c)	Installations for the disposal of non-hazardous waste

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE

Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	
--	--

4.1 RELEASES TO AIR

[Link to previous years emissions data](#)

[PRTR# : W0145 | Facility Name : Enva Ireland Limited (Cork) | Filename : W0145_2015V2.xls | Return Year : 2015]

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

POLLUTANT		METHOD		Please enter all quantities in this section in KGs			
No. Annex II	Name	M/C/E	Method Used Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

POLLUTANT		METHOD		Please enter all quantities in this section in KGs			
No. Annex II	Name	M/C/E	Method Used Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

POLLUTANT		METHOD		Please enter all quantities in this section in KGs			
Pollutant No.	Name	M/C/E	Method Used Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T (total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Please enter summary data on the quantities of methane flared and / or utilised	T (Total) kg/Year	Method Used		Facility Total Capacity m3 per hour
		M/C/E	Description or Description	
Total estimated methane generation (as per site model)	0.0			N/A
Methane flared	0.0			0.0 (Total Flaring Capacity)
Methane utilised in engine/s	0.0			0.0 (Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0			N/A

Enva Ireland Limited (Cork)

4.2 RELEASES TO WATERS

[Link to previous years emissions data](#)

[PRTR# : W0145 | Facility Name : Enva Ireland Limited (Cork) | Filename : W0145_2015V2.xls | Return Year : 2015]

31/03/2016 16:05

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this on!											
Please enter all quantities in this section in KGs											
POLLUTANT	No. Annex II	Name	M/C/E	Method Code	Method Used Designation or Description	Emission Point 1	T (Total) KG/Year			QUANTITY	
							A (Accidental) KG/Year	F (Fugitive) KG/Year	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
							0.0	0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

Please enter all quantities in this section in KGs											
POLLUTANT	No. Annex II	Name	M/C/E	Method Code	Method Used Designation or Description	Emission Point 1	T (Total) KG/Year			QUANTITY	
							A (Accidental) KG/Year	F (Fugitive) KG/Year	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
							0.0	0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

Please enter all quantities in this section in KGs											
POLLUTANT	Pollutant No.	Name	M/C/E	Method Code	Method Used Designation or Description	Emission Point 1	T (Total) KG/Year			QUANTITY	
							A (Accidental) KG/Year	F (Fugitive) KG/Year	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
							0.0	0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.3 RELEASES TO WASTEWATER OR SEWER

[Link to previous years emissions data](#)

| PRTR# : W0145 | Facility Name : Envia Ireland Limited (Co/Re) | Filename : W0145_2015V2.xls | Re

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER							
No. Annex II	Name	M/C/E	METHOD		Emission Point 1	QUANTITY	
			Method Code	Method Used / Designation or Description		T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER							
Pollutant No.	Name	M/C/E	METHOD		Emission Point 1	QUANTITY	
			Method Code	Method Used / Designation or Description		T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

[Link to previous years emissions data](#)

4.4 RELEASES TO LAND

[Link to previous years emissions data](#)

| PRTR# : W0145 | Facility Name : Envva Ireland Limited (Cork) | Filename : W0145_2015V2.xls | Return Year : 2015 |

31/03/2016 16:07

SECTION A : PRTR POLLUTANTS

POLLUTANT		METHOD		Please enter all quantities in this section in KGs			
No. Annex II	Name	M/C/E	Method Code	Method Used Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
						0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

POLLUTANT		METHOD		Please enter all quantities in this section in KGs			
Pollutant No.	Name	M/C/E	Method Code	Method Used Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
						0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE [PRTR#: W0145] Facility Name: Enva Ireland Limited (Cork) | Filename: W0145_2015V2.xls | Return Year: 2015 |
 Please enter all quantities on this sheet in Tonnes 31/03/2016 16:07

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste: Name and Licence/Permit No of Next Destination Facility Haz Waste: Name and Licence/Permit No of Recoverer/Disposer	Haz Waste: Address of Next Destination Facility Non Haz Waste: Address of Recoverer/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery/Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	13 02 08	Yes	786.24	other engine, gear and lubricating oils	R13	M	Weighted	Offsite in Ireland	Enva Ireland Ltd., W0184-01	Clonminam Industrial Estate, Portlaoise, Portlaoise, Laois, Ireland	Enva Ireland Ltd., W0184-01, Clonminam Industrial Estate, Portlaoise, Laois, Ireland and	Clonminam Industrial Estate, Portlaoise, Laois, Ireland and
Within the Country	13 04 03	Yes	183.02	bilge oils from other navigation	R13	M	Weighted	Offsite in Ireland	Enva Ireland Ltd., W0184-01	Clonminam Industrial Estate, Portlaoise, Portlaoise, Laois, Ireland	Enva Ireland Ltd., W0184-01, Clonminam Industrial Estate, Portlaoise, Laois, Ireland and	Clonminam Industrial Estate, Portlaoise, Laois, Ireland and

* Select a row by double-clicking the Description of Waste then click the delete button

ENVA CORK

Annual Groundwater Monitoring 2015

29 July 2015

47092963/CKRP0003

Issue No. 1 Draft

Prepared for: Enva Ireland Limited

Prepared by: AECOM

DOCUMENT PRODUCTION / APPROVAL RECORD				
Issue No. 1	Name	Signature	Date	Position
Prepared by	Fergus O'Regan		29/07/2015	Project Environmental Scientist
Checked and Approved by	Kevin Forde		29/07/2015	Principal Hydrogeologist

Project Name:
Enva Ireland Limited

Sub Title:
Enva Cork - Annual
Groundwater Monitoring 2015

Project No.
47092963

Status:
Draft

Client Contact Name:
Jamie Barry

Client Company Name:
Enva Ireland Limited

Issued by:
AECOM Infrastructure &
Environment Ireland Limited
Douglas Business Centre
Carrigaline Road
Douglas
Cork
www.aecom.com

DOCUMENT ISSUE RECORD		
Issue No.	Date	Details
1	29/07/15	Draft Issue for Client Review

Limitations

AECOM Infrastructure & Environment Ireland Limited¹ (hereafter referred to as "AECOM") has prepared this Report for the sole use of **Enva Ireland Limited** in accordance with the Agreement under which our services were performed (**Proposal 3153102.1, dated 08 June 2015**). No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by AECOM. This Report is confidential and may not be disclosed by the Client or relied upon by any other party without the prior and express written agreement of AECOM.

The information contained in this Report is based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by AECOM has not been independently verified by AECOM, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by AECOM in providing its services are outlined in this Report. The work described in this Report is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

AECOM disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to AECOM's attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. AECOM specifically does not guarantee or warrant any estimate or projections contained in this Report.

Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Copyright

© This Report is the copyright of AECOM Infrastructure & Environment Ireland Limited a wholly owned subsidiary of AECOM. Any unauthorised reproduction or usage by any person other than the addressee is strictly prohibited.

¹On 16 March 2015 the name of URS Ireland Limited changed to AECOM Infrastructure & Environment Ireland Limited to reflect the company's status as a wholly owned subsidiary through which AECOM operates in Ireland.

TABLE OF CONTENTS

1.	INTRODUCTION.....	1
1.1	Introduction	1
2.	SCOPE OF WORKS.....	2
2.1	Water Level Measurement.....	2
2.2	Well Purging and Water Quality Measurements	2
2.3	Groundwater Sampling.....	2
3.	RESULTS.....	3
3.1	Field Observations	3
3.2	Groundwater Flow Direction	3
3.3	Data Assessment	3
3.3.1	<i>Analytical Results</i>	4
3.4	Trends in Analytical Results	4
4.	CONCLUSIONS.....	5
5.	RECOMMENDATIONS.....	6

FIGURES

TABLES

APPENDIX A – SCHEDULE OF ANALYSIS

APPENDIX B – VALIDATED LABORATORY RESULTS

1. INTRODUCTION

1.1 Introduction

AECOM Infrastructure & Environment Ireland Limited (AECOM) is pleased to present this report to Enva Ireland Limited (Enva) summarising the 2015 groundwater monitoring round conducted at the Enva Facility, Unit 9, Raffeen Industrial Estate, Ringaskiddy, Co.Cork (the site).

The groundwater monitoring round was conducted by AECOM on 14 July 2015.

A site location plan is presented in Figure 1 and the site layout map showing the borehole locations is presented as Figure 2.

Works were completed in accordance with AECOM Proposal Number 3153102.1 entitled '2015 Annual Groundwater Monitoring Proposal – Enva Cork', dated 08 June 2015.

It is understood that under the terms of the site's Waste Licence (W0145-02), Enva is required to undertake annual groundwater monitoring of four groundwater wells (BH1, BH2, BH3 and BH4) for a range of organic and inorganic parameters.

The objective of the works presented herein was to fulfil the requirements of Waste Licence W0145-02 and to assess groundwater quality by comparison to published guidelines and previous groundwater monitoring data.

2. SCOPE OF WORKS

The following scope of work was completed by an experienced AECOM field scientist on 14 July 2015:

- Water level measurement at all four on-site groundwater monitoring wells
- Well purging and measurement of water quality parameters at monitoring wells BH1, BH2, BH3 and BH4
- Groundwater sampling and analysis from monitoring wells BH1, BH2, BH3 and BH4 in accordance with Waste Licence monitoring requirements

2.1 Water Level Measurement

Measurement of water levels was completed in all four accessible on site monitoring wells.

At each well, an interface probe was used to monitor depth to groundwater and total depth of the well, to assess the presence of free phase product (either floating or sinking).

2.2 Well Purging and Water Quality Measurements

The volume of standing water in each of the four groundwater monitoring wells to be sampled was calculated based on measured water levels. A minimum of three times this volume was then purged from the wells.

Water quality measurements were taken toward the end of purging using a calibrated water quality field meter in a flow-through cell fitted to the sampling tubing. Pumping continued until stable field measurements were recorded. Field measurements included pH, temperature, electrical conductivity (EC), dissolved oxygen (DO) and oxidation-reduction potential (ORP) were recorded.

Monitoring wells BH1, BH2, BH3 and BH4 were purged and sampled using dedicated, in-situ, inertial lift pumping equipment to minimise volatilisation and loss of volatile organic compounds (VOCs).

2.3 Groundwater Sampling

Groundwater samples were analysed for the Waste Licence monitoring parameters, as detailed in Appendix A and Table 1.

Groundwater samples were collected into clean, laboratory-supplied sample containers. Samples were handled by field staff wearing single use, disposable nitrile gloves, which were changed between sampling locations to minimise cross-contamination.

Samples were labelled in the field and sample details were entered onto a chain of custody form. Whilst on-site and during transit, the groundwater samples were stored in a chilled cool box.

The samples were sent by overnight courier to Jones Environmental Laboratories U.K., an AECOM - approved laboratory with UKAS accreditation.

3. RESULTS

3.1 Field Observations

During groundwater sampling on 09 July 2015, the following was noted:

- No separate floating/light or sinking/dense non-aqueous phase liquids (NAPLs) were detected in any of the four on site monitoring wells
- No evidence of contamination (such as sheens or odours) was noted during purging or sampling
- Groundwater was generally observed to be silty and cloudy brown in colour

Field measurements of water quality parameters are tabulated in Table 2 and summarised below:

- pH readings were close to neutral (pH 7) ranging between 6.78 (BH3) and 7.31 (BH2) and were within the normal range for groundwater at the site
- Groundwater temperatures ranged from 11.7 °C (BH1 and BH2) to 12.4 °C (BH3). Temperature readings were generally within the typical range for groundwater in Ireland (10.0 °C to 12.0 °C)
- EC values were low in all four monitoring wells and were within the normal range for groundwater in Ireland (EPA Draft Interim Guideline Value (IGV) = 1,000 µS/cm and Groundwater Threshold Value (GTV) = 1,875 µS/cm). EC values ranged between 110 µS/cm at BH4 and 525 µS/cm at BH1.
- Field ORP readings were compensated as recommended by the instrument manufacturer. The adjusted redox (Eh) readings ranged between 207 mV (BH2) and 293 mV (BH1) and indicate borderline reducing (slightly aerobic) groundwater conditions (<300 mV)
- Dissolved oxygen concentrations in groundwater ranged between 4.70 mg/L (BH3) and 8.75 mg/L (BH1 and BH4). Groundwater conditions beneath the site can therefore be described as slightly anaerobic and are consistent with the redox potential readings noted above. For comparison, fully aerated groundwater at the observed temperatures would be expected to have dissolved oxygen concentrations in the region of 10 mg/L

3.2 Groundwater Flow Direction

The direction of groundwater flow under natural gradient conditions is expected to follow the local topographic gradient towards the north-east, eventually discharging to Cork Harbour.

