

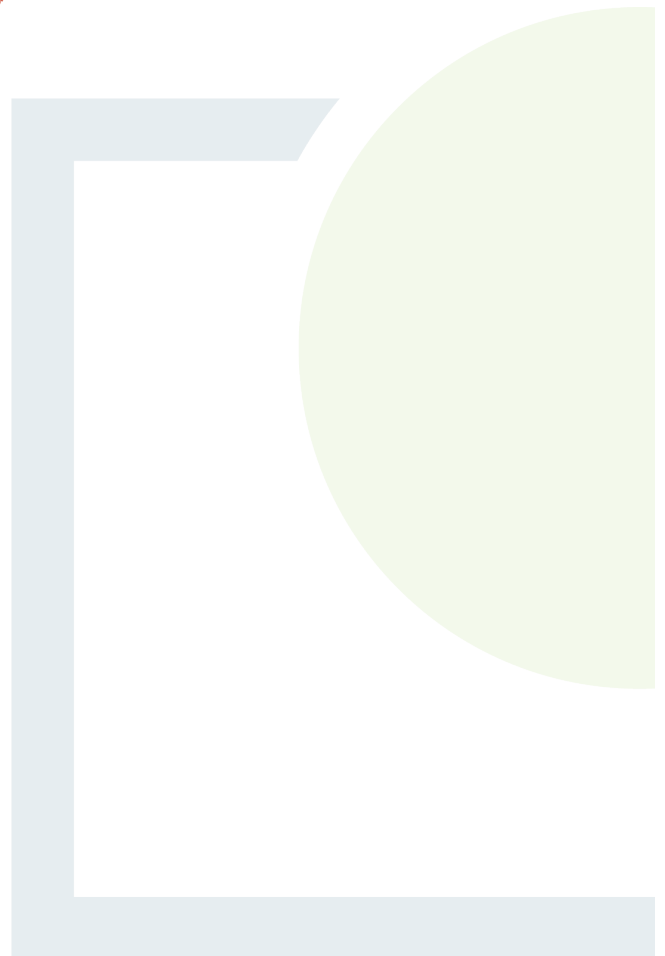


CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE & PLANNING

APPENDIX 4

Causeway Geotechnical
Reports

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CAUSEWAY
— GEOTECH

Galway Historic Landfills – Gort Ground Investigation

Client: Galway County Council

Client's Representative: Feehily Timoney

Report No.: 19-1465B

Date: August 2020

Status: Final for Issue

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APPENDICES

Appendix A	Site and exploratory hole location plans
Appendix B	Borehole logs
Appendix C	Trial pit logs
Appendix D	Trial pit photographs
Appendix E	Variable head test results
Appendix F	Geotechnical laboratory test results
Appendix G	Environmental laboratory test results

Document Control Sheet

Report No.:		19-1465B			
Project Title:		Galway Historic Landfills – Gort			
Client:		Galway County Council			
Client's Representative:		Feehily Timoney			
Revision:	A00	Status:	Final for Issue	Issue Date:	14 August 2020
Prepared by:		Reviewed by:		Approved by:	
 Sean Ross BSc MSc MIEI		 Colm Hurley BSc FGS PGeo		 Darren O'Mahony BSc MSc MIEI EurGeol PGeo	

The works were conducted in accordance with

British Standards Institute (2015) BS 5930:2015, Code of practice for site investigations.

BS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing.

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland

Laboratory testing was conducted in accordance with:

British Standards Institute BS 1377:1990 parts 2, 4, 5, 7 and 9

METHODS OF DESCRIBING SOILS AND ROCKS

Soil and rock descriptions are based on the guidance in BS5930:2015, The Code of Practice for Site Investigation.

