APPENDICES

APPENDIX A

Kildare County Council

Environment Section

Waste Management Act 1996 - 2011, Section 22 Site

Prusselstown, Athy, Co. Kildare

Conceptual Site Model and Risk Assessment.

Index

Kildare County Council,
Environment Section

Prusselstown Refuse Depot, Athy, Co. Kildare

Site Summary

Relevant Risk Screening Parameters.

Name: Prusselstown Refuse Depot, Athy, Co. Kildare
Source: Municipal Waste from 1st January '81 to 2nd February '82.
Geology: Ballysteen Formation Fossiliferous dark grey muddy limestone
Groundwater: Regionally Important Aquifer with a High Vulnerability (Rg/H).
Surface Water: The Clowgarrow Bog River is part of the Athy stream river system which is a tributary of the River Barrow and is 550m from the landfill site.
Human Presence: A hotel is located on the landfill site and dwellings are located 30m from the landfill site.
Protected Areas: There is no protected area around the site.

SPR Linkage: SPR10 Score of 70% for landfill gas lateral migration affecting humans as there is a hotel on the site and dwellings within 30m of the landfill site.
SPR11 score of 70% for landfill gas vertical migration affecting humans as there is a hotel on the landfill site and dwellings within 30m of the waste

Risk Classification: **High Risk**

Background

Location Appendix 1: Site Location Map

Prusselstown Refuse Depot is located adjacent to a residential area of Athy Town. A hotel was built on the site and residential dwelling areas are located within 30 meters from the landfill site.

The Clowgarrow Bog River is located 550m from the waste body.

Desk Top Study

Kildare County Council's files on the Prusselstown Refuse Depot do not indicate the nature of the waste material deposited at the site.
The site was used as a refuse depot for the period 1st January 1981 to 2nd February 1982 approx. The site has been capped with clay

Walkover Survey (Appendix 6)

The exact extent of the Prusselstown Refuse Depot in Athy, Co. Kildare is assumed to match the footprint on the maps Appendix 1.

The plan area is approximately 3.7 hectares.
The current landuse of the site is a hotel development and its associated car park with waste land to the west of the site, green grazing area to the east and south of the site. There are residential area in close proximately to the site.

There is no sign of surface ponding of leachate or leachate seepage from the landfill site. Also there are no landfill odours.

Geology

The GSI groundwater vulnerability mapping identifies the site of the Prusselstown Refuse Depot is located within Regionally Important Aquifer with High Vulnerability, Rg/ H zone

The rock type is Ballysteen Formation Fossiliferous dark-grey muddy limestone.

Tier 1 Risk Assessment Findings.

Following the Tier 1 Risk Assessment carried out on the site of the Prusselstown Refuse Depot a risk rating of 70% was assigned for:

SPR10 Score of 70% for landfill gas lateral migration affecting humans as there is a hotel on the landfill site and dwellings within 30m of the landfill site.

SPR11 score of 70% for landfill gas vertical migration affecting humans as there is a hotel on the landfill site and dwellings within 30m of the waste

Accordingly this historic unregulated waste disposal site is categorised as a **High Risk** site.

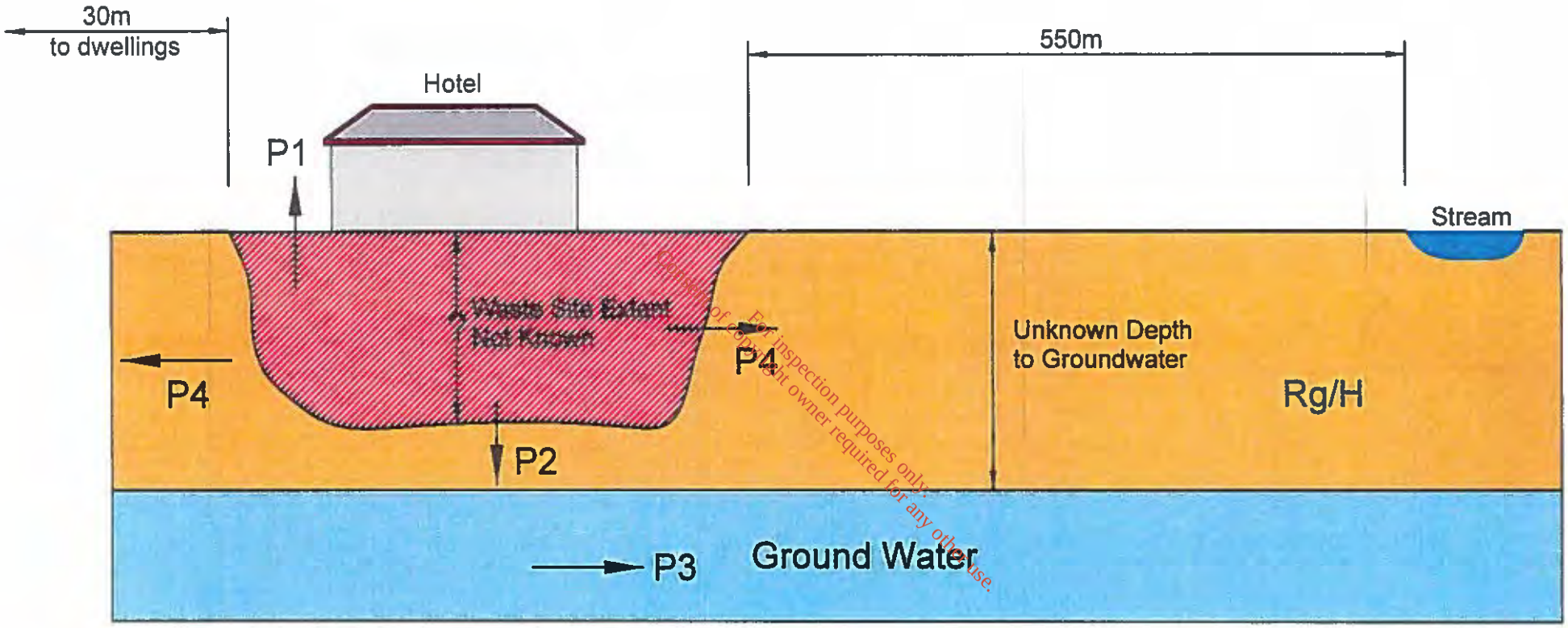
Access to site.

The portion of the site containing Hotel Delelopment is accessible when the facility is open.
The areas outside the hotel development are accessible from public roadways.

Ciara Corrigan,
Assistant Environmental Scientist,
Environment Section

Michael Holligan,
Senior Engineer,
Environment Section

Section 1: Conceptual Site Model, Risk Screening and Prioritisation



NOTES:

Waste Body

P1: Outdoor Inhalation
P2: Unsaturated Zone
P3: Saturated Zone
P4: Gas Migration

TITLE:
Environmental Risk Assessment for Unregulated Waste Disposal Sites

DRAWING NUMBER:
ERA / PR / CON

KILDARE COUNTY COUNCIL
Environment Section
Áras Chill Dara, Devoy Park, Naas, Co. Kildare.
Tel: +353-45-980588, Fax: +353-45-980587, e-mail: envirm@kildarecoco.ie
DIRECTOR OF SERVICES: JOE BOLAND
SENIOR ENGNEER: MICHAEL HOLLIGAN

PROJECT:
Conceptual Site Model

DRAWING:
Prusselstown Refuse Depot, Athy

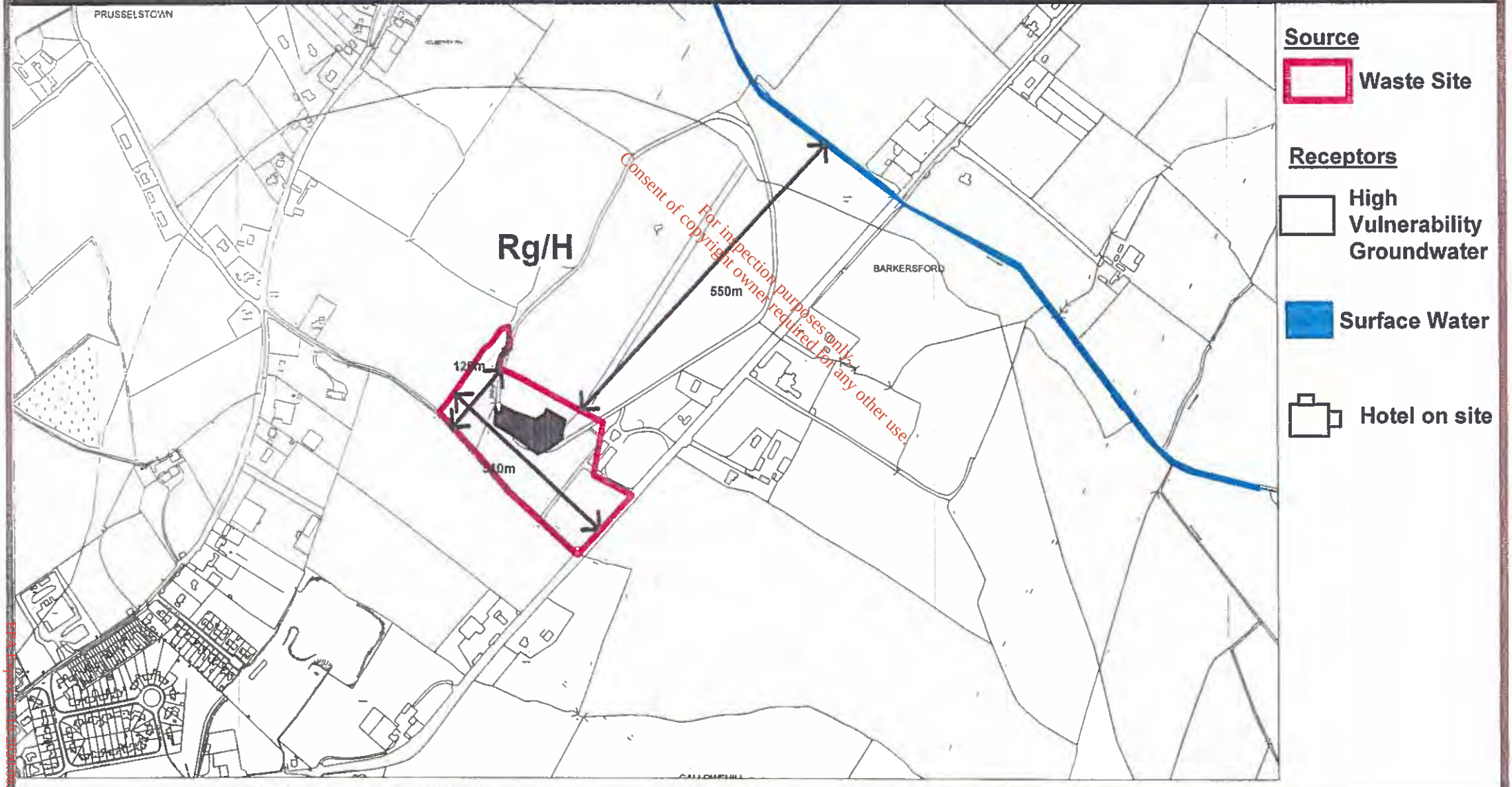
Scale:	Date:	Drawn by:
N.T.S.	Sept. 2011	D.O.B.

Kildare County Council
Environment Section

Waste Management Act 1996 - 2008
Section 22 Site

Site: Prusselstown, Athy

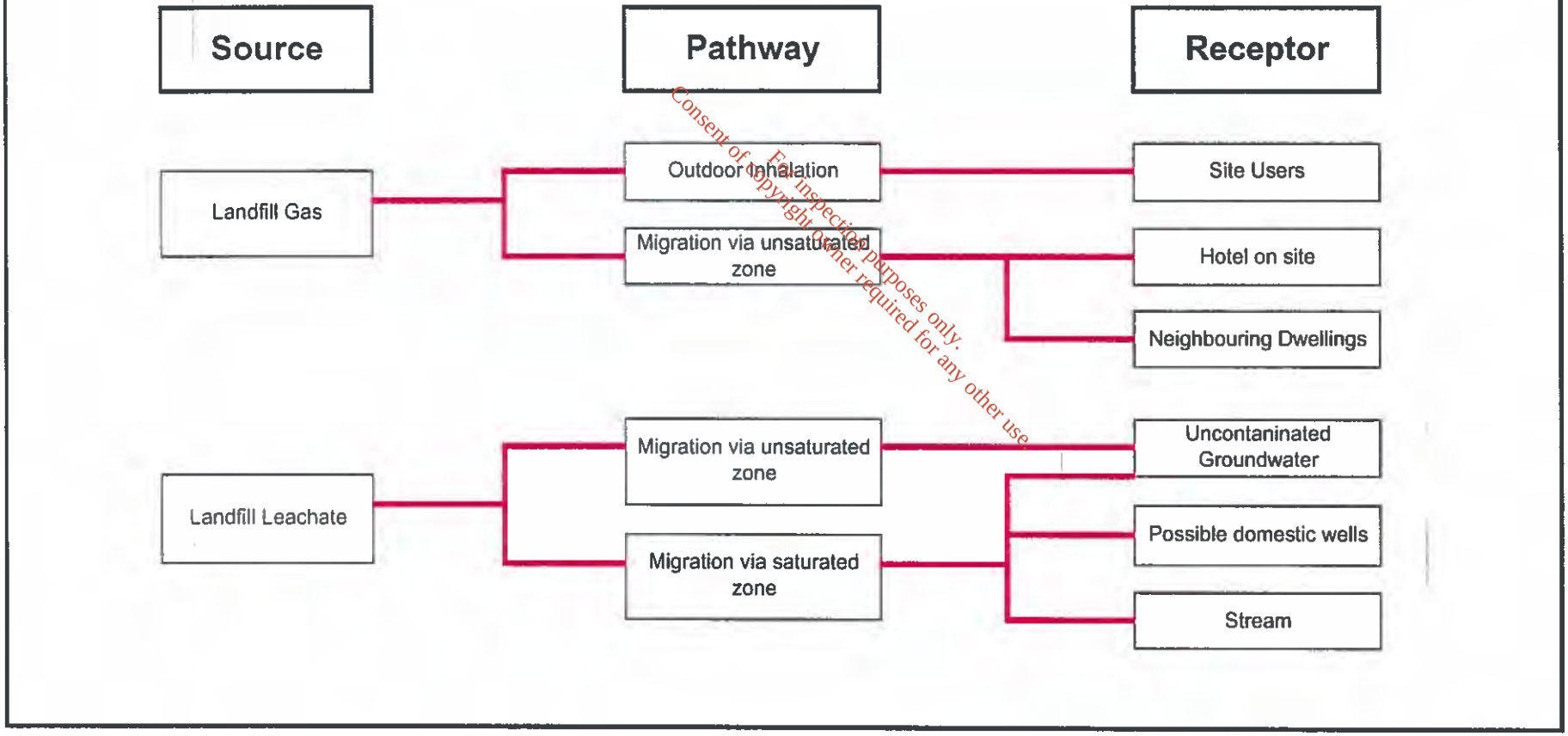
Conceptual Site Model - Site Plan Rev1



Kildare County Council
Environment Section

Waste Management Act 1996-2008
Section 22 Sites

Site: Prusselstown Refuse Depot, Athy	Conceptual Site Model - Network Diagram



Site : Prusselstown Refuse Depot, Athy

Table	Score	Rationale
1a: Leachate Hazard	7	Municipal waste deposited in area between 1 and 5 Ha (3.7 Ha approx)
1b: Landfill Gas Hazard	7	Municipal waste deposited in area between 1 and 5 Ha (3.7 Ha approx)
2a: Leachate Migration - GW Vulnerability	2	High Vunerability
2b: Leachate Migration - GW Flow Regime	2	Gravel groundwater bodies (Rg)
2C: Leachate Migration - SW Drainage	0	No direct connection to surface water drainage
2d: Landfill Gas - Laterial Migration	3	Sands and Gravels receptor within 250m
2e: Landfill Gas - Vertical Migration	5	Sands and Gravels receptor located above source
3a: Leachate Migration - Human Presence	3	Human presence above source
3b: Leachate Migration - Protected Area	0	None within 1km
3c: Leachate Migration - Aquifier Category	5	Regionally Important Aquifier (Rg)
3d: Leachate Migration - Public Water Supply	0	None within 1km
3e: Leachate Migration - Surface Watewr Bobied	1	550m approx to surface water body
3f: Landfill Gas - Human Presence	5	Human presence above source

SPR (Source Pathway Receptor) Linkage

SPR 1= 1a X (2a + 2b + 2c) X 3e
SPR 2= 1a X (2a + 2b + 2c) X 3b (SWDTE)
SPR 3= 1a X (2a + 2b) X 3a
SPR 4= 1a X (2a + 2b) X 3b
SPR 5= 1a X (2a + 2b) X 3c
SPR 6= 1a X (2a + 2b) X 3d
SPR 7= 1a X (2a + 2b) X 3e
SPR 8= 1a X 2c X 3e
SPR 2= 1a X 2c X 3b (SWDTE)
SPR 10= 1b X 2d X 3f
SPR 11= 1b X 2e X 3f

	Site score	Max score	%
SPR 1:	28	300	9.33%
SPR 2:	0	300	0.00%
SPR 3:	84	240	35.00%
SPR 4:	0	240	0.00%
SPR 5:	140	400	35.00%
SPR 6:	0	560	0.00%
SPR 7:	28	240	11.67%
SPR 8:	0	60	0.00%
SPR 9:	0	60	0.00%
SPR 10:	105	150	70.00%
SPR 11:	175	250	70.00%

High Risk (Class A) site

Site: Prusslestown, Athy

Table 1a. LEACHARE: SOURCE/HAZARD SCORING MATRIX

WASTE TYPE	WASTE FOOTPRINT (ha)		
	≤ 1 ha	>1≤ 5 ha	> 5 ha
C&D[20]	0.5	1	1.5
Municipal[21]	5	7	10
Industrial[22]	5	7	10
Pre 1977 sites[23]	1	2	3
		Max	10

1a	7

Table 1b: LANDFILL GAS: SOURCE/HAZARD SCORING MATRIX

WASTE TYPE	WASTE FOOTPRINT (ha)		
	≤ 1 ha	>1≤ 5 ha	> 5 ha
C&D[20]	0.5	1	1.5
Municipal[21]	5	7	10
Industrial[22]	5	7	10
Pre 1977 sites[23]	1	2	3
		Max	10

1b	7

Table 2a: LEACHATE MIGRATION: PATHWAYS

Parameter	Points available
GROUNDWATER FLOW REGIME (Vertical Pathway)	
Extreme Vunerability	3
High Vunerability	2
Moderate Vunerability	1
Low Vunerability	0.5
High - Low Vunerability	2

2a	2

Table 2b: LEACHATE MIGRATION: PATHWAYS

Parameter	Points available
GROUNDWATER FLOW REGIME (Horizontal Pathway)	
Karstified Groundwater bodies (Rk)	5
Productive Fissured Bedrock Groundwater Bodies (Rf and Lm)	3
Gravel Groundwater bodies (Rg and Lg)	2
Poorley Productive Bedrock Ground Water Bodies (Ll, Pl, PU)	1

2b	2

Table 2c: LEACHATE MIGRATION: PATHWAYS

Parameter	Points available
SURFACE WATER DRAINAGE (surface water pathway)	
Is there a direct connection between drainage ditches associated with the waste body and adjacent surface water body? Yes	2
If no direct connection	0

2c	0

Table 2d: LANDFILL GAS: PATHWAY assuming receptor within 250m of source

Parameter	Points available
LANDFILL GAS LATERIAL MIGRATION POTENTIAL	
Sand and gravel, Made ground, urban, Karst	3
Bedrock	2
All other Tills (including limestone, sandstone etc - moderate Permeability	1.5
All Namurian or Irish Sea Tills (low permeability)	1
Clay, Alluvium, Peat	1

2d	3

Table 2e: LANDFILL GAS: PATHWAY assuming receptor located above source

Parameter	Points available
LANDFILL GAS LATERIAL MIGRATION POTENTIAL	
Sand and gravel, Made ground, urban, Karst	5
Bedrock	3
All other Tills (including limestone, sandstone etc - moderate Permeability	2
All Namurian or Irish Sea Tills (low permeability)	1
Clay, Alluvium, Peat	1

2e	5

Table 3a: LEACHATE MIGRATION: RECEPTORS

Parameter	Points available
HUMAN PRESENCE (presence of a house indicates potential private well)	
On or within 50m of waste body	3
Greater than 50m but less than 250m of the waste body	2
Greater than 250m but less than 1km of the waste body	1
Greater than 1km of the waste body	0

3a	3

Table 3b: LEACHATE MIGRATION: RECEPTORS

Parameter	Points available
PROTECTED AREAS (SWDTE or GWDTE)	
On or within 50m of waste body	3
Greater than 50m but less than 250m of the waste body	2
Greater than 250m but less than 1km of the waste body	1
Greater than 1km of the waste body	0
Undesignated sites within 50m of waste body	1
Undesignated sites greater than 50m but less than 250m of the waste body	0.5
Undesignated sites greater than 250m of the waste body	0

3b	0

Table 3c: LEACHATE MIGRATION: RECEPTORS

Parameter	Points available
AQUIFIER CATEGORY (resource potential)	
Regionally Important Aquifier (Rk, Rf, Rg)	5
Locally Important Aquifier (Ll, Lm, Lg)	3
Poor Aquifier (Pl, Pu)	1

3c	5

Table 3d: LEACHATE MIGRATION: RECEPTORS

Parameter	Points available
PUBLIC WATER SUPPLY (other than private wells)	
Within 100m of site boundary	7
Greater than 100m but less than 300m or within Inner SPA (SI) for GW supplies	5
Greater than 300m but less than 1km or within Outer SPA (SO) for GW supplies	3
Greater than 1km (karst aquifier)	3
Greater than 1km (no karst aquifier)	0

3d	0

Table 3e: LEACHATE MIGRATION: RECEPTORS

Parameter	Points available
SURFACE WATER BODIES	
Within 50m of site boundary	3
Greater than 50m but less than 250m	2
Greater than 250m but less than 1km	1
Greater than 1km	0

3e	1

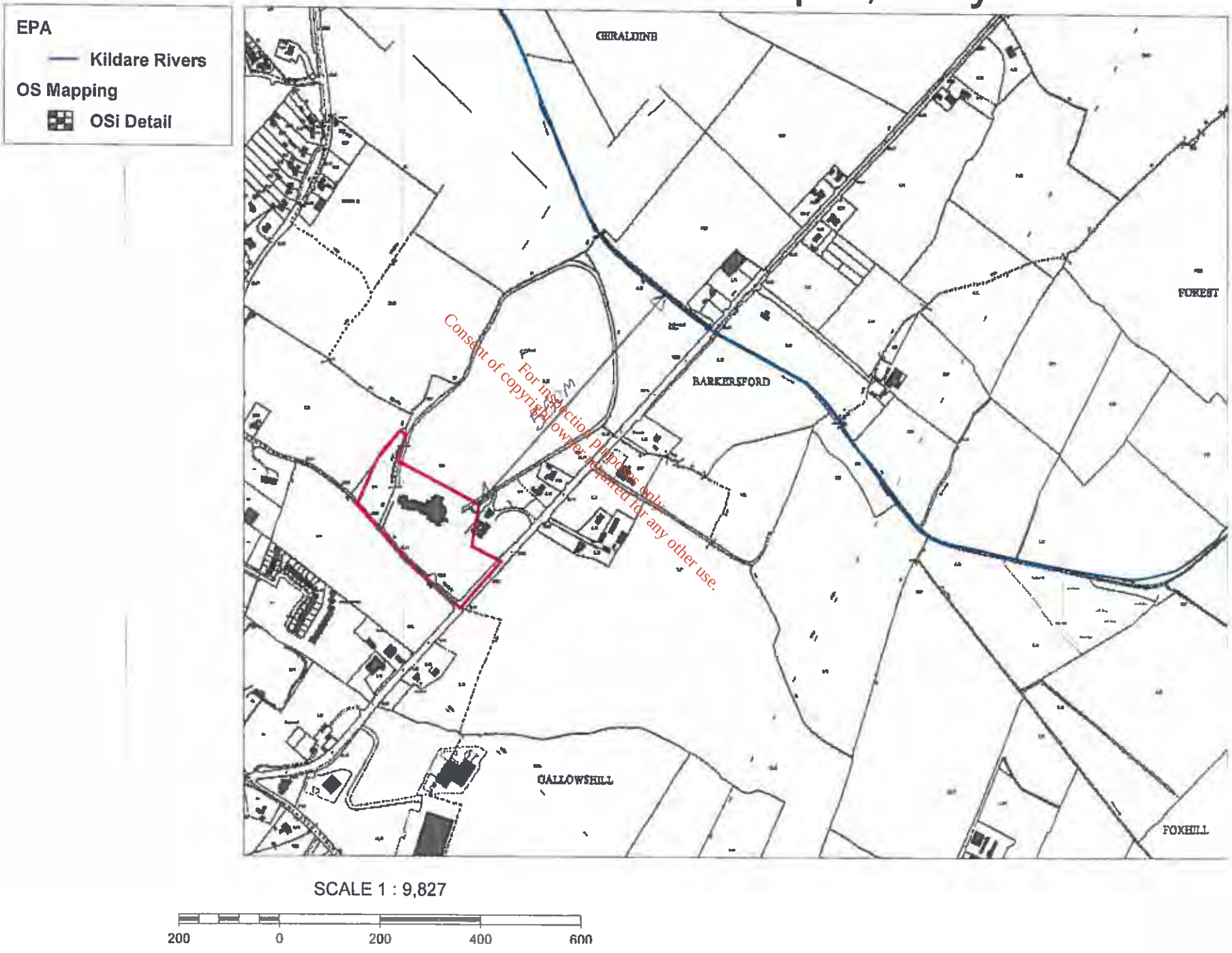
Table 3f: LANDFILL GAS: RECEPTORS

Parameter	Points available
HUMAN PRESENCE	
On site or within 50m of site boundary	5
Greater than 50m but less than 150m	3
Greater than 150m but less than 250m	1
Greater than 250m	0.5