Water levels were gauged on 14 July 2015. Well head elevations and standing water level measurements were used to calculate water table elevations and infer groundwater flow pattern which is presented in Figure 3.

The inferred groundwater gradient is relatively flat with a gradient to the north and east.

3.3 Data Assessment

The required groundwater analysis is listed in Schedule C.7 of the Waste Licence and is presented in Appendix C. No Emission Limit Values are specified in the licence for groundwater; therefore, assessment criteria were sourced from published guidance selected based on the site setting as follows:

- The nearest surface water feature is the Glounatouig Stream located approximately 500 m north of the site. This stream eventually flows into Cork Harbour at Monkstown Creek, which is located approximately 750 m northwest of the site
- The bedrock aquifer is classified by the Geological Survey of Ireland (GSI) as a 'locally important aquifer – bedrock which is generally moderately productive except for local zones - Karstified'
- GSI records show that there are nine groundwater monitoring wells located in a 1 km radius of the site. Three of the wells are used for industrial purposes, while four are associated with the Raffeen landfill site. The use of the remaining two wells listed is unknown. Records indicate that there are no drinking water abstraction wells located in the vicinity of the site

As such, given the above site setting, general groundwater quality was assessed by comparing analytical results to the following guidelines:

- European Communities Environmental Objectives (Groundwater) Regulations, 2010. Statutory Instrument No. 9 of 2010
- Environmental Protection Agency's Draft Interim Guidelines Values (IGVs) for the Protection of Groundwater, 2003

3.3.1 Analytical Results

The validated laboratory report is presented in Appendix B. Groundwater analytical results are presented in Tables 3, 4, 5 and 6.

A summary of the analytical results for July 2015 is presented below:

VOCs

VOC were not detected above the laboratory method detection limits (MDLs) in any the four groundwater samples analysed.

Semi-volatile organic compounds (SVOCs)

SVOCs were not detected above the laboratory MDLs in any of the four samples analysed.

Diesel range organics (DRO) and Mineral Oil

DRO and mineral oil were not detected above the laboratory MDL in the four samples analysed.

Dissolved Heavy Metals

The majority of dissolved heavy metals results were below the laboratory MDLs. The reported concentrations of all dissolved heavy metals analysed were below the adopted assessment criteria.

Major Ions

Reported concentrations of nitrate (NO₃) were slightly above the draft IGV of 25 mg/L in groundwater samples BH1 (30 mg/L) and BH2 (38 mg/L).

Orthophosphate (PO₄) was detected at concentrations marginally above the draft IGV of 0.03 mg/L at wells BH1 (0.06 mg/L), BH3 (0.08 mg/L) and BH4 (0.10 mg/L).

The reported concentrations of all other major ions in each of the samples analysed were below the adopted assessment criteria.

3.4 Trends in Analytical Results

Analytical results for July 2015 were comparable to the previous monitoring round completed in May 2014.

All VOCs and SVOCs were reported below the laboratory MDL in both May 2014 and July 2015.

DRO and mineral oil were also below laboratory MDLs in both monitoring rounds.

Nitrate had been reported above the IGV in samples BH1 (35 mg/L) and BH2 (37 mg/L) in 2014 and was reported at similar concentrations in 2015 (30 mg/L and 38 mg/L, respectively).

In July 2015, orthophosphate was detected in groundwater from wells BH1 (0.06 mg/L), BH3 (0.08 mg/L) and BH4 (0.10 mg/L). Orthophosphate had not been reported above the laboratory MDL in any of the wells sampled in May 2014. Higher concentrations for orthophosphate of 0.09 mg/L (BH3) and 0.35 mg/L (BH4) had been reported in August 2013. Trend results for orthophosphate are presented in Table 7 and Figure 4, showing historically fluctuating orthophosphate concentrations in groundwater since 2007.

4. CONCLUSIONS

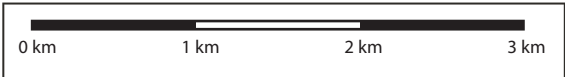
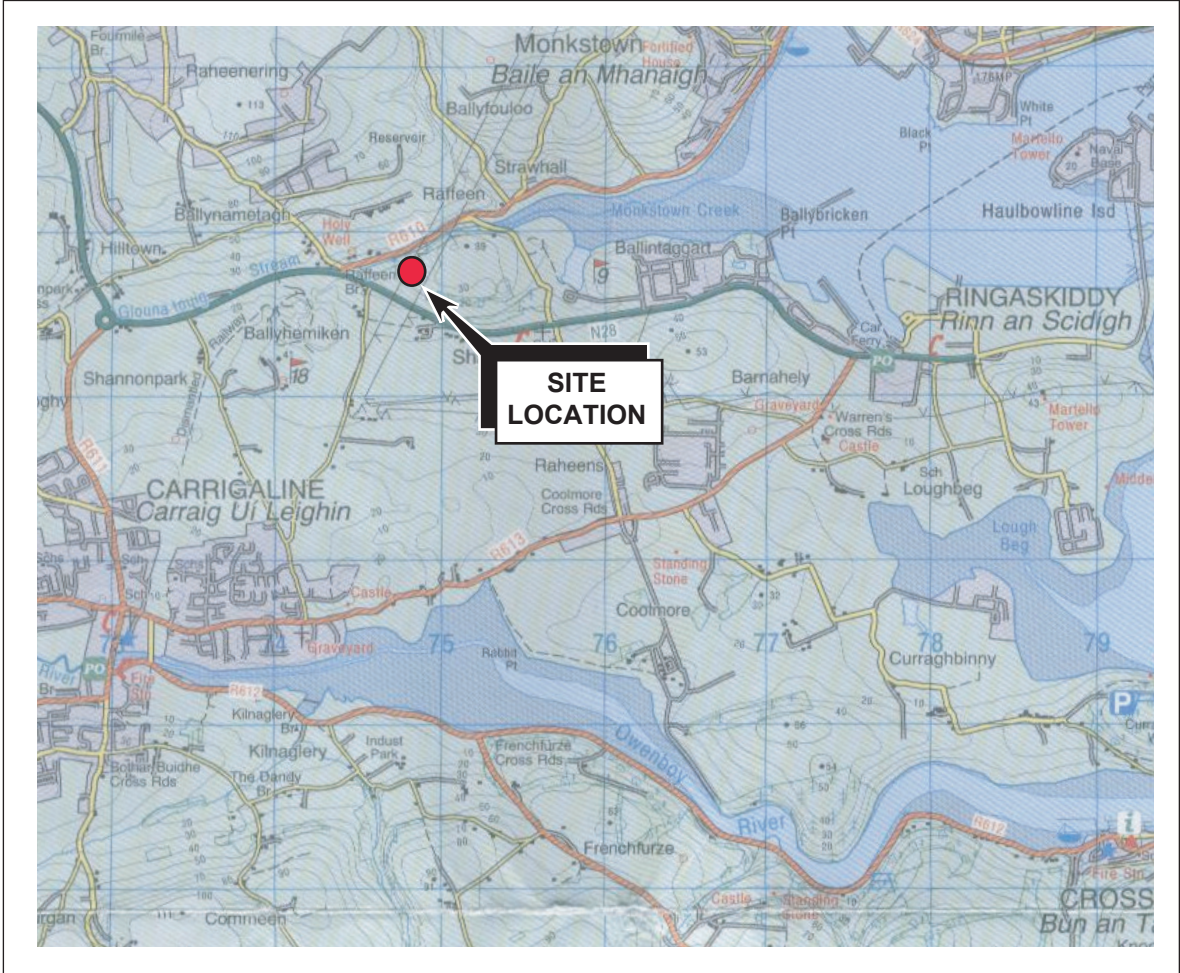
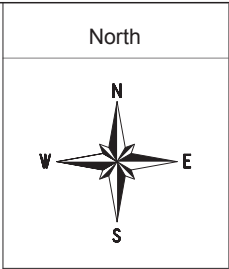
The findings of the July 2015 groundwater monitoring event are as follows:

- Groundwater contours indicate that groundwater flow is to the north and east
- Nitrate was reported above the adopted assessment criteria at wells BH1 and BH2
- Orthophosphate was reported above the adopted assessment criteria in groundwater from wells BH1, BH3 and BH4, though at concentrations lower than historical maxima.
- The reported concentrations of all other parameters analysed in each of the four wells (BH1 to BH4) in July 2015 were below the adopted assessment criteria

5. **RECOMMENDATIONS**

Based on the results of annual groundwater monitoring conducted in July 2015, AECOM recommend that groundwater monitoring continues in 2016 in line with EPA monitoring requirements.

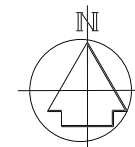
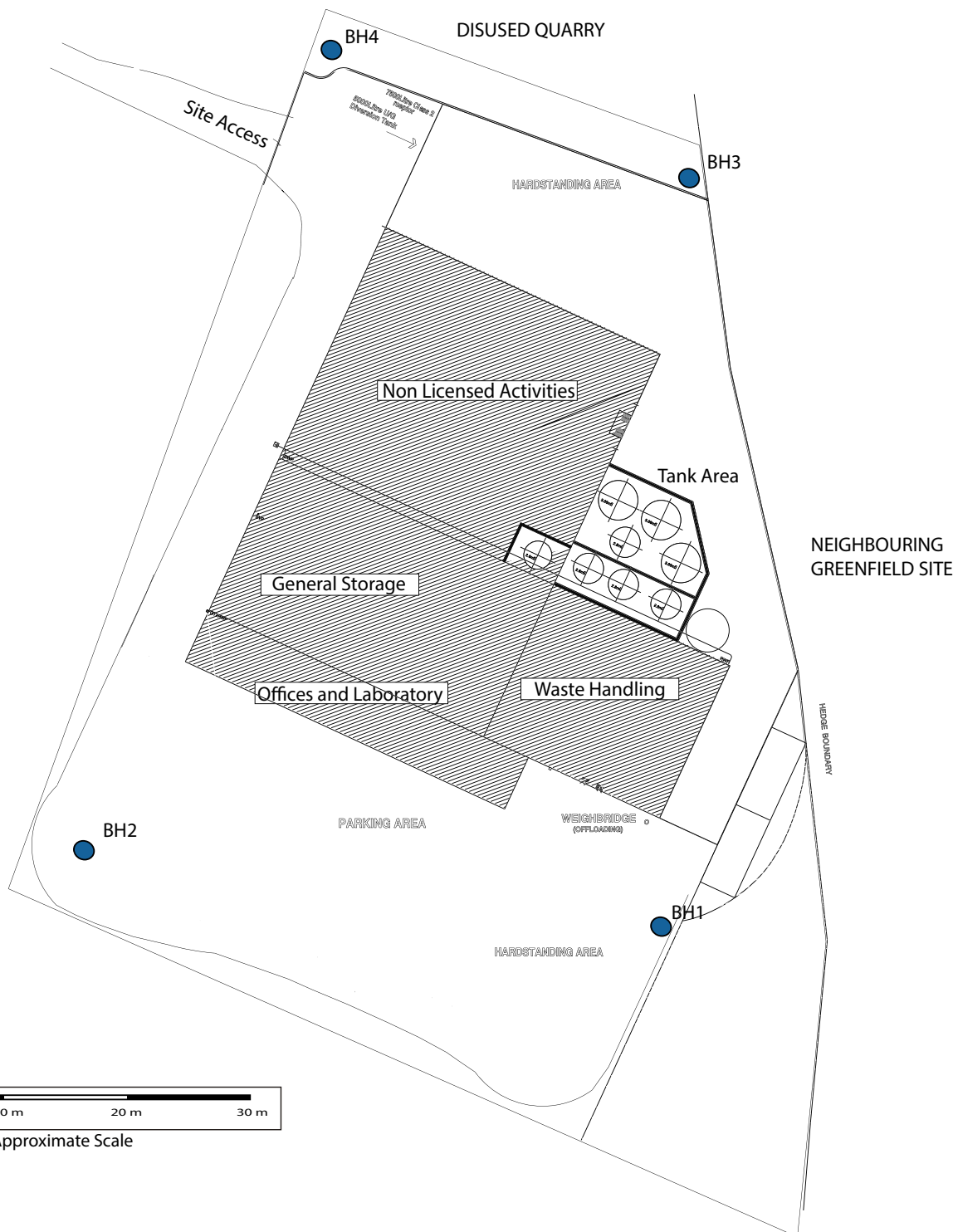
Figures