Abbreviations used on exploratory hole logs	
U	Nominal 100mm diameter undisturbed open tube sample (thick walled sampler).
UT	Nominal 100mm diameter undisturbed open tube sample (thin walled sampler).
P	Nominal 100mm diameter undisturbed piston sample.
B	Bulk disturbed sample.
LB	Large bulk disturbed sample.
D	Small disturbed sample.
C	Core sub-sample (displayed in the Field Records column on the logs).
L	Liner sample from dynamic sampled borehole.
W	Water sample.
ES / EW	Soil sample for environmental testing / Water sample for environmental testing.
SPT (s)	Standard penetration test using a split spoon sampler (small disturbed sample obtained).
SPT (c)	Standard penetration test using 60 degree solid cone.
(x,x/x,x,x,x)	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length.
(Y for Z/ Y for Z)	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given seating or test length 'Z' (mm).
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm).
HVP / HVR	In situ hand vane test result (HVP) and vane test residual result (HVR). Results presented in kPa.
V VR	Shear vane test (borehole). Shear strength stated in kPa. V: undisturbed vane shear strength VR: remoulded vane shear strength
Soil consistency description	In cohesive soils, where samples are undisturbed and there are no suitable laboratory tests, N values may be used to indicate consistency on borehole logs – a median relationship of $N \times 5 = C_u$ is used (as set out in Stroud & Butler 1975).
dd-mm-yyyy	Date at the end and start of shifts, shown at the relevant borehole depth. Corresponding casing and water depths shown in the adjacent columns.
▽	Water strike: initial depth of strike.
▼	Water strike: depth water rose to.
Abbreviations relating to rock core – reference Clause 36.4.4 of BS 5930: 2015	
TCR (%)	Total Core Recovery: Ratio of rock/soil core recovered (both solid and non-intact) to the total length of core run.
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, uninterrupted by natural discontinuities, but not necessarily a full circumference and is measured along the core axis between natural fractures.
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run.
FI	Fracture Index: Number of natural discontinuities per metre over an indicated length of core of similar intensity of fracturing.
NI	Non Intact: Used where the rock material was recovered fragmented, for example as fine to coarse gravel size particles.
AZCL	Assessed zone of core loss: The estimated depth range where core was not recovered.
DIF	Drilling induced fracture: A fracture of non-geological origin brought about by the rock coring.
(xxx/xxx/xxx)	Spacing between discontinuities (minimum/average/maximum) measured in millimetres.

Galway Historic Landfills – Gort

1 AUTHORITY

On the instructions of Feehily Timoney Consulting Engineers, (“the Client’s Representative”), acting on the behalf of Galway County Council (“the Client”), a ground investigation was undertaken at the above location to provide geotechnical and environmental information for input to the remediation of an historic landfill site in Galway.

This report details the work carried out both on site and in the geotechnical and chemical testing laboratories; it contains a description of the site and the works undertaken, the exploratory hole logs and the laboratory test results. A discussion on the recommendations for construction is also provided.

All information given in this report is based upon the ground conditions encountered during the site investigation works, and on the results of the laboratory and field tests performed. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations, and water conditions between or below exploratory holes. It should be noted that groundwater levels usually vary due to seasonal and/or other effects and may at times differ to those recorded during the investigation. No responsibility can be taken for conditions not encountered through the scope of work commissioned, for example between exploratory hole points, or beneath the termination depths achieved.

This report was prepared by Causeway Geotech Ltd for the use of the Client and the Client’s Representative in response to a particular set of instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded.

2 SCOPE

The extent of the investigation, as instructed by the Client’s Representative, included boreholes, trial pits, soil sampling, environmental sampling, in-situ and laboratory testing, and the preparation of a factual report on the findings.

3 DESCRIPTION OF SITE

As shown on the site location plan in Appendix A, the works were conducted on a site located 100m north west of Gort town centre. The site is accessed off Station Road and is bounded by the Gort River to the north and west, a railway line to the east and by TJ O’Mahony Hardware store to the south. Works were conducted across three separate fields, which were relatively flat with a gentle fall in elevation towards the river.

4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between 26th June and 13th July 2020, comprised:

- three boreholes by rotary drilling methods
- a standpipe installation in each borehole
- eleven machine dug trial pits; and
- three head permeability tests

The exploratory holes and in-situ tests were located as instructed by the Client's Representative, as shown on the exploratory hole location plan in Appendix A.

4.2 Boreholes

Three boreholes (GW01, GW02 and LH01) were put to their completion by rotary drilling techniques only. The boreholes were completed using a Hanjin D8 tracked drilling rig.

Symmetrix-cased full hole rotary percussive drilling techniques were employed to advance the boreholes to scheduled depth.

Appendix B presents the borehole logs.

4.3 Standpipe installations

A groundwater monitoring standpipe was installed in all boreholes. Each borehole was also installed with waterra tubing and foot valve to allow future groundwater sampling.

Details of the installations, including the depth range of the response zone, are provided in Appendix B on the individual borehole logs.

4.4 Trial Pits

Eleven trial pits (TP01-TP11) were excavated using a 13t tracked excavator fitted with a 600mm wide bucket, to a maximum depth of 4.50m.

Environmental samples and bulk samples were taken at depths specified by the Client's Representative.

Any water strikes encountered during excavation were recorded along with any changes in their levels as the excavation proceeded. The stability of the trial pit walls was noted on completion.

Appendix C presents the trial pit logs with photographs of the pits and arising provided in Appendix D.