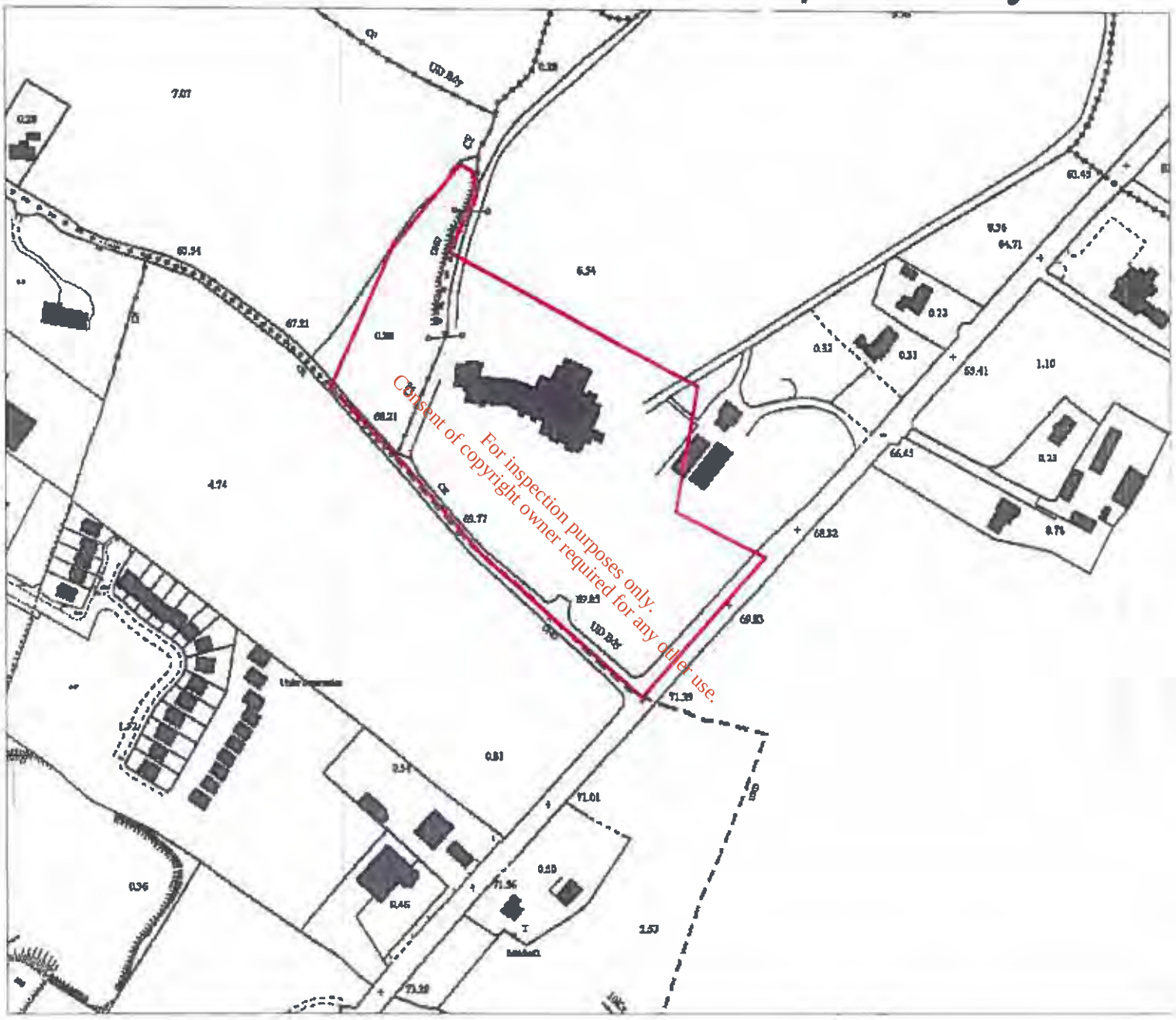
3f	5

Appendix 1: Site Location Map

Prusselstown Refuse Depot, Athy

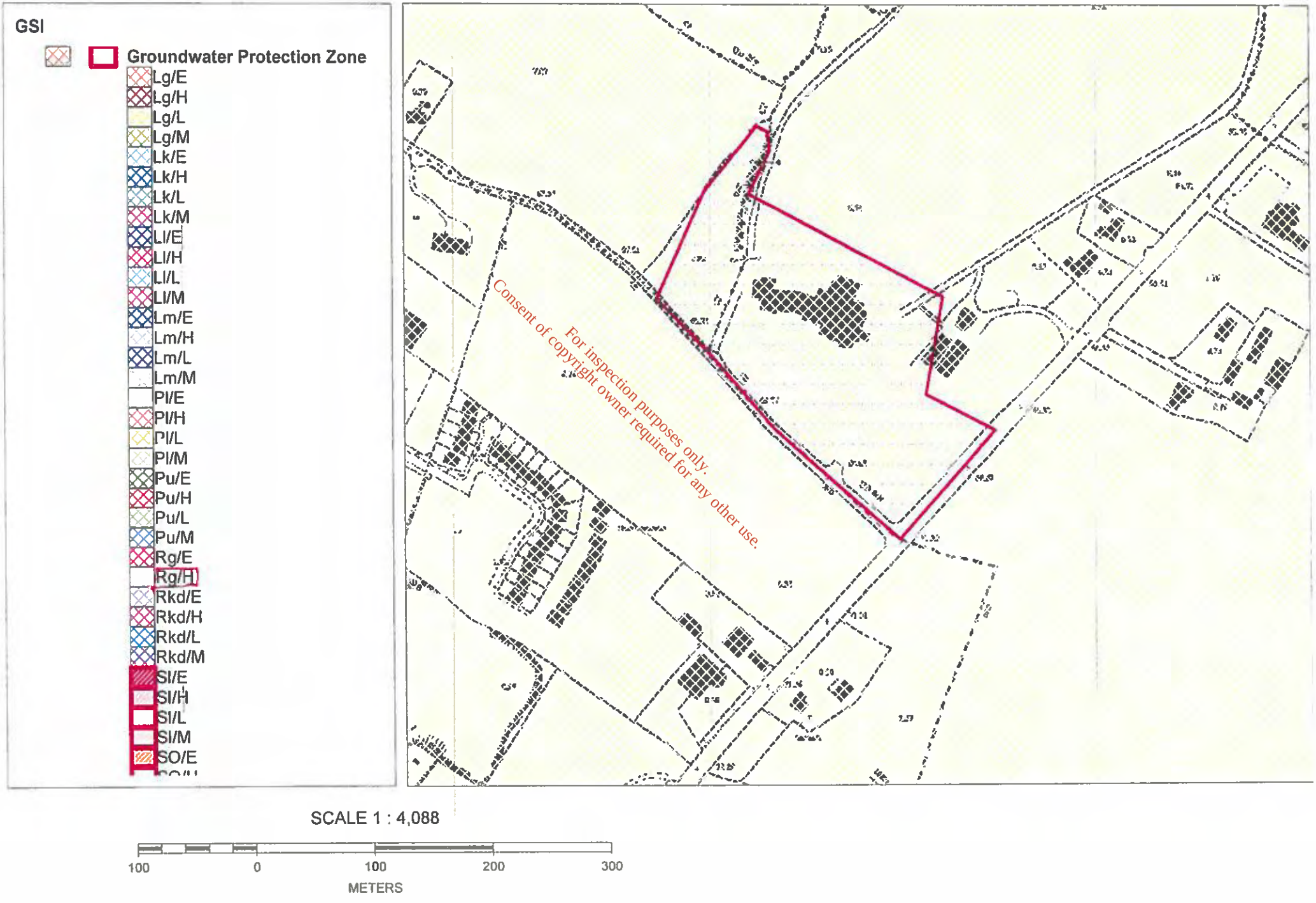


Prusselstown Refuse Depot, Athy

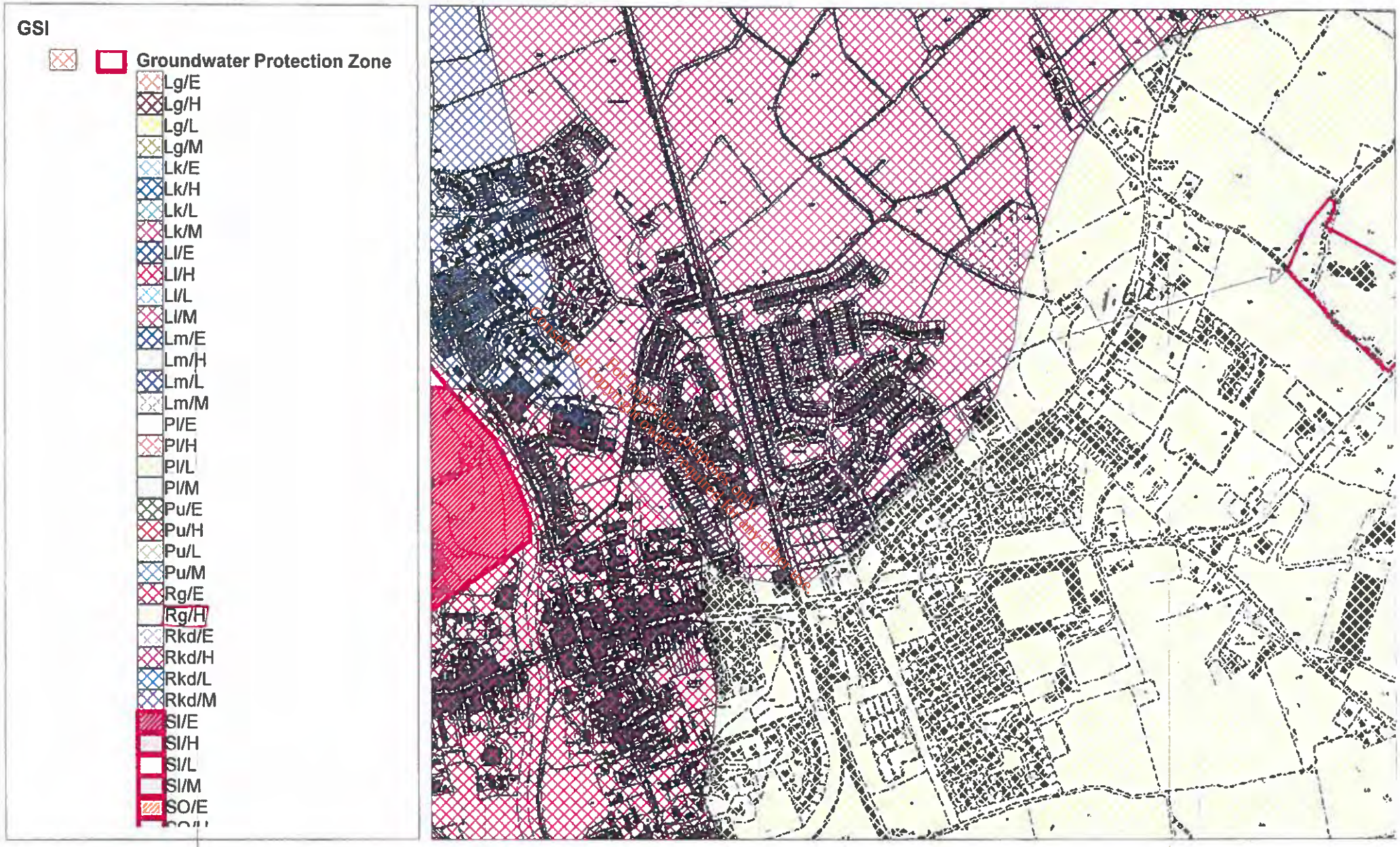


Appendix 2: Ground Water Protection Map

Prusselstown Refuse Depot, Athy

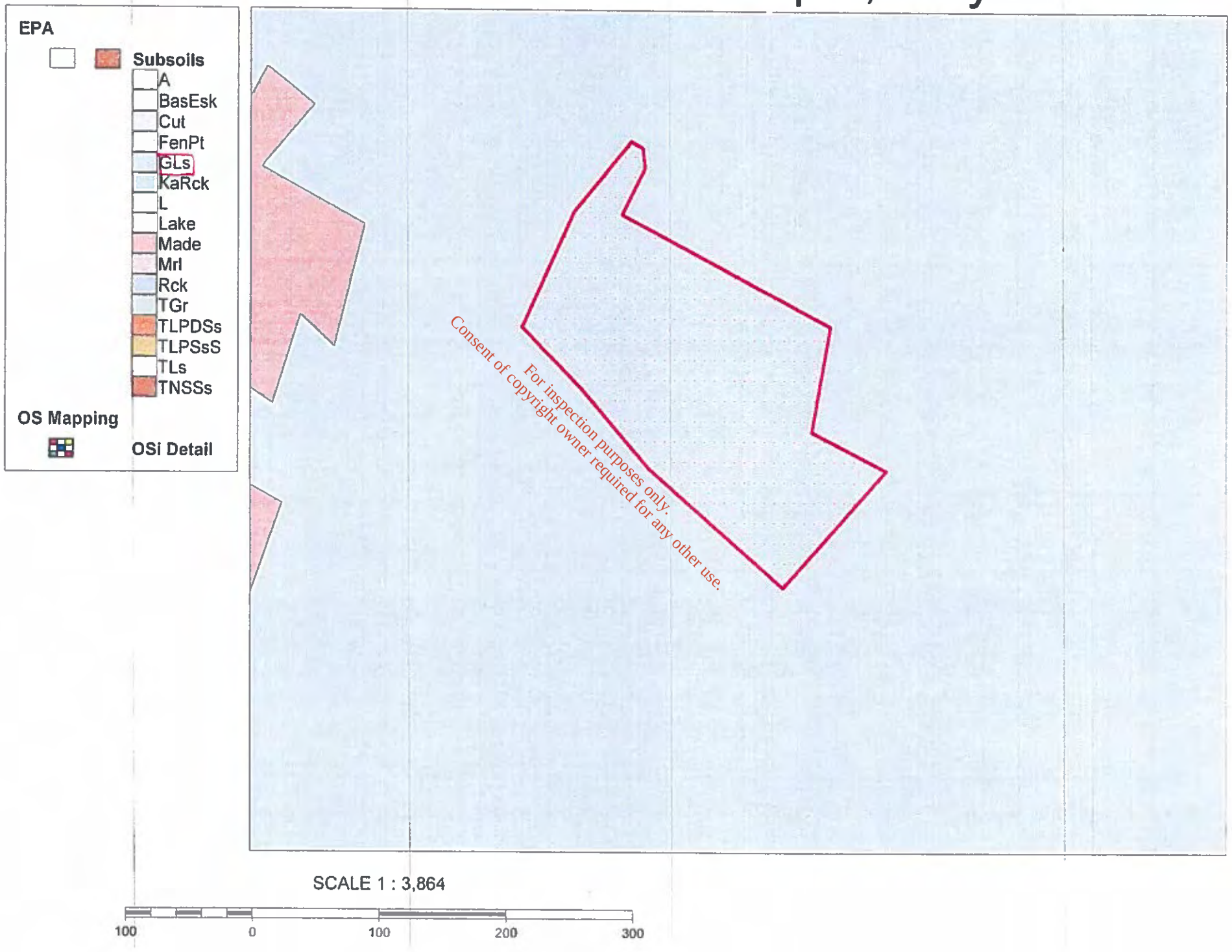


Prusselstown Refuse Depot, Athy



Appendix 3: Subsoil Map

Prusselstown Refuse Depot, Athy



Appendix 4: Photographs of site

Photograph 1: Hotel on Landfill Site

Photograph 2: Carpark on landfill site

Photograph 3: Grazing Area within landfill site

Photograph 4: Waste Land within the landfill site

Appendix 5: Cost Estimate

Appendix 5: Walkover Survey

Wallover Survey Checklist

Section 22 - Waste Management Act 1996-2011

Location: Prusselstown Refuse Depot, Athy, Co. Kildare

Information	Checked	Comment (include distances from site boundary
1. What is the current land use?		Hotel Development and associated car park, green grazing area and waste land.
2. What are the neighbouring land uses?		Residential and agricultural use
3. What is the size of the site?		The site is approximately 4 hectares
4. What is the topography?		It is a level site
5. Are there potential receptors (if yes give details)?		
Houses		Yes
Surface water features (if yes distance and direction of flow)		The Clowgarrow Bog River (is part of the Athy stream river system which is a tributary of the River Barrow) is 550 m from the landfill site.
Public Water Supplies		
Private Wells		
Services		
Other Buildings		Hotel Development
Other		
6. Are there any potential sources of contamination (if yes give details)?		
Surface waste (if yes what type)		No surface water visible
Surface ponding of leachate		No
Leachate seepage		No
Landfill gas odours		No

7. Are there any outfalls to surface water? (If so are there discharges and what is the nature of the discharge)		None visible
8. Are there any signs of impact on the environment? (if yes take photographic evidence)		No
Vegetation die off bare ground		No
Leachage seepages		No
Odours		No
Litter		No litter on site
Gas bubbling through water		No
Signs of settlement, subsidence, water logged areas		No settlement visible
Drainage of hydraulic issues		No
Downstream water quality appears poorer than upstream quality		Not tested
9. Are there any indication of remedial measures		
Capping		Clay Cap
Landfill gas collection		No
Leachate collection		No
10. Describe fences and security features (if any)		The hotel development has fencing around it. The rest of the landfill site is divided into 2 sections (i) a public waste land area with no fencing, (ii)fencing around agricultural/grazing land.
Any other relevant information		

APPENDIX B

Table 1a: Leachate: Source/hazard Scoring Matrix

Waste Type	Waste Footprint (ha)		
	≤ 1 ha	> 1 ≤ 5 ha	>5
C&D[1]	0.5	1	1.5
Municipal[2]	5	7	10
Industrial[3]	5	7	10
Pre 1977 sites[4]	1	2	3
		Max	*10*
		Result (1a)	**7**

Table 1b: Landfill Gas: Source/hazard Scoring Matrix

Waste Type	Waste Footprint (ha)		
	≤ 1 ha	> 1 ≤ 5 ha	>5
C&D[1]	0.5	0.75	1
Municipal[2]	5	7	10
Industrial[3]	3	5	7
Pre 1977 sites[4]	0.5	0.75	1
		Max	*10*
		Result (1b)	**7**

Table 2a: Leachate Migration: Pathways

Parameters		Points Available
Groundwater Vulnerability (Vertical Pathway)		
Extreme Vulnerability		3
High Vulnerability		2
Moderate Vulnerability		1
Low Vulnerability		0.5
High – Low Vulnerability		2
	Max	*3*
	Result (2a)	**2**

Table 2b: Leachate Migration: Pathways

Parameters		Points Available
Groundwater Flow Regime (Horizontal Pathway)		
Karstified Groundwater Bodies (Rk)[5]		5
Productive Fissured Bedrock Groundwater Bodies (Rf and Lm)[5]		3
Gravel Groundwater Bodies (Rg and Lg)[5]		2
Poorly Productive Bedrock Groundwater Bodies (Li, Pl, Pu)[5]		1
	Max	*5*
	Result (2b)	**2**

[1] Predominantly inert waste with low biodegradable fraction and/or small industrial waste fraction.
[2] Typically non-hazardous domestic waste (highly biodegradable) with potentially small hazardous waste fraction and/or small industrial waste fraction, e.g. town dump.
[3] Generally industrial waste where hazardous waste was known to have been deposited or there is a strong likelihood that hazardous waste was deposited due to the close proximity of such industries.
[4] Pre 1977 wastes would have been substantially degraded within the landfill.
[5] Refer to DEHLG/EPA/GSI 1999, Groundwater Protection Scheme.

Table 2c: Leachate Migration: Pathways

Parameters		Points Available
Surface Water Drainage[6] (surface water pathway)		
Is there a direct connection between drainage ditches associated with the waste body and adjacent surface water body? Yes		2
If no direct connection		0
	Max	*2*
	Result (2c)	**0**

Table 2d: Landfill Gas: Pathways (assuming receptor within 250m of source)

Parameters		Points Available
Landfill Gas Lateral Migration Potential		
Sand and Gravel, Made ground, urban, karst		3
Bedrock		2
All other tills (including limestone, sandstone etc – moderate permeability)		1.5
All Namurian or Irish Sea Tills (low permeability)		1
Clay, Alluvium, Peat		1
	Max	*3*
	Result (2d)	**3**

Table 2e: Landfill Gas: Pathways (assuming receptor located above source)

Parameters		Points Available
Landfill Gas Vertical (upwards) Potential		
Sand and Gravel, Made ground, urban, karst		5
Bedrock		3
All other tills (including limestone, sandstone etc – moderate permeability)		2
All Namurian or Irish Sea Tills (low permeability)		1
Clay, Alluvium, Peat		1
	Max	*5*
	Result (2e)	**5**

Table 3a: Leachate Migration: Receptors

Parameters		Points Available
Human Presence (presence of a house indicates potential private wells)		
On or within 50m of the waste body		3
Greater than 50m but less than 250m of the waste body		2
Greater than 250m but less than 1km of the waste body		1
Greater than 1km of the waste body		0
	Max	*3*
	Result (3a)	**3**

[6] This element needs to be determined during the site inspection (including walkover survey). The presence of a direct link between surface water drainage from the waste body and any adjacent surface water body implies the existence of a pathway.

Table 3b: Leachate Migration: Receptors

Parameters		Points Available
Protected Areas (SWDTE or GWDTE)		
Within 50m of the waste body		3
Greater than 50m but less than 250m of the waste body		2
Greater than 250m but less than 1km of the waste body		1
Greater than 1km of the waste body		0
Undesignated sites[7] within 50m of site of the waste body		1
Undesignated sites[7] greater than 50m but less than 250m of the waste body		0.5
Undesignated sites[7] greater than 250m of the waste body		0
	Max	*3*
	Result (3b)	**0**

Table 3c: Leachate Migration: Receptors

Parameters		Points Available
Aquifer Category[8] (resource potential)		
Regionally Important Aquifers (Rf, Rk, Rg)		5
Locally Important Aquifers (Li, Lm, Rg)		3
Poor Aquifers (Pl, Pu)		1
	Max	*5*
	Result (3c)	**5**

Rk Regionally Important Karstified Aquifers
Rf Regionally Important Fissured Bedrock Aquifers
Rg Regionally Important Extensive Sand/Gravel Aquifers
Ll Locally Important Sand/Gravel Aquifers
Lm Locally Important Bedrock Aquifers - Generally Moderately productive
Lg Locally Important Bedrock Aquifers - Generally productive only in local zones
Pl Poor Bedrock Aquifers - Generally unproductive except in local zones
Pu Poor Bedrock Aquifers - Generally unproductive

Table 3d: Leachate Migration: Receptors

Public Water Supplies (other than private wells)		
Within 100m of site boundary		7
Greater than 100m but less than 300m or within Inner SPA (SI) for GW supplies		5
Greater than 300m but less than 1km or within Outer SPA (SO) for GW supplies		3
Greater than 1km (karst aquifer)		3
Greater than 1km (no karst aquifer)		0
	Max	*7*
	Result (3d)	**0**

[7] The term "Undesignated sites" refers to wetland sites that are not designated under the Habitats or Bird Directive or Wildlife Act but are considered on a local scale. Consultation with NPWS is required to identify such sites.
[8] (DOHLG/EPA/GSI 1999) Groundwater Protection Scheme

Table 3e: Leachate Migration: Receptors

Parameters		Points Available
Surface Water Bodies		
Within 50m of site boundary		3
Greater than 50m but less than 250m		2
Greater than 250m but less than 1km		1
Greater than 1km		0
	Max	*3*
	Result (3e)	**1**

Table 3f: Leachate Gas: Receptors

Parameters		Points Available
Human Presence		
On site or within 50m of site boundary		5
Greater than 50m but less than 150m		3
Greater than 150m but less than 250m		1
Greater than 250m		0.5
	Max	*5*
	Result (3f)	**5**

Table 1a: Leachate: Source/hazard Scoring Matrix

Waste Type	Waste Footprint (ha)		
	≤ 1 ha	> 1 ≤ 5 ha	>5
C&D[1]	0.5	1	1.5
Municipal[2]	5	7	10
Industrial[3]	5	7	10
Pre 1977 sites[4]	1	2	3
		Max	*10*
		Result (1a)	**7**

Table 1b: Landfill Gas: Source/hazard Scoring Matrix

Waste Type	Waste Footprint (ha)		
	≤ 1 ha	> 1 ≤ 5 ha	>5
C&D[1]	0.5	0.75	1
Municipal[2]	5	7	10
Industrial[3]	3	5	7
Pre 1977 sites[4]	0.5	0.75	1
		Max	*10*
		Result (1b)	**7**

Table 2a: Leachate Migration: Pathways

Parameters		Points Available
Groundwater Vulnerability (Vertical Pathway)		
Extreme Vulnerability		3
High Vulnerability		2
Moderate Vulnerability		1
Low Vulnerability		0.5
High – Low Vulnerability		2
	Max	*3*
	Result (2a)	**2**

Table 2b: Leachate Migration: Pathways

Parameters		Points Available
Groundwater Flow Regime (Horizontal Pathway)		
Karstified Groundwater Bodies (Rk)[5]		5
Productive Fissured Bedrock Groundwater Bodies (Rf and Lm)[5]		3
Gravel Groundwater Bodies (Rg and Lg)[5]		2
Poorly Productive Bedrock Groundwater Bodies (Li, Pl, Pu)[5]		1
	Max	*5*
	Result (2b)	**2**

[1] Predominantly inert waste with low biodegradable fraction and/or small industrial waste fraction.
[2] Typically non-hazardous domestic waste (highly biodegradable) with potentially small hazardous waste fraction and/or small industrial waste fraction, e.g. town dump.
[3] Generally industrial waste where hazardous waste was known to have been deposited or there is a strong likelihood that hazardous waste was deposited due to the close proximity of such industries.
[4] Pre 1977 wastes would have been substantially degraded within the landfill.
[5] Refer to DEHLG/EPA/GSI 1999, Groundwater Protection Scheme.

Table 2c: Leachate Migration: Pathways

Parameters		Points Available
Surface Water Drainage[6] (surface water pathway)		
Is there a direct connection between drainage ditches associated with the waste body and adjacent surface water body? Yes		2
If no direct connection		0
	Max	*2*
	Result (2c)	**0**

Table 2d: Landfill Gas: Pathways (assuming receptor within 250m of source)

Parameters		Points Available
Landfill Gas Lateral Migration Potential		
Sand and Gravel, Made ground, urban, karst		3
Bedrock		2
All other tills (including limestone, sandstone etc – moderate permeability)		1.5
All Namurian or Irish Sea Tills (low permeability)		1
Clay, Alluvium, Peat		1
	Max	*3*
	Result (2d)	**3**

Table 2e: Landfill Gas: Pathways (assuming receptor located above source)

Parameters		Points Available
Landfill Gas Vertical (upwards) Potential		
Sand and Gravel, Made ground, urban, karst		5
Bedrock		3
All other tills (including limestone, sandstone etc – moderate permeability)		2
All Namurian or Irish Sea Tills (low permeability)		1
Clay, Alluvium, Peat		1
	Max	*5*
	Result (2e)	**5**

Table 3a: Leachate Migration: Receptors

Parameters		Points Available
Human Presence (presence of a house indicates potential private wells)		
On or within 50m of the waste body		3
Greater than 50m but less than 250m of the waste body		2
Greater than 250m but less than 1km of the waste body		1
Greater than 1km of the waste body		0
	Max	*3*
	Result (3a)	**3**

[6] This element needs to be determined during the site inspection (including walkover survey). The presence of a direct link between surface water drainage from the waste body and any adjacent surface water body implies the existence of a pathway.

Table 3b: Leachate Migration: Receptors

Parameters	Points Available
Protected Areas (SWDTE or GWDTE)	
Within 50m of the waste body	3
Greater than 50m but less than 250m of the waste body	2
Greater than 250m but less than 1km of the waste body	1
Greater than 1km of the waste body	0
Undesignated sites[7] within 50m of site of the waste body	1
Undesignated sites[7] greater than 50m but less than 250m of the waste body	0.5
Undesignated sites[7] greater than 250m of the waste body	0
Max	*3*
Result (3b)	**0**

Table 3c: Leachate Migration: Receptors

Parameters	Points Available
Aquifer Category[8] (resource potential)	
Regionally Important Aquifers (Rf, Rk, Rg)	5
Locally Important Aquifers (Li, Lm, Rg)	3
Poor Aquifers (Pl, Pu)	1
Max	*5*
Result (3c)	**5**

Rk Regionally Important Karstified Aquifers
Rf Regionally Important Fissured Bedrock Aquifers
Rg Regionally Important Extensive Sand/Gravel Aquifers
Ll Locally Important Sand/Gravel Aquifers
Lm Locally Important Bedrock Aquifers - Generally Moderately productive
Lg Locally Important Bedrock Aquifers - Generally productive only in local zones
Pl Poor Bedrock Aquifers - Generally unproductive except in local zones
Pu Poor Bedrock Aquifers - Generally unproductive

Table 3d: Leachate Migration: Receptors

Public Water Supplies (other than private wells)	
Within 100m of site boundary	7
Greater than 100m but less than 300m or within Inner SPA (SI) for GW supplies	5
Greater than 300m but less than 1km or within Outer SPA (SO) for GW supplies	3
Greater than 1km (karst aquifer)	3
Greater than 1km (no karst aquifer)	0
Max	*7*
Result (3d)	**0**

[7] The term "Undesignated sites" refers to wetland sites that are not designated under the Habitats or Bird Directive or Wildlife Act but are considered on a local scale. Consultation with NPWS is required to identify such sites.
[8] (DOHLG/EPA/GSI 1999) Groundwater Protection Scheme

Table 3e: Leachate Migration: Receptors

Parameters		Points Available
Surface Water Bodies		
Within 50m of site boundary		3
Greater than 50m but less than 250m		2
Greater than 250m but less than 1km		1
Greater than 1km		0
	Max	*3*
	Result (3e)	**1**

Table 3f: Leachate Gas: Receptors

Parameters		Points Available
Human Presence		
On site or within 50m of site boundary		5
Greater than 50m but less than 150m		3
Greater than 150m but less than 250m		1
Greater than 250m		0.5
	Max	*5*
	Result (3f)	**3**

APPENDIX C

AGL18195_02

REPORT ON THE GEOPHYSICAL INVESTIGATION AT PRUSSELSTOWN LANDFILL ATHY, CO. KILDARE, FOR MALONE O'REGAN

APEX Geoservices Limited
Kilanerin
Gorey
Co. Wexford

T: 0402 21842
F: 0402 21843
E: info@apexgeoservices.ie
W: www.apexgeoservices.com

24TH JUNE 2019

PRIVATE AND CONFIDENTIAL

THE FINDINGS OF THIS REPORT ARE THE RESULT OF A GEOPHYSICAL SURVEY USING NON-INVASIVE SURVEY TECHNIQUES CARRIED OUT AT THE GROUND SURFACE. INTERPRETATIONS CONTAINED IN THIS REPORT ARE DERIVED FROM A KNOWLEDGE OF THE GROUND CONDITIONS, THE GEOPHYSICAL RESPONSES OF GROUND MATERIALS AND THE EXPERIENCE OF THE AUTHOR. APEX GEOSERVICES LTD. HAS PREPARED THIS REPORT IN LINE WITH BEST CURRENT PRACTICE AND WITH ALL REASONABLE SKILL, CARE AND DILIGENCE IN CONSIDERATION OF THE LIMITS IMPOSED BY THE SURVEY TECHNIQUES USED AND THE RESOURCES DEVOTED TO IT BY AGREEMENT WITH THE CLIENT. THE INTERPRETATIVE BASIS OF THE CONCLUSIONS CONTAINED IN THIS REPORT SHOULD BE TAKEN INTO ACCOUNT IN ANY FUTURE USE OF THIS REPORT.

PROJECT NUMBER	AGL18195		
AUTHOR	**CHECKED**	**REPORT STATUS**	**DATE**
TONY LOMBARD M.SC (GEOPHYSICS)	KEVIN GALVIN B.A. (MOD)	V.01	10TH JUNE 2019
TONY LOMBARD M.SC (GEOPHYSICS)	KEVIN GALVIN B.A. (MOD)	V.02	24TH JUNE 2019

CONTENTS

1. EXECUTIVE SUMMARY

APEX Geoservices Limited was requested by Malone O'Regan to carry out a geophysical investigation at the site of Prusselstown Landfill in Athy, Co. Kildare. The purpose of the investigation is to assess the nature of a historical landfill on site.

Prusselstown Landfill site is within the grounds of a hotel in Athy, and the site is c. 4.3 Ha in extents and topography across the area ranges from c. 67 – 73 m OD.

The Geological Survey of Ireland (GSI) maps for the area indicate the site is underlain by gravels derived from limestones and the bedrock type across the site is the Ballysteen Formation which is described as dark muddy limestone.

The objectives of the investigation are to aid in determination of the extent of the waste body, the thickness of the waste, the presence of anomalous features, a volume calculation and depth to bedrock (if within limits of survey).

The geophysical investigation was conducted on the 6th and 8th November 2018 and consisted of EM Ground Conductivity mapping, Electrical Resistivity Tomography (ERT), Seismic Refraction surveying and Multi-Channel Analysis of Surface Waves (MASW) across accessible parts of the site (areas around the existing buildings were not surveyed).

A suite of 2019 direct investigation information, consisting of trial pits, leachate monitoring wells and groundwater wells, was supplied by the client for incorporation into this report. While five of the pits encountered MADE GROUND / WASTE to termination depths of 3.1 to 5.0m below ground level (BGL) two of the pits did not encounter waste to termination depths of 3.2m BGL.

Soils consisting of sandy gravelly clay, clayey silty gravel and silty sandy gravel are interpreted across the site. Where **MADE GROUND / WASTE** is interpreted the capping / topsoil of sandy gravelly clay is 0.3 – 1.5m thick.

Two types of waste are interpreted on site;

- **MADE GROUND/WASTE (municipal including organic and C&D)**. Where present this material is c. 2.9 – 11.7m thick with the thickest areas in the south and northwest of the site.
- **MADE GROUND/WASTE (C&D and municipal mixed with CLAY)**. Where present this material is 0.3 – 11.9m thick.

The combined thickness of both types of waste ranges from 0.3m in the southwest to 15.6m in the south and northwest of the site. The geophysical datasets indicate the **MADE GROUND / WASTE** is very soft – soft / very loose – loose.

In total **MADE GROUND / WASTE** covers approximately 1.71 Ha. The volume of waste is estimated as **114,920 cu.m** and tonnage is estimated at **160,888 tonnes**.

The geophysical report should be reviewed after the completion of any further direct investigation.

2. INTRODUCTION

APEX Geoservices Limited was requested by Malone O'Regan to carry out a geophysical investigation at the site of Prusselstown Landfill in Athy, Co. Kildare. The purpose of the investigation is to assess the nature of a historical landfill on site.

The geophysical investigation was conducted between the 6th and 8th November 2018 and consisted of EM Ground Conductivity mapping, Electrical Resistivity Tomography (ERT), Seismic Refraction surveying and Multi-channel Analysis of Surface Wave (MASW) across the site.

2.1 Survey Objectives

The objective of the investigation is to aid in determination of:

- The extent of the waste body,
- The thickness of the waste body,
- A volume calculation,
- Depth of ground water (where possible),
- Depth to bedrock (if within limits of survey)

2.2 Site Background & Topography

Prusselstown Landfill site is within the grounds of a hotel in Athy, Co. Kildare and is bounded to the south-east by a regional road, the R418, to the south-west by a local road, the L40071, and to the north by open agricultural lands. The area under investigation is c. 4.3 Ha in extents and topography across the area ranges from c. 67 – 73 m OD.

The site location is shown in Fig. 2.1.

Fig 2.1: Location map (site marked in red).

2.2.1 Soils and Bedrock

The Teagasc soils map for the site describes the soil as gravels derived from limestones (Fig. 2.2).

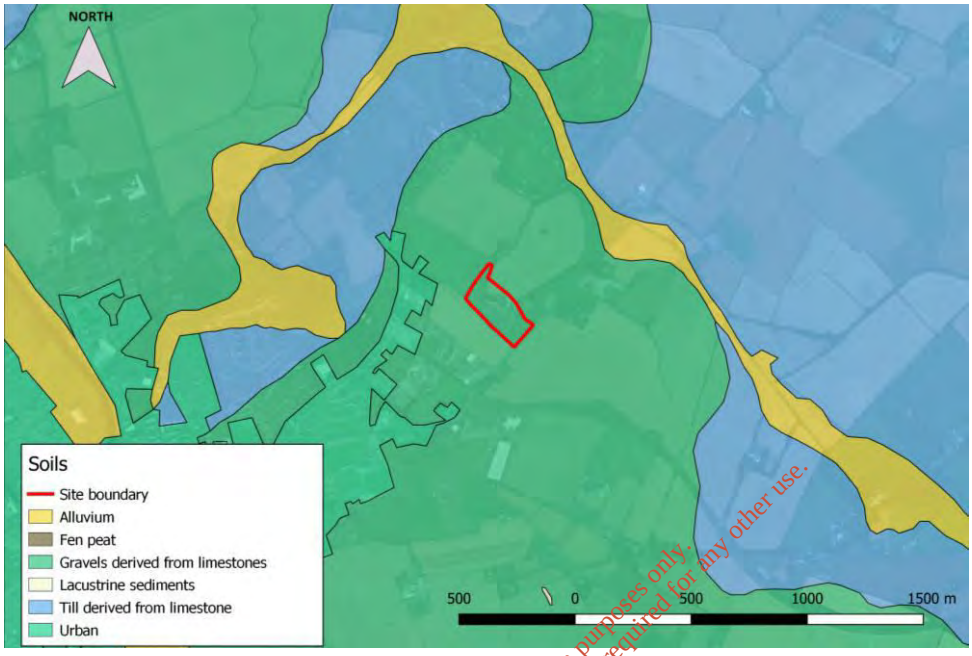


Fig 2.2: The Teagasc soils map (site marked in red).

The GSI bedrock geology map (Fig. 2.3) shows the area under investigation is located within the Ballysteen Formation which is described as dark muddy limestone.

Fig 2.3: The GSI bedrock map (site marked in red).

2.2.2 Groundwater vulnerability and aquifer classification

The area under investigation lies within an area of high groundwater vulnerability (Fig. 2.4). Bedrock within the site has been classified as bedrock which is a Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones (Fig. 2.5).

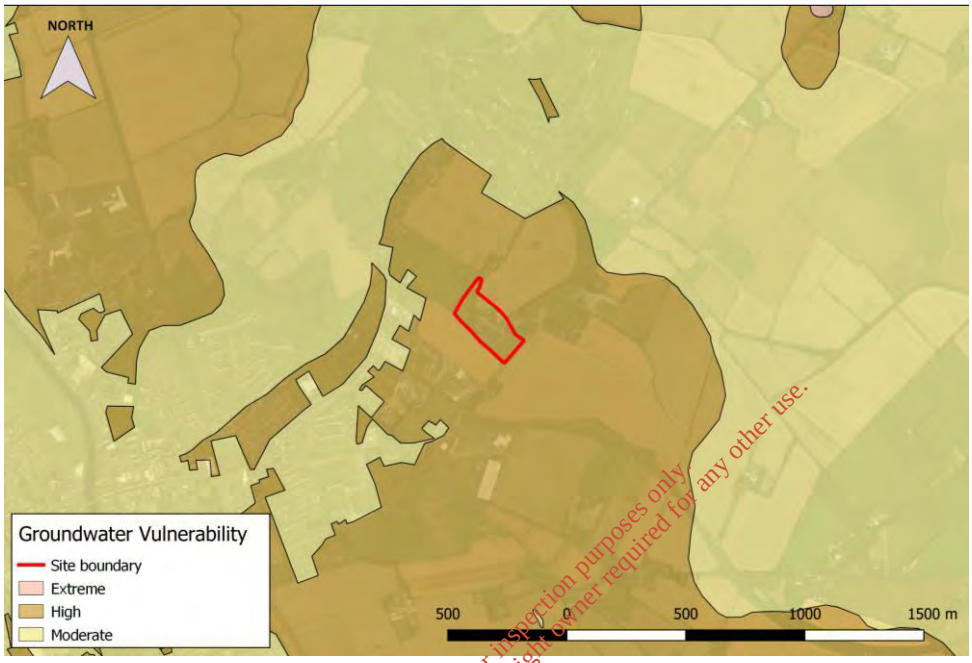


Fig 2.4: The GSI vulnerability map (site marked in red).

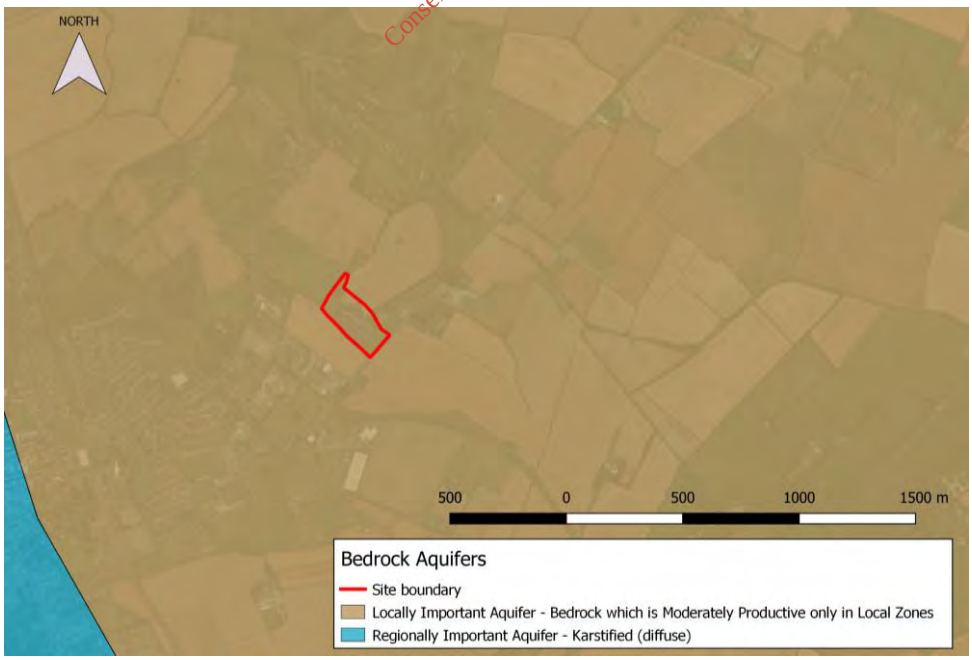


Fig 2.5: The GSI aquifer map (site marked in red).

2.2.3 Historical Data

The historical 6 inch map shows limestone gravel to the north-east of the site.

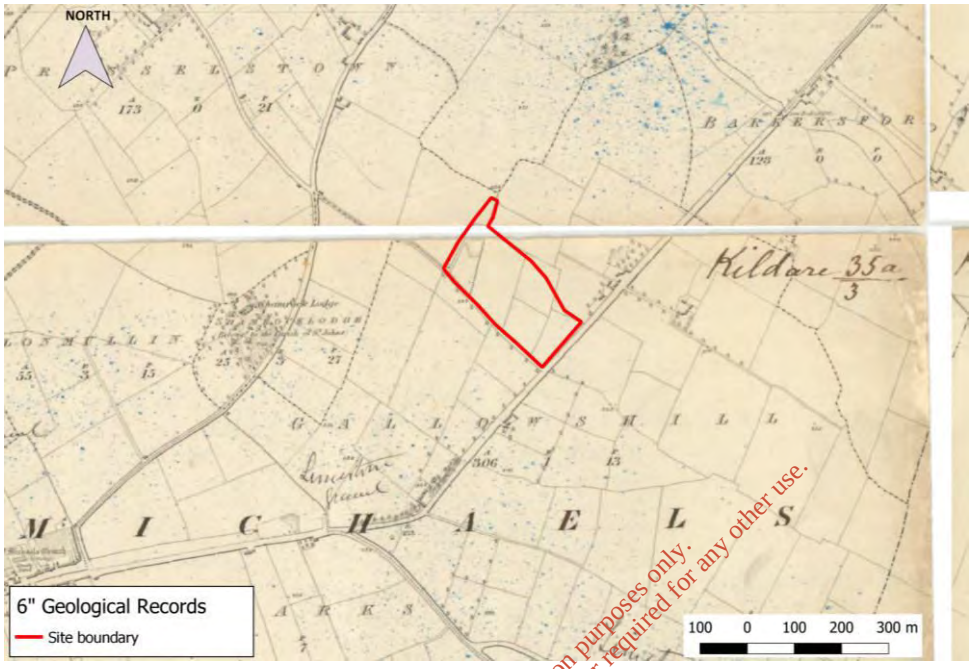


Fig 2.6: The historical 6inch map (site marked in red).

2.2.4 Direct Investigation Data

A suite of 2019 direct investigation information, consisting of trial pits, leachate monitoring wells and groundwater wells, was supplied by the client for incorporation into this report.

Seven trial pits were acquired across the site. Five encountered made ground of gravelly clay, cobbles, wood, plastic, glass, metal, brick, concrete, carpet, a mattress and burnt material to termination depths of 3.1 to 5.0m. Burnt and hydrocarbon odours are also recorded on a number of the logs. Two of the trial pits, TPC-PT & TPD-PT, encountered brown gravelly clay (with no waste indicated) to termination depths of 3.2m BGL.

Three leachate monitoring wells encountered made ground to termination depths of 5.1 – 8.5m BGL with one water strike at 1.8m BGL.

Three groundwater wells encountered thin topsoil 0.2 – 0.6m thick overlying sequences of sandy gravelly clay, gravelly sand and clayey sandy gravel to depths of 14.3 – 17.3m BGL. Water strikes were recorded at depths of 8.9 – 16.8m BGL.

The GSI online Geotechnical viewer shows six trial pits across the site. Two of these are within the area accessible to the geophysical investigation and four are to the north, around the main buildings. The pits encountered 0.2 – 0.4m of topsoil over sandy gravelly silt, silty sandy gravelly clay and made ground of plastic, clothing, wood, bags and bones to termination depths of 2.0 – 3.0m BGL. The made ground / possible made ground was encountered in the three most southerly trial pits. The location of these trial pits is shown on Drawing AGL18195_01.

2.3 Survey Rationale

The following techniques have been employed to achieve the objectives of the investigation:

- Electromagnetic ground conductivity mapping has been carried out across the site in order to map the extent of the fill and variations in the fill, and also to screen for any leachate plumes and obtain background values for the soils and rock.

- Electrical Resistivity Tomography (ERT) has been carried out across the site to investigate variations in the thickness and extent of the fill material and leachate, as well as to investigate the overburden and bedrock geology.

- Seismic refraction was carried out at selected locations. The results of the seismic survey have been used to outline the fill/soil boundary.

- Multi-Channel Analysis of Surface Waves (MASW) was carried out on the seismic refraction profiles. The results of the MASW have been used to indicate base of waste material. The MASW method is used to estimate shear-wave (S-wave) velocities in the ground material to indicate possible soft zones. Soil / fill material with an S-wave velocity of <175 m/s is generally classified as soft/loose.

As with all geophysical methods the results are based on indirect readings of the subsurface properties. The effectiveness of the proposed approach will be affected by variations in the ground properties. By combining a number of techniques it is possible to provide a higher quality interpretation and reduce any ambiguities which may otherwise exist. Further information on the detailed methodology of each geophysical method employed in this investigation is given in **APPENDIX B: DETAILED GEOPHYSICAL METHODOLOGY**.