Ordnance Survey Ireland Licence No. EN 0001915
 ©Ordnance Survey Ireland/Government of Ireland

CLIENT	Enva Ireland Limited
PROJECT LOCATION	Enva Raffeen, Ringaskiddy, Co. Cork
DRAWING TITLE	Figure 1 _ Site Location Map

ENVIRONMENTAL CONSULTANTS			
AECOM			
Douglas Business Centre Carrigaline Road, Douglas Cork. Tel 021 4365 006			
DRAWN FO'R	CHECKED FO'R	APPROVED KF	DATE July 2015
SCALE 1 : 50,000	JOB No. 47092903	REV. A	



NOTES

Key
 ● BH1 Monitoring Well Location and ID

STATUS **Final**

ENVIRONMENTAL CONSULTANTS



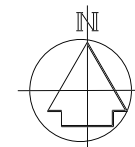
Douglas Business Centre
 Carrigaline Road, Douglas Cork.
 Tel 021 4365 006

CLIENT
Enva Ireland Limited

PROJECT
Enva Rafeen, Ringaskiddy, Co. Cork

DRAWING TITLE
Figure 2 _ Site Layout Plan Showing Monitoring Well Locations

DRAWN FO'R	CHECKED FO'R	APPROVED KF	DATE July 2015
SCALE AS SHOWN	JOB No. 47092903	REV. A	



NOTES

- Key**
- BH1 Monitoring Well Location and ID
 - 11.20m Groundwater Elevation Relative to Ordnance Datum
 - 12.3m Groundwater Contour
 - ➔ Groundwater Flow Direction

STATUS **Final**

ENVIRONMENTAL CONSULTANTS

AECOM

Douglas Business Centre
Carrigaline Road, Douglas Cork.
Tel 021 4365 006

CLIENT

Enva Ireland Limited

PROJECT

Enva Rafeen, Ringaskiddy, Co. Cork

DRAWING TITLE

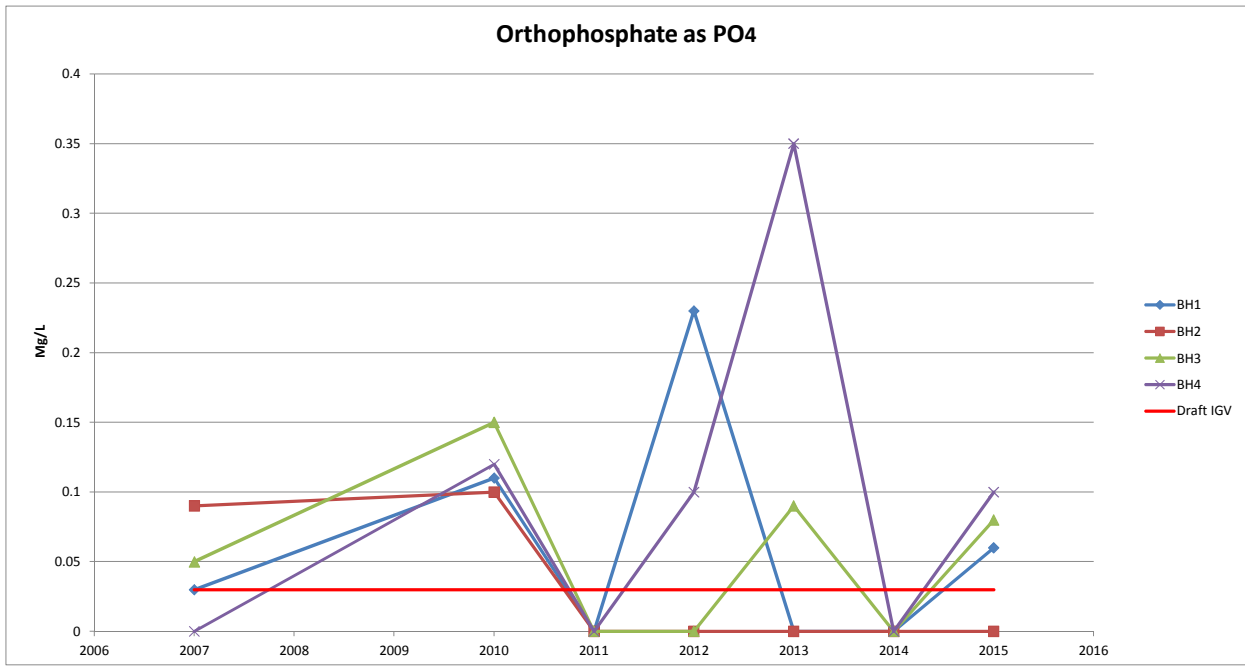
**Figure 3 _ Groundwater Contour Plan
14 July 2015**

DRAWN FO'R	CHECKED FO'R	APPROVED KF	DATE July 2015
SCALE AS SHOWN	JOB No. 47092903	REV. A	

0 m 10 m 20 m 30 m

Approximate Scale

Figure 4 - Orthophosphate Trends (mg/L) to 2015



Tables

Table 1: Sample Inventory - Enva Rafeen, July 2015

Compiled by: FO'R
Checked by: KF

Sampling Location	Field Parameters					Laboratory Parameters						
	pH	EC	Eh	T	DO	VOCs	SVOCs	COD	DRO & Mineral Oil	Total Ammonia	Major Ions	Heavy Metals
BH1	x	x	x	x	x	x	x	x	x	x	x	x
BH2	x	x	x	x	x	x	x	x	x	x	x	x
BH3	x	x	x	x	x	x	x	x	x	x	x	x
BH4	x	x	x	x	x	x	x	x	x	x	x	x

Notes:

EC - Electrical Conductivity
Eh - Redox Potential
T - Temperature
DO - Dissolved Oxygen

VOC - Volatile Organic Compounds
SVOC - Semi-Volatile Organic Compounds
COD - Chemical Oxygen Demand
DRO - Diesel Range Organics
Major Ions - Calcium, Chloride, Sulphate, Potassium, Sodium, Magnesium, Bicarbonate Alkalinity, Nitrate, Nitrite, Phosphate and Fluoride
Metals - Arsenic, Boron, Cadmium, Chromium, Copper, Mercury, Nickel, Lead, Selenium, Zinc, Iron and Manganese

Table 2: Water Level and Field Measurements - Enva Rafeen, 14 July 2015

Compiled by: FO'R
Checked by: KF

Sample Location	Sampling Date	SWL (m btoc)	Well Elevation (mAOD)	SWL (m AOD)	Total Depth (m)	Well Volume (L)	Minimum Purge Volume (L)	Actual Purge Volume (L)	pH	EC (μ S/cm)	Eh (mV)	T ($^{\circ}$ C)	DO (mg/L)	Observations
BH1	14-Jul-15	6.695	18.85	12.16	9.31	5	15	16	6.91	525	293	11.7	8.75	Very silty cloudy, brown, NEC.
BH2	14-Jul-15	6.375	18.62	12.24	8.59	4	13	14	7.31	515	207	11.7	8.54	Cloudy, silty brown, NEC.
20	14-Jul-15	6.745	18.84	12.10	9.81	6	18	18	6.78	354	248	12.4	4.70	Cloudy, silty brown, NEC.
BH4	14-Jul-15	6.240	18.62	12.38	7.95	3	10	11	7.04	110	246	12.1	8.75	Cloudy, silty brown, NEC.

Notes:

SWL - static water level
 m AOD - metres above Ordnance Datum
 m btoc - metres below top of casing
 NEC - No evidence of contamination
 *Redox potential readings compensated by adding 200 mV to field readings as recommended by instrument manufacturer

EC - Electrical Conductivity
 Eh - Redox Potential
 T - Temperature
 DO - Dissolved Oxygen

μ S/cm - micro Siemens per centimetre
 mV - millivolts
 $^{\circ}$ C - degrees centigrade
 mg/L - milligrams per litre

Table 3: Volatile Organic Compound Results (µg/L) - Enva Rafeen, July 2015

Compiled by: FO'R
Checked by: KF

Volatile Organic Compound	MDL	Groundwater Regs 2010	EPA Draft Interim Guideline Value (IGV)	Monitoring Well			
				BH1	BH2	BH3	BH4
Dichlorodifluoromethane	2	nv	nv	-	-	-	-
Methyl Tertiary Butyl Ether	0.1	nv	30	-	-	-	-
Chloromethane	3	nv	nv	-	-	-	-
Vinyl Chloride	0.1	0.375	nv	-	-	-	-
Bromomethane	1	nv	nv	-	-	-	-
Chloroethane	3	nv	nv	-	-	-	-
Trichlorofluoromethane	3	nv	nv	-	-	-	-
1,1-Dichloroethene	3	nv	30*	-	-	-	-
Dichloromethane	3	nv	10	-	-	-	-
trans-1-2-Dichloroethene	3	nv	30*	-	-	-	-
1,1-Dichloroethane	3	nv	nv	-	-	-	-
cis-1-2-Dichloroethene	3	nv	30*	-	-	-	-
2,2-Dichloropropane	1	nv	nv	-	-	-	-
Bromochloromethane	2	nv	nv	-	-	-	-
Chloroform	2	75 ¹	12	-	-	-	-
1,1,1-Trichloroethane	2	nv	500	-	-	-	-
1,1-Dichloropropene	3	nv	nv	-	-	-	-
Carbon tetrachloride	2	nv	2	-	-	-	-
1,2-Dichloroethane	2	2	3	-	-	-	-
Benzene	0.5	0.75	1.0	-	-	-	-
Trichloroethene	3	7.5 ²	70, 10**	-	-	-	-
1,2-Dichloropropane	2	nv	nv	-	-	-	-
Dibromomethane	3	nv	nv	-	-	-	-
Bromodichloromethane	2	75 ¹	nv	-	-	-	-
cis-1-3-Dichloropropene	2	nv	nv	-	-	-	-
Toluene	0.5	nv	10	-	-	-	-
trans-1-3-Dichloropropene	2	nv	nv	-	-	-	-
1,1,2-Trichloroethane	2	nv	nv	-	-	-	-
Tetrachloroethene	3	7.5 ²	10, 40***	-	-	-	-
1,3-Dichloropropane	2	nv	nv	-	-	-	-
Dibromochloromethane	2	75 ¹	nv	-	-	-	-
1,2-Dibromoethane	2	nv	nv	-	-	-	-
Chlorobenzene	2	nv	1	-	-	-	-
1,1,1,2-Tetrachloroethane	2	nv	nv	-	-	-	-
Ethylbenzene	0.5	nv	10	-	-	-	-
p/m-Xylene	1	nv	10****	-	-	-	-
o-Xylene	0.5	nv	10****	-	-	-	-
Styrene	2	nv	nv	-	-	-	-
Bromoform	2	75 ¹	nv	-	-	-	-
Isopropylbenzene	3	nv	nv	-	-	-	-
1,1,2,2-Tetrachloroethane	4	nv	nv	-	-	-	-
Bromobenzene	2	nv	nv	-	-	-	-
1,2,3-Trichloropropane	3	nv	nv	-	-	-	-
Propylbenzene	3	nv	nv	-	-	-	-
2-Chlorotoluene	3	nv	nv	-	-	-	-
1,3,5-Trimethylbenzene	3	nv	nv	-	-	-	-
4-Chlorotoluene	3	nv	nv	-	-	-	-
tert-Butylbenzene	3	nv	nv	-	-	-	-
1,2,4-Trimethylbenzene	3	nv	nv	-	-	-	-
sec-Butylbenzene	3	nv	nv	-	-	-	-
4-Isopropyltoluene	3	nv	nv	-	-	-	-
1,3-Dichlorobenzene	3	nv	nv	-	-	-	-
1,4-Dichlorobenzene	3	nv	nv	-	-	-	-
n-Butylbenzene	3	nv	nv	-	-	-	-
1,2-Dichlorobenzene	3	nv	10	-	-	-	-
1,2-Dibromo-3-chloropropane	2	nv	nv	-	-	-	-
1,2,4-Trichlorobenzene	3	nv	0.4*****	-	-	-	-
Hexachlorobutadiene	3	nv	0.1	-	-	-	-
Naphthalene	2	nv	1	-	-	-	-
1,2,3-Trichlorobenzene	3	nv	0.4*****	-	-	-	-