4.5 Falling head permeability testing

In-situ permeability tests were carried out in GW01, GW02 and LH01 by falling head permeability methods, following development of the wells. Testing was carried out in accordance with the guidance as set out in BS EN ISO 22282-2: 2012

The results are presented in Appendix E.

4.6 Surveying

The as-built exploratory hole positions were surveyed following completion of site operations by a Site Engineer from Causeway Geotech. Surveying was carried out using a Trimble R6 GPS system employing VRS and real time kinetic (RTK) techniques.

The plan coordinates (Irish Transverse Mercator) and ground elevation (mOD Malin) at each location are recorded on the individual exploratory hole logs. The exploratory hole plan presented in Appendix A shows these as-built positions.

5 LABORATORY WORK

Upon their receipt in the laboratory, all disturbed samples were carefully examined and accurately described and their descriptions incorporated into the borehole logs.

5.1 Geotechnical laboratory testing of soils

Laboratory testing of soils comprised:

- **soil classification:** moisture content measurement, Atterberg Limit tests and particle size distribution analysis.
- **shear strength** (total stress): unconsolidated undrained triaxial tests
- **compaction related:** Moisture Condition Value/moisture content relationship

Laboratory testing of soils samples was carried out in accordance with British Standards Institute: *BS 1377, Methods of test for soils for civil engineering purposes; Part 1 (2016), and Parts 2-9 (1990).*

The test results are presented in Appendix F.

5.2 Environmental laboratory testing of soils

Environmental testing, as specified by the Client's Representative was conducted on selected environmental soil samples by Chemtest at its laboratory in Newmarket, Suffolk.

Waste acceptance criteria (WAC) testing was carried out on two samples.

Results of environmental laboratory testing are presented in Appendix G.

6 GROUND CONDITIONS

6.1 General geology of the area

Published geological mapping indicate the superficial deposits underlying the site comprise glacial till and alluvium. These deposits are underlain by Waulsortian Limestones and limestones of the Ballysteen Formation with GSI mapping indicating that bedrock outcrops or is at sub-crop level to the north east of the site.

6.2 Ground types encountered during investigation of the site

A summary of the ground types encountered in the exploratory holes is listed below, in approximate stratigraphic order:

- **Topsoil:** reworked topsoil was encountered in TP01, TP03 and TP04 ranging in thickness from 200-300mm.
- **Made Ground (fill):** reworked sandy silty gravel or gravelly silty sand or sandy gravelly clay/silt clay generally encountered above landfill material or above suspected bedrock at all locations greatest in extent in TP04 with a thickness of 1.60m. Sheets of plastic were encountered in the material in TP02, TP05, TP08 and TP09, with red brick fragments encountered in TP04 and concrete fragments encountered in TP09.
- **Made Ground (landfill):** encountered at all locations except TP09-TP11 to a maximum depth of 4.00m in TP04. Material encountered comprised varying amounts of black plastic bags, plastic fragments, plastic bottles, wood, glass bottles, pieces of Styrofoam, glass fragments, carpet, waste pipe and nylon straps in a black clayey matrix.
- **Recent deposits (alluvium):** sandy gravelly clay or gravelly silty sand or peat encountered below landfill material in TP01-TP03, TP05, TP06, TP08, TP09 and TP11.

- **Bedrock (Limestone):** Limestone bedrock was encountered at depths ranging from 1.00m in GW02 to 2.80m in GW01. Bedrock was not encountered in LH01. Is it likely that the majority of the trial pits terminated on encountering bedrock.

6.3 Groundwater

Details of the individual groundwater strikes, along with any relative changes in levels as works proceeded, are presented on the exploratory hole logs for each location.

Groundwater was encountered during rotary drilling and trial pit excavation as water strikes as shown in Table 1 below.

Table 1: Groundwater strikes encountered during the ground investigation

GI Location	Water Level (mbgl)	Comments
GW01	3.20	Strong strike
GW02	2.00	Strong strike
	6.50	
LH01	4.60	
TP01	3.50	Slow seepage
TP02	3.00	Slow seepage
TP03	3.60	Slow seepage
TP04	3.40	Slow seepage
TP05	4.00	Slow seepage
TP06	3.50	Slow seepage

It should be noted that the casing used in supporting the borehole walls during drilling may have sealed out any/additional groundwater strikes and the possibility of encountering groundwater at other depths should not be ruled out.

Seasonal variation in groundwater levels should also be factored into design considerations and continued monitoring of the three installed standpipes will give an indication of the seasonal variation.

7 REFERENCES

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland

IS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. National Standards Authority of Ireland.

BS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. British Standards Institution.

BS 5930: 2015: Code of practice for ground investigations. British Standards Institution.