3. RESULTS

The investigation was carried out between the 6th and 8th of November 2018 and involved the collection of 800 EM conductivity data points, 6 ERT profiles and 3 seismic refraction profiles and associated MASW across the site.

3.1 EM Ground Conductivity Mapping

The EM ground conductivity survey locations are shown on Drawing AGL18195_01. The recorded EM conductivity values are contoured on Drawing AGL18195_02. The conductivity values range from 2-95 milliSiemens/metre (mS/m).

The conductivity values have been interpreted as follows:

Conductivity (mS/m)	*Interpretation*
2 - 5	Clayey Silty GRAVEL
5 - 15	Sandy Gravelly CLAY
15 - 35	MADE GROUND / WASTE (C&D and Municipal)
35 - 95	MADE GROUND / (Municipal including organic and C&D)

3.2 ERT

Six ERT profiles were recorded across the site (Profiles R1 to R6). The locations are shown on Drawing AGL18195_01. Interpreted cross sections were compiled for the profiles and are presented on Drawings AGL18195_R1 to AGL18195_R6.

In determining the various types of imported material present from the resistivity sections R1-R6 it should be noted that:

a) typical resistivities of Irish soils range from 20 Ohm-m (clays) to around 3000 Ohm-m (dry gravel),
b) the resistivity generally increases as the sand/gravel content increases,
c) silt/clay typically has values in the range 30-50 Ohm-m,
d) silty gravelly clay typically has resistivity values in the range 50-100 Ohm-m,
e) deposits of predominantly organic waste such as those occurring in municipal landfills typically have resistivities in the range 5-30 Ohm-m.
f) leachate saturated soils originating from predominantly organic waste have a similar resistivity range to organic waste, but will be influenced by the resistivities of the host material and the degree of dilution and dispersion of the leachate,
g) inert construction and demolition (C&D) waste such as concrete, brick and mixed rock fill, stone and clay will usually have resistivities similar to gravelly material (50-500 Ohm-m).

The resistivity values recorded at this site have been interpreted on the following basis:

	Resistivity (Ohm-m)	*Interpretation*
Waste	<30	MADE GROUND / WASTE (Municipal Waste including organic and C&D
	30-80	MADE GROUND / WASTE (C&D and Municipal)
Natural Ground	80 - 240	Sandy Gravelly CLAY
	240 - 960	Clayey Silty GRAVEL (possible weathered rock towards base)
	>960	Silty Sandy GRAVEL (possible dark LIMESTONE)

3.3 Seismic Refraction Profiling

Three seismic refraction profiles (S1-S3) were recorded across the site. The locations are shown on Drawing AGL18195_01 and the results are included on the interpreted cross-sections in Drawings AGL18195_R1 & AGL18195_R2 in Appendix A. The data quality of S3 was poor and the data was not used for seismic refraction interpretation.

The P-wave seismic velocities (Vp) have been interpreted as follows:

Layer	*Average P-Wave Seismic Velocity (m/s)*	*Interpretation*	*Stiffness/Rock Quality*
1	257 - 500	MADE GROUND / WASTE	Very Soft - Soft / Very Loose - Loose
2	500 - 1000	MADE GROUND / WASTE / SOIL	Firm / Medium Dense
3	1000 - 1800	SOIL	Stiff / Dense
4	1800 - 3207	SOIL / Weathered ROCK	Very Stiff / Very Dense or Fair – Good

3.4 MASW

Three 1D MASW soundings were recorded across the site at the centre of each seismic refraction profile. Shear wave (S-wave) velocity (Vs) values were determined for the made ground/waste and underlying soil material.

Vs velocities and corresponding soil cohesion ranges are summarised in Figure 3.1.

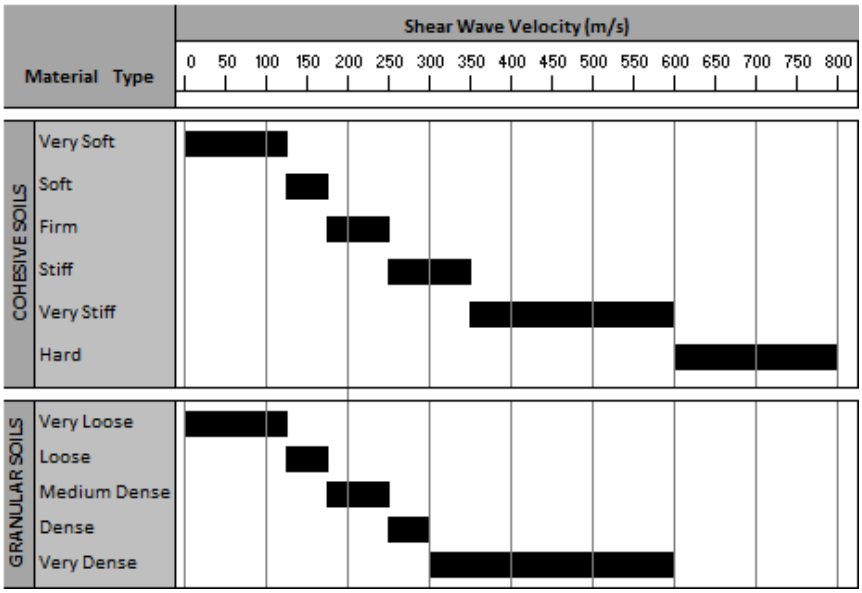


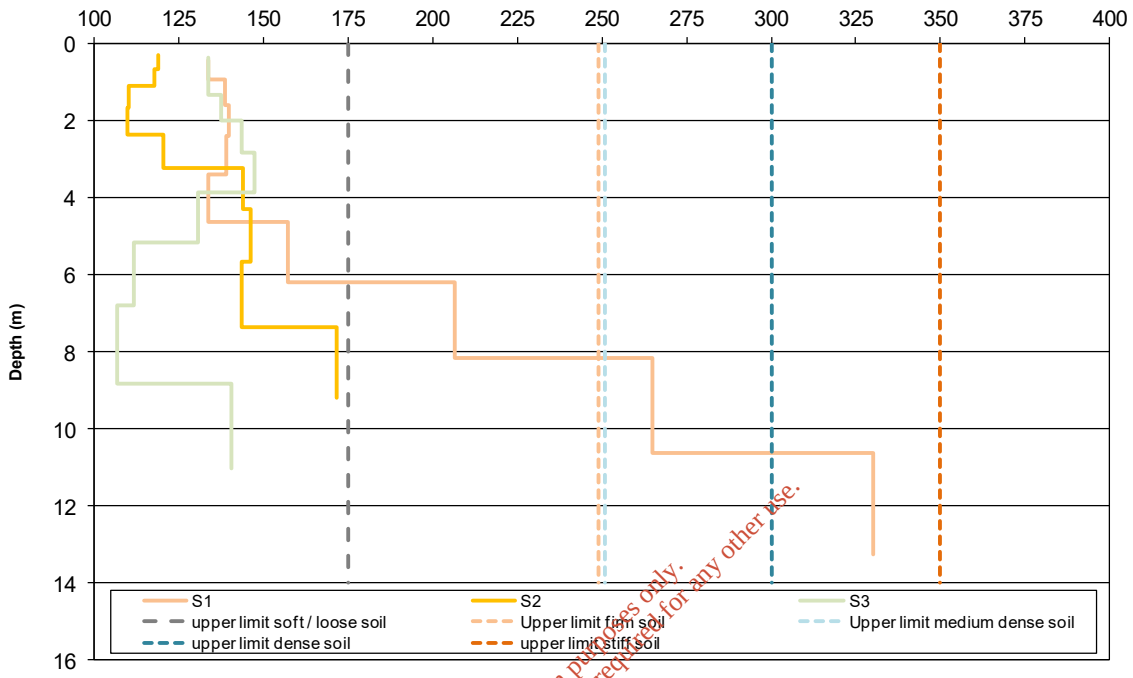
Fig 3.1: Vs velocities and corresponding soil cohesion ranges.

The velocities from this site have been interpreted as follows:

Layer	*S-Wave Seismic Velocity (m/s)*	*Interpretation*
1	106 - 125	MADE GROUND / WASTE
2	125- 175	MADE GROUND / WASTE
3	175 - 330	SOIL

The Vs seismic velocities and stiffness ranges are shown below in Figure 3.2.

Fig.3.2 Shear wave Velocity, V_s (m/s)



3.5 Integrated Interpretation

The interpretation of the geophysical data is plotted on Drawings AGL18195_03 and AGL18195_R1 to AGL18195_R6.

3.5.1 Extent of the waste

Client supplied trial pit data, leachate and monitoring well logs are combined with areas of elevated EM conductivity readings (15 - 95 mS/m) and reduced electrical resistivity readings (5 - 80 Ohm-m) to indicate areas of MADE GROUND / WASTE. The MADE GROUND / WASTE covers part of the site only (see Drawing AGL18195_03.)

Away from the MADE GROUND / WASTE the soil layers consist of sandy gravelly clay and clayey silty gravel. The seismic refraction data indicates the upper 3.2m of soil is soft – firm / loose – medium dense becoming stiff – very stiff / dense – very dense.

3.5.2 Type of waste

Two types of waste are interpreted across the site;

MADE GROUND/WASTE (municipal including organic and C&D) has been interpreted based on EM conductivity values of 35 - 95 mS/m) and ERT resistivity values (4 - 30 Ohm-m).

MADE GROUND/WASTE (C&D and municipal mixed with CLAY) has been interpreted based on EM conductivity values of 15 - 35 mS/m) and ERT resistivity values (30 - 80 Ohm-m).

3.5.3 Thickness of waste

Where MADE GROUND / WASTE is interpreted it is present beneath a thin capping layer of sandy gravelly clay which ranges in thickness from 0.3 – 1.5m.

Across the site MADE GROUND/WASTE (municipal including organic and C&D) is c. 2.9 – 11.7m thick with the thickest areas in the south and northwest of the site. This material is interpreted on ERT profiles R1 – R2 and R4 – R6 and is present across most of the site but is not interpreted on R3 in the west.

Across the site MADE GROUND/WASTE (C&D and municipal mixed with CLAY) is 0.3 – 11.9m thick. This material is interpreted on all ERT profiles R1 – R6 across the site.

The combined thickness of both types of waste ranges from 0.3m in the southwest, (see distance 86m on profile R3 on Drawing AGL18195_R3), to 15.6m in the south and northwest of the site.

The seismic refraction and the MASW datasets indicate the MADE GROUND / WASTE is very soft – soft / very loose – loose as Vp and Vs velocities within the waste range from 257 – 500m/s and 106 – 171m/s respectively.

3.5.4 Volume Calculation

The volume of waste calculated across the site is as follows;

Extent (Ha.)	*Average Thickness (m)*	*Volume (cu. m)*	*Tonnes (@ 1.4 tonnes/cu.m)*
0.52 (Thicker waste)	10.2	53,040	74,256
1.19 (Thinner waste)	5.2	61,880	86,632
TOTAL		**114,920**	**160,888**

3.5.5 Depth to Bedrock

Away from the main areas of interpreted MADE GROUND / WASTE the natural material is interpreted as clayey silty gravel, clayey silty gravel and silty sandy gravel which is up to 25m thick. While this interpretation correlates well with a thick sequence of gravel encountered to 14.3 – 17.3m BGL on client supplied groundwater wells GW1A-PT, GW2A-PT and GW3A-PT an increase in model resistivity values (>240 Ohm-m) and in seismic refraction VP velocities (1800 – 3207m/s) may also indicate a transition to weathered rock / dark limestone at depth. This transition is highlighted on Drawings AGL18195_R1 to AGL18195_R6 at depths of 5.0 – 23m BGL

4. RECOMMENDATIONS

The geophysical report should be reviewed after the completion of any further direct investigation.

5. REFERENCES

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6. APPENDIX A: DRAWINGS

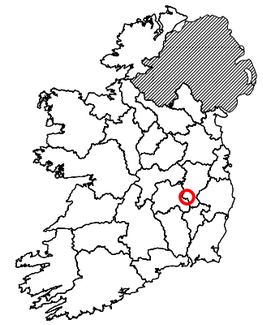
The information derived from the geophysical investigation as well as correlation with the available direct investigation is presented in the following drawings:

AGL18195_01	Geophysical Investigation Locations	Scale 1:1500 @ A3
AGL18195_02	Ground Conductivity (mS/m)	Scale 1:1500 @ A3
AGL18195_03	Summary Interpretation	Scale 1:1500 @ A3
AGL18195_R1	ERT R1 & Seismic S1 Results & Interpretation	Scale 1:1000 @ A4
AGL18195_R2	ERT R2 & Seismic S2 Results & Interpretation	Scale 1:1000 @ A4
AGL18195_R3	ERT R3 Results & Interpretation	Scale 1:1000 @ A4
AGL18195_R4	ERT R4 Results & Interpretation	Scale 1:1000 @ A4
AGL18195_R5	ERT R5 & Seismic S3 Results & Interpretation	Scale 1:1000 @ A4
AGL18195_R6	ERT R6 Results & Interpretation	Scale 1:1000 @ A4

FIGURE 1: GEOPHYSICAL INVESTIGATION LOCATIONS

SCALE 1:1500

INDEX MAP:



LEGEND:

- Site
- EM conductivity reading
- R1 — 2D resistivity profile
- S1 — Seismic refraction profile
- GW1A-PT / TPA-PT / L2A-PT — Client supplied groundwater, trial pit & leachate locations
- TP1 — Historic Trial Pits from GSI digital viewer

The information displayed here is to be used in conjunction with Report AGL18195_01 Report on the Geophysical Investigation at Prussellstown for Malone O'Reagan. APEX Geoservices Ltd. 24/06/2019.

apex geoservices

6 Knockmullen Business Park
Gorey
Co. Wexford
Ireland.
T +353 (0)402-21842
F +353 (0)402-21843
E info@apexgeoservices.ie
www.apexgeoservices.ie

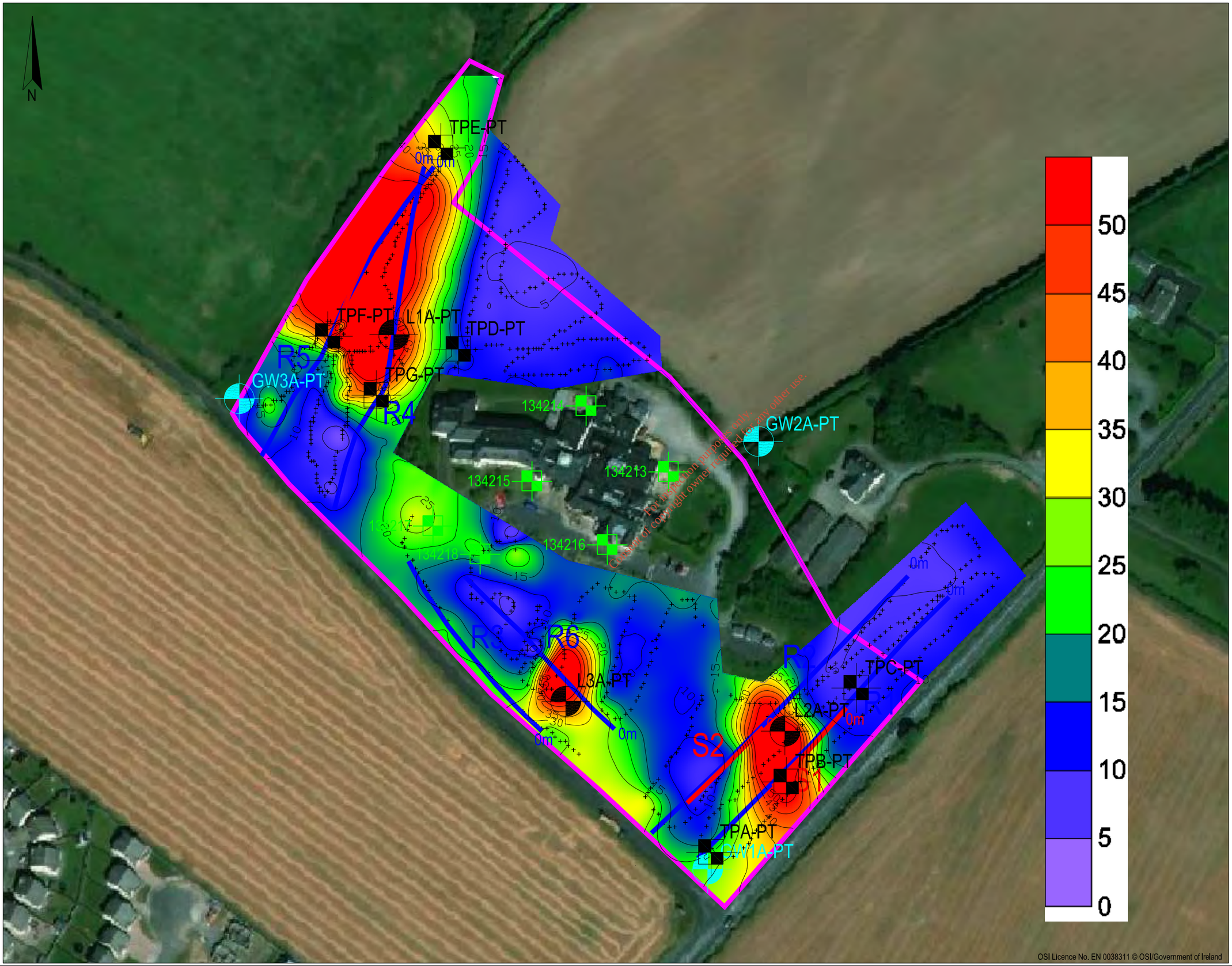
Regus House, Herald Way
Pegasus Business Park
Castle Donington
Derby DE74 2TZ
UK
T +44 (0)844 8700 692
E info@apexgeoservices.co.uk
www.apexgeoservices.co.uk

PROJECT:	PRUSSELSTOWN GEOPHYSICAL INVESTIGATION
CLIENT.:	MALONE O'REGAN
DRAWING NO:	AGL18195_01
SCALE:	AS INDICATED @ A3
DATE:	07/11/2018

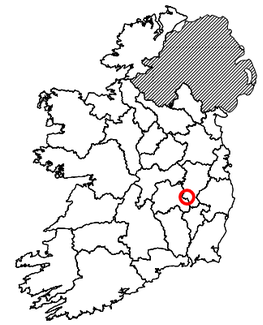
Version:	Date:	Drawn By:	Checked:
No.1	07/11/2018	KG	TL
No.2	10/06/2019	TL	KG
No.3	24/06/2019	TL	KG

FIGURE 1: GROUND CONDUCTIVITY (mS/m)

SCALE 1:1500



INDEX MAP:



LEGEND:

- Site
- 2D resistivity profile
- Seismic refraction profile

The information displayed here is to be used in conjunction with Report AGL18195_01 Report on the Geophysical Investigation at Prussellstown for Malone O'Reagan, APEX Geoservices Ltd. 24/06/2019.

apex geoservices

6 Knockmullen Business Park
Gorey
Co. Wexford
Ireland.
T +353 (0)402-21842
F +353 (0)402-21843
E info@apexgeoservices.ie
www.apexgeoservices.ie

Regus House, Herald Way
Pegasus Business Park
Castle Donington
Derby DE74 2TZ
UK
T +44 (0)844 8700 692
E info@apexgeoservices.co.uk
www.apexgeoservices.co.uk

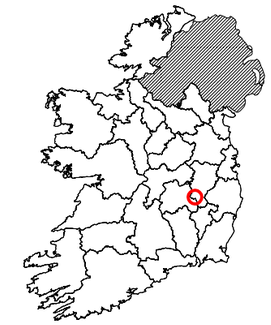
PROJECT:	PRUSSELSTOWN GEOPHYSICAL INVESTIGATION
CLIENT.:	MALONE O'REGAN
DRAWING NO:	AGL18195_02
SCALE:	AS INDICATED @ A3
DATE:	07/11/2018

Version:	Date:	Drawn By:	Checked:
No.1	07/11/2018	KG	TL
No.2	10/06/2019	TL	KG
No.3	24/06/2019	TL	KG

FIGURE 1: SUMMARY INTERPRETATION

SCALE 1:1500

INDEX MAP:



LEGEND:

- Site
- 2D resistivity profile
- Seismic refraction profile
- MADE GROUND / WASTE (primarily Municipal including organic & C&D)
- MADE GROUND / WASTE (primarily C&D and Municipal) with CLAY
- Sandy gravelly CLAY over Clayey Silty GRAVEL
- Clayey Silty GRAVEL

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apex geoservices

6 Knockmullen Business Park
Gorey
Co. Wexford
Ireland.
T +353 (0)402-21842
F +353 (0)402-21843
E info@apexgeoservices.ie
www.apexgeoservices.ie

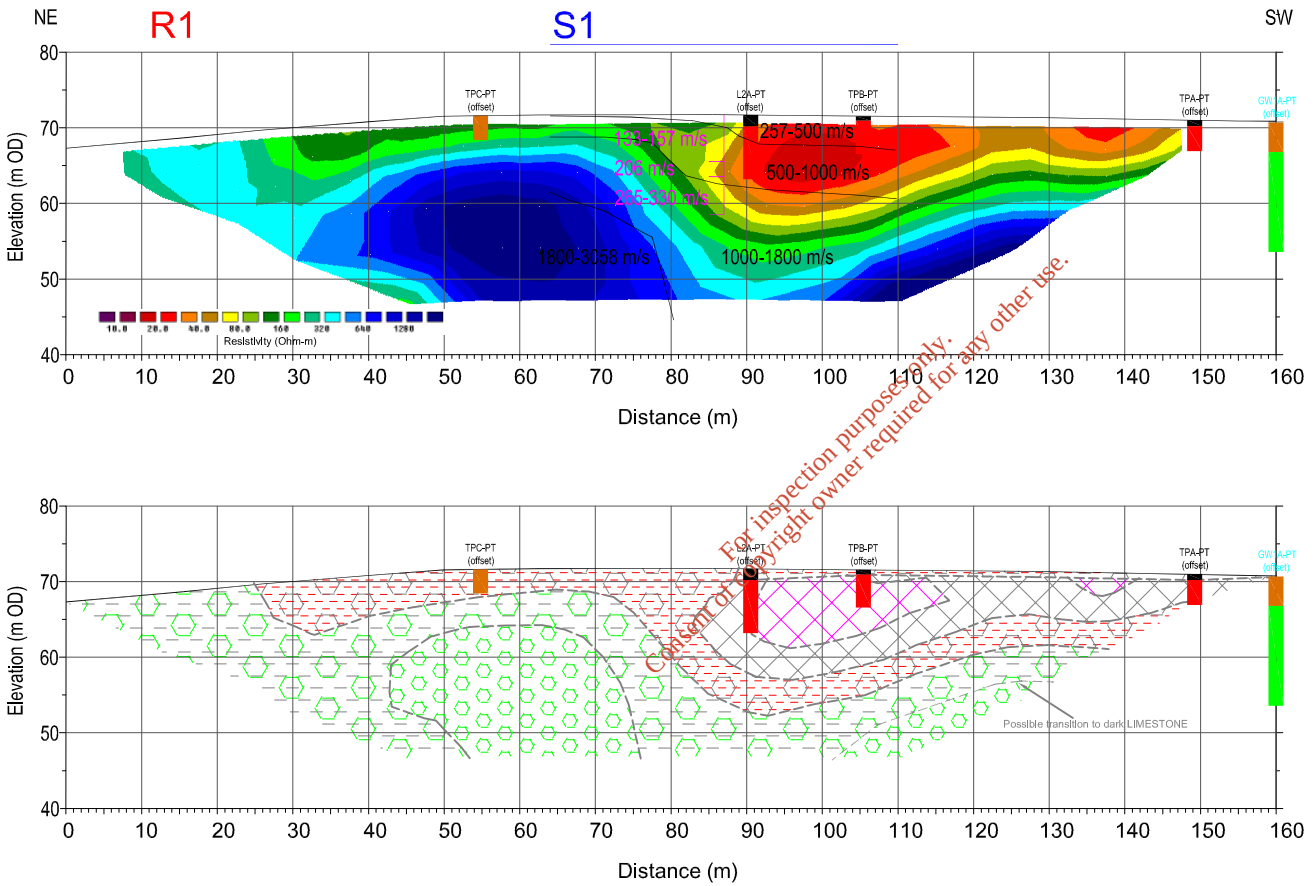
Regus House, Herald Way
Pegasus Business Park
Castle Donington
Derby DE74 2TZ
UK
T +44 (0)844 8700 692
E info@apexgeoservices.co.uk
www.apexgeoservices.co.uk

PROJECT:	PRUSSELSTOWN GEOPHYSICAL INVESTIGATION
CLIENT.:	MALONE O'REGAN
DRAWING NO:	AGL18195_03
SCALE:	AS INDICATED @ A3
DATE:	07/11/2018

Version:	Date:	Drawn By:	Checked:
No.1	07/11/2018	KG	TL
No.2	10/06/2019	TL	KG
No.3	24/06/2019	TL	KG

FIGURE 1: ERT R1 & SEISMIC S1 - RESULTS AND INTERPRETATION

SCALE 1:1000



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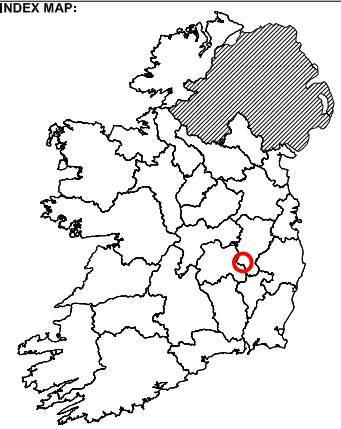

LEGEND:

- MADE GROUND / WASTE (Municipal including organic & C&D)
- MADE GROUND / WASTE (C&D and Municipal)
- Sandy gravelly CLAY
- Clayey Silty GRAVEL/ possible weathered rock towards base
- Silty Sandy GRAVEL / possible Dark LIMESTONE
- Seismic refraction layer with interpreted P-wave / S-wave velocity (1254-1288 m/s, 122-178 m/s)
- Topsoil(made), Topsoil, Made Ground
- Clay, Gravel

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apex geoservices

6 Knockmullen Business Park
Gorey
Co. Wexford
Ireland.
T +353 (0)402-21842
F +353 (0)402-21843
E info@apexgeoservices.ie
www.apexgeoservices.ie

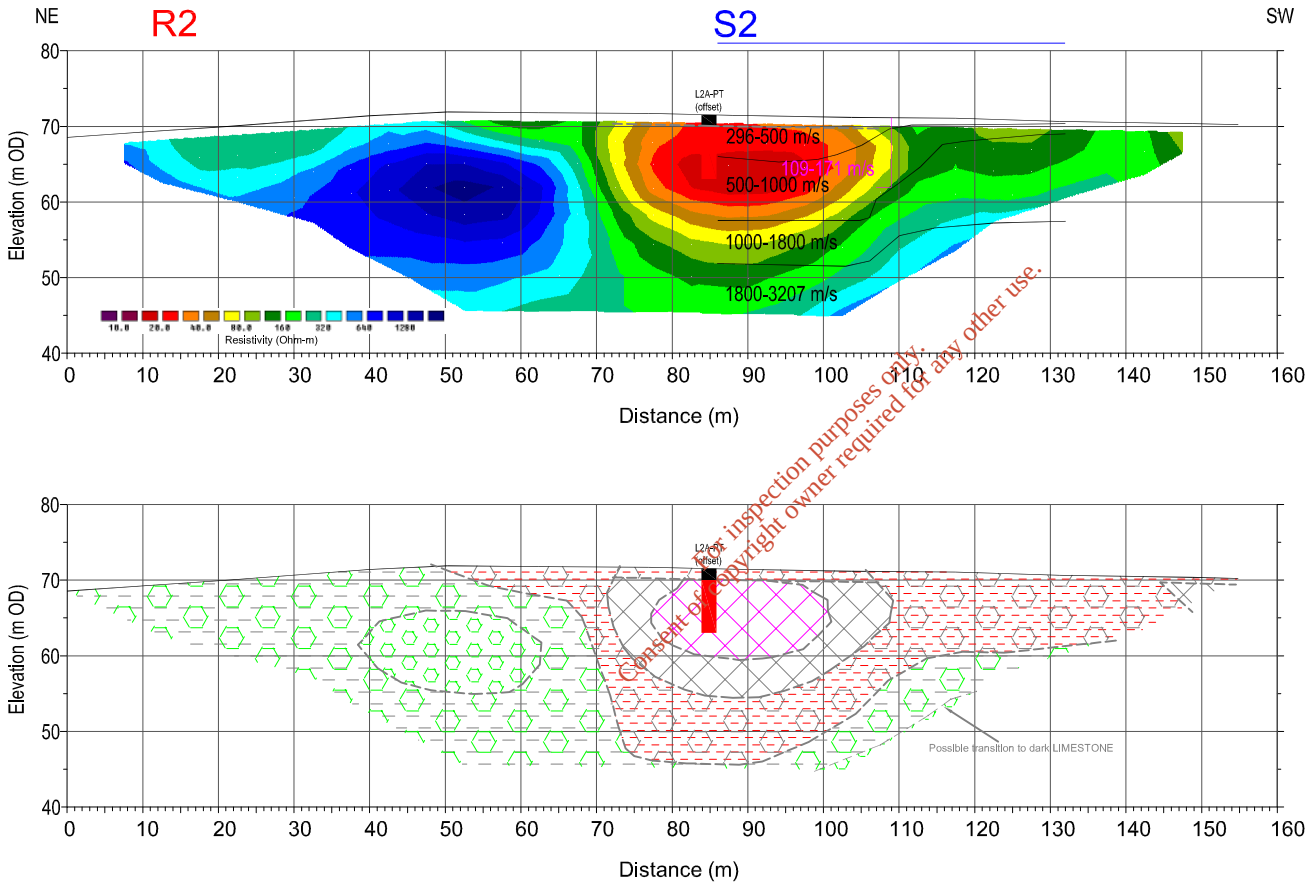
Regus House, Herald Way
Pegasus Business Park
Castle Donington
Derby DE74 2TZ
UK
T +44 (0)844 8700 692
E info@apexgeoservices.co.uk
www.apexgeoservices.co.uk

PROJECT:	PRUSSELSTOWN GEOPHYSICAL INVESTIGATION
CLIENT:	MALONE O'REGAN
DRAWING NO:	AGL18195_R1
SCALE:	AS INDICATED @ A4
DATE:	07/11/2018

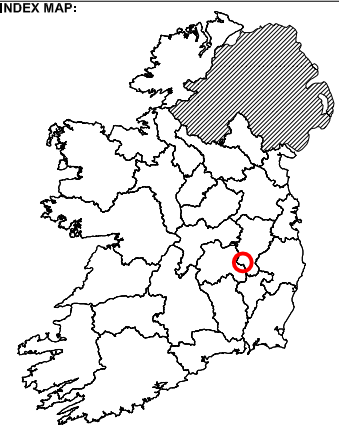
Version:	Date:	Drawn By:	Checked:
No.1	07/11/2018	KG	TL
No.2	10/06/2019	TL	KG
No.3	24/06/2019	TL	KG

FIGURE 1: ERT R2 & SEISMIC S2 - RESULTS AND INTERPRETATION

SCALE 1:1000



INDEX MAP:



LEGEND:

- MADE GROUND / WASTE (Municipal including organic & C&D)
- MADE GROUND / WASTE (C&D and Municipal)
- Sandy gravelly CLAY
- Clayey Silty GRAVEL/ possible weathered rock towards base
- Silty Sandy GRAVEL / possible Dark LIMESTONE
- Seismic refraction layer with interpreted P-wave / S-wave velocity (1254-1288 m/s, 122-178 m/s)
- Topsoil(made), Topsoil, Made Ground
- Clay, Gravel

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apex geoservices

6 Knockmullen Business Park
Gorey
Co. Wexford
Ireland.
T +353 (0)402-21842
F +353 (0)402-21843
E info@apexgeoservices.ie
www.apexgeoservices.ie

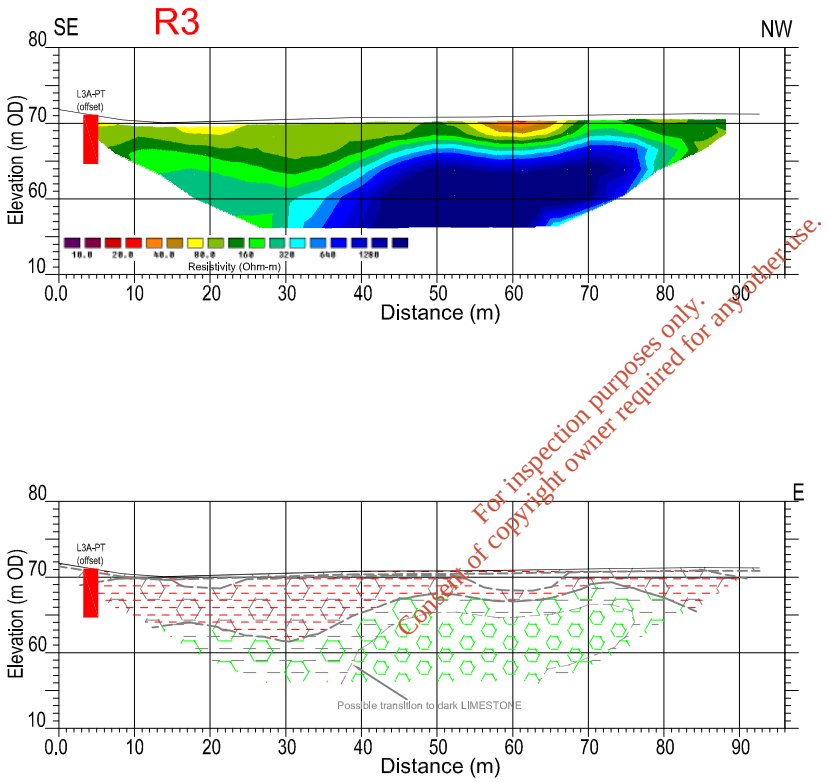
Regus House, Herald Way
Pegasus Business Park
Castle Donington
Derby DE74 2TZ
UK
T +44 (0)844 8700 692
E info@apexgeoservices.co.uk
www.apexgeoservices.co.uk

PROJECT:	PRUSSELSTOWN GEOPHYSICAL INVESTIGATION
CLIENT:	MALONE O'REGAN
DRAWING NO:	AGL18195_R2
SCALE:	AS INDICATED @ A4
DATE:	07/11/2018

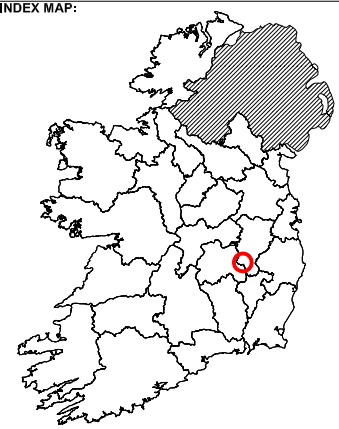
Version:	Date:	Drawn By:	Checked:
No.1	07/11/2018	KG	TL
No.2	10/06/2019	TL	KG
No.3	24/06/2019	TL	KG

FIGURE 1: ERT R3 - RESULTS AND INTERPRETATION

SCALE 1:1000



INDEX MAP:



LEGEND:

- MADE GROUND / WASTE (Municipal including organic & C&D)
- MADE GROUND / WASTE (C&D and Municipal)
- Sandy gravelly CLAY
- Clayey Silty GRAVEL/ possible weathered rock towards base
- Silty Sandy GRAVEL / possible Dark LIMESTONE
- 1254-1288 m/s, 122-178 m/s: Seismic refraction layer with interpreted P-wave / S-wave velocity
- Topsoil(made), Topsoil, Made Ground Clay, Gravel

The information displayed here is to be used in conjunction with Report AGL18195_01 Report on the Geophysical Investigation at Prussellstown for Malone O'Reagan. APEX Geoservices Ltd. 24/06/2019.

apex geoservices

6 Knockmullen Business Park
Gorey
Co. Wexford
Ireland.
T +353 (0)402-21842
F +353 (0)402-21843
E info@apexgeoservices.ie
www.apexgeoservices.ie