Notes:

Bold Exceeds Groundwater Regulations 2010
Italics Exceeds IGV (Interim Guideline Value)
 MDL Method Detection Limit
 - Less than the MDL
 nv IGV/GTV not defined

*Draft IGV is for the sum of dichloroethenes
 **Two Draft IGVs are given for trichloroethene
 ***Two Draft IGVs are given for tetrachloroethene
 ****Draft IGV is for the sum of xylenes
 *****Draft IGV is for the sum of trichlorobenzenes

¹GTV is for the sum of trihalomethanes.

²GTV is for the sum of tetrachloroethene and trichloroethene.

Table 4: Semi-volatile Organic Compound Results (µg/L) - Enva Rafeen, July 2015

Compiled by: F0'R
Checked by: KF

Semi-Volatile Organic Compound	MDL	Groundwater Regs 2010	EPA Draft Interim Guideline Value (IGV)	Monitoring Well			
				BH1	BH2	BH3	BH4
Phenols							
2-Chlorophenol	1	nv	200	-	-	-	-
2-Methylphenol	0.5	nv	0.5 ¹	-	-	-	-
2-Nitrophenol	0.5	nv	0.5 ¹	-	-	-	-
2,4-Dichlorophenol	0.5	nv	0.5 ¹	-	-	-	-
2,4-Dimethylphenol	1	nv	0.5 ¹	-	-	-	-
2,4,5-Trichlorophenol	0.5	nv	0.5 ¹	-	-	-	-
2,4,6-Trichlorophenol	1	nv	200	-	-	-	-
4-Chloro-3-methylphenol	0.5	nv	0.5 ¹	-	-	-	-
4-Methylphenol	1	nv	0.5 ¹	-	-	-	-
4-Nitrophenol	10	nv	0.5 ¹	-	-	-	-
Pentachlorophenol	1	nv	2	-	-	-	-
Phenol	1	nv	0.5 ¹	-	-	-	-
PAHs							
2-Chloronaphthalene	1	nv	nv	-	-	-	-
2-Methylnaphthalene	1	nv	nv	-	-	-	-
Naphthalene	1	nv	1	-	-	-	-
Acenaphthylene	0.5	nv	nv	-	-	-	-
Acenaphthene	1	nv	nv	-	-	-	-
Fluorene	0.5	nv	nv	-	-	-	-
Phenanthrene	0.5	nv	nv	-	-	-	-
Anthracene	0.5	nv	10000	-	-	-	-
Fluoranthene	0.5	nv	1	-	-	-	-
Pyrene	0.5	nv	nv	-	-	-	-
Benz(a)anthracene	0.5	nv	nv	-	-	-	-
Chrysene	0.5	nv	nv	-	-	-	-
Benzo(bk)fluoranthene	1	0.075 ^A	0.5, 0.05****	-	-	-	-
Benzo(a)pyrene	1	0.0075	0.01	-	-	-	-
Indeno(123cd)pyrene	1	0.075 ^A	0.05	-	-	-	-
Dibenzo(ah)anthracene	0.5	nv	nv	-	-	-	-
Benzo(ghi)perylene	0.5	0.075 ^A	0.05	-	-	-	-
Phthalates							
Bis(2-ethylhexyl) phthalate	5	nv	8	-	-	-	-
Butylbenzyl phthalate	1	nv	5 ²	-	-	-	-
Di-n-butyl phthalate	1.5	nv	2	-	-	-	-
Di-n-Octyl phthalate	1	nv	5 ²	-	-	-	-
Diethyl phthalate	1	nv	5 ²	-	-	-	-
Dimethyl phthalate	1	nv	5 ²	-	-	-	-
Other SVOCs							
1,2-Dichlorobenzene	1	nv	10	-	-	-	-
1,2,4-Trichlorobenzene	1	nv	0.4	-	-	-	-
1,3-Dichlorobenzene	1	nv	nv	-	-	-	-
1,4-Dichlorobenzene	1	nv	nv	-	-	-	-
2-Nitroaniline	1	nv	nv	-	-	-	-
2,4-Dinitrotoluene	0.5	nv	nv	-	-	-	-
2,6-Dinitrotoluene	1	nv	nv	-	-	-	-
3-Nitroaniline	1	nv	nv	-	-	-	-
4-Bromophenylphenylether	1	nv	nv	-	-	-	-
4-Chloroaniline	1	nv	nv	-	-	-	-
4-Chlorophenylphenylether	1	nv	nv	-	-	-	-
4-Nitroaniline	0.5	nv	nv	-	-	-	-
Azobenzene	0.5	nv	nv	-	-	-	-
Bis(2-chloroethoxy)methane	0.5	nv	nv	-	-	-	-
Bis(2-chloroethyl)ether	1	nv	nv	-	-	-	-
Carbazole	0.5	nv	nv	-	-	-	-
Dibenzofuran	0.5	nv	nv	-	-	-	-
Hexachlorobenzene	1	nv	0.03	-	-	-	-
Hexachlorobutadiene	1	nv	0.1	-	-	-	-
Hexachlorocyclopentadiene	1	nv	nv	-	-	-	-
Hexachloroethane	1	nv	nv	-	-	-	-
Isophorone	0.5	nv	nv	-	-	-	-
N-nitrosodi-n-propylamine	0.5	nv	nv	-	-	-	-
Nitrobenzene	1	nv	10	-	-	-	-

Notes:

Bold	Exceeds Groundwater Regulations 2010	Draft IGV - EPA Draft Interim Guideline Value
<i>Italics</i>	Exceeds IGV (Interim Guideline Value)	Bold Indicates result above IGV
MDL	Method Detection Limit	1 - Draft IGV is for the sum of phenols
-	Less than the MDL	2 - Draft IGV is for the sum of phthalates
nv	IGV/GTV not defined	

GTV: Groundwater threshold value, SI No. 9 of 2010, Schedule 5

Italics indicates result above GTV

A - PAH compounds specified in GTV

Table 5: Hydrocarbon and Metals Results (µg/L) - Enva Rafeen, July 2015

Compiled by:
Checked by:

Compound	MDL	Groundwater Regs 2010	EPA Draft Interim Guideline Value (IGV)	Monitoring Well			
				BH1	BH2	BH3	BH4
DRO/Mineral Oil							
EPH (C ₈ -C ₄₀)	10	nv	nv	-	-	-	-
Mineral Oil	10	nv	nv	-	-	-	-
Metals							
Arsenic	2.5	7.5	10	-	-	-	-
Boron	12	750	1,000	21	17	-	-
Cadmium	0.5	3.75	5	-	-	-	-
Chromium	1.5	37.5	30	-	-	-	-
Copper	7	1,500	30	-	-	-	-
Mercury	1	0.75	1	-	-	-	-
Nickel	2	15	20	-	-	-	-
Lead	5	18.75	10	-	-	-	-
Selenium	3	nv	nv	-	-	-	-
Zinc	3	nv	100	-	-	-	-
Iron	20	nv	200	-	-	-	-
Manganese	2	nv	50	-	-	35	-

Notes:

- Bold** Exceeds Groundwater Regulations 2010
- Italics* Exceeds IGV (Interim Guideline Value)
- MDL Method Detection Limit
- Less than the MDL
- nv IGV/GTV not defined

Table 6: Major Ion and COD Results (mg/L) - Enva Rafeen, July 2015

Compiled by: FOR
Checked by: KF

Compound	MDL	Groundwater Regs 2010	EPA Draft Interim Guideline Value (IGV)	Monitoring Well			
				BH1	BH2	BH3	BH4
Ammonium (Ammoniacal nitrogen as NH ₄)	0.03	0.30	0.15	-	-	0.05	-
COD (Settled)	7	nv	nv	-	-	-	-
Chloride	0.3	187.5	250	29	32	38	12
Sodium	0.1	150	150	14	15	6	8
Sulphate	0.05	187.5	200	10	11	10	4
Potassium	0.1	nv	5	1	1	2	2
Calcium	0.2	nv	200	116	114	34	43
Magnesium	0.1	nv	50	4	4	1	1
Bicarbonate Alkalinity as CaCO ₃	1	nv	No abnormal change	299	252	174	141
Nitrate as NO ₃	0.2	37.5	25	30	38	17	5
Nitrite as NO ₂	0.02	0.375	0.1	-	-	-	-
Ortho phosphate as PO ₄	0.06	nv	0.03	<i>0.06</i>	-	<i>0.08</i>	<i>0.10</i>
Fluoride	0.3	nv	1	-	-	-	-

Notes:

- Bold** Exceeds Groundwater Regulations 2010
- Italics* Exceeds IGV (Interim Guideline Value)
- MDL Method Detection Limit
- Less than the MDL
- nv IGV/GTV not defined

Table 7: Trend Results - Orthophosphate (mg/L) - Enva Rafeen, 2007 to 2015

Compiled by: FOR
Checked by: KF

Date	MDL	Groundwater Regs 2010	EPA Draft Interim Guideline Value (IGV)	2007	2010	2011	2012	2013	2014	2015
BH1	0.06	nv	0.03	0.03	<i>0.11</i>	-	<i>0.23</i>	-	-	<i>0.06</i>
BH2	0.06	nv	0.03	0.09	<i>0.10</i>	-	-	-	-	-
BH3	0.06	nv	0.03	0.05	<i>0.15</i>	-	-	<i>0.09</i>	-	<i>0.08</i>
BH4	0.06	nv	0.03	-	<i>0.12</i>	-	<i>0.10</i>	<i>0.35</i>	-	<i>0.10</i>

Notes:

Bold Exceeds Groundwater Regulations 2010
Italics Exceeds IGV (Interim Guideline Value)
 MDL Method Detection Limit
 - Less than the MDL
 nv IGV/GTV not defined

Appendix A - SCHEDULE OF ANALYSIS

Appendix A – Enva Cork Facility: The following table sets out the monitoring requirements of Waste Licence W0145-02 as detailed in Schedule C.7.