BS EN ISO 14688-1:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 1 Identification and description.

BS EN ISO 14688-2:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 2 Principles for a classification.

BS 1377: 1990: Methods of test for soils for civil engineering purposes. British Standards Institution.

BS EN ISO 14689-1:2018: Geotechnical investigation and testing. Identification and classification of rock. Identification and description.

BS EN ISO 22476-3:2005+A1:2011: Geotechnical investigation and testing. Field testing. Standard penetration test.

BS EN ISO 22282-2: 2012: Geotechnical investigation and testing. Geohydraulic testing – Part 2: Water permeability tests in a borehole using open systems.

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APPENDIX A
EXPLORATORY HOLE LOCATION PLAN

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Project No.: 19-1465B

Client: Galway County Council

Project Name: Galway Historic Landfills - Gort

Client's Representative: Feehily Timoney

Legend Key



Title:
Site Location Plan

Last Revised:
13/08/2020

Scale:
1:10000



Project No.: 19-1465B

Client: Galway County Council

Project Name: Galway Historic Landfills - Gort

Client's Representative: Feehily Timoney

Legend Key

- Locations By Type - RO
- Locations By Type - TP



Title:
Exploratory Hole Location Plan

Last Revised:
13/08/2020

Scale:
1:2500

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APPENDIX B
BOREHOLE LOGS

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Project No.
19-1465B

Project Name: Galway Historic Landfills - Gort

Borehole ID
GW01

Client: Galway County Council

Client's Rep: Feehily Timoney

Method Rotary Drilling	Plant Used Hanjin D8	Top (m) 0.00	Base (m) 9.50	Coordinates 545340.81 E 702182.13 N	Final Depth: 9.50 m	Start Date: 03/07/2020	Driller: KW	Sheet 1 of 2 Scale: 1:40
					Elevation: 22.18 mOD	End Date: 03/07/2020	Logger: SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								MADE GROUND: Brown sandy clayey GRAVEL. (Driller's description)		
					19.38	2.80		Grey LIMESTONE. (Driller's description)		
		Strong water strike at 3.20m								

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Water Strikes				Remarks							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)								
3.20											
Casing Details				Water Added							
To (m)	Diam (mm)	From (m)	To (m)								
4.00	200										
		Core Barrel	Flush Type	Termination Reason				Last Updated			
				Terminated at scheduled depth.				13/08/2020			



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Project No.
19-1465B

Project Name: Galway Historic Landfills - Gort

Borehole ID
GW01

Client: Galway County Council

Client's Rep: Feehily Timoney

Method Rotary Drilling	Plant Used Hanjin D8	Top (m) 0.00	Base (m) 9.50	Coordinates 545340.81 E 702182.13 N	Final Depth: 9.50 m	Start Date: 03/07/2020	Driller: KW	Sheet 2 of 2 Scale: 1:40
					Elevation: 22.18 mOD	End Date: 03/07/2020	Logger: SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					12.68	9.50		Grey LIMESTONE. (Driller's description)		
								End of Borehole at 9.50m		

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Water Strikes				Remarks							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)								
3.20											
Casing Details				Water Added							
To (m)	Diam (mm)	From (m)	To (m)								
4.00	200										
				Core Barrel	Flush Type	Termination Reason	Last Updated				
						Terminated at scheduled depth.	13/08/2020				