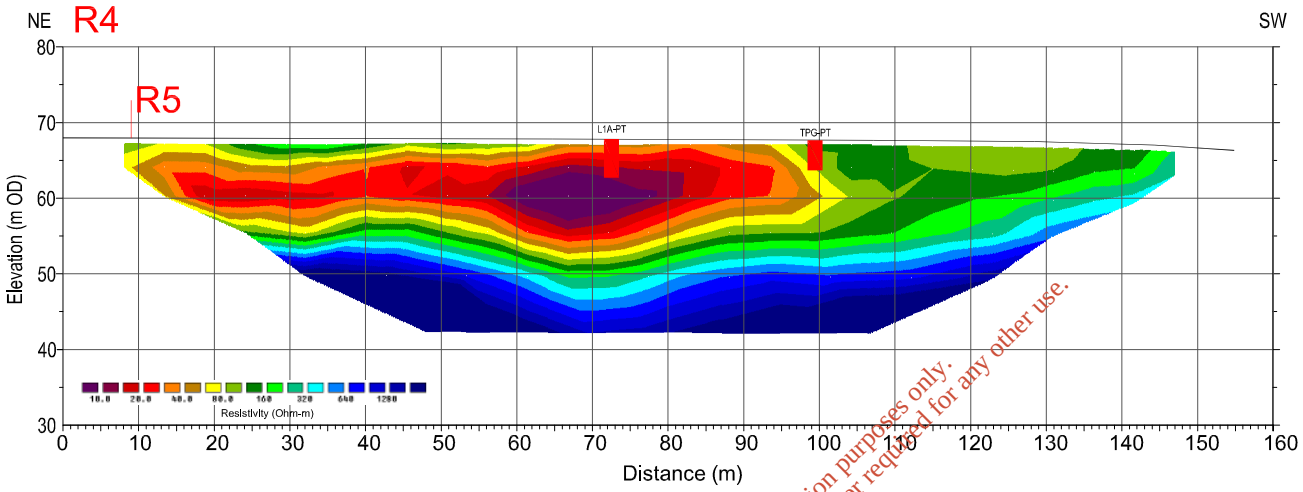
Regus House, Herald Way
Pegasus Business Park
Castle Donington
Derby DE74 2TZ
UK
T +44 (0)844 8700 692
E info@apexgeoservices.co.uk
www.apexgeoservices.co.uk

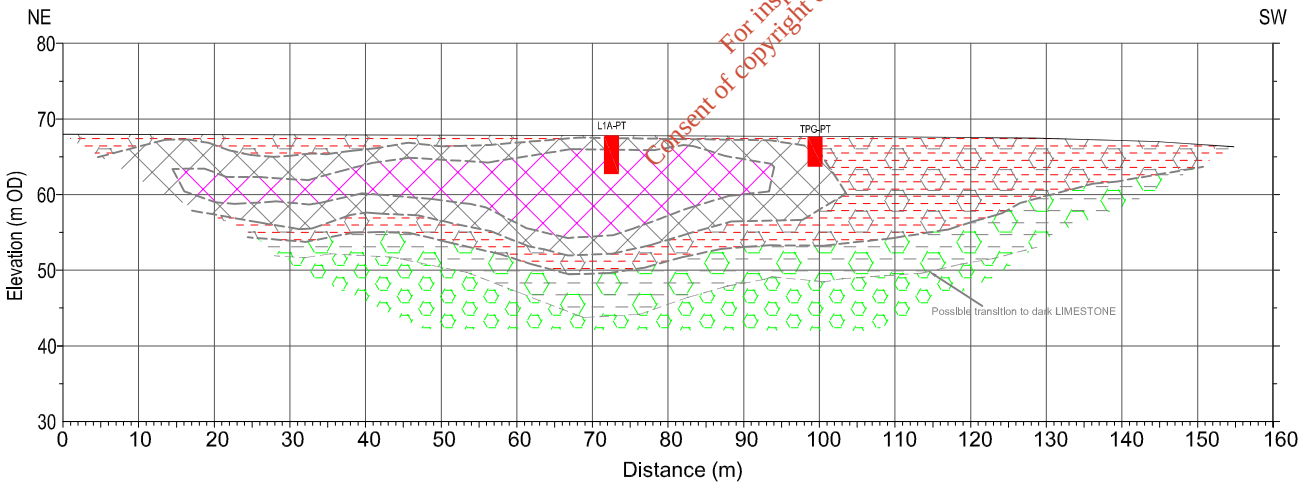
PROJECT:	PRUSSELSTOWN GEOPHYSICAL INVESTIGATION
CLIENT:	MALONE O'REGAN
DRAWING NO:	AGL18195_R3
SCALE:	AS INDICATED @ A4
DATE:	07/11/2018

Version:	Date:	Drawn By:	Checked:
No.1	07/11/2018	KG	TL
No.2	10/06/2019	TL	KG
No.3	24/06/2019	TL	KG

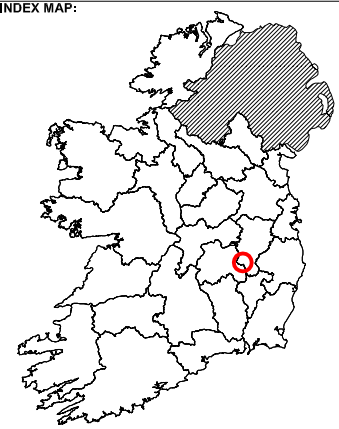
FIGURE 1: ERT R4 - RESULTS AND INTERPRETATION

SCALE 1:1000





INDEX MAP:



LEGEND:

- MADE GROUND / WASTE (Municipal including organic & C&D)
- MADE GROUND / WASTE (C&D and Municipal)
- Sandy gravelly CLAY
- Clayey Silty GRAVEL/ possible weathered rock towards base
- Silty Sandy GRAVEL / possible Dark LIMESTONE
- Seismic refraction layer with interpreted P-wave / S-wave velocity (1254-1288 m/s, 122-178 m/s)
- Topsoil(made), Topsoil, Made Ground
- Clay, Gravel

The information displayed here is to be used in conjunction with Report AGL18195_01 Report on the Geophysical Investigation at Prussellstown for Malone O'Reagan. APEX Geoservices Ltd. 24/06/2019.

apex geoservices

6 Knockmullen Business Park
Gorey
Co. Wexford
Ireland.
T +353 (0)402-21842
F +353 (0)402-21843
E info@apexgeoservices.ie
www.apexgeoservices.ie

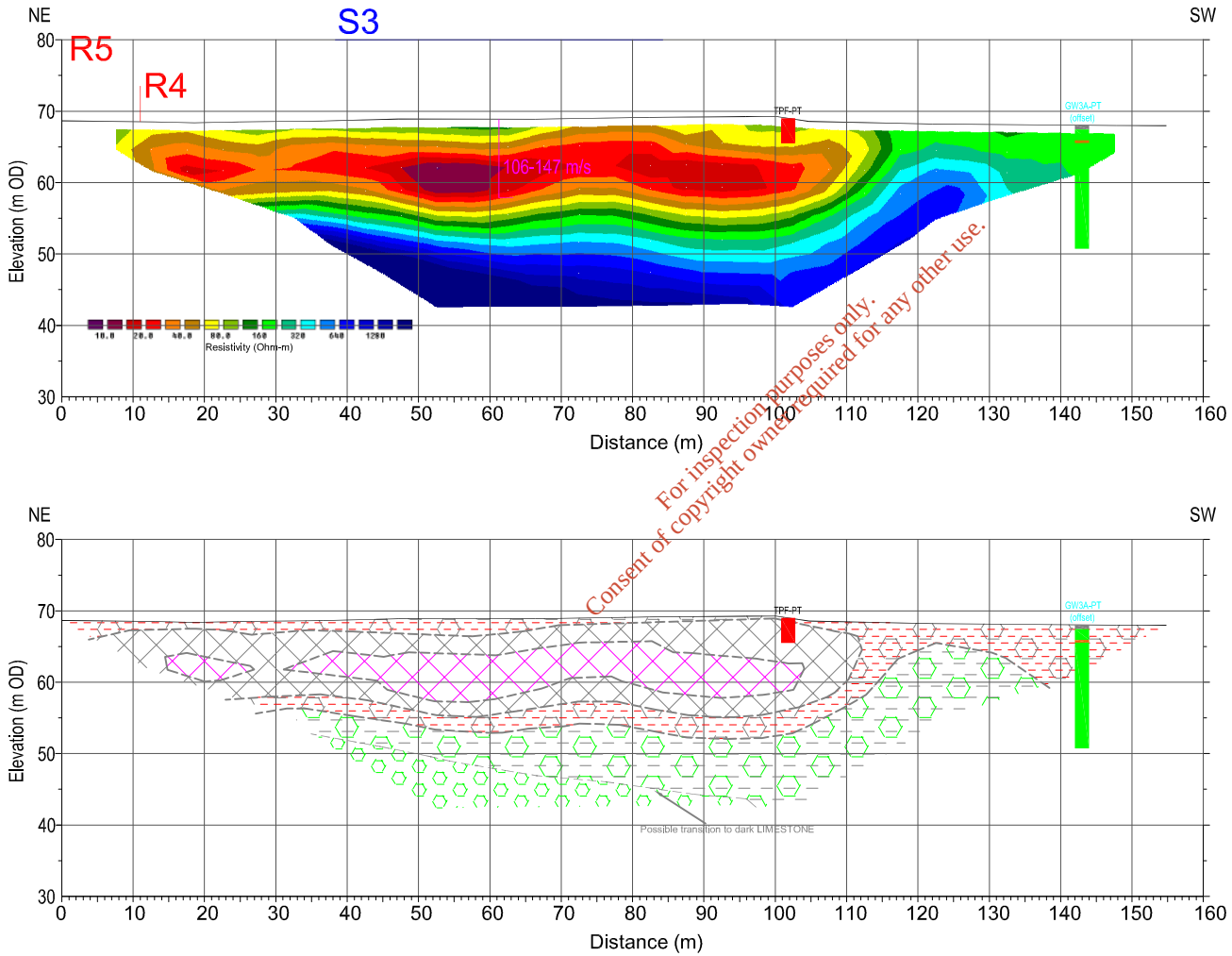
Regus House, Herald Way
Pegasus Business Park
Castle Donington
Derby DE74 2TZ
UK
T +44 (0)844 8700 692
E info@apexgeoservices.co.uk
www.apexgeoservices.co.uk

PROJECT:	PRUSSELSTOWN GEOPHYSICAL INVESTIGATION
CLIENT:	MALONE O'REGAN
DRAWING NO:	AGL18195_R4
SCALE:	AS INDICATED @ A4
DATE:	07/11/2018

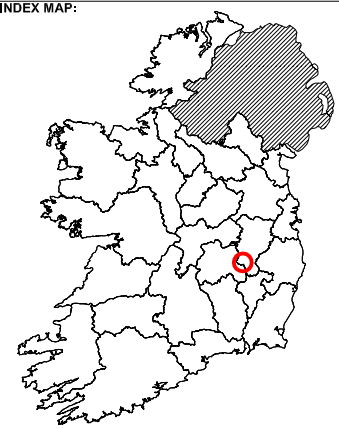
Version:	Date:	Drawn By:	Checked:
No.1	07/11/2018	KG	TL
No.2	10/06/2019	TL	KG
No.3	24/06/2019	TL	KG

FIGURE 1: ERT R5 & SEISMIC S3 - RESULTS AND INTERPRETATION

SCALE 1:1000



INDEX MAP:



LEGEND:

- MADE GROUND / WASTE (Municipal including organic & C&D)
- MADE GROUND / WASTE (C&D and Municipal)
- Sandy gravelly CLAY
- Clayey Silty GRAVEL/ possible weathered rock towards base
- Silty Sandy GRAVEL / possible Dark LIMESTONE
- Seismic refraction layer with interpreted P-wave / S-wave velocity (1254-1288 m/s, 122-178 m/s)
- Topsoil(made), Topsoil, Made Ground
- Clay, Gravel

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apex geoservices

6 Knockmullen Business Park
Gorey
Co. Wexford
Ireland.
T +353 (0)402-21842
F +353 (0)402-21843
E info@apexgeoservices.ie
www.apexgeoservices.ie

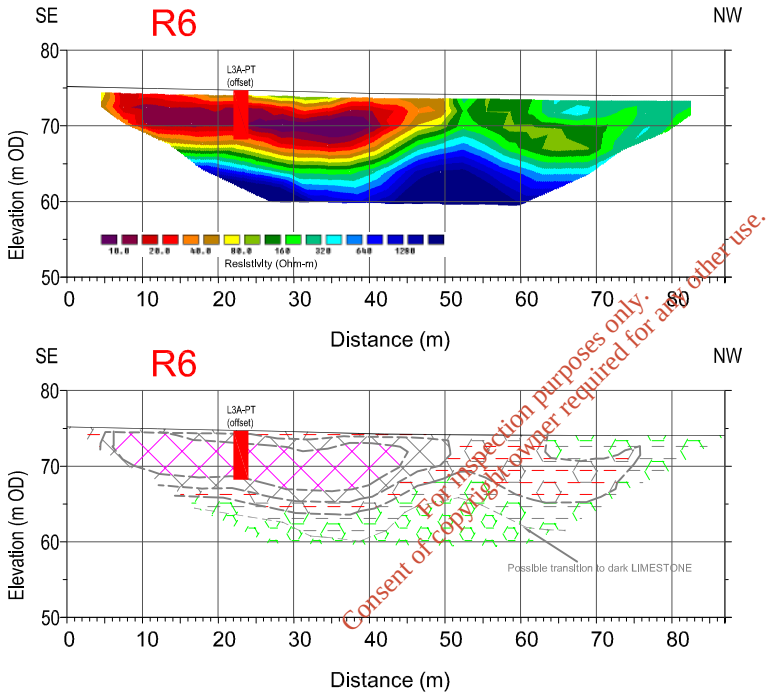
Regus House, Herald Way
Pegasus Business Park
Castle Donington
Derby DE74 2TZ
UK
T +44 (0)844 8700 692
E info@apexgeoservices.co.uk
www.apexgeoservices.co.uk

PROJECT:	PRUSSELSTOWN GEOPHYSICAL INVESTIGATION
CLIENT:	MALONE O'REGAN
DRAWING NO:	AGL18195_R5
SCALE:	AS INDICATED @ A4
DATE:	07/11/2018

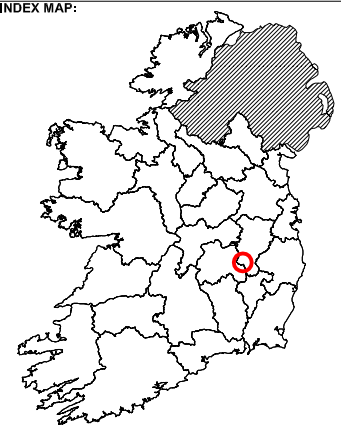
Version:	Date:	Drawn By:	Checked:
No.1	07/11/2018	KG	TL
No.2	10/06/2019	TL	KG
No.3	24/06/2019	TL	KG

FIGURE 1: ERT R6 - RESULTS AND INTERPRETATION

SCALE 1:1000



INDEX MAP:



LEGEND:

- MADE GROUND / WASTE (Municipal including organic & C&D)
- MADE GROUND / WASTE (C&D and Municipal)
- Sandy gravelly CLAY
- Clayey Silty GRAVEL/ possible weathered rock towards base
- Silty Sandy GRAVEL / possible Dark LIMESTONE
- 1254-1288 m/s / 122-176 m/s — Seismic refraction layer with interpreted P-wave / S-wave velocity
- Topsoil(made), Topsoil, Made Ground, Clay, Gravel

The information displayed here is to be used in conjunction with Report AGL18195_01 Report on the Geophysical Investigation at Prussellstown for Malone O'Reagan. APEX Geoservices Ltd. 24/06/2019.

apex geoservices

6 Knockmullen Business Park
Gorey
Co. Wexford
Ireland.
T +353 (0)402-21842
F +353 (0)402-21843
E info@apexgeoservices.ie
www.apexgeoservices.ie

Regus House, Herald Way
Pegasus Business Park
Castle Donington
Derby DE74 2TZ
UK
T +44 (0)844 8700 692
E info@apexgeoservices.co.uk
www.apexgeoservices.co.uk

PROJECT:	PRUSSELSTOWN GEOPHYSICAL INVESTIGATION
CLIENT:	MALONE O'REGAN
DRAWING NO:	AGL18195_R6
SCALE:	AS INDICATED @ A4
DATE:	07/11/2018

Version:	Date:	Drawn By:	Checked:
No.1	07/11/2018	KG	TL
No.2	10/06/2019	TL	KG
No.3	24/06/2019	TL	KG

7. APPENDIX B: DETAILED GEOPHYSICAL METHODOLOGY

A combination of a number of geophysical techniques was used to provide the high quality interpretation and reduce any ambiguities, which may otherwise exist.

7.1 EM ground conductivity mapping

7.1.1 Principles

This method operates on the principle of inducing currents in conductive substrata and measuring the resultant secondary electro-magnetic field. The strength of this secondary EM field is calibrated to give apparent ground conductivity in milliSiemens/metre (mS/m). Readings over material such as organic waste and peat give high conductivity values while readings over dry materials with low clay mineral content such as gravels, limestone or quartzite give low readings.

The EM ground conductivity survey technique determines the apparent conductivity of the ground material from 0-6m bgl depending on the dipole mode used.

7.1.2 Data collection

The EM equipment used was a GF CMD-4 conductivity meter equipped with data logger. This instrument features a real time graphic display of the previous 20 measurement points to monitor data quality and results. Conductivity and in-phase values were recorded across the site. Local conditions and variations were recorded.

7.1.3 Data processing

The conductivity and in-phase field readings were downloaded, contoured and plotted using the SURFER 12 program (Golden Software, 2015). Assignation of material types and possible anomaly sources was carried out, with cross-reference to other data.

7.1.4 Relocation

All data were referenced using a GPS system and all positions are given in Irish Tranverse Mercator coordinates.

7.2 Electrical Resistivity Tomography (ERT)

Electrical Resistivity Tomography was carried out to provide information on lateral variations in the overburden material as well as on the underlying overburden and bedrock.

7.2.1 Principles

This surveying technique makes use of the Wenner resistivity array. The 2D-resistivity profiling method records a large number of resistivity readings in order to map lateral and vertical changes in material types. The 2D-resistivity profiling method involves the use of 64 electrodes connected to a resistivity meter, using computer software to control the process of data collection and storage.

7.2.2 Data Collection

Profiles were recorded using a Tigre resistivity meter, imaging software, two 32 takeout multicore cables and up to 64 stainless steel electrodes. Saline solution was used at the electrode/ground interface in order to gain a good electrical contact required for the technique to work effectively. The recorded data were processed and viewed immediately after surveying.

7.2.3 Data Processing

The field readings were stored in computer files and inverted using the RES2DINV package (Campus Geophysical Instruments, 1997) with up to 5 iterations of the measured data carried out for each profile to obtain a 2D-Depth model of the resistivities.

The inverted 2D-Resistivity models and corresponding interpreted geology are displayed on the accompanying drawings alongside the processed seismic sections. Distance is indicated along the horizontal axis of the profiles. Profiles have been contoured using the same contour intervals and colour codes.

7.3 Seismic refraction profiling

7.3.1 Principles

This method measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities.

Seismic profiling measures the p-wave velocity (Vp) of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher Vp velocities while soft, loose or fractured materials have lower Vp velocities. Readings are taken using geophones connected via multi-core cable to a seismograph.

7.3.2 Data Collection

A Geode high resolution 24 channel digital seismograph, 24 10HZ vertical geophones and a 10 kg hammer were used to provide first break information, with a 24 take-out cable (2m spacing). Equipment was carried was operated by a two-person crew.

Readings are taken using geophones connected via multi-core cable to a seismograph. The depth of resolution of soil/bedrock boundaries is determined by the length of the seismic spread, typically the depth of resolution is about one third the length of the profile.(eg. 69m profile ~23m depth, 46m profile ~ 15m depth)

Shots from seven different positions were taken (2 x off-end, 2 x end, 3 x middle) to ensure optimum coverage of all refractors. All profiles were surveyed to Irish National Grid using a ProXR dGPS system.

7.3.3 Data Processing

The recorded data was processed and interpreted using ray-tracing along with time term inversion and tomographic inversion methods, to acquire depths to boundaries and the P-wave velocities of these layers, using the SeisImager/2D programme from Geometrics.

SeisImager/2D interprets seismic refraction data as a laterally varying layered earth structure. The programme includes three methods for data analysis, time-term inversion, the reciprocal method and tomography.

The tomography method creates an initial velocity model, then traces rays through the model, comparing the calculated and measured traveltimes. The model is then modified and the process repeated to minimise the difference between the calculated and measured times.

Approximate errors for Vp velocities are estimated to be +/- 10%. Errors for the calculated layer thicknesses are of the order of +/-20%. Possible errors due to the "hidden layer" and "velocity inversion" effects may also occur (Soske, 1959).

7.4 Multichannel Analysis of Surface Waves (MASW)

MASW profiling was carried out to provide shear wave velocity profiles with depth.

7.4.1 Principles

The Multi-channel Analysis of Surface Waves (MASW) (Park et al., 1998, 1999) utilizes Surface waves (Rayleigh waves) to determine the elastic properties of the shallow subsurface (<15m). Surface waves carry up to two/thirds of the seismic energy but are usually considered as noise in conventional body wave reflection and refraction seismic surveys.

The penetration depth of surface waves changes with wavelength, i.e. longer wavelengths penetrate deeper. When the elastic properties of near surface materials vary with depth, surface waves then become dispersive, i.e. propagation velocity changes with frequency. The propagation (or phase) velocity is determined by the average elastic property of the medium within the penetration depth. Therefore the dispersive nature of surface waves may be used to investigate changes in elastic properties of the shallow subsurface.

The MASW method employs the multi-channel recording and processing techniques (Sheriff and Geldart, 1982) that have similarities to those used in a seismic reflection survey and which allow better waveform analysis and noise elimination. To produce a shear wave velocity (Vs) profile and a stiffness profile of the subsurface using Surface waves the following basic procedure is followed:

(i)A point source (eg. a sledgehammer) is used to generate vertical ground motions,

(ii)The ground motions are measured using low frequency geophones, which are disposed along a straight line directed toward the source,

(iii)the ground motions are recorded using either a conventional seismograph, oscilloscope or spectrum analyzer,

(iv)a dispersion curve is produced from a spectral analysis of the data showing the variation of Surface wave velocity with wavelength,

(v)the dispersion curve in inverted using a modeling and least squares minimization process to produce a subsurface profile of the variation of Surface wave and shear wave velocity with depth.

7.4.2 Data Collection

A Geode high resolution 24 channel digital seismograph, 24 10HZ vertical geophones and a 10 kg hammer were used, with a 24 take-out cable (2m spacing). Equipment was carried was operated by a two-person crew.

7.4.3 Data Processing

MASW processing was carried out using the SURFSEIS processing package developed by Kansas Geological Survey (KGS, 2010). SURFSEIS is designed to generate a shear wave (Vs) velocity profile.

SURFSEIS data processing involves three steps:

(i) Preparation of the acquired multichannel record. This involves converting data file into the processing format.

(ii) Production of a dispersion curve from a spectral analysis of the data showing the variation of Raleigh wave phase velocity with wavelength. Confidence in the dispersion curve can be estimated through a measure of signal to noise ratio (S/N), which is obtained from a coherency analysis. Noise includes both body waves and higher mode surface waves. To obtain an accurate dispersion curve the spectral content and phase velocity characteristics are examined through an overtone analysis of the data.

(iii) Inversion of the dispersion curve is then carried out to produce a subsurface profile of the variation of shear wave velocity with depth.

7.5 Spatial relocation

All the geophysical investigation locations were acquired using Trimble Geo 7X high-accuracy GNSS handheld using the settings listed below. This system allows collecting GPS data with sub-meter accuracy.

Coordinate zone:	ITM (Republic of Ireland)
Datum:	Ordnance
Coordinate units:	Meters
Altitude units:	Meters
Survey altitude reference:	MSL
Geoid model:	Republic of Ireland

8. APPENDIX C: SEISMIC REFRACTION PLATES

For seismic refraction profile S1 and S2 the tomographic inversions are shown below. The locations of the profiles are shown in **Appendix A: Drawings**.

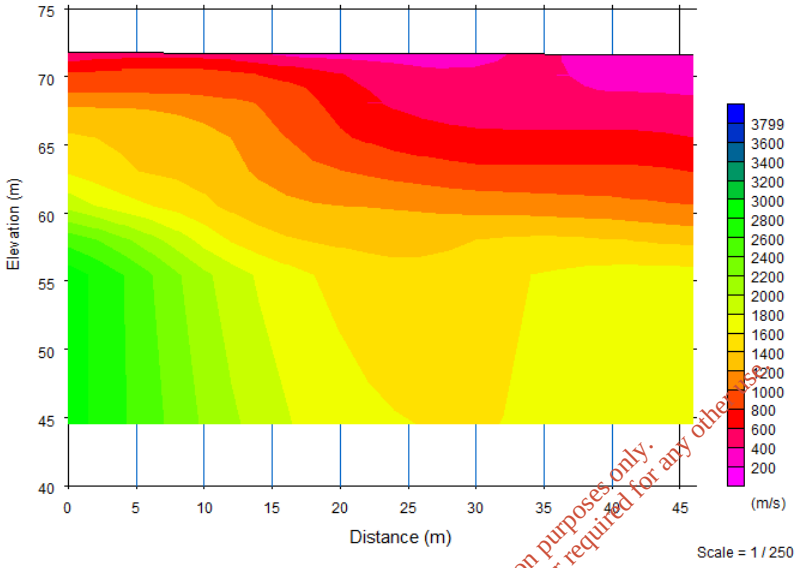


Figure 8.1: Tomographic inversion for seismic refraction spread S1.

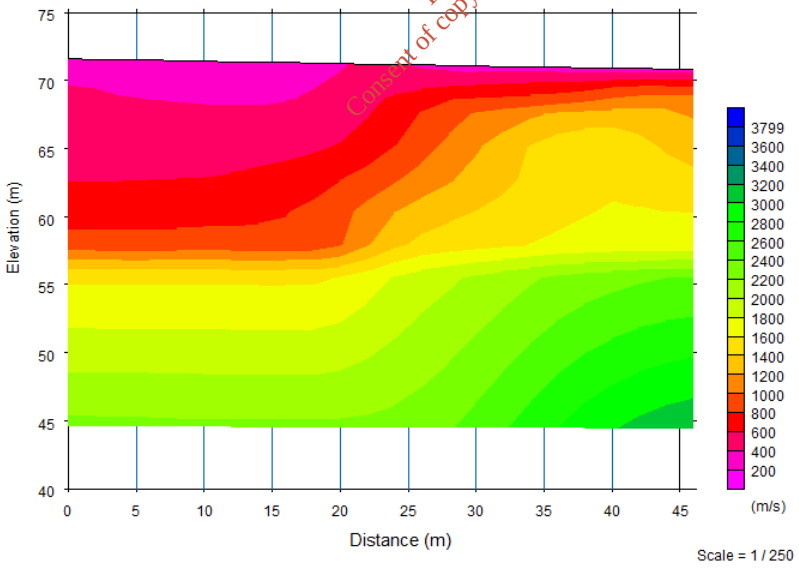


Figure 8.2: Tomographic inversion for seismic refraction spread S2.

APPENDIX D

TRIAL PIT LOG

MALONE O'REGAN ENVIRONMENTAL
Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V32Y

Project Number: E1506

Client: Kildare County Council

Project Title: E1506-Kildare Legacy Landfills

Site Location: Prusselstown, Athy, Co. Kildare

TRIAL PIT NO: TPA-PT

SUBSURFACE CONDITIONS				SAMPLE	
Depth (mbgl)	SYMBOL	DESCRIPTION	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)
0		MADE GROUND. Brown, gravelly, CLAY with cobbles. Dry. No odour.				
1		MADE GROUND. Dark brown, gravelly, CLAY with cobbles and occasional/some wood, plastic, glass, metal and cables. No odour. Dry.				
2		MADE GROUND. Black, sandy like material (burnt) and occasional/some concrete, coal, red bricks and glass. Slight burnt odour. Dry.				
3					3.8-4.1mbgl	
4			EOH at 4.1mbgl due to obstruction			
5						
6						

Excavation Date: 17/01/2019
Excavation Method: 13 tonne excavator
Excavated By: Dunne Ltd.

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 669879.1
Northing: 694570.4

Water Strike:
Strike: ▽ **Level:** ▼

Revision: FINAL **Page** 1 of 1

DISCLAIMER: This log is for environmental purposes only.

Trial Pit – TPA

TRIAL PIT LOG

Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V32Y

Project Number: E1506 | **Client:** Kildare County Council

Project Title: E1506-Kildare Legacy Landfills | **Site Location:** Prusselstown, Athy, Co. Kildare

TRIAL PIT NO: TPB-PT

SUBSURFACE CONDITIONS					SAMPLE	
Depth (mbgl)	SYMBOL	DESCRIPTION	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)
0		MADE GROUND. Brown CLAY. Dry. No odour.				
1		MADE GROUND. Black, CLAY with gravels, cobbles & occcasional cobbles and some/many mixed waste comprising plastic, sacks, glass bottles, car parts (metal). Strong decomposed odour. Dry at first - small inflow of water at 2.6mbgl.				
2						
3		MADE GROUND. Reddish, sandy, CLAY and occasional/some glass and metal. Moderate burnt odour. Dry.				
4						
5			EOH at 5.0mbgl due to obstruction			
6						

Excavation Date: 17/01/2019
Excavation Method: 13 tonne excavator
Excavated By: Dunne Ltd.

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 669911.1
Northing: 694600.3

Water Strike:
Strike: ▽ **Level:** ▼

Revision: FINAL **Page** 1 of 1

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Trial Pit – TPB

TRIAL PIT LOG

MALONE O'REGAN ENVIRONMENTAL
Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V32Y

Project Number: E1506

Client: Kildare County Council

Project Title: E1506-Kildare Legacy Landfills

Site Location: Prusselstown, Athy, Co. Kildare

TRIAL PIT NO: TPC-PT

SUBSURFACE CONDITIONS					SAMPLE	
Depth (mbgl)	SYMBOL	DESCRIPTION	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)
0		CLAY. Brown, gravelly, CLAY with cobbles and boulders. No odour. Dry.				
3			EOH at 3.2mbgl due to natural ground			

Excavation Date: 17/01/2019
Excavation Method: 13 tonne excavator
Excavated By: Dunne Ltd.

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 669940.8
Northing: 694640.2

Water Strike:
Strike: ▽ **Level:** ▼

Revision: FINAL **Page** 1 of 1

DISCLAIMER: This log is for environmental purposes only.

Trial Pit – TPC

TRIAL PIT LOG

Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V32Y

Project Number: E1506

Client: Kildare County Council

Project Title: E1506-Kildare Legacy Landfills

Site Location: Prusselstown, Athy, Co. Kildare

TRIAL PIT NO: TPD-PT

SUBSURFACE CONDITIONS				SAMPLE	
Depth (mbgl)	SYMBOL	DESCRIPTION	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)
0		CLAY. Brown, very gravelly, CLAY with cobbles. No odour. Dry.				
3			EOH at 3.3mgl due to natural ground			

Excavation Date: 17/01/2019
Excavation Method: 13 tonne excavator
Excavated By: Dunne Ltd.

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 669771.8
Northing: 694784.1

Water Strike:
Strike: ▽ **Level:** ▼

Revision: FINAL **Page** 1 of 1

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Trial Pit – TPD

TRIAL PIT LOG

Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V32Y

Project Number: E1506 | **Client:** Kildare County Council

Project Title: E1506-Kildare Legacy Landfills | **Site Location:** Prusselstown, Athy, Co. Kildare

TRIAL PIT NO: TPE-PT

SUBSURFACE CONDITIONS					SAMPLE	
Depth (mbgl)	SYMBOL	DESCRIPTION	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)
0		MADE GROUND. Brown /reddish, gravelly, CLAY. Dry. No odour.				
1		MADE GROUND. Dark brown, gravelly, CLAY and rare plastic and red bricks. No odour. Dry.				
2		MADE GROUND. Black, gravelly, CLAY and many mixed waste comprising plastic, cloths, glass bottles, bags from cement, oil can, pieces of carpet and mattress. Moderate decomposed and hydrocarbon odour. Dry.				
3			EOH at 3.1mbgl due to obstruction			
4						
5						
6						

Excavation Date: 17/01/2019
Excavation Method: 13 tonne excavator
Excavated By: Dunne Ltd.

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 669764.3
Northing: 694869.6

Water Strike:
Strike: ▽ **Level:** ▼

Revision: FINAL **Page** 1 of 1

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Trial Pit – TPE

TRIAL PIT LOG

Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V32Y

Project Number: E1506

Client: Kildare County Council

Project Title: E1506-Kildare Legacy Landfills

Site Location: Prusselstown, Athy, Co. Kildare

TRIAL PIT NO: TPF-PT

SUBSURFACE CONDITIONS					SAMPLE	
Depth (mbgl)	SYMBOL	DESCRIPTION	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)
0		MADE GROUND. Brown, gravelly, CLAY and occasional plastic and wood. No odour. Dry.				
1						
		MADE GROUND. Black, sandy material and industrial and household waste comprising plastic glasses, milk bricks, metal, cans (milk formula) and its lids, steel sheeting(to make up the lids), supermarket bags, pieces of throw, blue barrel and hard metal. Strong decomposed odour. Wet - Inflow of water at 1.6mbgl.			1.6-2.0mbgl	
2						
3			EOH at 3.5mbgl due to obstruction			
4						
5						
6						

Excavation Date: 17/01/2019
Excavation Method: 13 tonne excavator
Excavated By: Dunne Ltd.

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 669716.3
Northing: 694789.6

Water Strike:
Strike: ▽ **Level:** ▼

Revision: FINAL **Page** 1 of 1

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Trial Pit – TPF

TRIAL PIT LOG

Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V32Y

Project Number: E1506

Client: Kildare County Council

Project Title: E1506-Kildare Legacy Landfills

Site Location: Prusselstown, Athy, Co. Kildare

TRIAL PIT NO: TPG-PT

SUBSURFACE CONDITIONS					SAMPLE	
Depth (mbgl)	SYMBOL	DESCRIPTION	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)
0		MADE GROUND. Brown, CLAY with gravels and cobbles and rare metal. No odour. Dry.				
1		MADE GROUND. Brown, gravelly, CLAY and some mixed waste comprising plastic bottles, concrete, glass jars, glass, sacks from cement and metal wires. Slight sweet odour. Dry.				
2						
3						
		MADE GROUND. Black, sandy material and occasional plastic and wood. Slight burnt odour. Dry.			3.6-4.0mbgl	
4			EOH at 4.0mbgl due to obstruction			
5						
6						

Excavation Date: 17/01/2019
Excavation Method: 13 tonne excavator
Excavated By: Dunne Ltd.

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 669736.7
Northing: 694762.6

Water Strike:
Strike: ▽ **Level:** ▼

Revision: FINAL **Page** 1 of 1

DISCLAIMER: This log is for environmental purposes only.

Trial Pit – TPG

APPENDIX E

BOREHOLE LOG

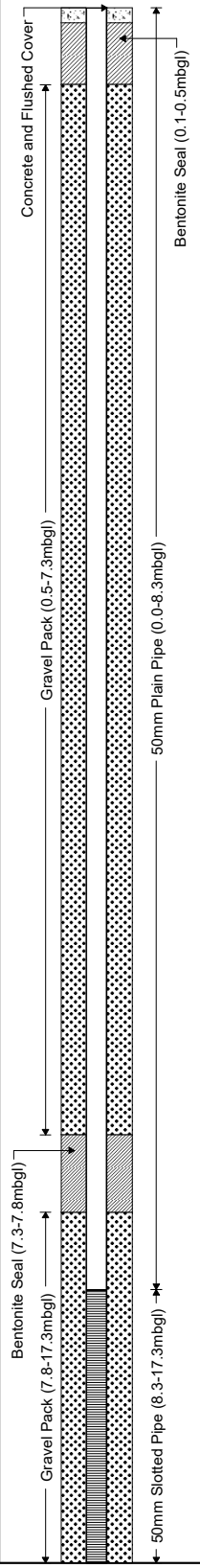
MALONE O'REGAN ENVIRONMENTAL
Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V4K6

Project Number: E1506 | **Client:** Kildare County Council

Project Title: E1506-Kildare Legacy Landfills | **Site Location:** Prusselstown, Athy, Co. Kildare

BOREHOLE NO: GW1A-PT

SUBSURFACE CONDITIONS						SAMPLE		INSTALLATION DETAILS
Depth (mbgl)	SYMBOL	DESCRIPTION	Elev (mAOD)	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)	
0			0.0					
		TOPSOIL Brown, slightly sandy, CLAY with gravels and cobbles. Earthy odour. Dry.	0.0 -0.2	No evidence of contamination (0.0-17.3mbgl)				
		CLAY Brown, slightly sandy, CLAY with gravels and cobbles. No odour. Dry.	0.2					
1			-1.4					
		BOULDER	1.4					
		CLAY Black, very sandy, CLAY with some gravels. Burnt odour. Dry.						
2			-2.7					
		CLAY Black/very dark brown, sandy, CLAY. No odour. Dry.	2.7					
3								
4			-4.1					
		GRAVEL Black/grey, slightly clayey, GRAVEL (subrounded, fine to medium). The proportion of clay and gravel varying with depth (dark brown, CLAY with some gravesl and clayey, GRAVEL). No odour. Dry.	4.1					
5			-5.6					
		GRAVEL Black/grey, slightly clayey, GRAVEL with some proportion of sand. Increasing proportion of sand with depth. From 6.4mbgl - Clayey, fine SAND with gravels. From 6.8mbgl - Slightly sandy, GRAVEL with some proportion of clay. No odour. Dry.	5.6					
6								
7			-7.4					
		SAND Black/brown, very gravelly, SAND. Increasing proportion of sand with depth. From 8.0mbgl - Slighty gravelly, SAND. No odour. Dry.	7.4					
8			-8.2					
		GRAVEL Black, grey, sandy, GRAVEL with small proportion of clay coating. Gravel is subangular/subrounded. The proportion of sand and gravel changed with depth. From 10.4mbgl - Slightly gravelly, SAND (Sand (fine to coarse) with frequent gravels). No odour. Dry.	8.2					
9								
10								



Drill Date: 10-11/04/2019
Drill Method: Air Rotary
Drilled By: Causeway Geotech Ltd

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 269942.321
Northing: 194528.131

Water Strike: (WS)
Strike: **Level:**

Revision: Final **Page:** 1 of 2

DISCLAIMER: This log is for environmental purposes only.