Parameter	Quarterly	Annually
Volatile Organic Compounds (VOCs), including chlorinated solvents		✓
Semi Volatile Organic Compounds (VOCs) (organohalogenes)		✓
Chemical Oxygen demand (COD)		✓
Mineral Oil		✓
Total Ammonia		✓
Heavy Metals (Dutch Target List)		✓
Calcium		✓
Magnesium		✓
Potassium		✓
Sodium		✓
Chloride		✓
Bicarbonate		✓
Sulphate		✓
Nitrate		✓
Nitrite		✓
Phosphate		✓
Fluoride		✓

Appendix B – VALIDATED LABORATORY RESULTS



Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

AECOM
Acorn Business Campus
Mahon Industrial Park
Black Rock
Cork
Ireland

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781



Attention : Fergus O'Regan
Date : 22nd July, 2015
Your reference : 47092963
Our reference : Test Report 15/10156 Batch 1
Location : Rafeen
Date samples received : 16th July, 2015
Status : Final report
Issue : 1

Four samples were received for analysis on 16th July, 2015 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Paul Lee-Boden BSc
Project Manager

Jones Environmental Laboratory

Client Name: AECOM
Reference: 47092963
Location: Rafeen
Contact: Fergus O'Regan
JE Job No.: 15/10156

Report : Misc

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.		1-6												Please see attached notes for all abbreviations and acronyms				
Sample ID		BH1																
Depth																		
COC No / misc																		
Containers		V H H N P G																
Sample Date		14/07/2015																
Sample Type		Ground Water																
Batch Number		1																
Date of Receipt		16/07/2015												LOD/LOR	Units	Method No.		
Sample Temperature		8.8														<0.1	Degrees C	NONE/NONE

Client Name: AECOM
 Reference: 47092963
 Location: Rafeen
 Contact: Fergus O'Regan
 JE Job No.: 15/10156

SVOC Report : Liquid

J E Sample No.	1-6	7-12	13-18	19-24										
Sample ID	BH1	BH2	BH3	BH4										
Depth														
COC No / misc														
Containers	V H H N P G	V H H N P G	V H H N P G	V H H N P G										
Sample Date	14/07/2015	14/07/2015	14/07/2015	14/07/2015										
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water										
Batch Number	1	1	1	1										
Date of Receipt	16/07/2015	16/07/2015	16/07/2015	16/07/2015										
											LOD/LOR	Units	Method No.	
SVOC MS														
Phenols														
2-Chlorophenol #	<1	<1	<1	<1								<1	ug/l	TM16/PM30
2-Methylphenol #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
2-Nitrophenol	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<1	<1	<1	<1								<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1	<1	<1	<1								<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
4-Methylphenol	<1	<1	<1	<1								<1	ug/l	TM16/PM30
4-Nitrophenol	<10	<10	<10	<10								<10	ug/l	TM16/PM30
Pentachlorophenol	<1	<1	<1	<1								<1	ug/l	TM16/PM30
Phenol	<1	<1	<1	<1								<1	ug/l	TM16/PM30
PAHs														
2-Chloronaphthalene #	<1	<1	<1	<1								<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<1	<1	<1	<1								<1	ug/l	TM16/PM30
Naphthalene #	<1	<1	<1	<1								<1	ug/l	TM16/PM30
Acenaphthylene #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Acenaphthene #	<1	<1	<1	<1								<1	ug/l	TM16/PM30
Fluorene #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Phenanthrene #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Anthracene #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Fluoranthene #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Pyrene #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Benzo(a)anthracene #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Chrysene #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Benzo(bk)fluoranthene #	<1	<1	<1	<1								<1	ug/l	TM16/PM30
Benzo(a)pyrene	<1	<1	<1	<1								<1	ug/l	TM16/PM30
Indeno(123cd)pyrene	<1	<1	<1	<1								<1	ug/l	TM16/PM30
Dibenzo(ah)anthracene #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Benzo(ghi)perylene #	<0.5	<0.5	<0.5	<0.5								<0.5	ug/l	TM16/PM30
Phthalates														
Bis(2-ethylhexyl) phthalate	<5	<5	<5	<5								<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1	<1	<1	<1								<1	ug/l	TM16/PM30
Di-n-butyl phthalate #	<1.5	<1.5	<1.5	<1.5								<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1	<1	<1	<1								<1	ug/l	TM16/PM30
Diethyl phthalate #	<1	<1	<1	<1								<1	ug/l	TM16/PM30
Dimethyl phthalate	<1	<1	<1	<1								<1	ug/l	TM16/PM30

Please see attached notes for all abbreviations and acronyms

Client Name: AECOM
Reference: 47092963
Location: Rafeen
Contact: Fergus O'Regan
JE Job No.: 15/10156

SVOC Report : Liquid

Table with columns for Sample ID, Depth, COC No / misc, Containers, Sample Date, Sample Type, Batch Number, Date of Receipt, LOD/LOR, Units, Method No., and SVOC MS. Rows include various SVOCs like 1,2-Dichlorobenzene, 1,2,4-Trichlorobenzene, etc., with values mostly <1 or <0.5.

Please see attached notes for all abbreviations and acronyms

Client Name: AECOM
 Reference: 47092963
 Location: Rafeen
 Contact: Fergus O'Regan
 JE Job No.: 15/10156

VOC Report : Liquid

J E Sample No.	1-6	7-12	13-18	19-24									
Sample ID	BH1	BH2	BH3	BH4									
Depth													
COC No / misc													
Containers	V H H N P G	V H H N P G	V H H N P G	V H H N P G									
Sample Date	14/07/2015	14/07/2015	14/07/2015	14/07/2015									
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water									
Batch Number	1	1	1	1									
Date of Receipt	16/07/2015	16/07/2015	16/07/2015	16/07/2015									
										LOD/LOR	Units	Method No.	
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1						<0.1	ug/l	TM15/PM10	
Chloromethane #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
Vinyl Chloride #	<0.1	<0.1	<0.1	<0.1						<0.1	ug/l	TM15/PM10	
Bromomethane	<1	<1	<1	<1						<1	ug/l	TM15/PM10	
Chloroethane #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
Trichlorofluoromethane #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
Dichloromethane (DCM) #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
trans-1-2-Dichloroethene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
1,1-Dichloroethane #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
cis-1-2-Dichloroethene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
2,2-Dichloropropane	<1	<1	<1	<1						<1	ug/l	TM15/PM10	
Bromochloromethane #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
Chloroform #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
1,1,1-Trichloroethane #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
1,1-Dichloropropene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
Carbon tetrachloride #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
1,2-Dichloroethane #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
Benzene #	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM15/PM10	
Trichloroethene (TCE) #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
1,2-Dichloropropane #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
Dibromomethane #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
Bromodichloromethane #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
cis-1-3-Dichloropropene	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
Toluene #	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM15/PM10	
trans-1-3-Dichloropropene	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
1,1,2-Trichloroethane #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
Tetrachloroethene (PCE) #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
1,3-Dichloropropane #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
Dibromochloromethane #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
1,2-Dibromoethane #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
Chlorobenzene #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
1,1,1,2-Tetrachloroethane #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
Ethylbenzene #	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM15/PM10	
p/m-Xylene #	<1	<1	<1	<1						<1	ug/l	TM15/PM10	
o-Xylene #	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM15/PM10	
Styrene	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
Bromoform #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
Isopropylbenzene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4						<4	ug/l	TM15/PM10	
Bromobenzene #	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
1,2,3-Trichloropropane #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
Propylbenzene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
2-Chlorotoluene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
1,3,5-Trimethylbenzene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
4-Chlorotoluene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
tert-Butylbenzene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
1,2,4-Trimethylbenzene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
sec-Butylbenzene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
4-Isopropyltoluene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
1,3-Dichlorobenzene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
1,4-Dichlorobenzene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
n-Butylbenzene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
1,2-Dichlorobenzene #	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
1,2,4-Trichlorobenzene	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
Hexachlorobutadiene	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
Naphthalene	<2	<2	<2	<2						<2	ug/l	TM15/PM10	
1,2,3-Trichlorobenzene	<3	<3	<3	<3						<3	ug/l	TM15/PM10	
Surrogate Recovery Toluene D8	93	93	93	92						<0	%	TM15/PM10	
Surrogate Recovery 4-Bromofluorobenzene	104	104	103	103						<0	%	TM15/PM10	

Please see attached notes for all abbreviations and acronyms

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/10156

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/10156

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM27	Modified US EPA method 9056.Determination of water soluble anions using Dionex (Ion-Chromatography).	PM0	No preparation is required.				
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.				
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.	Yes			
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes			

JE Job No: 15/10156

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM57	Modified US EPA Method 410.4. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometrically.	PM0	No preparation is required.	Yes			
TM75	Modified US EPA method 310.1. Determination of Alkalinity by Metrohm automated titration analyser.	PM0	No preparation is required.				
NONE	No Method Code	NONE	No Method Code				

ABOUT AECOM

In a complex and unpredictable world, where growing demands have to be met with finite resources, AECOM brings experience gained from improving quality of life in hundreds of places.

We bring together economists, planners, engineers, designers and project managers to work on projects at every scale. We engineer energy efficient buildings and we build new links between cities. We design new communities and regenerate existing ones. We are the first whole environments business, going beyond buildings and infrastructure.

Our Europe teams form an important part of our worldwide network of nearly 100,000 staff in 150 countries. Through 360 ingenuity, we develop pioneering solutions that help our clients to see further and go further.

www.aecom.com

Follow us on Twitter: [@aecom](https://twitter.com/aecom)



TECHNICAL REPORT

2015 ENVIRONMENTAL NOISE SURVEY REPORT
OF ENVA IRELAND LIMITED, RAFFEEN
INDUSTRIAL ESTATE, RINGASKIDDY ROAD, CO,
CORK.

For,
Jamie Barry,
Operations and Technical Manager,
Enva Ireland Ltd.,
Raffeen Industrial Estate,
Ringaskiddy Road,
Cork.

Report prepared by:
Niall Vaughan, B.Sc. MIOA
Our reference:
NV_13092015ENR01
Date:
14th September 2015

EXECUTIVE SUMMARY

The Enva Ireland facility off the Ringaskiddy Road in Cork is involved in the provision of solutions to waste water treatment problems. The facility comes under the remit of a Waste Licence, (Register No. W0145-02) as issued by the Environmental Protection Agency (EPA). This Waste Licence stipulates various environmental obligations which Enva is obliged to carry out. One of these is to carry out an annual environmental noise survey at the facility the details of which are in Section 6 of their Waste Licence. The part of Section 6 of the Waste Licence which pertains to noise is re-produced in Section 1 of this report.

The noise survey is conducted in order to ascertain the noise emissions emanating from the facility and compare them against the noise limits set down in their Waste licence. The survey is conducted at four boundary locations and one noise sensitive location as per their EPA licence. A description of these locations is provided in Section 2 of this report.

To fulfil the requirements for their 2015 annual environmental survey Enva requested CLV Consulting to carry it out. The survey was conducted during the month of September when it is understood the facility was in normal operating mode.

The operations at Enva take place under the one roof and there is little in the way of noise emissions to the receiving environment apart from occasional individual vehicle movements. Enva is situated just off the main Ringaskiddy Road (N28) and while this road is a single carriageway it serves a large number of big industrial facilities. Due to the impact from the steady state road traffic, vehicle noise was the dominant source of noise at all of the locations monitored. At the boundary locations (N1 to N4) Enva was observed as a marginal background source of noise. At the nearest noise sensitive location, which is the nearest dwelling, Enva was not audible during any of the monitoring periods.

Having reviewed the survey data and from the observations made during the survey it is considered reasonable to conclude that Enva would satisfy compliance with the noise conditions of their Waste Licence.

Report Prepared By:



NIALL VAUGHAN
Acoustic Consultant

CONTENTS		Page
	Executive Summary	2
1.0	Introduction	4
2.0	Survey Details	5
2.1	Choice of Measurement Locations	5
2.2	Survey Periods	6
2.3	Personnel and Instrumentation	6
2.4	Procedure	6
2.5	Measurement Parameters	6
2.6	Results	7
3.0	Discussion and Conclusions	10
	Figure 1 – Measurement Locations	12
	Figure 2 – Photographs of Noise Monitoring Locations	13
	Appendix A – 1/3 Octave Centre Frequency Data	14
	Appendix B – Graphical Representation of 1/3 Octave Centre Frequency Data	15
	Appendix C – Calibration Certificate for Sound Level Meter	18
	Appendix D – Calibration Certificate for Sound Level Calibrator	19

1.0 INTRODUCTION

Enva Ireland is a waste management and environmental solution provider. They provide services dealing with the treatment and disposal of oil and hazardous waste, on-site cleaning services, water and effluent treatment, and contaminated soil. Their facility located in the Raffeen Industrial Estate, Ringaskiddy Road, Co. Cork specialises in the diagnosis of waste water treatment problems and also the provision of waste water treatment products.