Project No.
19-1465B

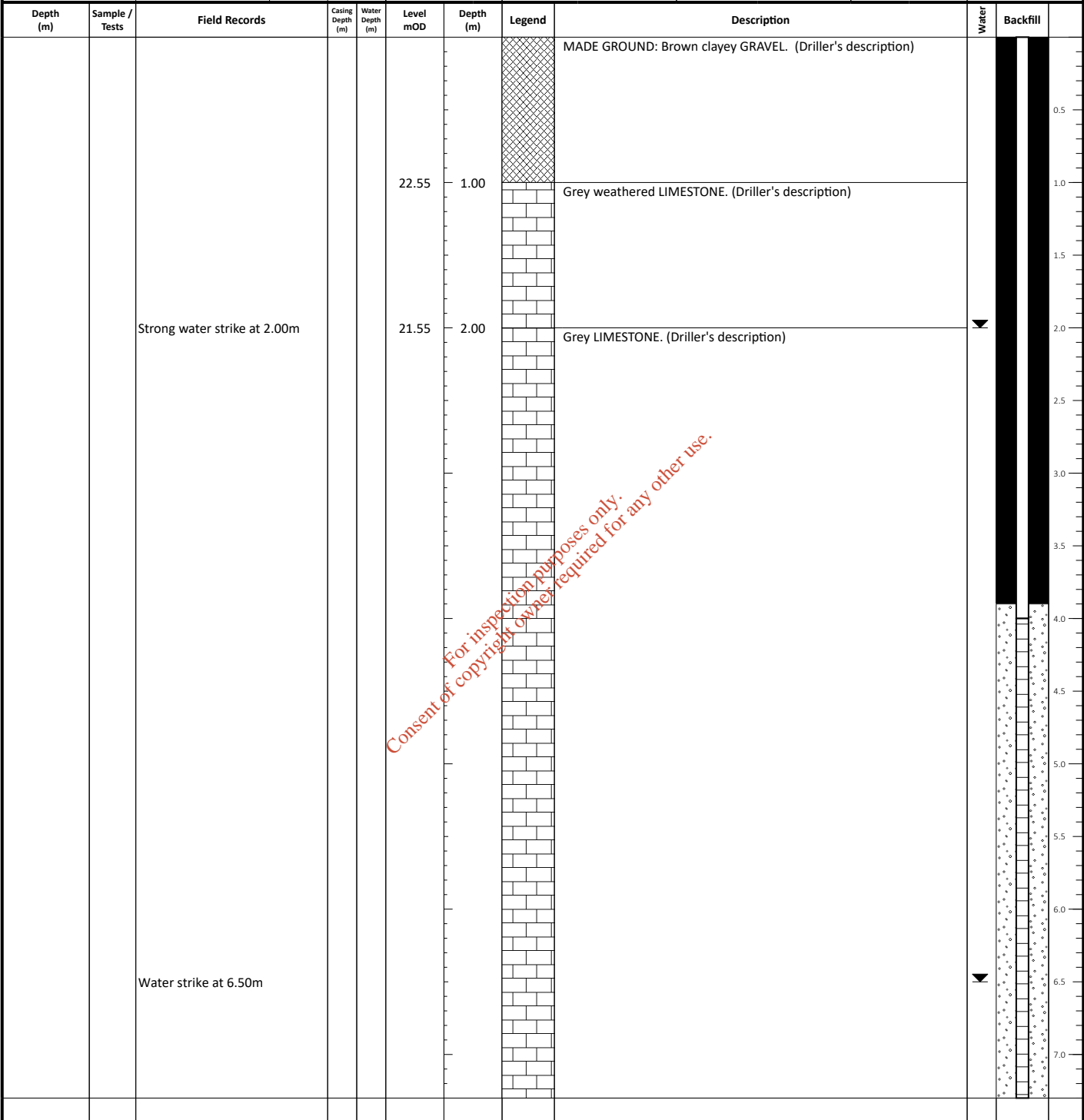
Project Name: Galway Historic Landfills - Gort

Client: Galway County Council

Client's Rep: Feehily Timoney

Borehole ID
GW02

Method Rotary Drilling	Plant Used Hanjin D8	Top (m) 0.00	Base (m) 10.00	Coordinates 545529.97 E 702362.06 N	Final Depth: 10.00 m	Start Date: 02/07/2020	Driller: KW	Sheet 1 of 2 Scale: 1:40
					Elevation: 23.55 mOD	End Date: 02/07/2020	Logger: SR	FINAL



Water Strikes				Remarks	
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)		
2.00					
6.50					
Casing Details		Water Added			
To (m)	Diam (mm)	From (m)	To (m)		
2.50	200				
		Core Barrel	Flush Type	Termination Reason	Last Updated
				Terminated at scheduled depth.	13/08/2020





Project No.
19-1465B

Project Name: Galway Historic Landfills - Gort

Borehole ID
GW02

Client: Galway County Council

Client's Rep: Feehily Timoney

Method Rotary Drilling	Plant Used Hanjin D8	Top (m) 0.00	Base (m) 10.00	Coordinates 545529.97 E 702362.06 N	Final Depth: 10.00 m	Start Date: 02/07/2020	Driller: KW	Sheet 2 of 2 Scale: 1:40
					Elevation: 23.55 mOD	End Date: 02/07/2020	Logger: SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					13.55	10.00		Grey LIMESTONE. (Driller's description)		
								End of Borehole at 10.00m		

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Water Strikes				Remarks							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)								
2.00											
6.50											
Casing Details				Water Added							
To (m)	Diam (mm)	From (m)	To (m)								
2.50	200										
				Core Barrel	Flush Type	Termination Reason			Last Updated		
						Terminated at scheduled depth.			13/08/2020		