BOREHOLE LOG

MALONE O'REGAN ENVIRONMENTAL
Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V4K6

Project Number: E1506 | **Client:** Kildare County Council

Project Title: E1506-Kildare Legacy Landfills | **Site Location:** Prusselstown, Athy, Co. Kildare

BOREHOLE NO: GW1A-PT

SUBSURFACE CONDITIONS					SAMPLE		INSTALLATION DETAILS
Depth (mbgl)	SYMBOL	DESCRIPTION	Elev (mAOD)	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)	
			-10.7					
		BOULDER	10.7					
11			-11.3					
		GRAVEL Black/grey, sandy, GRAVEL with small proportion of clay coating. The gravel is subangular/subrounded and fine to medium. Noticeable changes in the proportion of sand and gravel with depth and changes in colour. No odour. Dry at first. Water Strike at 14.0mbgl. Water Strike at 15.5mbgl. Water Strike at 16.8mbgl.	11.3		WL (10/04/2019)-12.7mbgl WL (11/04/19)-12.6mbgl WS (14.0mbgl) WS (15.5mbgl) WS (16.8mbgl)			Gravel Pack (7.8-17.3mbgl) 50mm Slotted Pipe (8.3-17.3mbgl)
12								
13								
14								
15								
16								
17			-17.3					
			17.3	EOH at 17.3mbgl				
18								
19								
20								

Drill Date: 10-11/04/2019
Drill Method: Air Rotary
Drilled By: Causeway Geotech Ltd

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 269942.321
Northing: 194528.131

Water Strike: (WS)
Strike: **Level:**

Revision: Final **Page:** 2 of 2

DISCLAIMER: This log is for environmental purposes only.

BOREHOLE LOG

MALONE O'REGAN ENVIRONMENTAL
Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V4K6

Project Number: E1506 | **Client:** Kildare County Council

Project Title: E1506-Kildare Legacy Landfills | **Site Location:** Prusselstown, Athy, Co. Kildare

BOREHOLE NO: GW2A-PT

SUBSURFACE CONDITIONS						SAMPLE		INSTALLATION DETAILS
Depth (mbgl)	SYMBOL	DESCRIPTION	Elev (mAOD)	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)	
0			0.0	No evidence of contamination (0.0-14.3mbgl)				Concrete and Flushed Cover; Gravel Pack (0.7-3.3mbgl); Bentonite Seal (0.1-0.7mbgl); 50mm Plain Pipe (0.0-4.3mbgl); Bentonite Seal (3.3-3.8mbgl); Gravel Pack (3.8-14.3mbgl); 50mm Slotted Pipe (4.3-14.3mbgl)
		TOPSOIL Brown (reddish), CLAY with some gravels and roots. Earthy odour. Dry.	0.0 -0.2					
		CLAY Light brown, CLAY with frequent gravels and some cobbles. Earthy odour. Dry	0.2 -0.8					
1		CLAY Slightly sandy, CLAY with gravels. Getting more cobbly with depth. From 1.5mbgl - Light brown, very sandy, CLAY with gravels. No odour. Dry.	0.8					
2			-2.2					
		SAND Black/grey, very gravelly (fine to medium, subangular/subrounded), SAND. Sand is fine to coarse. From 3.1mbgl increasing the proportion of sand - SAND with occasional gravel. From 5.3mbgl increasing the proportion of gravel - Slightly gravelly, SAND. No odour. Dry.	2.2					
3								
4								
5								
6			-6.4					
		SAND and GRAVEL Black/grey, SAND and GRAVEL. The proportion of sand and gravel changing slightly with depth. No odour. Dry.	6.4					
7			-7.2					
		GRAVEL Black/grey, very sandy, GRAVEL. No odour. Dry.	7.2 -7.7					
		POSSIBLE BOULDER	7.7					
8			-8.2					
		GRAVEL Grey, slightly clayey, slightly sandy, GRAVEL. Gravel is subangular, fine to medium. Proportion of clay decreased with depth to small proportion of clay coating. From 9.8mbgl increasing the proportion of gravel - GRAVEL with sand. Gravel is black/grey, rounded to subrounded. Turning into sandy, GRAVEL from 11.3mbgl. From 13.0mbgl increasing proportion of clay. No odour. Dry at first. Wet after the water strike. Water Strike at 9.8mbgl.	8.2		▼WS (9.8mbgl)			
9								
10								

Drill Date: 11/04/2019
Drill Method: Air Rotary
Drilled By: Causeway Geotech Ltd

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 269963.971
Northing: 194709.8

Water Strike: (WS)
Strike: **Level:**

Revision: Final **Page:** 1 of 2

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BOREHOLE LOG

MALONE O'REGAN ENVIRONMENTAL
Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V4K6

Project Number: E1506 | **Client:** Kildare County Council

Project Title: E1506-Kildare Legacy Landfills | **Site Location:** Prusselstown, Athy, Co. Kildare

BOREHOLE NO: GW2A-PT

SUBSURFACE CONDITIONS					SAMPLE		INSTALLATION DETAILS
Depth (mbgl)	SYMBOL	DESCRIPTION	Elev (mAOD)	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)	
11					WL (11/04/19)-12.4mbgl			
12								
13								
14			-14.3					
			14.3	EOH at 14.3mbgl				
15								
16								
17								
18								
19								
20								

Drill Date: 11/04/2019
Drill Method: Air Rotary
Drilled By: Causeway Geotech Ltd

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 269963.971
Northing: 194709.8

Water Strike: (WS)
Strike: **Level:**

Revision: Final **Page:** 2 of 2

DISCLAIMER: This log is for environmental purposes only.

BOREHOLE LOG

MALONE O'REGAN ENVIRONMENTAL
Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V4K6

Project Number: E1506 | **Client:** Kildare County Council

Project Title: E1506-Kildare Legacy Landfills | **Site Location:** Prusselstown, Athy, Co. Kildare

BOREHOLE NO: GW3A-PT

SUBSURFACE CONDITIONS						SAMPLE		INSTALLATION DETAILS
Depth (mbgl)	SYMBOL	DESCRIPTION	Elev (mAOD)	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)	
0			0.0					
		TOPSOIL Brown (reddish), CLAY with some gravels and roots and some plastic. Earthy odour. Dry.	0.0	No evidence of contamination (0.0-17.3mbgl)				
			-0.6					
		BOULDER	0.6 -0.8					
1		SAND Brown, slightly clayey, SAND with gravels. The proportion of gravel varying with depth. No odour. Dry.	0.8					
			-1.8					
		POSSIBLE BOULDER	1.8					
2			-2.1					
		CLAY Brown, sandy, CLAY with frequent gravels (grey, subangular/subrounded). No odour. Dry.	2.1					
			-2.5					
		SAND Black/brown, slightly clayey, SAND with occasional gravel. From 3.4mbgl increasing proportion of gravel. From 3.8mbgl - GRAVEL with some clay coating. No odour. Dry.	2.5					
3			-3.9					
		POSSIBLE BOULDER	3.9 -4.1					
4		GRAVEL Black/grey, slightly sandy, GRAVEL. Gravel is subangular to subrounded. No odour. Dry.	4.1 -4.3					
			4.3					
		BOULDER	4.7 4.7					
		SAND / SAND and GRAVEL Brown/grey, SAND with gravels. Proportion of gravel increasing slightly with depth - slightly gravelly, SAND. From 5.3mbgl - SAND and GRAVEL. No odour. Dry.						
5								
6			-6.1					
		BOULDER	6.1					
			-6.4					
		SAND and GRAVEL Black/grey, SAND and GRAVELS. No odour. Dry.	6.4					
			-6.9					
7		BOULDER	6.9					
			-7.2					
		GRAVEL Black/grey, GRAVEL with some sand. No odour. Dry.	7.2 -7.4					
			7.4					
		BOULDER						
8								
			-8.9					
9		GRAVEL Black/grey, sandy, GRAVEL. Increasing proportion of gravel with depth - slightly sandy, GRAVEL. No odour. Dry.	8.9					
			-9.3					
		POSSIBLE GRAVEL Black/grey, fine to medium, GRAVELS - not many returns.	9.3					
10								

WS (9.6mbgl)
WL (15/04/19)-8.9mbgl

Concrete and Flushed Cover
Gravel Pack (0.7-3.3mbgl)
Bentonite Seal (0.1-0.7mbgl)
50mm Plain Pipe (0.0-4.3mbgl)
Bentonite Seal (3.3-3.8mbgl)
Gravel Pack (3.8-17.3mbgl)
50mm Slotted Pipe (4.3-17.3mbgl)

Drill Date: 12-15/04/2019
Drill Method: Air Rotary
Drilled By: Causeway Geotech Ltd

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 269743.287
Northing: 194728.019

Water Strike: (WS)
Strike: **Level:**

Revision: Final **Page:** 1 of 2

DISCLAIMER: This log is for environmental purposes only.

BOREHOLE LOG

MALONE O'REGAN ENVIRONMENTAL
Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V4K6

Project Number: E1506 | **Client:** Kildare County Council

Project Title: E1506-Kildare Legacy Landfills | **Site Location:** Prusselstown, Athy, Co. Kildare

BOREHOLE NO: GW3A-PT

SUBSURFACE CONDITIONS					SAMPLE		INSTALLATION DETAILS
Depth (mbgl)	SYMBOL	DESCRIPTION	Elev (mAOD)	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)	
11			-11.3		WS (10.7mbgl)			
		GRAVEL Black/grey, very sandy, GRAVEL. The proportion of sand and gravel varying with depth - SAND and GRAVELS with some calcite pieces. No odour. Wet.	11.3		WS (11.2mbgl)			
12								
13								
14								
15								
16								
17			-17.3	EOH at 17.3mbgl				
			17.3					
18								
19								
20								

Gravel Pack (3.8-17.3mbgl)
50mm Slotted Pipe (4.3-17.3mbgl)

Drill Date: 12-15/04/2019
Drill Method: Air Rotary
Drilled By: Causeway Geotech Ltd

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 269743.287
Northing: 194728.019

Water Strike: (WS)
Strike: **Level:**

Revision: Final **Page:** 2 of 2

BOREHOLE LOG

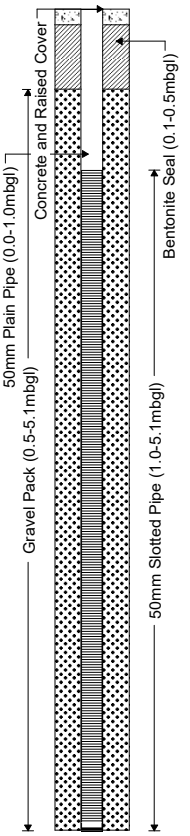
Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V4K6

Project Number: E1506 | **Client:** Kildare County Council

Project Title: E1506-Kildare Legacy Landfills | **Site Location:** Prusselstown, Athy, Co. Kildare

BOREHOLE NO: L1A-PT

SUBSURFACE CONDITIONS						SAMPLE		INSTALLATION DETAILS
Depth (mbgl)	SYMBOL	DESCRIPTION	Elev (mAOD)	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)	
0			0.0					
		MADE GROUND. Grey, slightly sandy, slightly gravelly, CLAY with cobbles and rare red bricks, wood, plastic and cloths. No odour at first - Slight hydrocarbon odour at approx. 1.5mbgl. Dry at first. Water Strike at 1.8mbgl.	0.0					
1								
			-1.8					
		MADE GROUND. Black/grey sludge of sandy, gravelly, CLAY with cobbles and rare/occasional strips of plastic, concrete, metal, wood and plastic bottles. Slight to moderate hydrocarbon odour. Wet.	1.8					
2								
3								
4								
5			-5.1	End of Borehole at 5.1mbgl due to obstruction				
			5.1					
6								
7								
8								
9								
10								



At 1.8mbgl - Water Strike

Drill Date: 07/01/2019
Drill Method: Shell and Auger
Drilled By: O'Connell Byrne

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 269808.937
Northing: 194755.197

Water Strike:
Strike: **Level:**

Revision: Final **Page:** 1 of 1

BOREHOLE LOG

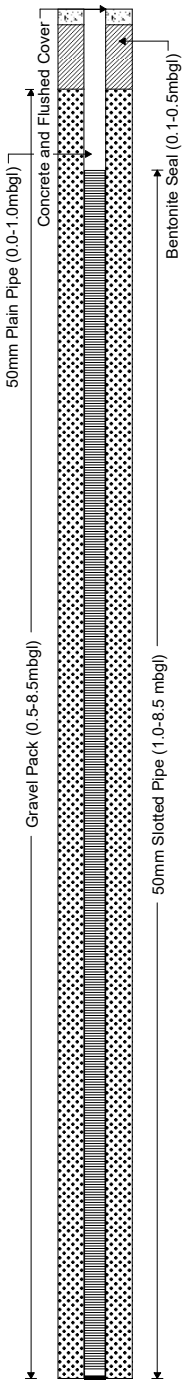
MALONE O'REGAN ENVIRONMENTAL
Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V4K6

Project Number: E1506 | **Client:** Kildare County Council

Project Title: E1506-Kildare Legacy Landfills | **Site Location:** Prusselstown, Athy, Co. Kildare

BOREHOLE NO: L2A-PT

SUBSURFACE CONDITIONS						SAMPLE		INSTALLATION DETAILS
Depth (mbgl)	SYMBOL	DESCRIPTION	Elev (mAOD)	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)	
0			0.0					
		MADE GROUND Brown, CLAY with gravels and cobbles. Dry - A bit mosit at 1.5mbgl No odour.	0.0					
1			-1.5					
		MADE GROUND. Brown/black, CLAY with gravels and cobbles and rare/occasional mixed waste comprising hard plastic, clothes, broken glass, red bricks, heavy duty black plastic and a piece of can. Slight hydrocarbon odour with depth. Small inflow of water at 1.5mbgl.	1.5					
2								
3			-3.5					
		MADE GROUND. Black, CLAY and some mixed waste (industrial and household) comprising hard plastic, half burnt tyre, metal, plastic bottles, wood, broken glass from bottle drinks, lids and refuse bags (heavy duty). Turning to slightly sandy, CLAY with gravels and some cobbles with depth. Moderate burnt odour. Dry.	3.5					
4								
5								
6			-6.6					
		MADE GROUND. Light black/reddish, slightly sandy, CLAY with cobbles and occasional C&D material comprising red bricks, broken glass and metal. Slight burnt and hydrocarbon odour. Dry.	6.6					
7								
8			-8.5					
			8.5	End of Borehole at 8.5mbgl due to obstruction				
9								
10								



Drill Date: 08/01/2019
Drill Method: Shell and Auger
Drilled By: O'Connell Byrne

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 269975.1668
Northing: 194586.756

Water Strike:
Strike: **Level:**

Revision: Final **Page:** 1 of 1

BOREHOLE LOG

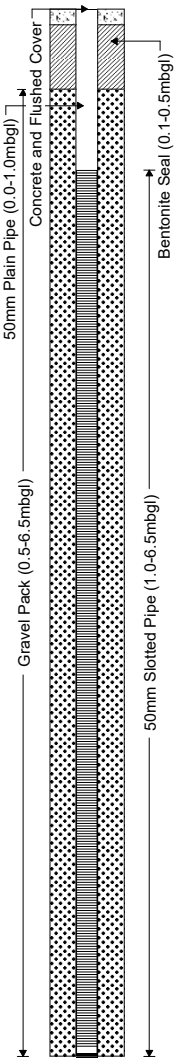
Ground Floor - Unit 3
Bracken Business Park
Bracken Road,
Sandyford
Dublin 18, D18 V4K6

Project Number: E1506 | **Client:** Kildare County Council

Project Title: E1506-Kildare Legacy Landfills | **Site Location:** Prusselstown, Athy, Co. Kildare

BOREHOLE NO: L3A-PT

SUBSURFACE CONDITIONS						SAMPLE		INSTALLATION DETAILS
Depth (mbgl)	SYMBOL	DESCRIPTION	Elev (mAOD)	COMMENTS	WATER (mbgl)	Depth (mbgl)	PID (ppm)	
0			0.0					
		MADE GROUND. Grey, sandy, CLAY with gravels and cobbles and rare red bricks. No odour. Dry. At approx. 0.9mbgl rare plastic, glass pieces, small rope. Slight hydrocarbon odour.	0.0					
1			-1.4					
		MADE GROUND. Black, CLAY and some gravel, with rare concrete, plastic, broken glass and red bricks. Slight to moderate hydrocarbon odour with depth and slight sweet odour. A bit damp with depth.	1.4					
2								
3			-3.5					
		MADE GROUND. Black, slightly sandy, CLAY and some gravels with depth, with rare broken glass, timber, and red bricks. Pieces of steel, concrete, hard plastic and red pipes with depth Slight hydrocarbon odour. Slightly damp - getting moist with depth.	3.5					
4								
5								
6			-6.5					
			6.5	End of Borehole at 6.5mbgl due to obstruction				
7								
8								
9								
10								



Drill Date: 04-05/01/2019
Drill Method: Shell and Auger
Drilled By: O'Connell Byrne

Logged By: NM
Checked By: TVM

Reference Datum:
Elevation: 0
Easting: 269882.029
Northing: 194599.438

Water Strike:
Strike: **Level:**

Revision: Final **Page:** 1 of 1

DISCLAIMER: This log is for environmental purposes only.

APPENDIX F

CHAIN OF CUSTODY

CLIENT: MOR	If Electronic File Required please select file format below	SAMPLER: NURIA MANZANAS	
ADDRESS: GROUND FLOOR - UNIT 3 - RANCKEN ROAD SANDYFORD, DUBLIN 18	EQUIS	MOBILE: 0857081300	
		EMAIL REPORT TO: nmanzanas@mor.ie	
PROJECT MANAGER (PM): THOMAS VAILLO MATTILA	CROSSTAB	cc REPORT TO: thomasvm@mor.ie	
MOBILE: 0863821225	CLIENT	INVOICE TO: (if different to report)	
PROJECT ID: E1506	AGS (please also fill in AGS SAMP_TYPE & SAMP_REF below)	QUOTE NUMBER: 14479 H3	P.O No:
SITE: ATHY (CO KILDARE) PROUSSELSTOWN		ANALYSIS REQUIRED including SUITE names	

Jones Environmental Laboratory

Chain of Custody sheet page ..... of .....

TURNAROUND - please tick

10 DAY		4 DAY		Other
5 DAY		3 DAY		

All waters - tick for samples to be tested shaken or settled

FOR LABORATORY USE ONLY

AVERAGE COOL BOX TEMP (if required):

SAMPLE RECIEPT CONDITION:

MATRIX:- S=Soil, GW=GroundWater, SW=SurfaceWater, L/E=Leachate/Effluent, OW=OtherWater, P=Product/Oil)

Sample ID	AGS SAMPT YPE	AGS SAMPR EF	Shaken	Settled	S/GW/SW/ L/E/OW/P	Date	Time	Depth in Metres	Preserv ation	Asbestos risk: High	Medium	Low	ANALYSIS REQUIRED including SUITE names
TPA					S	17/01/19		3.8-4.1m					
TPF					S	17/01/19		1.6-2.0m					
TPG					S	17/01/19		3.6-4.0m					

PARAMETERS TO ANALISE AS PER QUOTE

SOILS -We are MCERTS accredited for samples predominantly made up of sand, loam and clay (no other matrices). Please request an MCERTS report if required. WATERS - we are accredited for surface and groundwaters (leachates and effluents are accredited for some tests, please see UKAS schedule). Please tick whether analysis is required on settled or shaken samples

NOTE: PLEASE SEND US OVER ONE REPORT FOR THIS SAMPLES AND ONE INVOICE AS WELL.

INVOICE TO KILDARE COUNTY COUNCIL

PO TO FOLLOW

RELINQUISHED BY:		RECIEVED BY:		METHOD of SHIPMENT
Name: NURIA MANZANAS	Date: 31/01/19	Name:	Date:	Consignment note No:
Of: MOR	Time:	Of:	Time:	Courier Company:

Health & Safety instructions including known hazards (eg suspected asbestos). Please let us know if samples are heavily contaminated, High PAHs expected, provide PID readings if available

Jones Environmental Forensics Ltd.
Unit 3 Deeside Point, Zone 3 Deeside Industrial Park, Deeside, CH5 2UA Tel: 0044 1244 833 780

JEL 105596

CHAIN OF CUSTODY

CLIENT: HOR
ADDRESS: GROUND FLOOR - UNIT 3 BRACKEN IND ESTATE, DUBLIN 18
PROJECT MANAGER (PM): THOMAS VAINIO-MATTILA
MOBILE:
PROJECT ID: E1506
SITE: ATHY - SITE 2

If Electronic File Required please select file format below: EQUIS / CROSSTAB / CLIENT / AGS (please also fill in AGS SAMP_TYPE & SAMP_REF below)

SAMPLER: HK / NH
MOBILE: 0857193534
EMAIL REPORT TO: mkeogh@...
cc REPORT TO: ...
INVOICE TO: (if different to report)
QUOTE NUMBER: 14479 HJ HOR P.O No:

Chain of Custody sheet page 1 of 1

TURNAROUND - please tick: 10 DAY ✓ | 4 DAY | Other | 5 DAY | 3 DAY

All waters - tick for samples to be tested shaken or settled

FOR LABORATORY USE ONLY
AVERAGE COOL BOX TEMP.(if required):
SAMPLE RECIEPT CONDITION:

MATRIX:- S=Soil, GW=GroundWater, SW=SurfaceWater, L/E=Leachate/Effluent, OW=OtherWater, P=Product/Oil)

SOILS -We are MCERTS accredited for samples predominantly made up of sand, loam and clay (no other matrices). Please request an MCERTS report if required. WATERS - we are accredited for surface and groundwaters (leachates and effluents are accredited for some tests, please see UKAS schedule). Please tick whether analysis is required on settled or shaken samples

Sample ID	AGS SAMPTYPE	AGS SAMPREF	Shaken	Settled	S/GW/SW/ L/E/OW/P	Date	Time	Depth in Metres	Preservation	Asbestos risk High	Medium	Low	ANALYSIS REQUIRED including SUITE names	Notes
GW1A					GW	25/04/19							AS PER (GW) QUOTATION	
GW2A					GW	"								SAMPLES SPREAD
GW3A					GW	"								OVER 2 (TWO)
L1A					L	"							AS PER LEACHATE QUOTATION	COOLER BOXES
SW1A					SW	"								MICRO IS BEING
SW2A					SW	"							AS PER SW QUOTATION	DELIVERED TO CITY ANALYST

RELINQUISHED BY:
Name: MARTIN KENNS
Of: HOR
Date: 25/04/19
Time:

RECIEVED BY:
Name:
Of:
Date:
Time:

METHOD of SHIPMENT
Consignment note No:
Courier Company:

Health & Safety instructions including known hazards (eg suspected asbestos). Please let us know if samples are heavily contaminated, High PAHs expected, provide PID readings if available

Exova Jones Environmental
Unit 3 Deeside Point, Zone 3 Deeside Industrial Park, Deeside, CH5 2UA Tel: 0044 1244 833 780
Reg Office: Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian EH28 8PL Company Reg No: SC070429

JEL 131209

CHAIN OF CUSTODY

CLIENT: HOR	If Electronic File Required please select file format below	SAMPLER: HK / NR	
ADDRESS: UNIT 3 - GROUND FLOOR, BRICKEN IND ESTATE, DUBLIN 18		MOBILE: 0857193534	
	EQUIS	EMAIL REPORT TO: hkearns@whpe.ie	
PROJECT MANAGER (PM): THOMAS UWINO-MATILA.	CROSSTAB	cc REPORT TO: tuwinom@whpe.ie	
MOBILE:	CLIENT	INVOICE TO: (if different to report)	
PROJECT ID: E1506	AGS (please also fill in AGS SAMP_TYPE & SAMP_REF below)	QUOTE NUMBER:	P.O No:
SITE: ATHY - SITE 2		ANALYSIS REQUIRED including SUITE names	

Exova JONES ENVIRONMENTAL

Chain of Custody sheet page 1 of 1

TURNAROUND - please tick

10 DAY	✓	4 DAY		Other	
5 DAY		3 DAY			

All waters - tick for samples to be tested shaken or settled

FOR LABORATORY USE ONLY

AVERAGE COOL BOX TEMP.(if required)

SAMPLE RECIEPT CONDITION:

MATRIX:- S=Soil, GW=GroundWater, SW=SurfaceWater, L/E=Leachate/Effluent, OW=OtherWater, P=Product/Oil)

Sample ID	AGS SAMPT YPE	AGS SAMPR EF	Shaken	Settled	S/GW/SW/ L/E/OW/P	Date	Time	Depth in Metres	Preserv ation	Asbestos risk: High	Medium	Low	ANALYSIS REQUIRED including SUITE names
GW1A					GW	25/04/19							FAECAL AND TOTAL
GW2A					GW	"							COLIFORMS
GW3A					GW	"							
L1A					L	"							

SOILS -We are MCERTS accredited for samples predominantly made up of sand, loam and clay (no other matrices). Please request an MCERTS report if required. WATERS - we are accredited for surface and groundwaters (leachates and effluents are accredited for some tests, please see UKAS schedule). Please tick whether analysis is required on settled or shaken samples

QUOTATION No FROM EXOVA 144979 HJ HOR

RELINQUISHED BY:		RECIEVED BY:		METHOD of SHIPMENT
Name: MARTIN KENNY	Date:	Name:	Date:	Consignment note No:
Of: HOR	Time:	Of:	Time:	Courier Company:

Health & Safety instructions including known hazards (eg suspected asbestos). Please let us know if samples are heavily contaminated, High PAHs expected, provide PID readings if available

JEL 131210

CHAIN OF CUSTODY

CLIENT: Malone O Regan	If Electronic File Required please select file format below	SAMPLER: MK	
ADDRESS: Beacon Bus. Pk. Sandyford D18	EQUIS	MOBILE: 085 7193534	
PROJECT MANAGER (PM): Thomas Vanio-Mattila	CROSSTAB	EMAIL REPORT TO: mkearns@moces.ie	
MOBILE:	CLIENT	cc REPORT TO: amorgan@moces.ie	
PROJECT ID: E1506	AGS (please also fill in AGS SAMP_TYPE & SAMP_REF below)	INVOICE TO: (if different to report)	
SITE:		QUOTE NUMBER: 14575	P.O No:

EXOVA JONES ENVIRONMENTAL

Chain of Custody sheet page ..... of .....

ANALYSIS REQUIRED Including SUITE names

TURNAROUND - please tick

10 DAY | 4 DAY | Other

5 DAY | 3 DAY

All waters - tick for samples to be tested shaken or settled

FOR LABORATORY USE ONLY

AVERAGE COOL BOX TEMP (if required).

SAMPLE RECIEPT CONDITION.

MATRIX:- S=Soil, GW=GroundWater, SW=SurfaceWater, L/E=Leachate/Effluent, OW=OtherWater, P=Product/Oil)

Sample ID	AGS SAMPT YPE	AGS SAMPR EF	Shaken	Settled	S/GW/SW/ L/E/OW/P	Date	Time	Depth in Metres	Preserv ation	Asbestos risk: High	Medium	Low	
GW1A					GW	9 May							2 x 2l GW bottle
GW2A													
GW3A													Samples over
L1A					L	9 May							2 x 2l Leachate bottle 2 cooler boxes
SW1					SW	9 May							
SW2													
SW1A													2 x 2l SW bottle
SW2A													

SOILS -We are MCERTS accredited for samples predominantly made up of sand, loam and clay (no other matrices). Please request an MCERTS report if required. WATERS - we are accredited for surface and groundwaters (leachates and effluents are accredited for some tests, please see UKAS schedule). Please tick whether analysis is required on settled or shaken samples

RELINQUISHED BY:		RECIEVED BY:		METHOD of SHIPMENT: DHL
Name:	Date: 9 May	Name:	Date:	Consignment note No:
Of:	Time:	Of:	Time:	Courier Company:

Health & Safety instructions including known hazards (eg suspected asbestos). Please let us know if samples are heavily contaminated, High PAHs expected, provide PID readings if available

Exova Jones Environmental

Unit 3 Deeside Point, Zone 3 Deeside Industrial Park, Deeside, CH5 2UA Tel: 0044 1244 833 780

Reg Office: Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian EH28 8PL Company Reg No: SC070429

JEL 160563

CHAIN OF CUSTODY

Exova Jones Environmental

CLIENT:	Malone O Regan
ADDRESS:	Brocken Bus. PK, Sandyford, D18
PROJECT MANAGER (PM):	Thomas Vainio-Mattila
MOBILE:	
PROJECT ID:	E1506
SITE:	

If Electronic File Required please select file format below: EQUIS / CROSSTAB / CLIENT / AGS (please also fill in AGS SAMP_TYPE & SAMP_REF below)

SAMPLER:	
MOBILE:	
EMAIL REPORT TO:	mkearns@mores.ie
cc REPORT TO:	
INVOICE TO: (if different to report)	
QUOTE NUMBER:	P O No:

Chain of Custody sheet page ..1.. of ..1..

TURNAROUND - please tick: 10 DAY / 5 DAY / 4 DAY / 3 DAY / Other

All waters - tick for samples to be tested shaken or settled

FOR LABORATORY USE ONLY
AVERAGE COOL BOX TEMP.(if required)
SAMPLE RECIEPT CONDITION:

MATRIX:- S=Soil, GW=GroundWater, SW=SurfaceWater, L/E=Leachate/Effluent, OW=OtherWater, P=Product/Oil)

ANALYSIS REQUIRED including SUITE names

SOILS -We are MCERTS accredited for samples predominantly made up of sand, loam and clay (no other matrices). Please request an MCERTS report if required. WATERS - we are accredited for surface and groundwaters (leachates and effluents are accredited for some tests, please see UKAS schedule). Please tick whether analysis is required on settled or shaken samples

Sample ID	AGS SAMPTYPE	AGS SAMPREF	Shaken	Settled	S/GW/SW/ L/E/OW/P	Date	Time	Depth in Metres	Preservation	Asbestos risk High	Asbestos risk Medium	Asbestos risk Low	Faecal coliforms	total coliforms
GW1A					GW	4 May							✓	✓
GW2A					|	|						|	|
GW3A					|	|						|	|

RELINQUISHED BY: Name: Of: Date: Time:	RECIEVED BY: Name: Of: Date: Time:	METHOD of SHIPMENT Consignment note No: Courier Company:

Health & Safety Instructions including known hazards (eg suspected asbestos). Please let us know if samples are heavily contaminated, High PAHs expected, provide PID readings if available

Exova Jones Environmental
Unit 3 Deeside Point, Zone 3 Deeside Industrial Park, Deeside, CH5 2UA Tel: 0044 1244 833 780
Reg Office: Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian EH28 8PL Company Reg No: SC070429

JEL 160564

APPENDIX G

Exova Jones Environmental

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

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

Malone O'Regan
Ground Floor - Unit 3
Bracken Business Park
Bracken Road
Sandyford
Dublin 18
D18 V4K6

Attention :	Thomas Vainio-Mattila
Date :	13th February, 2019
Your reference :	E1506
Our reference :	Test Report 19/1582 Batch 1
Location :	Athy Co Kildare Prussletown
Date samples received :	1st February, 2019
Status :	Final report
Issue :	1

Three samples were received for analysis on 1st February, 2019 of which three 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.

Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Bruce Leslie
Project Co-ordinator

Client Name: Malone O'Regan
Reference: E1506
Location: Athy Co Kildare Prussletown
Contact: Thomas Vainio-Mattila
JE Job No.: 19/1582

Report : Solid

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

J E Sample No.	1-3	4-6	7-9									
Sample ID	TPA	TPF	TPG									
Depth	3.80-4.10	1.60-2.00	3.60-4.00									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	17/01/2019	17/01/2019	17/01/2019									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	01/02/2019	01/02/2019	01/02/2019									

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
Antimony	11	5	-								<1	mg/kg	TM30/PM15
Arsenic #	56.0	10.2	-								<0.5	mg/kg	TM30/PM15
Barium #	581	136	-								<1	mg/kg	TM30/PM15
Cadmium #	1.6	1.5	-								<0.1	mg/kg	TM30/PM15
Chromium #	79.6	227.3	-								<0.5	mg/kg	TM30/PM15
Copper #	237	91	-								<1	mg/kg	TM30/PM15
Lead #	377	78	-								<5	mg/kg	TM30/PM15
Mercury #	1.0	0.1	-								<0.1	mg/kg	TM30/PM15
Molybdenum #	9.1	3.8	-								<0.1	mg/kg	TM30/PM15
Nickel #	51.7	31.4	-								<0.7	mg/kg	TM30/PM15
Selenium #	3	2	-								<1	mg/kg	TM30/PM15
Total Sulphate as SO4 #	1811	6467	-								<50	mg/kg	TM50/PM29
Water Soluble Boron #	3.3	8.2	-								<0.1	mg/kg	TM74/PM32
Zinc #	706	555	-								<5	mg/kg	TM30/PM15
Antimony	-	-	8								<1	mg/kg	TM30/PM62
Arsenic	-	-	16.1								<0.5	mg/kg	TM30/PM62
Barium	-	-	308								<1	mg/kg	TM30/PM62
Cadmium	-	-	0.6								<0.1	mg/kg	TM30/PM62
Chromium	-	-	26.8								<0.5	mg/kg	TM30/PM62
Copper	-	-	32								<1	mg/kg	TM30/PM62
Lead	-	-	73								<5	mg/kg	TM30/PM62
Mercury	-	-	0.2								<0.1	mg/kg	TM30/PM62
Molybdenum	-	-	6.5								<0.1	mg/kg	TM30/PM62
Nickel	-	-	33.8								<0.7	mg/kg	TM30/PM62
Selenium	-	-	2								<1	mg/kg	TM30/PM62
Total Sulphate as SO4	-	-	5713								<50	mg/kg	TM50/PM29
Water Soluble Boron	-	-	28.8								<0.1	mg/kg	TM74/PM61
Zinc	-	-	302								<5	mg/kg	TM30/PM62

Client Name: Malone O'Regan
Reference: E1506
Location: Athy Co Kildare Prussletown
Contact: Thomas Vainio-Mattila
JE Job No.: 19/1582

Report : Solid

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

J E Sample No.	1-3	4-6	7-9									
Sample ID	TPA	TPF	TPG									
Depth	3.80-4.10	1.60-2.00	3.60-4.00									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	17/01/2019	17/01/2019	17/01/2019									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	01/02/2019	01/02/2019	01/02/2019									

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
PAH MS													
Naphthalene #	0.40	0.12	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.12	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	0.07	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.56	0.33	<0.03								<0.03	mg/kg	TM4/PM8
Anthracene #	0.13	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.97	0.25	<0.03								<0.03	mg/kg	TM4/PM8
Pyrene #	0.83	0.21	<0.03								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.89	0.12	<0.06								<0.06	mg/kg	TM4/PM8
Chrysene #	0.87	0.14	<0.02								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	2.31	0.31	<0.07								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	1.21	0.14	<0.04								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.99	0.11	<0.04								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.35	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.87	0.11	<0.04								<0.04	mg/kg	TM4/PM8
Coronene	0.16	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
PAH 6 Total #	6.35	0.92	<0.22								<0.22	mg/kg	TM4/PM8
PAH 17 Total	10.66	1.91	<0.64								<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	1.66	0.22	<0.05								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.65	0.09	<0.02								<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1								<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	100	95	99								<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	905	97								<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1 SV	<0.1 SV	<0.1 SV								<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1 SV	<0.1 SV	<0.1 SV								<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 SV	<0.1 SV	<0.1 SV								<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	4.8	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	47	<4								<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	119	<7								<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	28	672	97								<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	62	<7								<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	28	905	97								<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1 SV	<0.1 SV	<0.1 SV								<0.1	mg/kg	TM36/PM12
>C10-C25	<10	360	<10								<10	mg/kg	TM5/PM8/PM16
>C25-C35	32	494	82								<10	mg/kg	TM5/PM8/PM16

Client Name: Malone O'Regan
Reference: E1506
Location: Athy Co Kildare Prussletown
Contact: Thomas Vainio-Mattila
JE Job No.: 19/1582

Report : Solid

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

J E Sample No.	1-3	4-6	7-9	LOD/LOR	Units	Method No.
Sample ID	TPA	TPF	TPG			
Depth	3.80-4.10	1.60-2.00	3.60-4.00			
COC No / misc						
Containers	V J T	V J T	V J T			
Sample Date	17/01/2019	17/01/2019	17/01/2019			
Sample Type	Soil	Soil	Soil			
Batch Number	1	1	1			
Date of Receipt	01/02/2019	01/02/2019	01/02/2019			
TPH CWG						
Aromatics						
>C5-EC7 #	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	6.6	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	19	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	79	11	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	115	423	117	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	17	62	27	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	132	590	155	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	160	1495	252	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1 SV	<0.1 SV	<0.1 SV	<0.1	mg/kg	TM36/PM12
>EC10-EC25	19	200	29	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	93	331	94	<10	mg/kg	TM5/PM8/PM16
MTBE #	<5 SV	<5 SV	<5 SV	<5	ug/kg	TM31/PM12
Benzene #	<5 SV	<5 SV	<5 SV	<5	ug/kg	TM31/PM12
Toluene #	<5 SV	<5 SV	<5 SV	<5	ug/kg	TM31/PM12
Ethylbenzene #	<5 SV	<5 SV	<5 SV	<5	ug/kg	TM31/PM12
m/p-Xylene #	<5 SV	8 SV	<5 SV	<5	ug/kg	TM31/PM12
o-Xylene #	<5 SV	<5 SV	<5 SV	<5	ug/kg	TM31/PM12
PCB 28 #	<5	<100 AA	<5	<5	ug/kg	TM17/PM8
PCB 52 #	<5	<100 AA	<5	<5	ug/kg	TM17/PM8
PCB 101 #	<5	<100 AA	<5	<5	ug/kg	TM17/PM8
PCB 118 #	<5	<100 AA	<5	<5	ug/kg	TM17/PM8
PCB 138 #	<5	<100 AA	<5	<5	ug/kg	TM17/PM8
PCB 153 #	<5	<100 AA	<5	<5	ug/kg	TM17/PM8
PCB 180 #	<5	<100 AA	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<700 AA	<35	<35	ug/kg	TM17/PM8
Phenol #	<0.01	<0.01	<0.01	<0.01	mg/kg	TM26/PM21
Natural Moisture Content	34.1	36.9	52.3	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	25.4	27.0	34.3	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	79.6	227.3	-	<0.5	mg/kg	NONE/NONE
Chromium III	-	-	26.8	<0.5	mg/kg	NONE/NONE
Total Cyanide #	1.2	1.0	<0.5	<0.5	mg/kg	TM89/PM45
Total Organic Carbon #	19.80	3.44	NDP	<0.02	%	TM21/PM24

Please see attached notes for all abbreviations and acronyms

Client Name: Malone O'Regan
Reference: E1506
Location: Athy Co Kildare Prussletown
Contact: Thomas Vainio-Mattila
JE Job No.: 19/1582

Report : Solid

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

J E Sample No.	1-3	4-6	7-9									
Sample ID	TPA	TPF	TPG									
Depth	3.80-4.10	1.60-2.00	3.60-4.00									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	17/01/2019	17/01/2019	17/01/2019									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	01/02/2019	01/02/2019	01/02/2019									

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
Sulphide	<10	41	<10								<10	mg/kg	TM107/PM119
Elemental Sulphur	28	1422	-								<1	mg/kg	TM108/PM114
Elemental Sulphur	-	-	11								<1	mg/kg	TM108/PM8
pH #	7.71	7.88	7.95								<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1184	0.1127	0.1344									kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09									kg	NONE/PM17

Client Name: Malone O'Regan
Reference: E1506
Location: Athy Co Kildare Prussletown
Contact: Thomas Vainio-Mattila
JE Job No.: 19/1582

Report : CEN 10:1 1 Batch

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

J E Sample No.	1-3	4-6	7-9									
Sample ID	TPA	TPF	TPG									
Depth	3.80-4.10	1.60-2.00	3.60-4.00									
COC No / misc												
Containers	V J T	V J T	V J T									
Sample Date	17/01/2019	17/01/2019	17/01/2019									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	01/02/2019	01/02/2019	01/02/2019									

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
Dissolved Antimony #	0.007	<0.002	0.011								<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	0.07	<0.02	0.11								<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	0.0108	0.0074	0.0054								<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	0.108	0.074	0.054								<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.023	0.025	0.059								<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.23	0.25	0.59								<0.03	mg/kg	TM30/PM17
Dissolved Boron #	0.044	0.369	0.997								<0.012	mg/l	TM30/PM17
Dissolved Boron (A10) #	0.44	3.69	9.97								<0.12	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005								<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005								<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	0.0182	<0.0015	<0.0015								<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	0.182	<0.015	<0.015								<0.015	mg/kg	TM30/PM17
Dissolved Copper #	0.007	<0.007	<0.007								<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07								<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	0.005	0.010								<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	0.05	0.10								<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.009	0.052	0.078								<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.09	0.52	0.78								<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	0.007	<0.002								<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	0.07	<0.02								<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003								<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03								<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.008	0.004	<0.003								<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	0.08	0.04	<0.03								<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001								<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001								<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01								<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1								<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	<0.3								<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	<3								<3	mg/kg	TM173/PM0
Sulphate as SO4 #	13.2	209.5	80.3								<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	132	2095	803								<5	mg/kg	TM38/PM0
Chloride #	<0.3	7.8	1.4								<0.3	mg/l	TM38/PM0
Chloride #	<3	78	14								<3	mg/kg	TM38/PM0
Ammoniacal Nitrogen as N #	0.09	42.69	4.02								<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as N #	0.9	426.9	40.2								<0.3	mg/kg	TM38/PM0
Dissolved Organic Carbon	3	18	8								<2	mg/l	TM60/PM0
Dissolved Organic Carbon	30	180	80								<20	mg/kg	TM60/PM0
Total Dissolved Solids #	176	421	361								<35	mg/l	TM20/PM0
Total Dissolved Solids #	1760	4210	3608								<350	mg/kg	TM20/PM0

Mass of sample taken (kg)	-	Dry Matter Content Ratio (%) =	75.7
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	-
Particle Size <4mm =	>95%	Eluate Volume (l)	0.8

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**19/1582**			
Sample No	**3**			
Client Sample No	**TPA**			
Depth/Other	**3.80-4.10**	**Inert**	**Stable Non-reactive**	**Hazardous**
Sample Date	**17/01/2019**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	19.80	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	<30	500	-	-
PAH Sum of 6 (mg/kg)	6.35	-	-	-
PAH Sum of 17 (mg/kg)	10.66	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	0.108	0.5	2	25
Barium	0.23	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	0.182	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.09	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	<0.05	0.5	10	50
Antimony	0.07	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.08	4	50	200
Chloride	<3	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	132	1000	20000	50000
Total Dissolved Solids	1760	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	30	500	800	1000

Mass of sample taken (kg)	-	Dry Matter Content Ratio (%) =	79.6
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	-
Particle Size <4mm =	>95%	Eluate Volume (l)	0.82

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**19/1582**			
Sample No	**6**			
Client Sample No	**TPF**			
Depth/Other	**1.60-2.00**	**Inert**	**Stable Non-reactive**	**Hazardous**
Sample Date	**17/01/2019**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	3.44	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.700	1	-	-
Mineral Oil (mg/kg)	905	500	-	-
PAH Sum of 6 (mg/kg)	0.92	-	-	-
PAH Sum of 17 (mg/kg)	1.91	100	-	-

Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	0.074	0.5	2	25
Barium	0.25	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.52	0.5	10	30
Nickel	0.07	0.4	10	40
Lead	0.05	0.5	10	50
Antimony	<0.02	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	0.04	4	50	200
Chloride	78	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	2095	1000	20000	50000
Total Dissolved Solids	4210	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	180	500	800	1000

Mass of sample taken (kg)	-	Dry Matter Content Ratio (%) =	66.9
Mass of dry sample (kg) =	0.09	Leachant Volume (l)	-
Particle Size <4mm =	>95%	Eluate Volume (l)	0.74

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**19/1582**			
Sample No	**9**			
Client Sample No	**TPG**	**Inert**	**Stable Non-reactive**	**Hazardous**
Depth/Other	**3.60-4.00**			
Sample Date	**17/01/2019**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	NDP	3	5	6
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	97	500	-	-
PAH Sum of 6 (mg/kg)	<0.22	-	-	-
PAH Sum of 17 (mg/kg)	<0.64	100	-	-
Eluate Analysis	**10:1 concn leached**	**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	A10			
	mg/kg	**mg/kg**		
Arsenic	0.054	0.5	2	25
Barium	0.59	20	100	300
Cadmium	<0.005	0.04	1	5
Chromium	<0.015	0.5	10	70
Copper	<0.07	2	50	100
Mercury	<0.0001	0.01	0.2	2
Molybdenum	0.78	0.5	10	30
Nickel	<0.02	0.4	10	40
Lead	0.10	0.5	10	50
Antimony	0.11	0.06	0.7	5
Selenium	<0.03	0.1	0.5	7
Zinc	<0.03	4	50	200
Chloride	14	800	15000	25000
Fluoride	<3	10	150	500
Sulphate as SO4	803	1000	20000	50000
Total Dissolved Solids	3608	4000	60000	100000
Phenol	<0.1	1	-	-
Dissolved Organic Carbon	80	500	800	1000

Client Name: Malone O'Regan **Matrix : Solid**
Reference: E1506
Location: Athy Co Kildare Prussletown
Contact: Thomas Vainio-Mattila

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	EPH Interpretation
19/1582	1	TPA	3.80-4.10	1-3	PAH's & lubricating oil
19/1582	1	TPF	1.60-2.00	4-6	Degraded diesel, Possible PAH's, lubricating oil & Naturally occurring compounds
19/1582	1	TPG	3.60-4.00	7-9	PAH's & lubricating oil

Client Name: Malone O'Regan
Reference: E1506
Location: Athy Co Kildare Prussletown
Contact: Thomas Vainio-Mattila

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
19/1582	1	TPA	3.80-4.10	2	06/02/2019	**General Description (Bulk Analysis)**	Soil/Stones
					06/02/2019	**Asbestos Fibres**	NAD
					06/02/2019	**Asbestos ACM**	NAD
					06/02/2019	**Asbestos Type**	NAD
					06/02/2019	**Asbestos Level Screen**	NAD
19/1582	1	TPF	1.60-2.00	5	06/02/2019	**General Description (Bulk Analysis)**	Soil/Stones
					06/02/2019	**Asbestos Fibres**	NAD
					06/02/2019	**Asbestos ACM**	NAD
					06/02/2019	**Asbestos Type**	NAD
					06/02/2019	**Asbestos Level Screen**	NAD
19/1582	1	TPG	3.60-4.00	8	06/02/2019	**General Description (Bulk Analysis)**	Soil/Stones
					06/02/2019	**Asbestos Fibres**	Fibre Bundles
					06/02/2019	**Asbestos ACM**	NAD
					06/02/2019	**Asbestos Type**	Chrysotile
					06/02/2019	**Asbestos Level Screen**	less than 0.1%
					13/02/2019	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					13/02/2019	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					13/02/2019	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
					13/02/2019	**Asbestos PCOM Quantification (Fibres)**	<0.001 (mass %)
					13/02/2019	**Asbestos Gravimetric & PCOM Total**	<0.001 (mass %)

Client Name: Malone O'Regan **Matrix : Solid**
Reference: E1506
Location: Athy Co Kildare Prussletown
Contact: Thomas Vainio-Mattila

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Method No.	NDP Reason
19/1582	1	TPG	3.60-4.00	7-9	TM21/PM24	Asbestos detected in sample

Client Name: Malone O'Regan

Matrix : Solid

Reference: E1506

Location: Athy Co Kildare Prussletown

Contact: Thomas Vainio-Mattila

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
19/1582	1	TPA	3.80-4.10	1-3	Cyanide, EPH, GRO, PAH, PCB, Phenols	Sample holding time exceeded prior to receipt
19/1582	1	TPF	1.60-2.00	4-6	Cyanide, EPH, GRO, PAH, PCB, Phenols	Sample holding time exceeded prior to receipt
19/1582	1	TPG	3.60-4.00	7-9	Cyanide, EPH, GRO, PAH, PCB, Phenols	Sample holding time exceeded prior to receipt

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/1582

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.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

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

ISO17025 accreditation applies to surface water and groundwater and usually 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.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

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.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
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 an Exova 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
AA	x20 Dilution

Appendix - Methods used for WAC (2003/33/EC)

JE Job No.: 19/1582

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometic methods after distillation)* (BY HPLC - Jones Env)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amounts of acid or base needed to cover the pH range

Notes:

*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS
**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180

***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.

JE Job No: 19/1582

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

JE Job No: 19/1582

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21	As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

JE Job No: 19/1582

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	Dried and ground solid sample is boiled with dilute hydrochloric acid, the resulting liquor is then analysed.	Yes		AD	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	Dried and ground solid sample is boiled with dilute hydrochloric acid, the resulting liquor is then analysed.			AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM61	As received solid samples are extracted with hot water in a 20:1 ratio of water to soil ready for analysis by ICP.			AR	Yes

JE Job No: 19/1582

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser	PM119	As received solid samples are extracted with 1M NaOH by orbital shaker for Sulphide and Thiocyanate analysis.			AR	Yes
TM108	Determination of Elemental Sulphur by Reversed Phase High Performance Liquid Chromatography with Ultra Violet spectroscopy.	PM114	End over end extraction of dried and crushed soil samples for organic analysis. The solvent mix varies depending on analysis required			AD	Yes
TM108	Determination of Elemental Sulphur by Reversed Phase High Performance Liquid Chromatography with Ultra Violet spectroscopy.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM131	Quantification of Asbestos Fibres and ACM, based on HSG248 and SCA method.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AR	Yes
NONE	No Method Code	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

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

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

Malone O'Regan
Ground Floor - Unit 3
Bracken Business Park
Bracken Road
Sandyford
Dublin 18
D18 V4K6

Attention :	Thomas Vainio-Mattila
Date :	10th May, 2019
Your reference :	E1506
Our reference :	Test Report 19/6806 Batch 1
Location :	Athy - Site 2
Date samples received :	26th April, 2019
Status :	Final report
Issue :	1

Six samples were received for analysis on 26th April, 2019 of which six 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:

Bruce Leslie
Project Co-ordinator

Client Name: Malone O'Regan
Reference: E1506
Location: Athy - Site 2
Contact: Thomas Vainio-Mattila
JE Job No.: 19/6806

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-33	34-42	43-51					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019							
Dissolved Arsenic	-	-	-	<2.5	-	-					<2.5	ug/l	TM30/PM14
Dissolved Arsenic #	<2.5	<2.5	<2.5	-	<2.5	<2.5					<2.5	ug/l	TM30/PM14
Dissolved Boron	92	23	39	286	23	21					<12	ug/l	TM30/PM14
Dissolved Cadmium	-	-	-	<0.5	-	-					<0.5	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Calcium	-	-	-	255.1 AA	-	-					<0.2	mg/l	TM30/PM14
Dissolved Calcium #	148.7	142.9	142.0	-	104.7	128.9					<0.2	mg/l	TM30/PM14
Total Dissolved Chromium	-	-	-	<1.5	-	-					<1.5	ug/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5	<1.5	-	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Copper	-	-	-	<7	-	-					<7	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	<7	-	<7	<7					<7	ug/l	TM30/PM14
Total Dissolved Iron	-	-	-	<20	-	-					<20	ug/l	TM30/PM14
Total Dissolved Iron #	<20	<20	<20	-	<20	<20					<20	ug/l	TM30/PM14
Dissolved Lead	-	-	-	<5	-	-					<5	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5	-	<5	<5					<5	ug/l	TM30/PM14
Dissolved Magnesium	-	-	-	26.1	-	-					<0.1	mg/l	TM30/PM14
Dissolved Magnesium #	19.9	14.2	18.5	-	17.1	17.7					<0.1	mg/l	TM30/PM14
Dissolved Manganese	-	-	-	1031	-	-					<2	ug/l	TM30/PM14
Dissolved Manganese #	3	<2	<2	-	<2	<2					<2	ug/l	TM30/PM14
Dissolved Mercury	-	-	-	<1	-	-					<1	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	-	<1	<1					<1	ug/l	TM30/PM14
Dissolved Nickel	-	-	-	5	-	-					<2	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2	<2	-	<2	<2					<2	ug/l	TM30/PM14
Dissolved Potassium	-	-	-	28.3	-	-					<0.1	mg/l	TM30/PM14
Dissolved Potassium #	7.6	2.1	1.9	-	2.1	2.3					<0.1	mg/l	TM30/PM14
Dissolved Sodium	-	-	-	21.9	-	-					<0.1	mg/l	TM30/PM14
Dissolved Sodium #	45.4	15.0	11.3	-	9.2	9.5					<0.1	mg/l	TM30/PM14
Dissolved Zinc	-	-	-	27	-	-					<3	ug/l	TM30/PM14
Dissolved Zinc #	<3	<3	<3	-	<3	<3					<3	ug/l	TM30/PM14
Methyl Tertiary Butyl Ether	-	-	-	<0.1	-	-					<0.1	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	-	<0.1	<0.1					<0.1	ug/l	TM15/PM10
Benzene	-	-	-	<0.5	-	-					<0.5	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM15/PM10
Toluene	-	-	-	<5	-	-					<5	ug/l	TM15/PM10
Toluene #	<5	<5	<5	-	<5	<5					<5	ug/l	TM15/PM10
Ethylbenzene	-	-	-	<1	-	-					<1	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM15/PM10
m/p-Xylene	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
o-Xylene	-	-	-	<1	-	-					<1	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	111	109	107	112	108	103					<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	103	97	95	103	97	94					<0	%	TM15/PM10

Client Name: Malone O'Regan
Reference: E1506
Location: Athy - Site 2
Contact: Thomas Vainio-Mattila
JE Job No.: 19/6806

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-33	34-42	43-51					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019							
Pesticides													
Organochlorine Pesticides													
Aldrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Alpha-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Beta-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Chlorothalonil	<2.50 AB	<2.50 AB	<2.50 AB	<2.50 AB	<2.50 AB	<2.50 AB					<0.01	ug/l	TM149/PM30
cis-Chlordane	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Delta-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Dieldrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endosulphan I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endosulphan II	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endosulphan sulphate	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Gamma-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Heptachlor	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Heptachlor Epoxide	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Hexachlorobenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Isodrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
o,p'-DDE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
o,p'-DDT	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
o,p'-Methoxychlor	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
o,p'-TDE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-DDE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-DDT	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-Methoxychlor	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-TDE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Pendimethalin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Permethrin I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Permethrin II	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Quintozene (PCNB)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Tecnazene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Telodrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
trans-Chlordane	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Triadimefon	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Triallate	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Trifluralin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30

Client Name: Malone O'Regan
Reference: E1506
Location: Athy - Site 2
Contact: Thomas Vainio-Mattila
JE Job No.: 19/6806

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

J E Sample No.	1-8	9-16	17-24	25-33	34-42	43-51					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019							
Pesticides													
Organophosphorus Pesticides													
Azinphos ethyl	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Azinphos methyl	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Carbophenothion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Chlorfenvinphos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Chlorpyrifos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Chlorpyrifos-methyl	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Diazinon	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Dichlorvos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Disulfoton	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Dimethoate	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Ethion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Ethyl Parathion (Parathion)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Etrimphos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Fenitrothion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Fenthion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Malathion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Methyl Parathion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Mevinphos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Phosalone	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Pirimiphos Methyl	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Propetamphos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Triazophos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30

Please see attached notes for all abbreviations and acronyms

Client Name: Malone O'Regan
Reference: E1506
Location: Athy - Site 2
Contact: Thomas Vainio-Mattila
JE Job No.: 19/6806

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-33	34-42	43-51					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019							
Acid Herbicides													
Benazolin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Bentazone	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Bromoxynil	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Clopyralid	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
4-CPA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
2,4-D	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
2,4-DB	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Dicamba	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Dichloroprop	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Diclofop	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Fenoprop	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Flamprop	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Flamprop-isopropyl	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Ioxynil	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
MCPA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
MCPB	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Mecoprop	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Picloram	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Pentachlorophenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
2,4,5-T	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
2,3,6-TBA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Triclopyr	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Atrazine	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Simazine	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
EPH (C8-C40)	-	-	-	<10	-	-					<10	ug/l	TM5/PM30
EPH (C8-C40) #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM30
Mineral Oil (C10-C40)											<10	ug/l	TM5/PM16/PM30

Client Name: Malone O'Regan
Reference: E1506
Location: Athy - Site 2
Contact: Thomas Vainio-Mattila
JE Job No.: 19/6806

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-33	34-42	43-51					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019							
TPH CWG													
Aliphatics													
>C5-C6	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>C5-C6 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>C6-C8	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>C6-C8 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>C8-C10	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>C8-C10 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>C10-C12	-	-	-	<5	-	-					<5	ug/l	TM5/PM16/PM30
>C10-C12 #	<5	<5	<5	-	<5	<5					<5	ug/l	TM5/PM16/PM30
>C12-C16	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>C12-C16 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
>C16-C21	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>C16-C21 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
>C21-C35	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>C21-C35 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35	-	-	-	<10	-	-					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics C5-35 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>C5-EC7 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>EC7-EC8 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>EC8-EC10 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12	-	-	-	<5	-	-					<5	ug/l	TM5/PM16/PM30
>EC10-EC12 #	<5	<5	<5	-	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>EC12-EC16 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>EC16-EC21 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>EC21-EC35 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35	-	-	-	<10	-	-					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aromatics C5-35 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35)	-	-	-	<10	-	-					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
GRO (>C4-C8)	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
GRO (>C4-C8) #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
GRO (>C8-C12)	-	-	-	16	-	-					<10	ug/l	TM36/PM12
GRO (>C8-C12) #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
GRO (>C4-C12)	-	-	-	16	-	-					<10	ug/l	TM36/PM12
GRO (>C4-C12) #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12

Client Name: Malone O'Regan
Reference: E1506
Location: Athy - Site 2
Contact: Thomas Vainio-Mattila
JE Job No.: 19/6806

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-33	34-42	43-51					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019							
Phenol	-	-	-	<0.01	-	-					<0.01	mg/l	TM26/PM0
Phenol #	<0.01	<0.01	<0.01	-	<0.01	<0.01					<0.01	mg/l	TM26/PM0
Fluoride	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	mg/l	TM173/PM0
Sulphate as SO4	-	-	-	33.7	-	-					<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	79.0	43.4	26.4	-	29.2	24.3					<0.5	mg/l	TM38/PM0
Chloride	-	-	-	25.8	-	-					<0.3	mg/l	TM38/PM0
Chloride #	83.7	50.0	30.1	-	27.4	26.8					<0.3	mg/l	TM38/PM0
MRP Ortho Phosphate as P	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03					<0.03	mg/l	TM38/PM0
Total Oxidised Nitrogen as N	-	-	-	<0.2	-	-					<0.2	mg/l	TM38/PM0
Total Oxidised Nitrogen as N #	7.6	8.9	7.8	-	9.1	8.9					<0.2	mg/l	TM38/PM0
Total Cyanide	-	-	-	0.04	-	-					<0.01	mg/l	TM89/PM0
Total Cyanide #	<0.01	<0.01	<0.01	-	<0.01	<0.01					<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as N	-	-	-	39.03	-	-					<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as N #	<0.03	<0.03	<0.03	-	<0.03	<0.03					<0.03	mg/l	TM38/PM0
Total Alkalinity as CaCO3 #	666	4770	342	-	274	284					<1	mg/l	TM75/PM0
Dibutyltin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM94/PM48
Tributyltin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM94/PM48
Triphenyltin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM94/PM48
BOD (Settled)	-	-	-	10	-	-					<1	mg/l	TM58/PM0
BOD (Settled) #	-	-	-	-	<1	<1					<1	mg/l	TM58/PM0
COD (Settled)	-	-	-	69	-	-					<7	mg/l	TM57/PM0
COD (Settled) #	-	-	-	-	13	9					<7	mg/l	TM57/PM0
Dissolved Oxygen	8	9	6	3	9	11					<1	mg/l	TM58/PM0
Electrical Conductivity @25C	-	-	-	1500	-	-					<2	uS/cm	TM76/PM0
Electrical Conductivity @25C #	875	805	707	-	685	731					<2	uS/cm	TM76/PM0
Faecal Coliforms*	<1	<1	<	-	-	-						CFU/100ml	Subcontracted
pH	-	-	-	7.51	-	-					<0.01	pH units	TM73/PM0
pH #	7.38	7.21	7.28	-	7.74	7.86					<0.01	pH units	TM73/PM0
Redox	369.49	365.04	358.73	-40.96	135.08	172.41						mV	TM72/PM0
Total Organic Carbon #	<2	<2	<2	-	-	-					<2	mg/l	TM60/PM0
Total Coliforms*	<1.0	7.4	165.8	-	-	-						CFU/100ml	Subcontracted
Total Dissolved Solids #	673	530	516	-	-	-					<35	mg/l	TM20/PM0
Total Suspended Solids #	-	-	-	-	<10	<10					<10	mg/l	TM37/PM0

Client Name: Malone O'Regan
Reference: E1506
Location: Athy - Site 2
Contact: Thomas Vainio-Mattila
JE Job No.: 19/6806

SVOC Report : **Liquid**

J E Sample No.	1-8	9-16	17-24	25-33	34-42	43-51							
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth											Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019							
SVOC MS											LOD/LOR	Units	Method No.
Phenols													
2-Chlorophenol	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
2-Chlorophenol #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
2-Methylphenol	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
2-Methylphenol #	<0.5	<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	<0.5					<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
4-Methylphenol	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
4-Nitrophenol	<10	<10	<10	<10	<10	<10					<10	ug/l	TM16/PM30
Pentachlorophenol	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Phenol	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
PAHs													
2-Chloronaphthalene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
2-Chloronaphthalene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
2-Methylnaphthalene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Naphthalene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Naphthalene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Acenaphthylene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Acenaphthylene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Acenaphthene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Acenaphthene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Fluorene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Fluorene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Phenanthrene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Phenanthrene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Anthracene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Anthracene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Fluoranthene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Fluoranthene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Pyrene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Pyrene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Benzo(a)anthracene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Benzo(a)anthracene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Chrysene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Chrysene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Benzo(bk)fluoranthene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Benzo(bk)fluoranthene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Benzo(a)pyrene	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Indeno(123cd)pyrene	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Dibenzo(ah)anthracene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Dibenzo(ah)anthracene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Benzo(ghi)perylene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Benzo(ghi)perylene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<5	<5	<5	<5	<5	<5					<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Di-n-butyl phthalate	-	-	-	<1.5	-	-					<1.5	ug/l	TM16/PM30
Di-n-butyl phthalate #	<1.5	<1.5	<1.5	-	<1.5	<1.5					<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Diethyl phthalate	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Diethyl phthalate #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Dimethyl phthalate	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30

Client Name: Malone O'Regan
Reference: E1506
Location: Athy - Site 2
Contact: Thomas Vainio-Mattila
JE Job No.: 19/6806

SVOC Report : **Liquid**

J E Sample No.	1-8	9-16	17-24	25-33	34-42	43-51							
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth											Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019							
SVOC MS											LOD/LOR	Units	Method No.
Other SVOCs													
1,2-Dichlorobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
1,2-Dichlorobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
1,3-Dichlorobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
1,3-Dichlorobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
1,4-Dichlorobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
1,4-Dichlorobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
2-Nitroaniline	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
2,4-Dinitrotoluene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
2,4-Dinitrotoluene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
3-Nitroaniline	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
4-Bromophenylphenylether	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
4-Bromophenylphenylether #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
4-Chloroaniline	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
4-Chlorophenylphenylether	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
4-Chlorophenylphenylether #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
4-Nitroaniline	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Azobenzene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Azobenzene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Bis(2-chloroethyl)ether #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Carbazole	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Carbazole #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Dibenzofuran	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Dibenzofuran #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Hexachlorobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Hexachlorobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Hexachlorobutadiene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Hexachlorobutadiene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Hexachloroethane	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Hexachloroethane #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Isophorone	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Isophorone #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Nitrobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Nitrobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	95	98	83	94	87	96					<0	%	TM16/PM30
Surrogate Recovery p-Terphenyl-d14	102	104	86	102	98	102					<0	%	TM16/PM30

Client Name: Malone O'Regan
Reference: E1506
Location: Athy - Site 2
Contact: Thomas Vainio-Mattila
JE Job No.: 19/6806

VOC Report : **Liquid**

J E Sample No.	1-8	9-16	17-24	25-33	34-42	43-51							
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019							
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether	-	-	-	<0.1	-	-					<0.1	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	-	<0.1	<0.1					<0.1	ug/l	TM15/PM10
Chloromethane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Vinyl Chloride	-	-	-	<0.1	-	-					<0.1	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1	-	<0.1	<0.1					<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Chloroethane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Trichlorofluoromethane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE)	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Dichloromethane (DCM)	-	-	-	<5	-	-					<5	ug/l	TM15/PM10
Dichloromethane (DCM) #	<5	<5	<5	-	<5	<5					<5	ug/l	TM15/PM10
trans-1-2-Dichloroethene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,1-Dichloroethane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Bromochloromethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Chloroform	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,1,1-Trichloroethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,1-Dichloropropene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Carbon tetrachloride	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,2-Dichloroethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Benzene	-	-	-	<0.5	-	-					<0.5	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM15/PM10
Trichloroethene (TCE)	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,2-Dichloropropane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Dibromomethane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Bromodichloromethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Toluene	-	-	-	<5	-	-					<5	ug/l	TM15/PM10
Toluene #	<5	<5	<5	-	<5	<5					<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,1,2-Trichloroethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Tetrachloroethene (PCE)	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,3-Dichloropropane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Dibromochloromethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,2-Dibromoethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Chlorobenzene	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Client Name: Malone O'Regan
Reference: E1506
Location: Athy - Site 2
Contact: Thomas Vainio-Mattila
JE Job No.: 19/6806

VOC Report : **Liquid**

J E Sample No.	1-8	9-16	17-24	25-33	34-42	43-51							
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth											Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019	25/04/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019	26/04/2019					LOD/LOR	Units	Method No.
VOC MS Continued													
1,1,1,2-Tetrachloroethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Ethylbenzene	-	-	-	<1	-	-					<1	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM15/PM10
m/p-Xylene	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
o-Xylene	-	-	-	<1	-	-					<1	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM15/PM10
Styrene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Bromoform	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Isopropylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4	<4	<4					<4	ug/l	TM15/PM10
Bromobenzene	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,2,3-Trichloropropane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Propylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
2-Chlorotoluene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
4-Chlorotoluene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
tert-Butylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
sec-Butylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
4-Isopropyltoluene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,3-Dichlorobenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,4-Dichlorobenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
n-Butylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,2-Dichlorobenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	111	109	107	112	108	103					<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	103	97	95	103	97	94					<0	%	TM15/PM10

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Malone O'Regan

Reference: E1506

Location: Athy - Site 2

Contact: Thomas Vainio-Mattila

Matrix : Liquid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
19/6806	1	GW1A		1-8	Mercury, Metals	Sample holding time exceeded
19/6806	1	GW2A		9-16	Mercury, Metals	Sample holding time exceeded
19/6806	1	GW3A		17-24	Mercury, Metals	Sample holding time exceeded
19/6806	1	SW1A		34-42	Mercury, Metals	Sample holding time exceeded
19/6806	1	SW2A		43-51	Mercury, Metals	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/6806

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.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

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

ISO17025 accreditation applies to surface water and groundwater and usually 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

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

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.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

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.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
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 an Exova 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
AA	x5 Dilution
AB	x250 Dilution

JE Job No: 19/6806

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details				
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	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			

JE Job No: 19/6806

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes			
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. 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, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.	Yes			
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods USEPA 160.2, EN872:2005 and SMWW 2540D. Gravimetric determination of Total Suspended Solids. Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed.	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes			

JE Job No: 19/6806

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM42	Modified US EPA method 8270. Pesticides and herbicides by GC-MS	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM57	Modified US EPA Method 410.4. Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically.	PM0	No preparation is required.				
TM57	Modified US EPA Method 410.4. Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically.	PM0	No preparation is required.	Yes			
TM58	APHA Standard Methods for the extraction of water and waste water (SMEWW) 5210B: Comparible with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as ammonia, nitrite and organic nitrogen which exert a nitrogenous demand. Determination of Dissolved Oxygen using the Hach HQ30D Oxygen Meter.	PM0	No preparation is required.				
TM58	APHA Standard Methods for the extraction of water and waste water (SMEWW) 5210B: Comparible with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as ammonia, nitrite and organic nitrogen which exert a nitrogenous demand. Determination of Dissolved Oxygen using the Hach HQ30D Oxygen Meter.	PM0	No preparation is required.	Yes			
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			
TM72	Redox Potential is measured by HI98120 redox meter.	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	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.	Yes			

JE Job No: 19/6806

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM76	Modified US EPA method 120.1. Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.				
TM76	Modified US EPA method 120.1. Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.				
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			
TM94	Derivatisation and extraction of Organotins. Analysis by GC-MS	PM48	Samples are pretreated and derivatised. The derviatised organotins are then extracted using hexane.				
TM149	Determination of Pesticides by Large Volume Injection on GC Triple Quad MS, based upon USEPA method 8270	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.				
Subcontracted	See attached subcontractor report for accreditation status and provider.						

City Analysts Limited,
Pigeon House Road,
Ringsend,
Dublin 4.

Tel: (01) 613 6003
Fax: (01) 613 6008

Email:
reports@cityanalysts.ie

www.cityanalysts.ie

Customer

Kate Wiley

Exova Environmental UK Ltd
Rosewell House
2A (1F) Harvest Drive
Newbridge, MidLothian Scotland
EH28 8QJ United Kingdom

Certificate Of Analysis

Job Number: 19-55383
Issue Number: 1
Report Date: 29 April 2019

Site: Not Applicable
PO Number: Not Supplied
Date Samples Received: 25/04/2019

Please find attached the results for the samples received at our laboratory on 25/04/2019.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our website at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

Authorised By: Shane Reynolds
Laboratory Manager

Authorised Date: 29 April 2019

Notes:

Results relate only to the items tested.
Information on methods of analysis and performance characteristics is available on request.
Any opinions or interpretations indicated are outside the scope of our INAB accreditation.
This test report shall not be reproduced except in full or with written approval of City Analysts Limited.

City Analysts Limited,
Pigeon House Road,
Ringsend,
Dublin 4.

Tel: (01) 613 6003
Fax: (01) 613 6008

Email:
reports@cityanalysts.ie

www.cityanalysts.ie

Certificate Of Analysis

Customer

Kate Wiley

Exova Environmental UK Ltd
Rosewell House
2A (1F) Harvest Drive
Newbridge, MidLothian Scotland
EH28 8QJ United Kingdom

Report Reference: 19-55383

Report Version: 1

Site: Not Applicable

Sample Description: GW1A

Sample Type: Ground

Lab Reference Number: 436538

Date of Sampling: 25/04/2019

Date Sample Received: 25/04/2019

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	25/04/2019	Coliforms	< 1.0	MPN/100ml	-
D/D3221#	25/04/2019	Faecal Coliforms	< 1	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total viable count
Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

City Analysts Limited,
Pigeon House Road,
Ringsend,
Dublin 4.

Tel: (01) 613 6003
Fax: (01) 613 6008

Email:
reports@cityanalysts.ie

www.cityanalysts.ie

Certificate Of Analysis

Customer

Kate Wiley

Exova Environmental UK Ltd
Rosewell House
2A (1F) Harvest Drive
Newbridge, MidLothian Scotland
EH28 8QJ United Kingdom

Report Reference: 19-55383

Report Version: 1

Site: Not Applicable

Sample Description: GW2A

Sample Type: Ground

Lab Reference Number: 436539

Date of Sampling: 25/04/2019

Date Sample Received: 25/04/2019

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	25/04/2019	Coliforms	7.4	MPN/100ml	-
D/D3221#	25/04/2019	Faecal Coliforms	< 1	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total viable count
Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

City Analysts Limited,
Pigeon House Road,
Ringsend,
Dublin 4.