This facility consists of offices, a laboratory, a warehouse, storage tanks and a modest amount of ancillary pumps and mechanical equipment.

The Raffeen facility operates under the terms of a Waste Licence (Register No. W0145-02) as issued by the EPA. One of the terms of this licence is for an annual environmental noise survey to be carried out at the facility and at one noise sensitive location (NSL).

To fulfil this requirement Enva requested CLV Consulting to carry out their noise survey in accordance with the EPA guidance note NG4 (*Guidance Note for Noise: Licence Applications, Surveys and Assessments in relation to Schedules Activities*).

Condition 6.14 and Schedule B.4 of the Enva IPPC licence sets out the following noise conditions;

Condition 6.14

The licensee shall carry out a noise survey of the site operations annually. The survey programme shall be undertaken in accordance with the methodology specified in the “Environmental Noise Survey Guidance Document” as published by the Agency.

Schedule B.4

Daytime dB L_{Aeq} (30 minutes)	Night-time dB L_{Aeq} (30 minutes)
55 ^{Note 1}	45 ^{Note 1}

Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity of any noise sensitive location.

Please note: the facility does not operate after 1800hrs and therefore a night-time noise survey is not required.

2.0 SURVEY DETAILS

The survey was conducted in accordance with ISO 1996: 2007: *Acoustics – Description and measurement of environmental noise* and the EPA guidance note – *Guidance Note for Noise: Licence Applications, Surveys and Assessments in relation to Schedules Activities (NG4)*: Specific details are set out below.

The hours of operation at the Enva Raffeen facility are from 08:00hrs to 18:00hrs. As the facility only operates during daytime hours the existing noise environment was assessed and quantified over a daytime period only in accordance with their Waste Licence requirements. Daytime is defined as 07:00hrs to 19:00hrs.

2.1 Choice of Measurement Locations

The noise measurements were conducted at four boundary locations and one noise sensitive location. A description of each measurement location is as follows;

Location 1 - N1 - (North Boundary):

This is the North boundary location for all measurements. The measurement location is situated at the midpoint of the north boundary approximately 15m from the northern façade of the Enva building.

Location 2 - N2 - (West Boundary):

This is the West boundary location for all measurements. The measurement location is situated at the midpoint of the west boundary adjacent to the site's entrance road. It is approximately 12m away from and directly opposite a raised fire escape door which is on the western façade of the Enva building.

Location 3 - N3 – (South Boundary):

This is the South boundary location for all measurements. The measurement location is situated at the midpoint of the south boundary adjacent to the Enva car park. It is approximately 25m from the main reception entrance.

Location 4 - N4 – (East Boundary):

This is the East boundary location for all measurements. The measurement location is situated at the midpoint of the east boundary and approximately 6m from a large storage vessel.

Location 5 – Noise Sensitive Location (NSL 1) S1:

The nearest NSL is a private dwelling located some 45m South of the Enva facility. The main Ringaskiddy to Cork road (N28) runs between Enva and the dwelling and the two locations are further separated by a grass verge and some light foliage. The selected measurement location is some 7m from the north boundary of the dwelling

and adjacent to the N28. The measurement location has a partial line of sight to the first floor level of the Enva facility.

2.2 Survey Periods

Measurements were conducted over the following survey periods:

- 08:15hrs to 16:39hrs on 3rd September 2015.

The weather conditions for both survey periods were dry with a west to north west breeze ranging from 0.8m/s to 1.9m/s.

2.3 Personnel and Instrumentation

Niall Vaughan (CLV) conducted the noise level measurements during the survey periods. He holds a BSc from Bradford University in Environmental Science, a diploma in acoustics from the Institute of Acoustics and he is a member of the Institute of Acoustics. Niall has over fourteen years of experience in the field of acoustics. He has extensive knowledge in the fields of environmental noise assessment, mechanical services and manufacturing plant noise control and architectural acoustics.

The measurements were performed using a Brüel & Kjær Type 2260 Investigator sound level meter (SLM). Before and after the survey the measurement apparatus was check calibrated using a Cirrus CR:115 sound level calibrator (SLC). The SLM was fitted with a 90mm windshield. The calibration certificates for the SLM and SLC are included in Appendices C and D respectively of this report.

2.4 Procedure

Sample periods were 30 minutes in duration during the survey periods. The results were saved to the instrument memory for later analysis. Survey personnel noted all primary noise sources contributing to noise build-up.

2.5 Measurement Parameters

The survey results are presented in terms of the following five parameters:

- L_{Aeq}** is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.
- L_{Amax}** is the instantaneous maximum sound level measured during the sample period.
- L_{Amin}** is the instantaneous minimum sound level measured during the sample period.
- L_{A10}** is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.
- L_{A90}** is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The “A” suffix denotes the fact that the sound levels have been “A-weighted” in order to account for the non-linear nature of human hearing. In addition, the data is presented in A-weighted 1/3-octave spectra for each measurement. All sound levels in this report are expressed in terms of decibels (dB) relative to 2×10^{-5} Pa.

2.6 Results

The results of the survey data are presented below for each measurement location.

2.6.1 Location N1 – North Boundary

The results of measurements conducted during the survey at Location N1 are summarised in Table 1.

Ref	Start Time	Period	Measured Noise Levels (dB re. 2×10^{-5} Pa)					Comments
			L _{Aeq}	L _{Amax}	L _{Amin}	L _{A10}	L _{A90}	
1	10:05 – 10:35	Day	48	62	38	50	44	Road traffic. Enva. Wind. Birdsong.
2	12:52 – 13:22		54	79	38	49	43	
3	15:37 – 16:07		58	80	43	52	47	

Table 1 Summary of results for Location N1.

The ambient noise environment at location N1 was dominated by road traffic noise from the N28. Traffic movements entering and leaving Enva had a reasonable impact on the ambient noise levels. Background noise included birdsong and occasional wind noise through the foliage. The impact from the background noise was slight.

No tonal or impulsive components were audible from site noise emissions at this location during the monitoring periods.

Noise levels were of the order of 48dB to 58dB L_{Aeq} and 43dB to 47dB L_{A90}.

2.6.2 Location N2 – West Boundary

The results of measurements conducted during the survey at Location N2 are summarised in Table 2.

Ref	Start Time	Period	Measured Noise Levels (dB re. 2×10^{-5} Pa)					Comments
			L _{Aeq}	L _{Amax}	L _{Amin}	L _{A10}	L _{A90}	
4	09:33 – 10:03	Day	56	69	45	59	49	Road traffic. Enva. Birdsong.
5	12:20 – 12:50		54	74	45	57	48	
6	15:05 – 15:35		55	63	46	58	51	

Table 2 Summary of results for Location N2.

Road traffic noise coming from the N28 was the primary noise source at N2. An extraction vent on the south western façade of the Enva building was the only noise contributor from Enva and its impact on the noise environment was slight. Birdsong was perceptible as an occasional background source of noise.

No tonal or impulsive components were audible from site noise emissions at this location during the monitoring periods.

Noise levels were of the order of 54dB to 56dB L_{Aeq} and 48dB to 51dB L_{A90} .

2.6.3 Location N3 – South Boundary

The results of measurements conducted during the survey at Location N3 are summarised in Table 3.

Ref	Start Time	Period	Measured Noise Levels (dB re. 2×10^{-5} Pa)					Comments
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
7	09:00 – 09:30	Day	59	73	36	62	49	Road traffic. Enva. Birdsong.
8	11:48 – 12:18		60	82	38	62	46	
9	14:33 – 15:03		59	69	41	62	48	

Table 3 Summary of results for Location N3.

Location N3 is the closest of the boundary locations to the N28 and hence traffic noise was the main noise source at this location. There were occasional traffic movements in Enva which did contribute to the noise levels. Birdsong in the adjacent foliage was present as a faint background noise source.

No tonal or impulsive components were audible from site noise emissions at this location during the monitoring periods.

Noise levels were of the order of 59dB to 60dB L_{Aeq} and 46dB to 49dB L_{A90} .

2.6.4 Location N4 – East Boundary

The results of measurements conducted during the survey at Location N4 are summarised in Table 4.

Ref	Start Time	Period	Measured Noise Levels (dB re. 2×10^{-5} Pa)					Comments
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
10	10:40 – 11:10	Day	57	64	44	60	47	Road traffic. Enva. Birdsong. Wind.
11	12:49 – 13:19		56	66	44	60	47	
12	15:02 – 15:32		59	76	43	62	52	

Table 4 Summary of results for Location N4.

At the eastern boundary N28 traffic noise the dominant source of noise for the entire duration of the monitoring. There were a number of contributions from Enva's tanker area although their impact on the noise environment was slight. Birdsong and wind noise were occasionally present as an insignificant background noise source.

No tonal or impulsive components were audible from site noise emissions at this location during the monitoring periods.

Noise levels were of the order of 56dB to 59dB L_{Aeq} and 47dB to 52dB L_{A90} .

2.6.5 Location NSL1 – Noise Sensitive Location

The results of measurements conducted during the survey at Location NSL 1 are summarised in Table 5.

Ref	Start Time	Period	Measured Noise Levels (dB re. 2×10^{-5} Pa)					Comments
			L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
13	08:15 – 08:45	Day	78	94	41	83	58	Road traffic.
14	11:13 – 11:43		78	94	46	83	57	
15	13:59 – 14:29		79	91	47	84	56	

Table 5 Summary of results for Location NSL1.

Steady state road traffic movements were the dominant source of noise at the noise sensitive location NSL1. Enva was not audible at any point during the measurement periods at this location and there were no other noise sources observed during the monitoring periods.

No tonal or impulsive components were audible from site noise emissions at this location during the monitoring periods.

Noise levels were of the order of 78dB to 79dB L_{Aeq} and 56dB to 58dB L_{A90} .

3.0 DISCUSSION AND CONCLUSIONS

To recap the noise conditions set out in Enva's waste licence at the NSL are as follows;

Daytime dB L_{Aeq} (30 minutes)	Night-time dB L_{Aeq} (30 minutes)
55 ^{Note 1}	45 ^{Note 1}

Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity of any noise sensitive location.

In common with previous years road traffic noise was the most audible source of noise at all of the boundary locations. As mentioned previously the nearby N28 caters for a high volume of road traffic serving the industrial facilities in Ringaskiddy and the deep water berth for ships and this is particularly so during the daytime hours.

Enva was noted as a slight background noise source at the boundary locations and to try and provide an indication of the noise emissions from the facility the L_{A90} parameter is a more appropriate indicator. The L_{A90} parameter is useful gauge of background noise when other intermittent noise sources such as traffic are present.

The L_{A90} values from this survey ranged from 43dB to 58dB. Putting forward a worst case scenario by assuming that the highest value of 58dB was attributed to Enva (which is unlikely) the noise level at the NSL would be significantly below the 55dB daytime criteria due to the attenuation as a result of the distance. In addition to this Enva was not audible at any point during the monitoring at the NSL.

It can therefore be concluded that Enva Ireland would meet compliance with the noise section of its Waste Licence (Register No. W0145-02) as issued by the EPA.

For comparison purposes Tables 6 below compares noise levels between the 2013, 2013 and 2015 environmental noise surveys. Variances in noise levels are most likely attributed to fluctuations associated with N28 road traffic.