Project No.
19-1465B

Project Name: Galway Historic Landfills - Gort

Borehole ID
LH01

Client: Galway County Council

Client's Rep: Feehily Timoney

Method Rotary Drilling	Plant Used Hanjin D8	Top (m) 0.00	Base (m) 10.00	Coordinates 545356.32 E 702289.38 N	Final Depth: 10.00 m	Start Date: 02/07/2020	Driller: KW	Sheet 1 of 2 Scale: 1:40
					Elevation: 22.11 mOD	End Date: 02/07/2020	Logger: SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
								MADE GROUND: Landfill WASTE		
					18.61	3.50		Brown sandy gravelly CLAY. (Driller's description)		
					18.11	4.00		Brown SAND. (Driller's description)		
		Water strike at 4.60m			17.61	4.50		Brownish grey sandy GRAVEL with cobbles and boulders. (Driller's description)		

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Water Strikes				Remarks							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)								
4.60											
Casing Details		Water Added									
To (m)	Diam (mm)	From (m)	To (m)								
7.50	200			Core Barrel	Flush Type	Termination Reason	Last Updated				
						Terminated at scheduled depth.	13/08/2020				



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Project No.
19-1465B

Project Name: Galway Historic Landfills - Gort

Borehole ID
LH01

Client: Galway County Council

Client's Rep: Feehily Timoney

Method Rotary Drilling	Plant Used Hanjin D8	Top (m) 0.00	Base (m) 10.00	Coordinates 545356.32 E 702289.38 N	Final Depth: 10.00 m	Start Date: 02/07/2020	Driller: KW	Sheet 2 of 2 Scale: 1:40
					Elevation: 22.11 mOD	End Date: 02/07/2020	Logger: SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					12.11	10.00		Brownish grey sandy GRAVEL with cobbles and boulders. (Driller's description)		
								End of Borehole at 10.00m		

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Water Strikes				Remarks							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)								
4.60											
Casing Details		Water Added									
To (m)	Diam (mm)	From (m)	To (m)								
7.50	200										
				Core Barrel	Flush Type	Termination Reason	Last Updated				
						Terminated at scheduled depth.	13/08/2020				



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APPENDIX C
TRIAL PIT LOGS

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Project No.
19-1465B

Project Name:
Galway Historic Landfills - Gort

Trial Pit ID

Coordinates
545296.23 E
702317.69 N

Client:
Galway County Council
Client's Representative:
Feehily Timoney

TP01

Sheet 1 of 1
Scale: 1:25

Method:
Trial Pitting

Plant:
13t 360 Excavator

Elevation
21.28 mOD

Date:
26/06/2020

Logger:
RS

FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			21.08	0.20		Reworked TOPSOIL	
						MADE GROUND: Brownish yellow sandy silty subrounded fine to coarse GRAVEL of limestone with low cobble content.	0.5
			20.48	0.80		MADE GROUND: Lenses of soft black clay with multicoloured sheets of plastic, plastic bottles, glass bottles, and pieces of wood.	1.0
						Soft grey CLAY	1.5
			18.28	3.00			2.0
		Slow seepage at 3.50m					2.5
							3.0
							3.5
							4.0
			16.78	4.50		End of trial pit at 4.50m	4.5

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Water Strikes		Depth: 4.50 Width: 1.20 Length: 4.50	Remarks:
Struck at (m)	Remarks		
3.50	Slow seepage at 3.50m		
Stability: Stable		Termination Reason: Terminated at scheduled depth.	Last Updated 13/08/2020





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Project No. 19-1465B	Project Name: Galway Historic Landfills - Gort	Trial Pit ID TP02
Coordinates 545339.38 E 702331.03 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t 360 Excavator	Elevation 20.39 mOD	Date: 26/06/2020
		Logger: RS
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			19.68	0.70		MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY with low cobble content and sheets of plastic. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone.	
						MADE GROUND: Multicoloured sheets of plastic with plastic bottles, glass bottles, pieces of wood and styrofoam.	
		Slow water strike at 3.00m					▼
			16.78	3.60		Spongy brown pseudo-fibrous PEAT.	
			15.88	4.50		End of trial pit at 4.50m	

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Water Strikes		Depth: 4.50 Width: 1.20 Length: 4.00	Remarks:
Struck at (m)	Remarks		
3.00	Slow water strike at 3.00m		
Stability: Unstable	Termination Reason: Terminated at scheduled depth.	Last Updated 13/08/2020	