Tel: (01) 613 6003
Fax: (01) 613 6008

Email:
reports@cityanalysts.ie

www.cityanalysts.ie

Certificate Of Analysis

Customer

Kate Wiley

Exova Environmental UK Ltd
Rosewell House
2A (1F) Harvest Drive
Newbridge, MidLothian Scotland
EH28 8QJ United Kingdom

Report Reference: 19-55383

Report Version: 1

Site: Not Applicable

Sample Description: GW3A

Sample Type: Ground

Lab Reference Number: 436540

Date of Sampling: 25/04/2019

Date Sample Received: 25/04/2019

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	25/04/2019	Coliforms	165.8	MPN/100ml	-
D/D3221#	25/04/2019	Faecal Coliforms	< 1	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total viable count
Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

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Exova Environmental UK Ltd
Rosewell House
2A (1F) Harvest Drive
Newbridge, MidLothian Scotland
EH28 8QJ United Kingdom

Report Reference: 19-55383

Report Version: 1

Site: Not Applicable

Sample Description: L1A

Sample Type: Ground

Lab Reference Number: 436541

Date of Sampling: 25/04/2019

Date Sample Received: 25/04/2019

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	25/04/2019	Coliforms	10810.0	MPN/100ml	-
D/D3221#	25/04/2019	Faecal Coliforms	23	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total viable count
Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Exova Jones Environmental

Registered Office: Exova Environmental UK Limited, 10 Lower Grosvenor Place, London, SW1W 0EN. Reg No. 11371415

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

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

Malone O'Regan
Ground Floor - Unit 3
Bracken Business Park
Bracken Road
Sandyford
Dublin 18
D18 V4K6

Attention :	Thomas Vainio-Mattila
Date :	14th June, 2019
Your reference :	E1506
Our reference :	Test Report 19/7606 Batch 1
Location :	
Date samples received :	10th May, 2019
Status :	Final report
Issue :	2

Six samples were received for analysis on 10th May, 2019 of which six 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:

Phil Sommerton BSc
Senior Project Manager

Client Name: Malone O'Regan
Reference: E1506
Location:
Contact: Thomas Vainio-Mattila
JE Job No.: 19/7606

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-33	52-59	60-68					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019							
Dissolved Arsenic	-	-	-	17.1	-	-					<2.5	ug/l	TM30/PM14
Dissolved Arsenic #	8.1	<2.5	<2.5	-	<2.5	<2.5					<2.5	ug/l	TM30/PM14
Dissolved Boron	98	26	45	298	32	30					<12	ug/l	TM30/PM14
Dissolved Cadmium	-	-	-	<0.5	-	-					<0.5	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Calcium	-	-	-	254.3 AA	-	-					<0.2	mg/l	TM30/PM14
Dissolved Calcium #	150.4	146.0	131.3	-	128.3	123.2					<0.2	mg/l	TM30/PM14
Total Dissolved Chromium	-	-	-	<1.5	-	-					<1.5	ug/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5	<1.5	-	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Copper	-	-	-	<7	-	-					<7	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	<7	-	<7	<7					<7	ug/l	TM30/PM14
Total Dissolved Iron	-	-	-	65	-	-					<20	ug/l	TM30/PM14
Total Dissolved Iron #	<20	<20	<20	-	<20	<20					<20	ug/l	TM30/PM14
Dissolved Lead	-	-	-	<5	-	-					<5	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5	-	<5	<5					<5	ug/l	TM30/PM14
Dissolved Magnesium	-	-	-	24.5	-	-					<0.1	mg/l	TM30/PM14
Dissolved Magnesium #	20.8	14.5	18.2	-	16.1	17.1					<0.1	mg/l	TM30/PM14
Dissolved Manganese	-	-	-	1331	-	-					<2	ug/l	TM30/PM14
Dissolved Manganese #	4	<2	<2	-	2	<2					<2	ug/l	TM30/PM14
Dissolved Mercury	-	-	-	<1	-	-					<1	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	-	<1	<1					<1	ug/l	TM30/PM14
Dissolved Nickel	-	-	-	4	-	-					<2	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2	<2	-	<2	<2					<2	ug/l	TM30/PM14
Dissolved Potassium	-	-	-	25.0	-	-					<0.1	mg/l	TM30/PM14
Dissolved Potassium #	8.3	2.0	1.8	-	2.1	2.1					<0.1	mg/l	TM30/PM14
Dissolved Sodium	-	-	-	22.8	-	-					<0.1	mg/l	TM30/PM14
Dissolved Sodium #	42.7	14.3	11.5	-	8.9	9.1					<0.1	mg/l	TM30/PM14
Dissolved Zinc	-	-	-	5	-	-					<3	ug/l	TM30/PM14
Dissolved Zinc #	<3	<3	<3	-	<3	<3					<3	ug/l	TM30/PM14
Methyl Tertiary Butyl Ether	-	-	-	<0.1	-	-					<0.1	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	-	<0.1	<0.1					<0.1	ug/l	TM15/PM10
Benzene	-	-	-	<0.5	-	-					<0.5	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM15/PM10
Toluene	-	-	-	<5	-	-					<5	ug/l	TM15/PM10
Toluene #	<5	<5	<5	-	<5	<5					<5	ug/l	TM15/PM10
Ethylbenzene	-	-	-	<1	-	-					<1	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM15/PM10
m/p-Xylene	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
o-Xylene	-	-	-	<1	-	-					<1	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	109	111	111	89	88	89					<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	108	110	109	85	86	86					<0	%	TM15/PM10

Client Name: Malone O'Regan
Reference: E1506
Location:
Contact: Thomas Vainio-Mattila
JE Job No.: 19/7606

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-33	52-59	60-68					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019							
Pesticides													
Organochlorine Pesticides													
Aldrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Alpha-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Beta-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Chlorothalonil	<2.50 AB	<2.50 AB	<2.50 AB	<2.50 AB	<2.50 AB	<2.50 AB					<0.01	ug/l	TM149/PM30
cis-Chlordane	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Delta-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Dieldrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endosulphan I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endosulphan II	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endosulphan sulphate	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Gamma-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Heptachlor	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Heptachlor Epoxide	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Hexachlorobenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Isodrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
o,p'-DDE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
o,p'-DDT	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
o,p'-Methoxychlor	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
o,p'-TDE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-DDE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-DDT	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-Methoxychlor	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-TDE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Pendimethalin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Permethrin I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Permethrin II	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Quintozene (PCNB)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Tecnazene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Telodrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
trans-Chlordane	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Triadimefon	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Triallate	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Trifluralin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30

Client Name: Malone O'Regan
Reference: E1506
Location:
Contact: Thomas Vainio-Mattila
JE Job No.: 19/7606

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-33	52-59	60-68					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019							
Pesticides													
Organophosphorus Pesticides													
Azinphos ethyl	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Azinphos methyl	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Carbophenothion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Chlorfenvinphos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Chlorpyrifos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Chlorpyrifos-methyl	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Diazinon	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Dichlorvos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Disulfoton	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Dimethoate	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Ethion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Ethyl Parathion (Parathion)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Etrimphos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Fenitrothion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Fenthion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Malathion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Methyl Parathion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Mevinphos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Phosalone	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Pirimiphos Methyl	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Propetamphos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Triazophos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30

Client Name: Malone O'Regan
Reference: E1506
Location:
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JE Job No.: 19/7606

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Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019							
Acid Herbicides													
Benazolin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Bentazone	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Bromoxynil	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Clopyralid	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
4-CPA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
2,4-D	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
2,4-DB	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Dicamba	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Dichloroprop	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Diclofop	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Fenoprop	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Flamprop	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Flamprop-isopropyl	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Ioxynil	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
MCPA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
MCPB	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Mecoprop	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Picloram	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Pentachlorophenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
2,4,5-T	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
2,3,6-TBA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Triclopyr	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM42/PM30
Atrazine	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Simazine	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
GRO (>C4-C8)	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
GRO (>C4-C8)#	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
GRO (>C8-C12)	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
GRO (>C8-C12)#	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
GRO (>C4-C12)	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
GRO (>C4-C12)#	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
EPH (C8-C40)	-	-	-	<10	-	-					<10	ug/l	TM5/PM30
EPH (C8-C40)#	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM30
Mineral Oil (C10-C40)	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30

Client Name: Malone O'Regan
Reference: E1506
Location:
Contact: Thomas Vainio-Mattila
JE Job No.: 19/7606

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-33	52-59	60-68					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019							
TPH CWG													
Aliphatics													
>C5-C6	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>C5-C6 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>C6-C8	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>C6-C8 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>C8-C10	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>C8-C10 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>C10-C12	-	-	-	<5	-	-					<5	ug/l	TM5/PM16/PM30
>C10-C12 #	<5	<5	<5	-	<5	<5					<5	ug/l	TM5/PM16/PM30
>C12-C16	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>C12-C16 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
>C16-C21	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>C16-C21 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
>C21-C35	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>C21-C35 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35	-	-	-	<10	-	-					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics C5-35 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>C5-EC7 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>EC7-EC8 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10	-	-	-	<10	-	-					<10	ug/l	TM36/PM12
>EC8-EC10 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12	-	-	-	<5	-	-					<5	ug/l	TM5/PM16/PM30
>EC10-EC12 #	<5	<5	<5	-	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>EC12-EC16 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>EC16-EC21 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35	-	-	-	<10	-	-					<10	ug/l	TM5/PM16/PM30
>EC21-EC35 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35	-	-	-	<10	-	-					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aromatics C5-35 #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35)	-	-	-	<10	-	-					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) #	<10	<10	<10	-	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Phenol	-	-	-	<0.01	-	-					<0.01	mg/l	TM26/PM0
Phenol #	<0.01	<0.01	<0.01	-	<0.01	<0.01					<0.01	mg/l	TM26/PM0
Fluoride	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	mg/l	TM173/PM0
Sulphate as SO4	-	-	-	87.6	-	-					<0.5	mg/l	TM38/PM0

Client Name: Malone O'Regan
Reference: E1506
Location:
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JE Job No.: 19/7606

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-33	52-59	60-68					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019							
Sulphate as SO4 #	58.2	20.3	22.1	-	22.6	22.9					<0.5	mg/l	TM38/PM0
Chloride	-	-	-	22.8	-	-					<0.3	mg/l	TM38/PM0
Chloride #	83.2	49.8	33.1	-	27.8	28.1					<0.3	mg/l	TM38/PM0
MRP Ortho Phosphate as P	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03					<0.03	mg/l	TM38/PM0
Total Oxidised Nitrogen as N	-	-	-	<0.2	-	-					<0.2	mg/l	TM38/PM0
Total Oxidised Nitrogen as N #	7.5	9.1	7.9	-	8.8	8.7					<0.2	mg/l	TM38/PM0
Total Cyanide	-	-	-	0.01	-	-					<0.01	mg/l	TM89/PM0
Total Cyanide #	<0.01	<0.01	<0.01	-	<0.01	<0.01					<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as N	-	-	-	31.00	-	-					<0.03	mg/l	TM38/PM0
Ammoniacal Nitrogen as N #	<0.03	<0.03	<0.03	-	0.03	<0.03					<0.03	mg/l	TM38/PM0
Total Alkalinity as CaCO3 #	962	3430	328	-	262	270					<1	mg/l	TM75/PM0
Dibutyltin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM94/PM48
Tributyltin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM94/PM48
Triphenyltin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM94/PM48
BOD (Settled)	-	-	-	7	-	-					<1	mg/l	TM58/PM0
BOD (Settled) #	-	-	-	-	<1	<1					<1	mg/l	TM58/PM0
COD (Settled)	-	-	-	49	-	-					<7	mg/l	TM57/PM0
COD (Settled) #	-	-	-	-	<7	<7					<7	mg/l	TM57/PM0
Dissolved Oxygen	7	9	8	2	10	10					<1	mg/l	TM58/PM0
Electrical Conductivity @25C	-	-	-	1288	-	-					<2	uS/cm	TM76/PM0
Electrical Conductivity @25C #	858	727	718	-	631	641					<2	uS/cm	TM76/PM0
Faecal Coliforms*	<1	<1	<1	-	-	-						CFU/100ml	Subcontracted
pH	-	-	-	7.15	-	-					<0.01	pH units	TM73/PM0
pH #	7.12	7.14	7.37	-	7.62	7.51					<0.01	pH units	TM73/PM0
Redox	96.27	165.48	188.64	-89.80	167.10	181.78						mV	TM72/PM0
Total Organic Carbon #	<2	<2	<2	-	-	-					<2	mg/l	TM60/PM0
Total Coliforms*	3.1	9.6	27.2	-	-	-						MPN/100ml	Subcontracted
Total Dissolved Solids #	753	532	500	-	-	-					<35	mg/l	TM20/PM0
Total Suspended Solids #	-	-	-	-	<10	<10					<10	mg/l	TM37/PM0

Client Name: Malone O'Regan
Reference: E1506
Location:
Contact: Thomas Vainio-Mattila
JE Job No.: 19/7606

SVOC Report : **Liquid**

J E Sample No.	1-8	9-16	17-24	25-33	52-59	60-68							
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth											Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019							
SVOC MS											LOD/LOR	Units	Method No.
Phenols													
2-Chlorophenol	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
2-Chlorophenol #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
2-Methylphenol	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
2-Methylphenol #	<0.5	<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	<0.5					<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
4-Methylphenol	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
4-Nitrophenol	<10	<10	<10	<10	<10	<10					<10	ug/l	TM16/PM30
Pentachlorophenol	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Phenol	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
PAHs													
2-Chloronaphthalene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
2-Chloronaphthalene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
2-Methylnaphthalene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Naphthalene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Naphthalene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Acenaphthylene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Acenaphthylene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Acenaphthene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Acenaphthene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Fluorene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Fluorene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Phenanthrene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Phenanthrene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Anthracene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Anthracene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Fluoranthene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Fluoranthene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Pyrene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Pyrene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Benzo(a)anthracene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Benzo(a)anthracene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Chrysene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Chrysene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Benzo(bk)fluoranthene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Benzo(bk)fluoranthene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Benzo(a)pyrene	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Indeno(123cd)pyrene	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Dibenzo(ah)anthracene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Dibenzo(ah)anthracene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Benzo(ghi)perylene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Benzo(ghi)perylene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<5	<5	<5	<5	<5	<5					<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Di-n-butyl phthalate	-	-	-	<1.5	-	-					<1.5	ug/l	TM16/PM30
Di-n-butyl phthalate #	<1.5	<1.5	<1.5	-	<1.5	<1.5					<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Diethyl phthalate	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Diethyl phthalate #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Dimethyl phthalate	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30

Client Name: Malone O'Regan
Reference: E1506
Location:
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JE Job No.: 19/7606

SVOC Report : **Liquid**

J E Sample No.	1-8	9-16	17-24	25-33	52-59	60-68					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019							
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
1,2-Dichlorobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
1,3-Dichlorobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
1,3-Dichlorobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
1,4-Dichlorobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
1,4-Dichlorobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
2-Nitroaniline	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
2,4-Dinitrotoluene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
2,4-Dinitrotoluene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
3-Nitroaniline	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
4-Bromophenylphenylether	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
4-Bromophenylphenylether #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
4-Chloroaniline	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
4-Chlorophenylphenylether	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
4-Chlorophenylphenylether #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
4-Nitroaniline	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Azobenzene	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Azobenzene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Bis(2-chloroethyl)ether #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Carbazole	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Carbazole #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Dibenzofuran	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Dibenzofuran #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Hexachlorobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Hexachlorobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Hexachlorobutadiene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Hexachlorobutadiene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<1	<1	<1	<1	<1	<1					<1	ug/l	TM16/PM30
Hexachloroethane	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Hexachloroethane #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Isophorone	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
Isophorone #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine	-	-	-	<0.5	-	-					<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM16/PM30
Nitrobenzene	-	-	-	<1	-	-					<1	ug/l	TM16/PM30
Nitrobenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM16/PM30
Surrogate Recovery 2-Fluorobiphenyl	101	98	121	93	90	105					<0	%	TM16/PM30
Surrogate Recovery p-Terphenyl-d14	122	116	125	111	109	124					<0	%	TM16/PM30

Please see attached notes for all abbreviations and acronyms

Client Name: Malone O'Regan
Reference: E1506
Location:
Contact: Thomas Vainio-Mattila
JE Job No.: 19/7606

VOC Report : **Liquid**

J E Sample No.	1-8	9-16	17-24	25-33	52-59	60-68							
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth											Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019							
VOC MS											LOD/LOR	Units	Method No.
Dichlorodifluoromethane	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether	-	-	-	<0.1	-	-					<0.1	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	-	<0.1	<0.1					<0.1	ug/l	TM15/PM10
Chloromethane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Vinyl Chloride	-	-	-	<0.1	-	-					<0.1	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1	-	<0.1	<0.1					<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Chloroethane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Trichlorofluoromethane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE)	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Dichloromethane (DCM)	-	-	-	<5	-	-					<5	ug/l	TM15/PM10
Dichloromethane (DCM) #	<5	<5	<5	-	<5	<5					<5	ug/l	TM15/PM10
trans-1-2-Dichloroethene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,1-Dichloroethane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Bromochloromethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Chloroform	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,1,1-Trichloroethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,1-Dichloropropene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Carbon tetrachloride	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,2-Dichloroethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Benzene	-	-	-	<0.5	-	-					<0.5	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	-	<0.5	<0.5					<0.5	ug/l	TM15/PM10
Trichloroethene (TCE)	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,2-Dichloropropane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Dibromomethane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Bromodichloromethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Toluene	-	-	-	<5	-	-					<5	ug/l	TM15/PM10
Toluene #	<5	<5	<5	-	<5	<5					<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,1,2-Trichloroethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Tetrachloroethene (PCE)	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,3-Dichloropropane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Dibromochloromethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,2-Dibromoethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Chlorobenzene	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane	-	-	-	<2	-	-					<2	ug/l	TM15/PM10

Client Name: Malone O'Regan
Reference: E1506
Location:
Contact: Thomas Vainio-Mattila
JE Job No.: 19/7606

VOC Report : **Liquid**

J E Sample No.	1-8	9-16	17-24	25-33	52-59	60-68					LOD/LOR	Units	Method No.
Sample ID	GW1A	GW2A	GW3A	L1A	SW1A	SW2A							
Depth													
COC No / misc													
Containers	V H N P G	V H N P G	V H N P G	V H N P BOD G	V H N P BOD G	V H N P BOD G							
Sample Date	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019	09/05/2019							
Sample Type	Ground Water	Ground Water	Ground Water	Leachate	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019	10/05/2019							
VOC MS Continued													
1,1,1,2-Tetrachloroethane #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Ethylbenzene	-	-	-	<1	-	-					<1	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM15/PM10
m/p-Xylene	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
o-Xylene	-	-	-	<1	-	-					<1	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	-	<1	<1					<1	ug/l	TM15/PM10
Styrene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Bromoform	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
Isopropylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4	<4	<4					<4	ug/l	TM15/PM10
Bromobenzene	-	-	-	<2	-	-					<2	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2	-	<2	<2					<2	ug/l	TM15/PM10
1,2,3-Trichloropropane	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
Propylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
2-Chlorotoluene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
4-Chlorotoluene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
tert-Butylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
sec-Butylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
4-Isopropyltoluene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,3-Dichlorobenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,4-Dichlorobenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
n-Butylbenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,2-Dichlorobenzene	-	-	-	<3	-	-					<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3	-	<3	<3					<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	109	111	111	89	88	89					<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	108	110	109	85	86	86					<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Client Name: Malone O'Regan
Reference: E1506
Location:
Contact: Thomas Vainio-Mattila

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 19/7606						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/7606

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.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

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

ISO17025 accreditation applies to surface water and groundwater and usually 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

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

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.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

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.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
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 an Exova 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
AA	x5 Dilution
AB	x250 Dilution

JE Job No: 19/7606

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details				
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	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			

JE Job No: 19/7606

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes			
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. 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, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.	Yes			
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified methods USEPA 160.2, EN872:2005 and SMWW 2540D. Gravimetric determination of Total Suspended Solids. Sample is filtered through a 1.5um pore size glass fibre filter and the resulting residue is dried and weighed.	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes			

JE Job No: 19/7606

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM42	Modified US EPA method 8270. Pesticides and herbicides by GC-MS	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM57	Modified US EPA Method 410.4. Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically.	PM0	No preparation is required.				
TM57	Modified US EPA Method 410.4. Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometerically.	PM0	No preparation is required.	Yes			
TM58	APHA Standard Methods for the extraction of water and waste water (SMEWW) 5210B: Comparible with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as ammonia, nitrite and organic nitrogen which exert a nitrogenous demand. Determination of Dissolved Oxygen using the Hach HQ30D Oxygen Meter.	PM0	No preparation is required.				
TM58	APHA Standard Methods for the extraction of water and waste water (SMEWW) 5210B: Comparible with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as ammonia, nitrite and organic nitrogen which exert a nitrogenous demand. Determination of Dissolved Oxygen using the Hach HQ30D Oxygen Meter.	PM0	No preparation is required.	Yes			
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.	Yes			
TM72	Redox Potential is measured by HI98120 redox meter.	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	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.	Yes			

JE Job No: 19/7606

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM76	Modified US EPA method 120.1. Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.				
TM76	Modified US EPA method 120.1. Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.				
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			
TM94	Derivatisation and extraction of Organotins. Analysis by GC-MS	PM48	Samples are pretreated and derivatised. The derviatised organotins are then extracted using hexane.				
TM149	Determination of Pesticides by Large Volume Injection on GC Triple Quad MS, based upon USEPA method 8270	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.				
Subcontracted	See attached subcontractor report for accreditation status and provider.						

City Analysts Limited,
Pigeon House Road,
Ringsend,
Dublin 4.

Tel: (01) 613 6003
Fax: (01) 613 6008

Email:
reports@cityanalysts.ie

www.cityanalysts.ie

Customer

Kate Wiley

Exova Environmental UK Ltd
Rosewell House
2A (1F) Harvest Drive
Newbridge, MidLothian Scotland
EH28 8QJ United Kingdom

Certificate Of Analysis

Job Number: 19-55902
Issue Number: 1
Report Date: 13 May 2019

Site: Not Applicable
PO Number: Not Supplied
Date Samples Received: 09/05/2019

Please find attached the results for the samples received at our laboratory on 09/05/2019.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our website at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

Authorised By: Shane Reynolds
Laboratory Manager

Authorised Date: 13 May 2019

Notes:

Results relate only to the items tested.
Information on methods of analysis and performance characteristics is available on request.
Any opinions or interpretations indicated are outside the scope of our INAB accreditation.
This test report shall not be reproduced except in full or with written approval of City Analysts Limited.

City Analysts Limited,
Pigeon House Road,
Ringsend,
Dublin 4.

Tel: (01) 613 6003
Fax: (01) 613 6008

Email:
reports@cityanalysts.ie

www.cityanalysts.ie

Certificate Of Analysis

Customer

Kate Wiley

Exova Environmental UK Ltd
Rosewell House
2A (1F) Harvest Drive
Newbridge, MidLothian Scotland
EH28 8QJ United Kingdom

Report Reference: 19-55902

Report Version: 1

Site: Not Applicable

Sample Description: GW 1A

Sample Type: Ground

Lab Reference Number: 438201

Date of Sampling: 09/05/2019

Date Sample Received: 09/05/2019

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	09/05/2019	Coliforms	3.1	MPN/100ml	-
D/D3221#	09/05/2019	Faecal Coliforms	< 1	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total viable count
Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

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Pigeon House Road,
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Dublin 4.

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Email:
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Certificate Of Analysis

Customer

Kate Wiley

Exova Environmental UK Ltd
Rosewell House
2A (1F) Harvest Drive
Newbridge, MidLothian Scotland
EH28 8QJ United Kingdom

Report Reference: 19-55902

Report Version: 1

Site: Not Applicable

Sample Description: GW 2A

Sample Type: Ground

Lab Reference Number: 438202

Date of Sampling: 09/05/2019

Date Sample Received: 09/05/2019

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	09/05/2019	Coliforms	9.6	MPN/100ml	-
D/D3221#	09/05/2019	Faecal Coliforms	< 1	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total viable count
Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

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Certificate Of Analysis

Customer

Kate Wiley

Exova Environmental UK Ltd
Rosewell House
2A (1F) Harvest Drive
Newbridge, MidLothian Scotland
EH28 8QJ United Kingdom

Report Reference: 19-55902

Report Version: 1

Site: Not Applicable

Sample Description: GW 3A

Sample Type: Ground

Lab Reference Number: 438203

Date of Sampling: 09/05/2019

Date Sample Received: 09/05/2019

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
D/D1201#	09/05/2019	Coliforms	27.2	MPN/100ml	-
D/D3221#	09/05/2019	Faecal Coliforms	< 1	cfu/100ml	-

= INAB Accredited, U = UKAS Accredited, * = Subcontracted

Note:
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.
For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total viable count
Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

Private Well (Hotel)

IAS Laboratory Report

IAS LABORATORIES

Independent Analytical Supplies

Test Report

Lab Report Number:	**5742L01**	**Analysis Number:**	**99A/123770**

Customer ID:	CLAN.C1	**Analysis Type:**	Misc. Tests (99A)
Contact Name:	DAVID MCCARTHY	**Delivery By:**	Customer
Company Name:	CLANARD COURT HOTEL	**Sample Card Number:**	49555/2
Address:	ATHY CO. KILDARE	**Sample Condition:**	Acceptable
Sample Type:	Drinking Water	**Date Sample Received:**	23/10/2019
Sample Reference:	KITCHEN TAP	**Date Analysis Commenced:**	23/10/2019
Sample Description:	T:9.30AM 23.10.19 WASH AREA	**Date Certificate Issued:**	04/11/2019

Parameter	Method	Result	Unit
E. Coli	Quanti-tray SOP 2090	0	MPN/100ml
Total Coliforms	Quanti-tray SOP 2090	0	MPN/100ml
T.V.C. @ 22°C^*^	Subcontracted	0	c.f.u./ml
Aluminium*^	Subcontracted	<20	ug/l
Iron*^	Subcontracted	<20	ug/l
Manganese*^	Subcontracted	27	ug/l
Ammonia	Konelab Aquakem SOP 2057	0.02	mg/l NH3
Nitrite	Konelab Aquakem SOP 2059	0.03	mg/l NO2
Nitrate	Konelab Aquakem SOP 2060	16.15	mg/l NO3
pH	Electrometry SOP 2004	7.2	pH units
Colour	Konelab Aquakem SOP 2063	1.5	Pt Co
Conductivity	Electrometry SOP 2076	711	µS/cm 20°C
Total Hardness*^	Subcontracted	394	mg/l CaCO3
Turbidity	Turbidimetric SOP 2022	<0.02	NTU
Chloride	Konelab Aquakem SOP 2065	41.20	mg/l
Sulphate	Konelab Aquakem SOP 2062	20.12	mg/l SO4
Calcium*^	Subcontracted	112	mg/l
Sodium*^	Subcontracted	15.2	mg/l
Potassium*^	Subcontracted	1.64	mg/l
Lead*^	Subcontracted	<1	ug/l
Copper*^	Subcontracted	93	ug/l
Magnesium*^	Subcontracted	27.3	mg/l

Signed: WD McCall

Wendy McCall - Laboratory Manager

Date: 04/11/2019

* = not INAB Accredited ^ = Subcontracted

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 2751

IAS LABORATORIES, Unit 4 Bagenalstown Bus. Park, Bagenalstown, Co. Carlow,
Phone: 00353 59 9721022 Fax: 00353 59 9721897 Email: ias@iaslabs.ie Web: www.iaslabs.ie

APPENDIX H

LABORATORY REPORT

4043

Contract Number: PSL19/2620

Report Date: 04 June 2019

Client's Reference: 19-0225B

Client Name: Causeway Geotech
8 Drumahiskey Road
Ballymoney
Co.Antrim
BT53 7QL

For the attention of: Stephen Watson

Contract Title: Groundwater Monitoring Wells - Clanard Court Hotel, Athy

Date Received: 26/4/2019
Date Commenced: 26/4/2019
Date Completed: 4/6/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson (Director)
A Watkins (Director)
R Berriman (Quality Manager)

S Royle (Laboratory Manager)
S Eyre (Senior Technician)
L Knight (Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
GW04	1	U	0.00	0.45	Brown very gravelly very sandy CLAY.

UKAS TESTING 4043	PSL Professional Soils Laboratory	Groundwater Monitoring Wells - Clanard Court Hotel, Athy	Contract No: PSL19/2620 Client Ref: 19-0225B

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m^3 Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
GW04	1	U	0.00	0.45	18							

SYMBOLS : **NP : Non Plastic** *** : Liquid Limit and Plastic Limit Wet Sieved.**

UKAS TESTING 4043

PSL Professional Soils Laboratory

Groundwater Monitoring Wells - Clanard Court Hotel, Athy

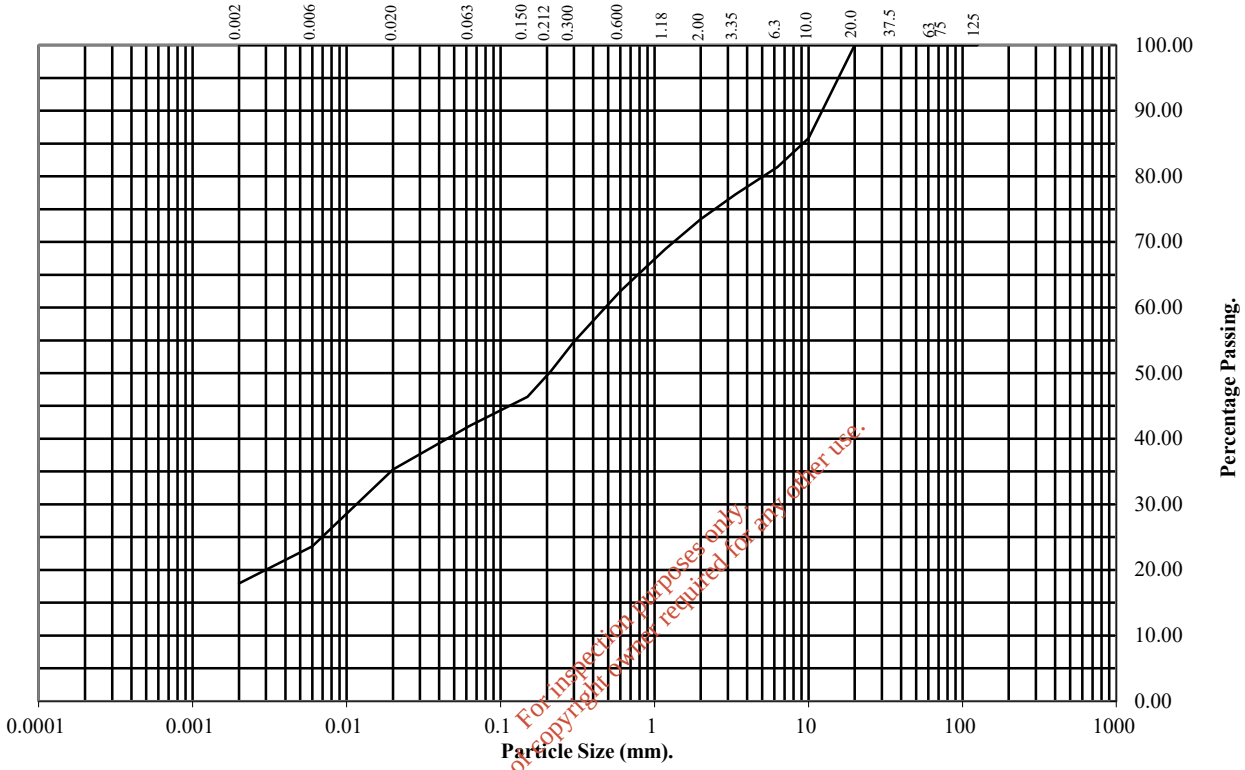
Contract No:
PSL19/2620
Client Ref:
19-0225B

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number:	**GW04**	**Top Depth (m):**	**0.00**
Sample Number:	**1**	**Base Depth(m):**	**0.45**
Sample Type:	**U**		



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	86
6.3	81
3.35	77
2	73
1.18	69
0.6	62
0.3	55
0.212	50
0.15	46
0.063	42

Particle Diameter	Percentage Passing
0.02	35
0.006	24
0.002	18

Soil Fraction	Total Percentage
Cobbles	0
Gravel	27
Sand	31
Silt	24
Clay	18

Remarks:
See Summary of Soil Descriptions

UKAS TESTING 4043	PSL Professional Soils Laboratory	**Groundwater Monitoring Wells - Clanard Court Hotel, Athy**	**Contract No:** PSL19/2620 **Client Ref:** 19-0225B

PERMEABILITY IN A TRIAXIAL CELL

BS 1377 : Part 6 : 1990: Clause 6

Hole Number:	**GW04**	**Top Depth (m) :**	**0.00**
Sample Number:	**1**	**Base Depth (m) :**	**0.45**
Sample Type:	**U**	**Lift Number:**	
Date		**Grid Reference:**	

Description of Specimen
See summary of soil descriptions
Remarks
Remoulded to original density of U70 sample

Initial Specimen Conditions		
Height	mm	102.00
Diameter	mm	101.50
Area	mm^2	8091.37
Volume	cm^3	825.32
Mass	g	1697
Dry Mass	g	1442
Bulk Density	Mg/m^3	2.06
Dry Density	Mg/m^3	1.75
Moisture Content	%	18
Voids Ratio	-	0.516
Specific Gravity	Mg/m^3	2.65
(assumed/measured)	-	assumed

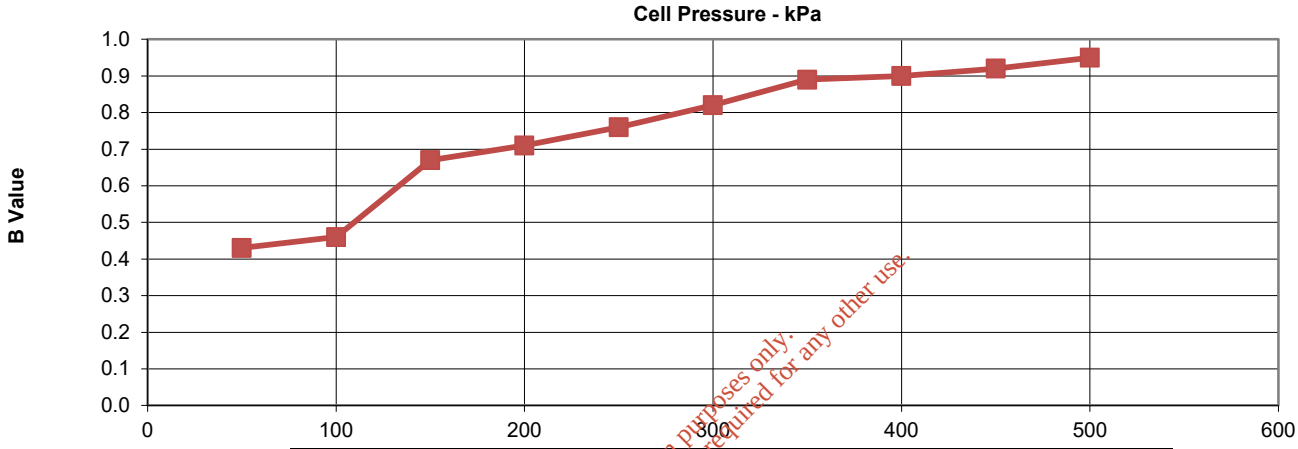
Final Specimen Conditions		
Moisture Content	%	20
Bulk Density	Mg/m^3	2.09
Dry Density	Mg/m^3	1.75

Test Setup		
Date Started		17/05/2019
Date Finished		22/05/2019
Top Drain Used		Y
Base Drain Used		Y
Method of Saturation		By back pressure
Direction Of Flow		Vertically Downwards
Saturation Time	Days	4
Consolidation Time	Days	1
Permeability Time	Days	1

PERMEABILITY IN A TRIAXIAL CELL

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details		
Hole Number		GW04
Sample Depth	m	0.00
Sample No,		1
Grid Reference		
Lift Number		
Saturation		
Cell Pressure Incr.	kPa	50
Back Pressure Incr.	kPa	50
Differential Pressure	kPa	10
Final Cell Pressure	kPa	500
Final B Value	-	0.95



Consolidation		
Effective Pressure	kPa	100
Cell Pressure	kPa	600
Back Pressure	kPa	500
Final PWP	kPa	500
PWP dissipation	%	100