Location	Year	2013		2014		2015	
		L_{Aeq}	L_{A90}	L_{Aeq}	L_{A90}	L_{Aeq}	L_{A90}
N1	Day	51	46	53	49	48	44
		57	49	55	50	54	43
		56	48	60	54	58	47
N2	Day	58	50	63	54	56	56
		62	56	61	55	54	54
		57	48	63	57	55	55
N3	Day	63	49	61	52	59	49
		63	52	62	54	60	46
		61	55	63	57	59	48
N4	Day	67	45	55	43	57	47
		60	52	64	47	56	47

		61	45	58	47	59	52
S1	Day	80	61	81	68	78	58
		78	61	80	70	78	57
		79	62	81	71	79	56

Table 6 Comparison between 2013, 2014 & 2015 measured L_{Aeq} and L_{A90} noise levels

FIGURE 1
MEASUREMENT LOCATIONS



FIGURE 2

PHOTOGRAPHS OF NOISE MONITORING LOCATIONS



Location N1



Location N2



Location N3



Location N4



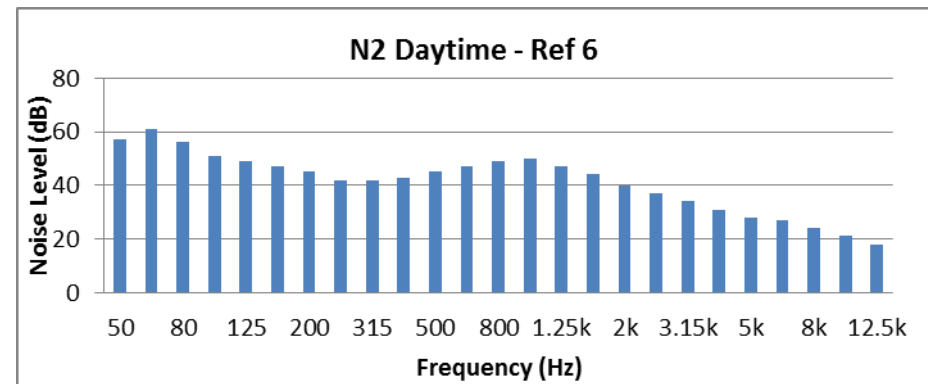
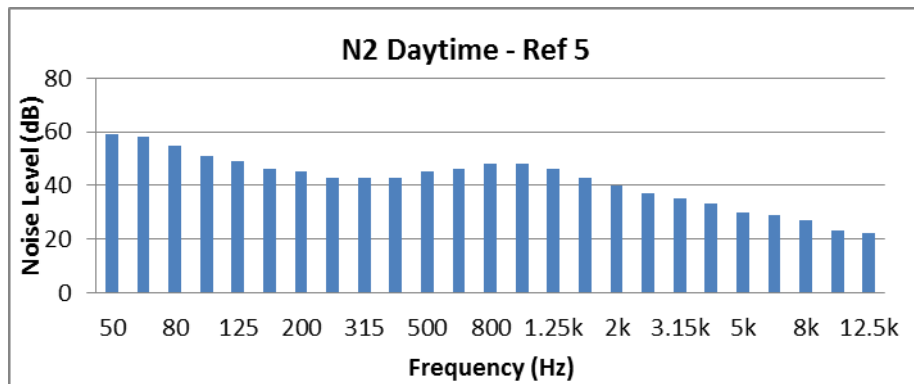
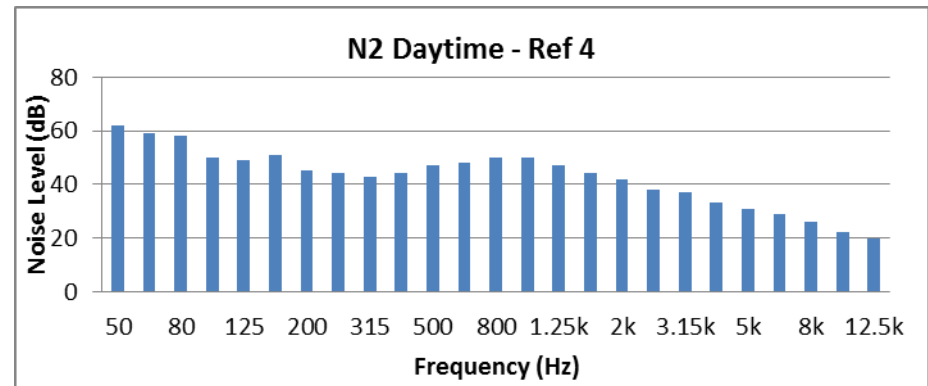
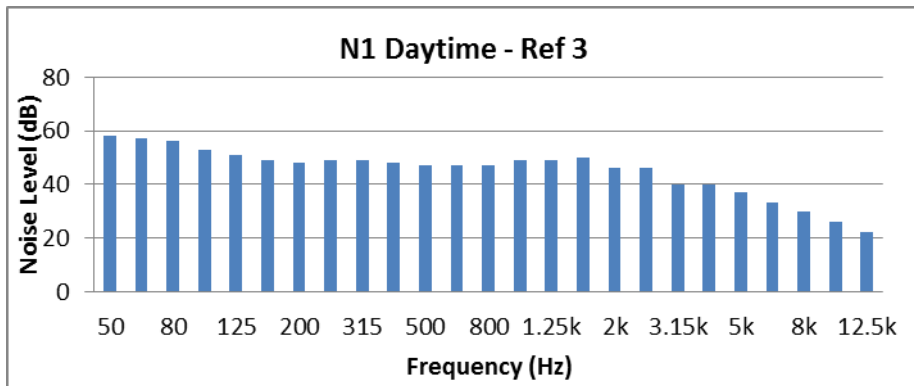
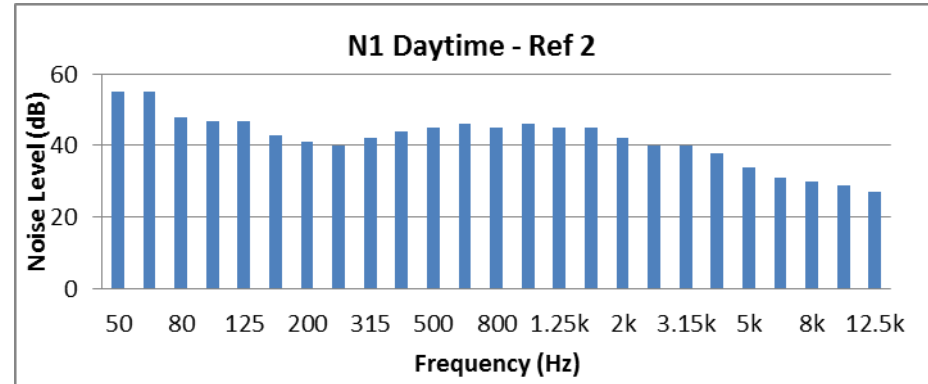
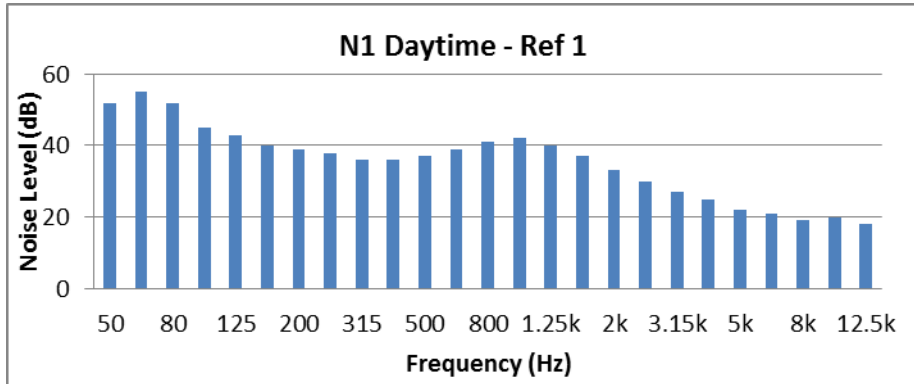
Location S1

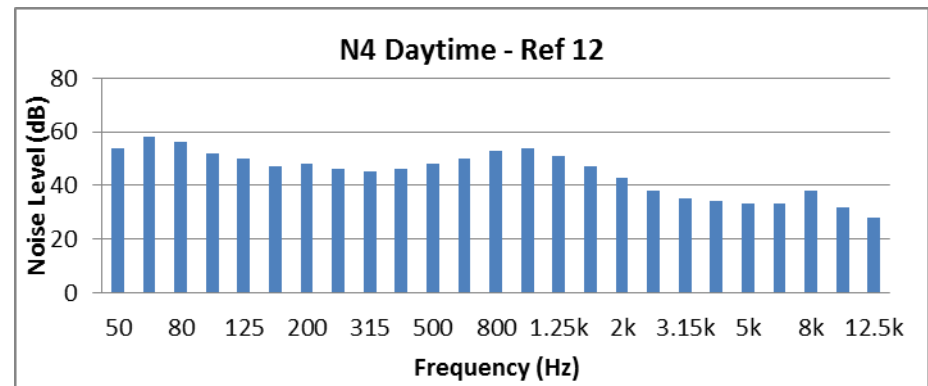
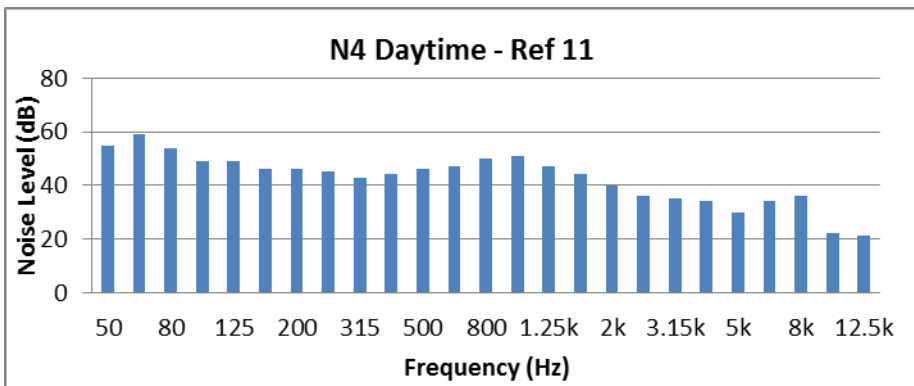
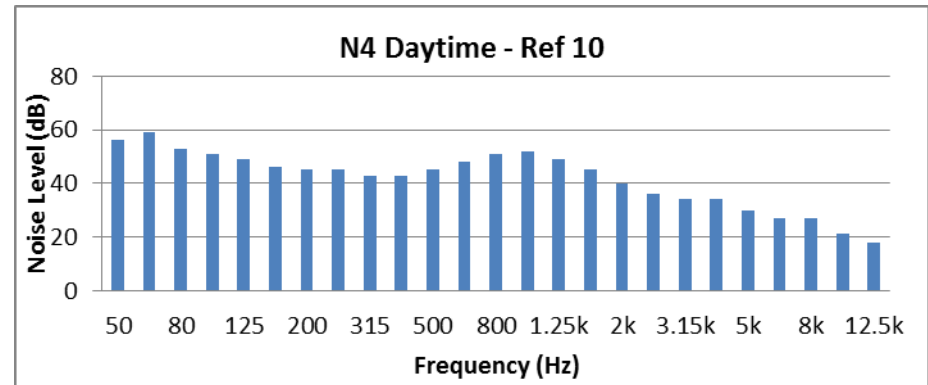
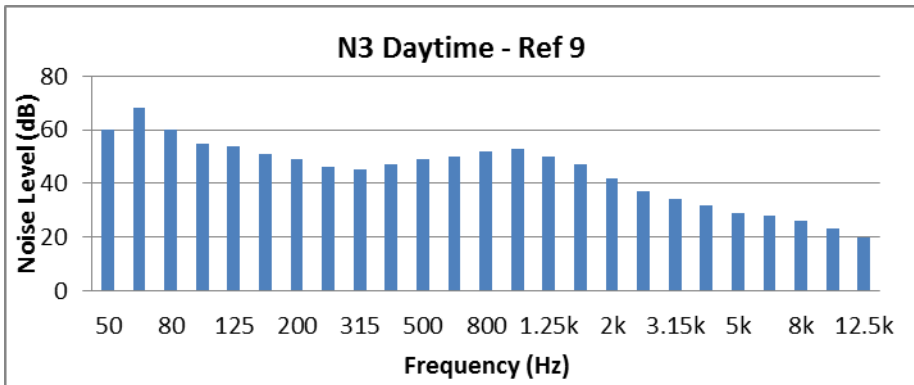
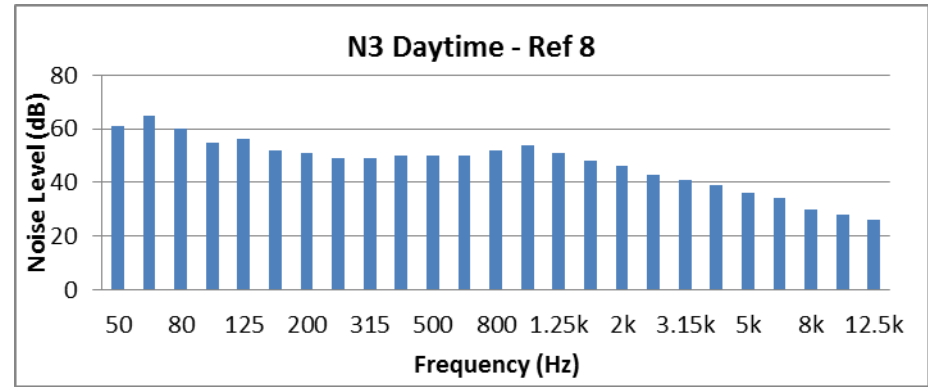
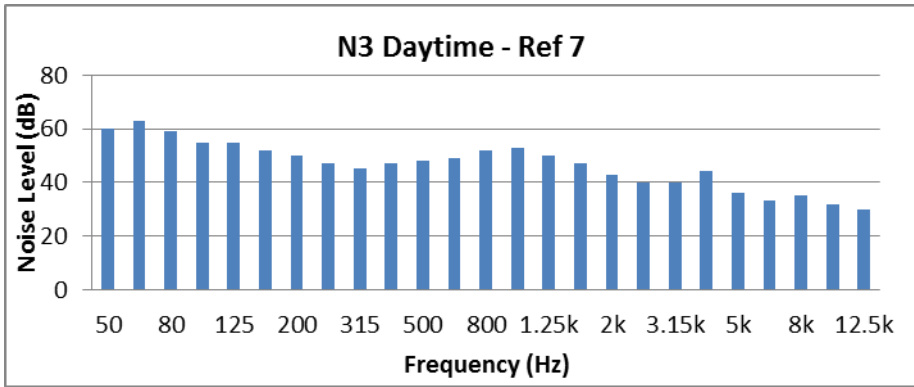
APPENDIX A