Project No. 19-1465B	Project Name: Galway Historic Landfills - Gort	Trial Pit ID TP03
Coordinates 545387.86 E 702337.20 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t 360 Excavator	Elevation 21.92 mOD	Date: 26/06/2020
		Logger: RS
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.50	B1		21.67	0.25		Reworked TOPSOIL	
			21.17	0.75		MADE GROUND: Stiff yellowish brown slightly sandy slightly gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone. Cobbles are of limestone.	0.5
2.00	ES2	Slow seepage at 3.60m				MADE GROUND: Multicoloured sheets of plastic with pieces of styrofoam, wood and plastic bottles.	1.0
							1.5
			18.42	3.50		Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	2.0
			17.92	4.00		End of trial pit at 4.00m	2.5
							3.0
							3.5
							4.0
							4.5

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Water Strikes		Depth: 4.00 Width: 1.00 Length: 4.00	Remarks:
Struck at (m)	Remarks		
3.60	Slow seepage at 3.60m		
Stability:	Termination Reason:	Last Updated	
Stable	Terminated on possible bedrock/boulder.	13/08/2020	



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Project No. 19-1465B	Project Name: Galway Historic Landfills - Gort	Trial Pit ID TP04
Coordinates 545422.46 E 702347.02 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t 360 Excavator	Elevation 21.67 mOD	Date: 26/06/2020
		Logger: RS
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			21.37	0.30		Reworked TOPSOIL	
			20.87	0.80		MADE GROUND: Stiff yellowish brown slightly sandy slightly gravelly SILT with fragments of red brick. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.	0.5
			20.07	1.60		MADE GROUND: Firm grey slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone.	1.0
						MADE GROUND: Firm black slightly sandy slightly gravelly CLAY with low cobble content and sheets of plastic and broken glass. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone.	1.5
		Slow seepage at 3.40m					2.0
							2.5
							3.0
							3.5
			17.67	4.00		End of trial pit at 4.00m	4.0
							4.5

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Water Strikes		Depth: 4.00 Width: 1.20 Length: 4.00	Remarks:
Struck at (m)	Remarks		
3.40	Slow seepage at 3.40m		
Stability:	Termination Reason:	Last Updated	
Stable	Terminated on possible bedrock/boulder.	13/08/2020	



Project No. 19-1465B	Project Name: Galway Historic Landfills - Gort	Trial Pit ID TP05
Coordinates 545312.62 E 702276.60 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t 360 Excavator	Elevation 21.90 mOD	Date: 26/06/2020
	Logger: RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.50	B1		21.30	0.60	[Cross-hatched pattern]	MADE GROUND: Stiff brown slightly gravelly sandy SILT with low cobble content and sheets of plastic. Sand is fine to coarse. Gravel is subrounded fine to medium of mixed lithologies. Cobbles are of limestone.	
2.00	ES2				[Cross-hatched pattern]	MADE GROUND: Lenses of soft black CLAY with multicoloured sheets of plastic with plastic bottles, pipes, pieces of wood and styrofoam.	
		Slow seepage at 4.00m	18.00	3.90	[Horizontal dashed pattern]	Soft cream CLAY	▼
			17.40	4.50		End of trial pit at 4.50m	

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Water Strikes		Depth: 4.50 Width: 1.20 Length: 4.50	Remarks:
Struck at (m)	Remarks		
4.00	Slow seepage at 4.00m		
Stability: Stable	Termination Reason: Terminated at scheduled depth.	Last Updated 13/08/2020	



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Project No. 19-1465B	Project Name: Galway Historic Landfills - Gort	Trial Pit ID TP06
Coordinates 545380.64 E 702296.49 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t 360 Excavator	Elevation 22.30 mOD	Date: 26/06/2020
	Logger: RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.50	B1					MADE GROUND: Stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies. Cobbles are of limestone.	
			21.20	1.10		MADE GROUND: Lenses of soft black CLAY with multicoloured sheets of plastic, plastic bottles, pipes, pieces of wood and styrofoam.	
2.50	ES2						
		Slow seepage at 3.50m					▼
			18.40	3.90		Grey gravelly silty fine to coarse SAND. Gravel is subrounded fine to coarse of limestone.	
			17.80	4.50		End of trial pit at 4.50m	

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Water Strikes		Depth: 4.50 Width: 1.20 Length: 4.00	Remarks:
Struck at (m)	Remarks		
3.50	Slow seepage at 3.50m		
Stability: Stable	Termination Reason: Terminated at scheduled depth.	Last Updated 13/08/2020	



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Project No. 19-1465B	Project Name: Galway Historic Landfills - Gort	Trial Pit ID TP07
Coordinates 545422.93 E 702310.61 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t 360 Excavator	Elevation 21.70 mOD	Date: 26/06/2020
		Logger: RS
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			21.50	0.20		MADE GROUND: Firm orangish brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse of mixed lithologies.	
						MADE GROUND: Firm grey slightly sandy slightly gravelly SILT with low cobble and boulder content, sheets of plastic, tree trunks, glass bottles, pieces of carpet, waste pipe, nylon straps, and styrofoam.	0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5
			19.60	2.10		End of trial pit at 2.10m	