UKAS TESTING 4043

PSL Professional Soils Laboratory

Groundwater Monitoring Wells - Clanard Court Hotel, Athy

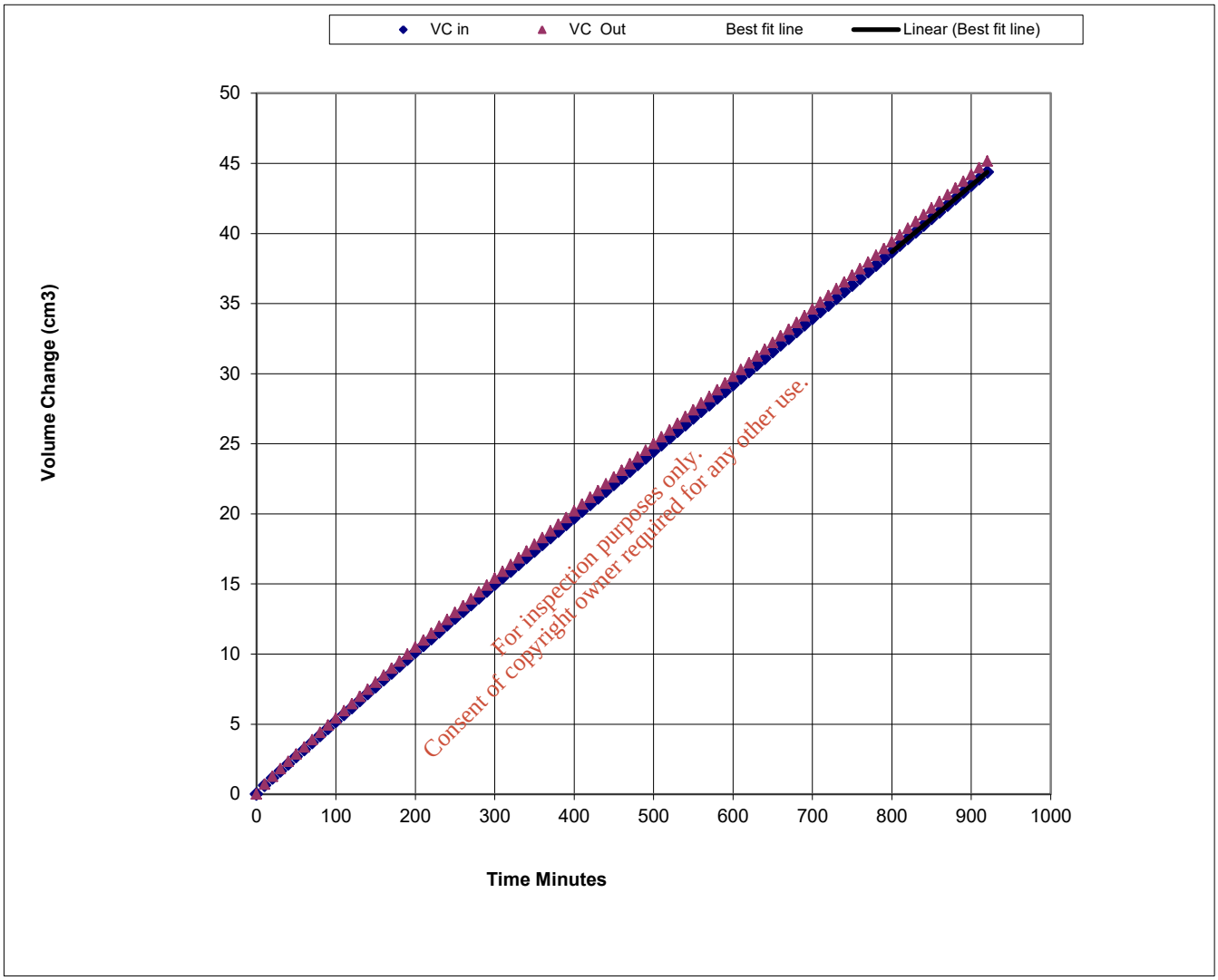
Contract No.
PSL19/2620
Client Ref
19-0225B

PERMEABILITY IN A TRIAXIAL CELL

BS 1377 : Part 6 : 1990 Clause 6

Specimen Details		
Hole Number		GW04
Sample Depth	m	0.00
Sample No.		1
Grid Reference		
Lift Number		

Permeability Stage



Permeability Stage		
Cell Pressure	kPa	600
Mean Effective Stress	kPa	100
Back Pressure Diff.	kPa	20
Mean Rate of Flow	ml/min	0.0474
Average Temperature	'C	20
Vertical Permeability Kv	m/s	4.9E-09

APPENDIX I

October 2019

Appropriate Assessment - Stage 1

Screening Report

Site at Prusselstown

Kildare County Council

Athy, Co. Kildare

MALONE O'REGAN ENVIRONMENTAL

MALONE O'REGAN

Form ES - 04

MALONE O'REGAN ENVIRONMENTAL

Ground Floor – Unit 3
Bracken Business Park
Bracken Road, Sandyford
Dublin 18, D18 V32Y
Tel: +353- 1- 567 76 55
Email: enviro@mores.ie

Title: Appropriate Assessment - Stage 1 Screening Report, Site at Prusselstown, Kildare County Council, Athy, Co. Kildare

Job Number: E1506

Prepared By: Amelia Keane **Signed:** _____

Checked By: Stephen Coakley **Signed:** _____

Approved By: Dyfrig Hubble **Signed:** _____

Revision Record

Issue No.	Date	Description	Remark	Prepared	Checked	Approved
01	11/19/2019	AA Screening Report	FINAL	AK	SC	DH

Appropriate Assessment - Stage 1 Screening Report

Site at Prusselstown

Kildare County Council

Athy, Co. Kildare

Contents

FIGURES

TABLES

1 INTRODUCTION

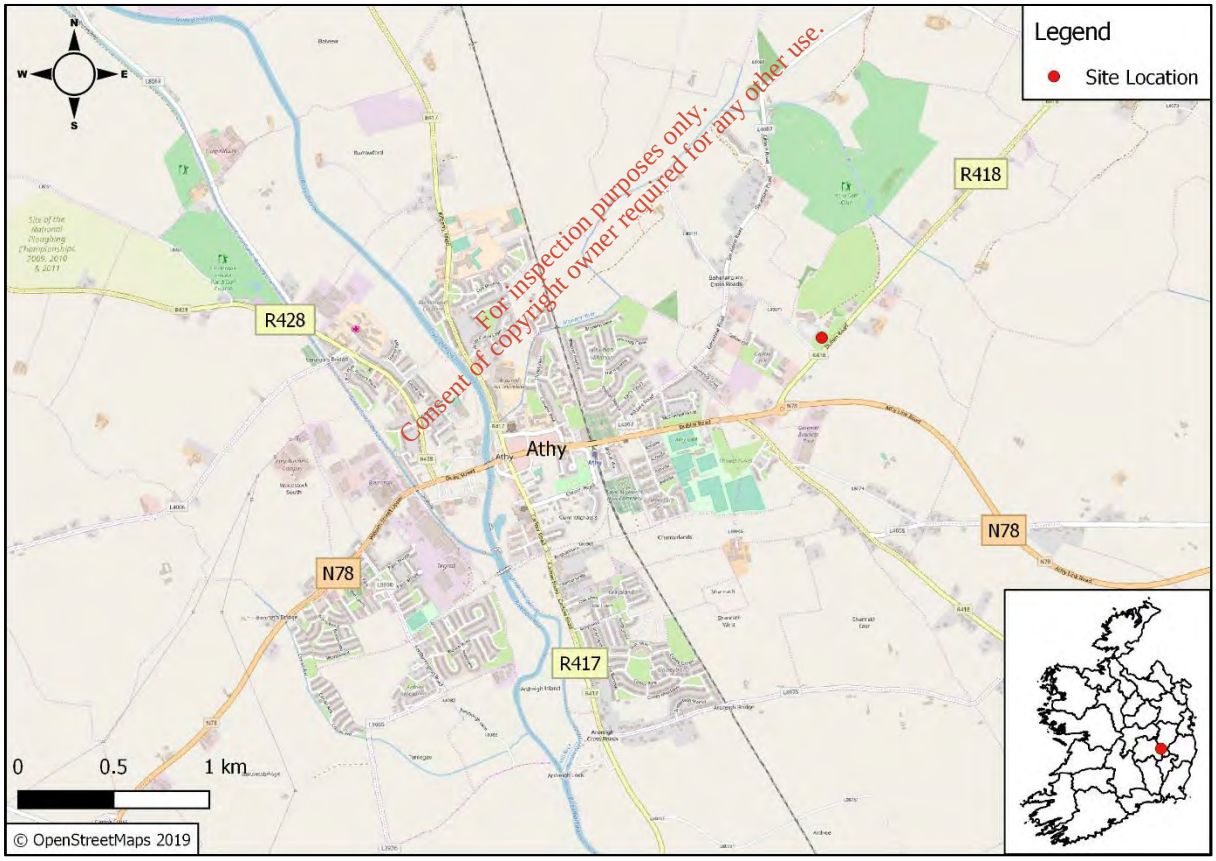
1.1 Background

This Appropriate Assessment Screening Report has been prepared by Malone O'Regan Environmental (MOR) on behalf of Kildare County Council (KCC) to assess the potential impacts, if any, of imported fill materials that had been deposited at a location in the legacy landfill at a location in Prusselstown, Co. Kildare (the Site), (OS Ref: S 69883 94639), on nearby sites with European conservation designations (i.e. Natura 2000 sites).

The location of the Site is shown in Figure 1-1.

In 2019 MOR undertook an Environmental Risk Assessment (ERA), which included Tier 1 Risk Screening and preliminary conceptual site model (CSM), Tier 2 Site Investigations and Testing, Tier 3 Refinement of CSM and Quantitative Risk Assessment (QRA), for the Site on behalf of KCC for submission to the Environmental Protection Agency (EPA). The aim of the assessment was to assess if the imported materials deposited within the Site cause an adverse impact to the groundwater, the surface water and the receiving environment within and adjacent to the Site.

Figure 1-1: Site Location



The purpose of this assessment was to determine the appropriateness, or otherwise, of the Site in the context of the conservation objectives of European conservation designations (i.e. Natura 2000 sites).

This report also considers the need and or appropriateness, or otherwise, of the recommendations in the ERA in the context of the conservation objectives of the Natura 2000 sites.

1.2 Regulatory Context

This Appropriate Assessment Screening Report was prepared in compliance with the following legislation:

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna better known as 'The Habitats Directive' which provides the framework for legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000 sites. These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/EEC as amended 2009/149/EC)) (better known as 'The Birds Directive').

Article 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect Natura 2000 sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment (now termed Natura Impact Statement):

> *Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implication for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. First, the project should aim to avoid any negative impacts on European sites by identifying possible impacts early in the planning stage, and designing the project in order to avoid such impacts. Second, mitigation measures should be applied, if necessary, during the AA process to the point where no adverse impacts on the site(s) remain. If the project is still likely to result in adverse effects, and no further practicable mitigation is possible, it is rejected. If no alternative solutions are identified and the project is required for imperative reasons of overriding public interest (IROPI test) under Article 6(4) of the Habitats Directive, then compensation measures are required for any remaining adverse effects.

1.3 Stages of Appropriate Assessment

This Appropriate Assessment Screening Report has been undertaken in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC 2001) and the European Commission Guidance 'Managing Natura 2000 Sites.' The Guidance for Planning Authorities published by the Department of Environment, Heritage and Local Government (DOEHLG, December 2009) was also adhered to.

There are four distinct stages to undertaking an AA as outlined in current EU and DOEHLG guidance:

1. Appropriate Assessment Screening;
2. Appropriate Assessment;
3. Assessment of Alternatives in cases where significant impact cannot be prevented; and,
4. Where no alternatives exist, an Assessment of Compensatory Issues in the case of projects or plans which can be considered to be necessary for Imperative Reasons of Overriding Public Interest (IROPI).

This Report comprises a Stage 1 Screening Report, which seeks to determine whether the subject site will, on its own or in combination with other plans / projects, have a significant effect on Natura 2000 sites within a defined radius of the subject site.

2 SCREENING FOR APPROPRIATE ASSESSMENT

Screening determines whether Appropriate Assessment is necessary by examining:

1. Whether a plan or project can be excluded from AA requirements because it is directly connected with, or necessary to, the management of a Natura 2000 site; and
2. Whether the project will have a potentially significant effect on a Natura 2000 site, either alone or in combination with other projects or plans, in view of the site's conservation objectives.

Screening involves the following:

i) Description of a plan or project;

ii) Identification of relevant Natura 2000 sites, and compilation of information on their qualifying interests and conservation objectives;

iii) Assessment of likely effects – direct, indirect and cumulative – undertaken on the basis of available information as a desk study or field survey or primary research as necessary; and

iv) Screening Statement with conclusions.

2.1 Desk Based Studies

A desk-based review of information sources was completed, which included the following sources of information:

- The National Parks and Wildlife Service (NPWS) website was consulted to obtain the most up to date detail on conservation objectives for the Natura 2000 sites relevant to this assessment (National Parks and Wildlife Service, 2019);
- The National Biodiversity Data Centre (NBDC) website was consulted with regard to species distributions (National Biodiveristy Data Centre, 2019);
- The EPA Envision website was consulted to obtain details about watercourses in the vicinity of the Site (http://gis.epa.ie/Envision) (EPA, 2019); and
- The EPA Catchments website was also consulted to obtain details about watercourses in the vicinity of the Site (https://www.catchments.ie/maps/) (EPA, 2019).

3 DESCRIPTION OF THE PROJECT

3.1 Site Context and Description

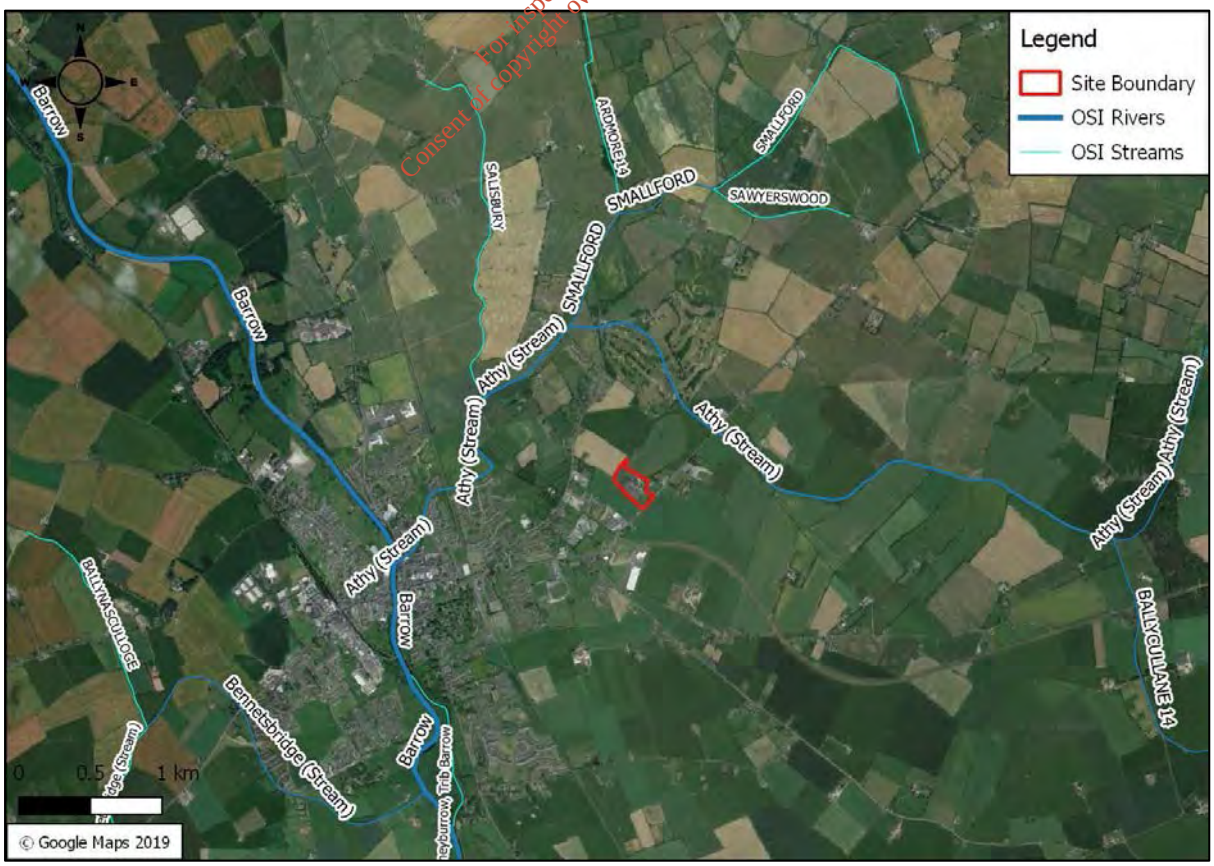
The Site is located ca. 1.6km south-west of the centre of Athy town, County Kildare. The Site is accessed through a third-class road R418 off the national road N78, and it is located within the Townlands of Gallowshill and Prusselstown (Refer to Figure 1-1). The area of the Site is approximately 4.4ha and is currently occupied by a hotel with an associated car park, a field to the west of the hotel and a grassed area for sheep, horses and alpacas to the east and south of the Site.

There are a number of residential properties along the northern boundary of the Site, the closest ca.11m from the boundary. Further residential properties are located ca.150m south-west of the site. A petrol station is located ca. 160m south-west of the Site, and the town centre is ca. 1.6km south-west of the Site.

There are two watercourses of note within the vicinity of the Site; the River Barrow and the Athy Stream, both located within the Barrow_SC_070 sub-catchment. The Athy Stream is the closest hydrological feature, located ca. 600m north east of the Site at its closest point. The Athy Stream flows in a north easterly direction and is a tributary of the River Barrow. The River Barrow is located ca. 1.6km south-west of the Site and flows in a southerly direction. The River Barrow forms part of the River Barrow and River Nore SAC.

The water quality and status of the portion of the Athy Stream nearest to the Site is considered '*moderate*' and '*at risk*' and the water quality and risk status of the River Barrow adjacent to the Site is '*unassigned*' (EPA Catchments, 2019). There is no hydrological connection between the Site and any watercourses.

Figure 3-1: Watercourses in the vicinity of the Site



3.2 Description of the Environmental Risk Assessment

MOR was appointed by KCC to undertake an ERA based on an exploratory site investigation of Prusselstown, Co. Kildare, in accordance with the EPA's published Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites (2007) published in December 2008, hereafter referred to as the 'CoP' (where applicable).

As part of the ERA there is a requirement to complete an AA to determine potential impacts, if any, of the Site, on nearby Natura 2000 sites. The report also considers the need and or appropriateness, or otherwise, of the recommendations made in the ERA in the context of the conservation objectives of the Natura 2000 sites.

Prior to sampling, a geographical survey and topographical survey were undertaken to assess subsurface and surface conditions of the Site. Once site conditions were established, trial pit extractions, leachate and gas boreholes and groundwater boreholes were extracted. All of the monitoring / sampling pits were located in amenity grassland with a flat topography (See Figure 3-1).

3.3 Trial Pit Excavations

Trial pitting excavations at seven (7 No) locations were carried out on the 17th of January 2019 (Figure 3-1, TPA to TPG). The objective of the trial pitting was to assess the lateral extent and composition of the imported material. In this regard any visual or olfactory evidence of contamination was recorded including photographic evidence. A MOR environmental consultant was on site during all of the trial pit excavations.

The excavation of the trial pits to a maximum depth of approximately 5.0mbgl was undertaken using a 13-tonne tracked excavator. Each trial pit was logged in accordance with the BS 5930:2015 standards. Locations for the trial pits were selected based on initial discussions with KCC, findings of the desk-based studies, the Site walkover and the results of the geophysical survey. Each trial pit was re-instated to as close to its original condition as possible. Exact locations are shown in Drawing No. 12. Refer to Appendix D for trial pit logs and also for photographic records of all trial pits. Three (3 No) different sub-surface profiles were recorded at the Site;

- Profile 1 – Trial pits on the eastern boundary of the Site (TPC) and to the north-west of the hotel building (TPD);
- Profile 2 – Trial pits located in the field to the south-east and east of the hotel (TPA and TPB); and
- Profile 3 – Trial pits located in the agricultural field to the west boundary of the hotel (TPE, TPF and TPG).

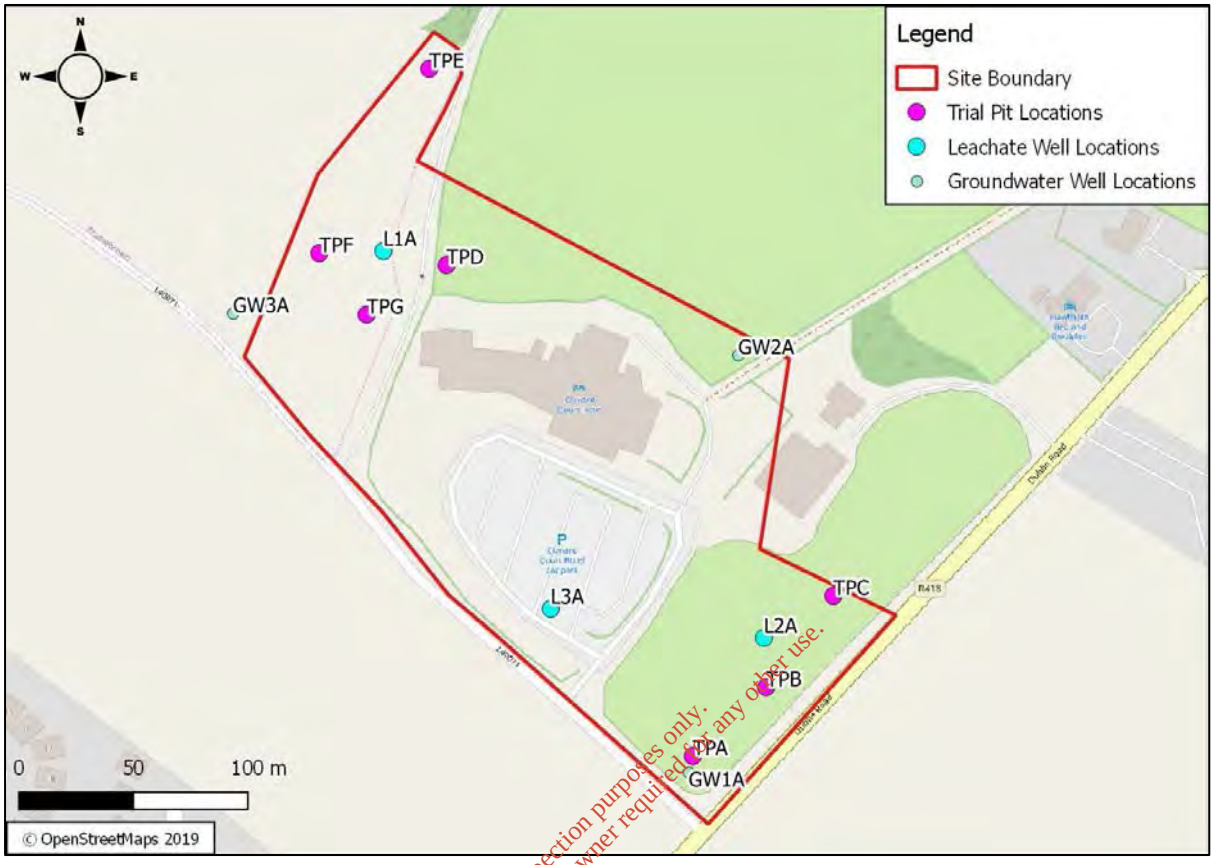
3.4 Leachate and Gas Boreholes

A shell and auger rig was mobilised to the Site from the 9th to the 15th of January 2019 to install shallow leachate/gas wells (Figure 3-1, L1A to L3A). The three (3 No) combined leachate and gas monitoring wells were installed within the imported material to maximum depths ranging from 5.1 to 8.5mbgl. During the installation works the MOR consultant noted any field evidence of contamination through the soil/lithological profile to ensure that a conduit was not provided to the underlying aquifer.

3.5 Groundwater Boreholes

Three (3 No) groundwater monitoring wells were installed between the 10th and the 15th of April 2019 to a maximum depth of 17.3mbgl using an air rotary drill rig (Figure 3-1, GW1A to GW3A). The wells were installed in order to characterise groundwater quality upgradient and downgradient of the imported fill materials,

Figure 3-2: Environmental Risk Assessment Sampling Locations



3.6 Findings of the Environmental Risk Assessment

The ERA concluded the following:

- Overall the ERA completed in July 2019, concluded that the Site has been well characterised. This assumption was based on the different investigations undertaken at the Site between January to April 2019.

Based on the evaluation of all available data in accordance with recognised best practice criteria, the following was concluded:

- The Site was in operation from the early 1970s to mid-1980s. According to KCC's files the Site was used as a refuse depot from approximately 1st January 1981 to 2nd February 1982;
- The Site is located within a sensitive receiving environment based on the high-extreme vulnerability rating assigned. This vulnerability rating was assigned due to the presence of an important gravel aquifer beneath the Site. However, the River Barrow and River Nore SAC is c. 1.70km west of the Site and therefore there would not be any potential risks arising from the Site to the SAC;
- The hydrogeological setting of the Site comprises a regionally important gravel aquifer underlain by the Ballysteen Formation and a locally important bedrock aquifer;
- Groundwater flow direction in the underlying aquifer is interpreted to be to the south / south-west towards the River Barrow;
- In general, the imported material comprises gravelly/sandy clay with mixed imported material, with a thickness of c. 0.6-8.5mbgl (trial pits and leachate/gas wells data).

Natural ground was not encountered during the trial pit excavations and leachate/gas well installations, with the exception at TPC and TPD, which were excavated in natural ground. Bedrock was not encountered during the groundwater well installations;

- The preliminary CSM identified the source associated with the Site as;
    - *The imported material underneath the Site.*

  The potential pathways were identified as follows;
    - *Shallow Sand and Gravel aquifer and subsoils.*

  The key environmental receptors were identified as follows;
    - *The groundwater (sand & gravel aquifer) beneath the Site, the surface water (Athy Stream / River Barrow), the hotel adjacent to the imported material, the residential properties in the vicinity of the Site (c.15m) and the ecologically protected sites within the 10km radius.*
- The imported materials comprised mainly gravelly, clay and ashy material with variable amounts of red bricks, concrete, glass, wood, plastic, metal, cables, car parts, cloths, pieces of carpets and mattress, milk cartons, metal cans, lids, steel sheeting, supermarket bags and textiles;
- The capping material encountered during the Site investigations (trial pit) was identified as brown gravelly clay with a thickness of 0.6 to 1.4m. According to the geotechnical results the capping material was classified as brown very gravelly very sandy CLAY, with low permeability $4.9x10^{-9}$ m/s. The low permeability of the capping material overlying the imported material would impede rainfall infiltration and therefore reduce the generation of leachate.
- The soil laboratory results of three (3 No.) of the trial pits were compliant with the inert Waste Acceptance Criteria (WAC) limits. There were some exceedances in antimony, molybdenum, sulphate and total dissolved solids, which complied with the non-hazardous WAC. An exceedance was noted in Total Organic Carbon in TPA, which complied with the hazardous WAC. There was a visual identification only of asbestos fibres at TPG, which were further quantified at concentrations <0.001%, confirming that the imported material present on site, with the current use of the Site, poses a low risk of contamination to the underlying strata (natural ground);
- The leachate results indicate that there were some exceedances of the parameters analysed. However, it was concluded that they would not pose a risk to human health and the environment, and do not require further assessment;
- The groundwater results (GW1A to GW3A and the private well) confirm that the imported material has not negatively impacted upon the underlying aquifer. There were a number of exceedances in the groundwater, which it was concluded do not pose a risk to human health and the environment, and do not require further assessment;
- The surface water results confirm that the imported materials have not negatively impacted on the Athy Stream. The risk to surface water is considered to be low;
- This assessment did not identify any impacts from the imported materials on the ecological receptors on-site or within the surrounding vicinity;
- Elevated Methane (CH_4) was detected at leachate/gas locations L1A. Methane was not detected at groundwater monitoring locations external to the imported materials GW1A to GW3A during any sampling event. Given the very low flow concentrations of methane and the surface VOC monitoring survey measured within and outside of the

Site, the detected gas concentrations are not considered to represent a risk to any identified receptors (on and off-site);

- In strict accordance with the CoP and taking cognisance of the intrusive site investigation and the updated conceptual site model, the Site would be classified as a Moderate risk site. However, during the data assessment, it was concluded that the pathways to the receptors were broken and therefore the pollutant linkages no longer exist; and,
- According to the Environmental Risk Assessment carried out for the Site, it is believed that the imported materials have not resulted in any impacts on the identified human receptors or environmental receptors.

3.7 Environmental Risk Assessment Recommendations

The Environmental Risk Assessment considers that the Site has been well characterised at this juncture given the comprehensive investigations undertaken. Based on the evaluation of the current data set in accordance with recognised best practice criteria, it is considered that there is enough evidence to conclude that the unregulated historic landfill does not present a potential environmental risk to underlying aquifer or potential receptors and therefore, in strict accordance with the CoP, no further actions are required.

4 IDENTIFICATION OF NATURA 2000 SITES

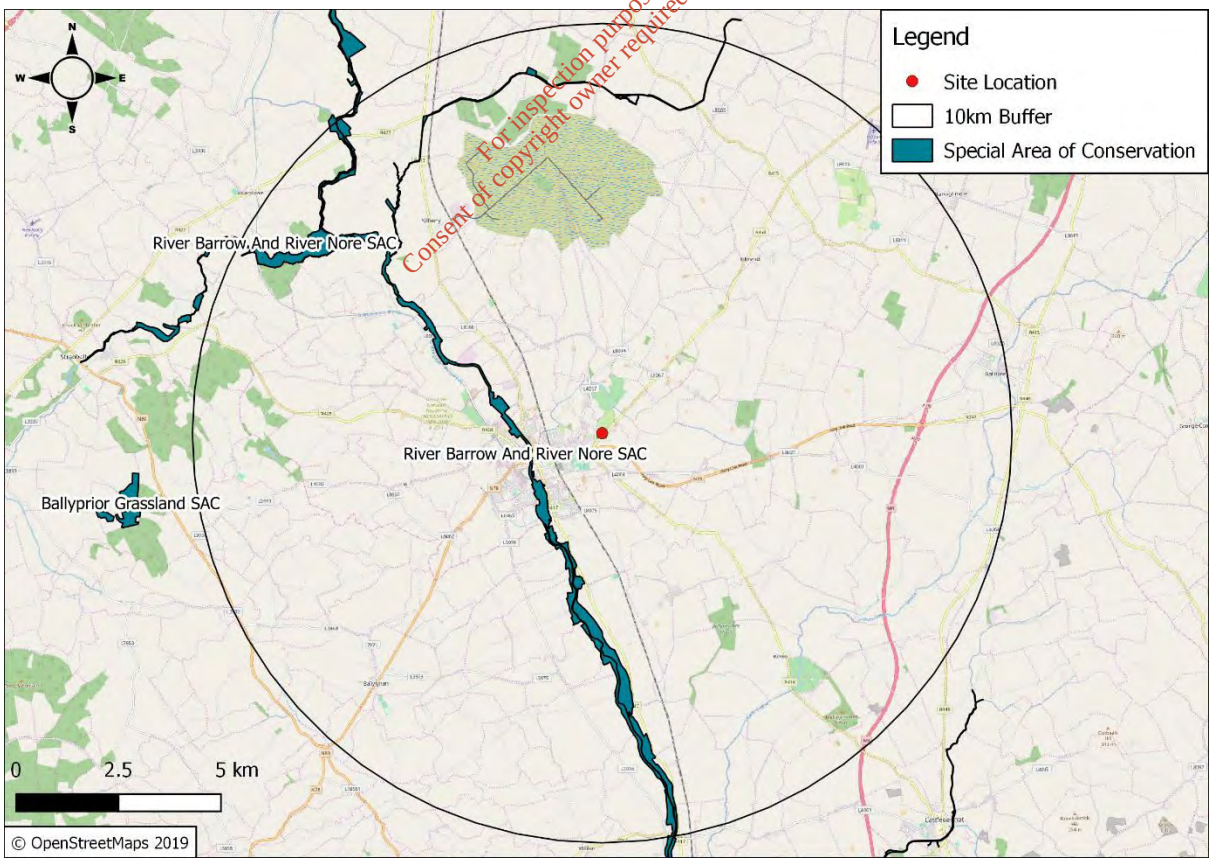
In accordance with the European Commission Methodological Guidance (European Commission, 2002) a list of European sites that can be potentially affected by the Historic Landfill has been compiled. Guidance for Planning Authorities prepared by the Department of Environment Heritage and Local Government (DoEHLG, 2009) states that defining the likely zone of impact for the screening and the approach used will depend on the nature, size, location and the likely effects of the project. The key variables determining whether or not a particular Natura 2000 site is likely to be negatively affected by a project are: the physical distance from the project to the site; the sensitivities of the ecological receptors; and, the potential for in-combination effects. Adopting the precautionary principle, all Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) sites within a 10km radius of the Site have been considered.

One Natura 2000 designated sites were identified within 10km of the Site (Table 4-1, Figure 4-1).

Table 4-1: Natura 2000 Designated Sites within 10km of the Site

Site Name	Site Code	Distance (km)	Direction
Special Areas of Conservation			
River Barrow and River Nore SAC	002162	1.63	W

Figure 4-1: Designated Sites located further within 10km of Site Location



Only the River Barrow and River Nore SAC are located within 10km of the Site. Further consideration in terms of potential adverse effects are considered below.

5 IDENTIFICATION AND ASSESSMENT OF POTENTIAL IMPACTS

Only features that have the potential to cause adverse effects on the conservation objectives of the identified Natura 2000 sites were considered. A number of factors were examined at this stage and dismissed due to the very low risk associated with them. The key area of potential concern is in relation to potential adverse effects on the SAC are from the impairment of water quality resulting from the landfill site.

5.1 Potential Impairment of Water Quality

In accordance with the EPA CoP risk prioritisation calculations prepared for Environmental Risk Assessment the Site has been classified as a Class A – HIGH Risk Site due to the potential risks associated with landfill gas migration to on-site receptors and the risk of landfill gas migration to off-site receptors.

However, as stated in the ERA, due to the current site settings, the low flow rates observed throughout the monitoring locations and the findings during the landfill gas monitoring survey, it can be stated that the observed landfill gas concentrations do not pose a risk to human health or the environment, these exceedances do not pose a risk to water quality. The surface water results of the ERA confirmed that the imported materials are not impacting on the Athy Stream and therefore the potential risk and impacts to the quality to the Barrow River are considered to be low.

It can therefore be stated that in its current state, the Site is not contributing to a discernible decline in water quality. Furthermore, in the absence of any impact on the water quality within the waterbodies, it can also be stated that the Site is not currently causing any loss or disturbance as a result of emissions from the Site to either habitats or species for which the Natura 2000 sites are designated.

5.2 Analysis of 'In-Combination' Effects

The Habitats Directive requires competent authorities to undertake an appropriate assessment of any plan or project which is likely to have a significant effect alone or in-combination with other plans and projects.

The assessment has considered the possibility of impacts on the River Barrow and River Nore SAC. It can be objectively demonstrated that the historic landfill and the proposed recommendations will not have any adverse effects, direct or indirect, on the conservation objectives of these designated European sites, either alone or in combination with other activities and projects, such as the Scowland Water Treatment Plant, agricultural practices, industrial practices, residential properties, transport infrastructure and commercial and leisure activities occurring along the River Barrow.

The conclusions of this assessment are that the historic landfill site in its current state will not have any adverse effects on the River Barrow and River Nore SAC, either alone or in combination with other activities and projects.

6 SCREENING CONCLUSIONS AND STATEMENT

The screening process has examined the details of the ERA undertaken for the Site and has considered the potential for causing impacts on Natura 2000 European sites and their qualifying features of interests within a 10km radius of the proposed Site.

One designated site, the River Barrow and River Nore SAC, is located within a 10km radius of the Site.

Taking into consideration the findings of the Risk Assessment, it has been concluded that that the historic landfill is currently not resulting in the direct loss or disturbance of any Annex I habitats or Annex II species for which the SAC is designated. Furthermore, it is considered that the implementation of further monitoring works at the Site will not have any significant impact on the SAC. The proposed monitoring of surface water and groundwater at the Site will also provide an early indication to any changes at the Site that could potentially result in impacts to designated sites.

Taking into account all of the matters discussed, it can be concluded that the historic landfill site or the proposed monitoring works, alone or in-combination with other projects, will not adversely affect the integrity and conservation status of any of the Natura 2000 sites or their qualifying features of interest.

Accordingly, progression to Stage 2 of the Appropriate Assessment process (i.e. preparation of a Natura Impact Statement) is not considered necessary as this stage.

7 REFERENCES

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