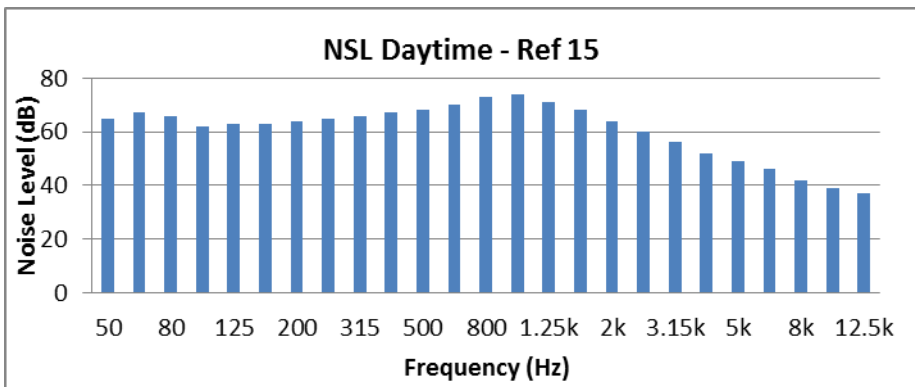
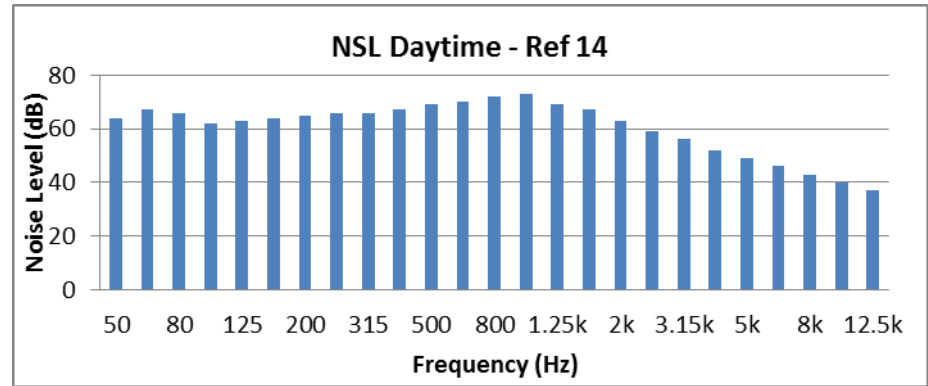
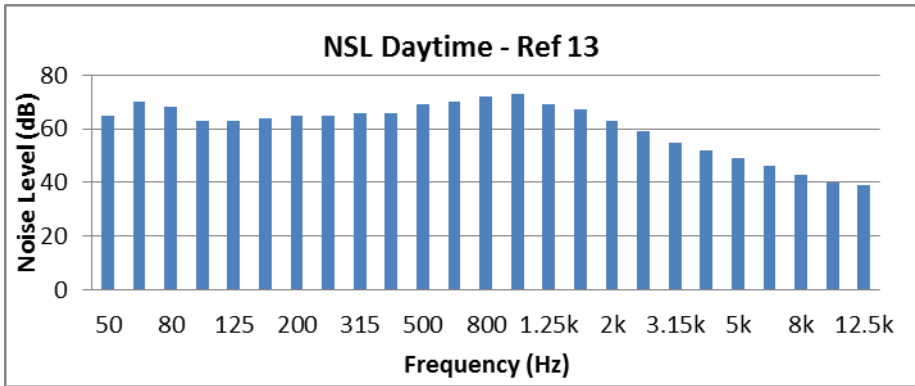
1/3 Octave Centre Frequency Date

Ref			A-weighted One-third Octave Band Centre Frequency [Hz]																							A		
			50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k		10k	12.5k
1	N1	Day	52	55	52	45	43	40	39	38	36	36	37	39	41	42	40	37	33	30	27	25	22	21	19	20	18	48
2		Day	55	55	48	47	47	43	41	40	42	44	45	46	45	46	45	45	42	40	40	38	34	31	30	29	27	54
3		Day	58	57	56	53	51	49	48	49	49	48	47	47	47	49	49	50	46	46	40	40	37	33	30	26	22	58
4	N2	Day	62	59	58	50	49	51	45	44	43	44	47	48	50	50	47	44	42	38	37	33	31	29	26	22	20	56
5		Day	59	58	55	51	49	46	45	43	43	43	45	46	48	48	46	43	40	37	35	33	30	29	27	23	22	54
6		Day	57	61	56	51	49	47	45	42	42	43	45	47	49	50	47	44	40	37	34	31	28	27	24	21	18	55
7	N3	Day	60	63	59	55	55	52	50	47	45	47	48	49	52	53	50	47	43	40	40	44	36	33	35	32	30	59
8		Day	61	65	60	55	56	52	51	49	49	50	50	50	52	54	51	48	46	43	41	39	36	34	30	28	26	60
9		Day	60	68	60	55	54	51	49	46	45	47	49	50	52	53	50	47	42	37	34	32	29	28	26	23	20	59
10	N4	Day	56	59	53	51	49	46	45	45	43	43	45	48	51	52	49	45	40	36	34	34	30	27	27	21	18	57
11		Day	55	59	54	49	49	46	46	45	43	44	46	47	50	51	47	44	40	36	35	34	30	34	36	22	21	56
12		Day	54	58	56	52	50	47	48	46	45	46	48	50	53	54	51	47	43	38	35	34	33	33	38	32	28	59
13	S1	Day	65	70	68	63	63	64	65	65	66	66	69	70	72	73	69	67	63	59	55	52	49	46	43	40	39	78
14		Day	64	67	66	62	63	64	65	66	66	67	69	70	72	73	69	67	63	59	56	52	49	46	43	40	37	78
15		Day	65	67	66	62	63	63	64	65	66	67	68	70	73	74	71	68	64	60	56	52	49	46	42	39	37	79

APPENDIX B 1/3 Octave Centre Frequency Data Graphical Representation







APPENDIX C

Calibration Certificate of Sound Level Meter



NSAI

National Metrology Laboratory

Certificate of Calibration

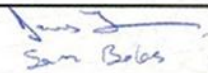


Issued to CLV Consulting
 c/o MEP Engineering Services Limited
 Unit 15 Carrigaline Industrial Park
 Crosshaven Road
 Carrigaline
 Co. Cork

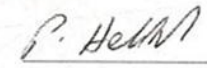
Attention of Niall Vaughan

Certificate Number E15024B
 Item Calibrated Bruel & Kjaer Type 2260 Sound Level Meter and 4189 Microphone
 Serial Number 1824859 and 1836745 (microphone)
 Client ID Number -----
 Order Number Niall Vaughan
 Date Received 21 Jan 2015
 NML Procedure Number AP-NM-09

Method The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. The verification checks performed are those outlined in BS7580:Pt 1 (1997), *Specification for the verification of sound level meters*. This British Standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC60651 (1994) and IEC60804 (2000), respectively. Prior to calibration the instrument was tested, and its overall sensitivity adjusted in accordance with Clause 5.4 of BS 7580: Pt 1 using its associated sound level calibrator.

Calibration Standards Norsonic 1504A Calibration System incorporating:
 SR DS360 Signal Generator, No. 0735, [Cal. Due Date: 12 Sep 2015]
 Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 14 Jul 2015]
 B&K 4134 Measuring Microphone, No. 0742 [Cal Due Date: 13 Jan 2016]
 B&K 4228 Pistonphone, No. 0741 [Cal. Due Date: 13 Jan 2016]
 B&K 4226 Acoustical Calibrator, No. 0150, [Cal. Due Date: 01 May 2015]

Calibrated by 
 David Fleming 
 Sam Boles 

Approved by 
 Paul Hetherington

Date of Calibration 04 Feb 2015 Date of Issue 04 Feb 2015



This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

APPENDIX D

Calibration Certificate of Sound Calibrator



NSAI

National Metrology Laboratory

Certificate of Calibration

Issued to CLV Consulting
Carrigaline Industrial Estate
Carrigaline
Co. Cork

Attention of Mr. Niall Vaughan

Certificate Number	E15024A
Item Calibrated	Casella CEL-120/1 Acoustic Calibrator
Serial Number	3921077
Client ID Number	-----
Order Number	-----
Date Received	21 Jan 2015
NML Procedure Number	AP-NM-13

Method The above calibrator was allowed to stabilize for a suitable period in laboratory conditions. It was then calibrated by measuring the sound pressure level generated in its measuring cavity (half-inch configuration). The calibrator's operating frequency was also measured.

Calibration Standards Norsonic 1504A Calibration System incorporating:
Agilent 34401A Multimeter, No. 0736 [Cal due date: 14 Jul 2015]
B & K 4134 Measuring Microphone, No. 0742 [Cal due date: 13 Jan 2016]
B & K 4228 Pistonphone, No. 0741 [Cal due: 13 Jan 2016]

Calibrated by	<u>Sam Boles</u>	Approved by	<u>P. Hetherington</u>
	Sam Boles		Paul Hetherington
Date of Calibration	02 Feb 2015	Date of Issue	02 Feb 2015



This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)