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Water Strikes		Depth: 2.10 Width: 1.20 Length: 2.50	Remarks: No groundwater encountered
Struck at (m)	Remarks		
		Stability: Unstable	Termination Reason: Terminated due to collapsing sides.
			Last Updated 13/08/2020





Project No. 19-1465B	Project Name: Galway Historic Landfills - Gort	Trial Pit ID TP08
Coordinates 545377.30 E 702254.34 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t 360 Excavator	Elevation 21.46 mOD	Date: 26/06/2020
		Logger: RS
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.50	B1		20.86	0.60		MADE GROUND: Firm brown slightly gravelly sandy SILT with low cobble content and sheets of plastic. Sand is fine to coarse. Gravel is subrounded fine to medium of mixed lithologies. Cobbles are of limestone.	0.5
1.50	ES2					MADE GROUND: Lenses of soft black clay with multicoloured sheets of plastic, pieces of wood, glass bottles, plastic bottles, carpet, and styrofoam.	1.0
			19.06	2.40		soft cream CLAY	2.5
			18.36	3.10		End of trial pit at 3.10m	3.0
							3.5
							4.0
							4.5

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Water Strikes		Depth: 3.10 Width: 1.20 Length: 4.00	Remarks: No groundwater encountered	Last Updated 13/08/2020	
Struck at (m)	Remarks				
		Stability: Stable	Termination Reason: Terminated on possible bedrock/boulder.		



Project No. 19-1465B	Project Name: Galway Historic Landfills - Gort	Trial Pit ID TP09
Coordinates 545489.73 E 702337.98 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t 360 Excavator	Elevation 22.77 mOD	Date: 26/06/2020
		Logger: RS
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.50 0.50	B1 ES2		22.17	0.60		MADE GROUND: Brown slightly sandy slightly gravelly SILT with low cobble content and sheets of plastic and fragments of concrete. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone. Cobbles are of limestone	0.5
						Yellowish grey gravelly silty fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse of limestone. Cobbles are of limestone.	1.0
			21.47	1.30		End of trial pit at 1.30m	1.5
							2.0
							2.5
							3.0
							3.5
							4.0
							4.5

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Water Strikes		Depth: 1.30 Width: 1.00 Length: 3.50	Remarks: No groundwater encountered
Struck at (m)	Remarks		
		Stability: Unstable	Termination Reason: Terminated on possible bedrock/boulder.
			Last Updated 13/08/2020



Project No. 19-1465B	Project Name: Galway Historic Landfills - Gort	Trial Pit ID TP10
Coordinates 545497.87 E 702372.79 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t 360 Excavator	Elevation 24.53 mOD	Date: 26/06/2020
		Logger: RS
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			24.13	0.40		MADE GROUND: Firm brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of limestone.	
			23.53	1.00		MADE GROUND: Yellowish grey gravelly silty fine to coarse SAND. Gravel is subangular fine to coarse of limestone.	
						End of trial pit at 1.00m	

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Water Strikes		Depth: 1.00 Width: 1.00 Length: 3.20	Remarks: No groundwater encountered	Last Updated 13/08/2020	
Struck at (m)	Remarks				
		Stability: Stable	Termination Reason: Terminated on possible bedrock/boulder.		



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Project No. 19-1465B	Project Name: Galway Historic Landfills - Gort	Trial Pit ID TP11
Coordinates 545526.26 E 702405.23 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t 360 Excavator	Elevation 26.64 mOD	Date: 26/06/2020
		Logger: RS
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			26.54	0.10		MADE GROUND: Grey sandy silty subangular fine to coarse GRAVEL of limestone. Sand is fine to coarse. MADE GROUND: Stiff yellowish grey slightly sandy slightly gravelly SILT with lenses of orange clay and low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse of limestone. Cobbles and boulders are of limestone.	0.5
			25.74	0.90		Grey gravelly silty fine to coarse SAND with low cobble and boulder content. Gravel is subangular fine to coarse of limestone. Cobbles and boulders are of limestone.	1.0
			23.44	3.20		End of trial pit at 3.20m	3.0
							3.5
							4.0
							4.5

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Water Strikes		Depth: 3.20 Width: 1.00 Length: 3.20	Remarks: No groundwater encountered
Struck at (m)	Remarks		
		Stability: Stable	Termination Reason: Terminated on possible bedrock/boulder.
			Last Updated 13/08/2020



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APPENDIX D
TRIAL PIT PHOTOGRAPHS

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TP01



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