

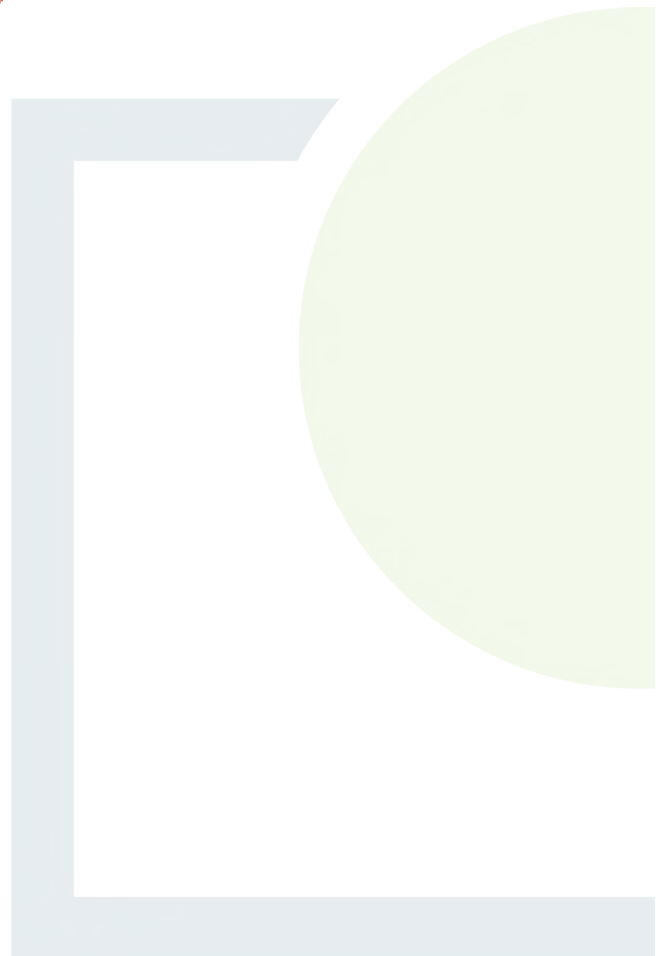


CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE & PLANNING

APPENDIX 4

Causeway Geotechnical
Report

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CAUSEWAY
— GEOTECH

Galway Historic Landfills – New Inn Ground Investigation

Client: Galway County Council

Client's Representative: Feehily Timoney

Report No.: 19-1465C

Date: August 2020

Status: Final for Issue

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APPENDICES

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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
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Document Control Sheet

Report No.:		19-1465C			
Project Title:		Galway Historic Landfills – New Inn			
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 disturbed 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 – New Inn

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 in New Inn, Co. Galway. The site is located 500m south west of Sarsfields GAA Club and is accessed to the north of the R348 and is bounded to the north, east and west by agricultural fields and to the south by the R348.

4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between 29th June and 10th July 2020, comprised:

- two boreholes by rotary drilling methods
- a standpipe installation in each borehole
- eight machine dug trial pits; and
- two variable head 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

Two boreholes (GW01 and GW02) 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

Eight trial pits (TP01–TP08) 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 and GW02 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 fluvioglacial sands and gravels. These deposits are underlain by limestones of the Lucan Formation.

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:** topsoil or reworked topsoil was encountered at all trial pit locations except TP05 with a thickness range of 50-100mm.
- **Made Ground (fill):** reworked sandy clayey gravel or gravelly silty sand generally encountered above landfill material in TP01-TP04 with a maximum thickness of 0.90m in TP03. Varying amounts of plastic, glass, steel wire, brick was encountered in TP01 and TP02. The strata were also encountered in TP05, GW01 and GW02 to a maximum extent of 2.80m in GW01 overlying natural ground or bedrock. It should be noted that borehole descriptions were based off driller descriptions of drilling returns.
- **Made Ground (landfill):** encountered in TP01 to TP04 to a maximum depth of 4.50m in TP02, although the full extent was not bottomed out due to the maximum reach of the excavator. Material encountered comprised varying amounts of plywood, plastic bags, aluminium, plastic pipes, timber, polystyrene, glass bottles, paper, clothing, tin, brick, tyres, steel wire, bicycle frames, rope, steel drums and cardboard, food packaging and nappies in a black clayey sand matrix.
- **Fluvioglacial sands and gravels:** gravelly silty sand or sandy silty gravel with lenses of sandy gravelly clay/silt encountered beneath landfill material in TP01 and TP03 and in TP05-TP08 to

depths of 4.00m in TP03 likely overlying bedrock, although not proven due to instability of the trial pits or maximum extent of the excavator.

- **Bedrock (limestone):** Bedrock was encountered at depths of 1.00m in GW02 to 2.80m in GW01.

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	6.00	
TP02	0.60	Slow seepage
TP03	3.40	Slow seepage
TP05	1.80	Rapid inflow
TP06	2.20	Steady seepage, rose to 2.10m after 20 mins
TP07	2.30	
TP08	1.80	Strong inflow

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 two 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.: 19-1465C

Client: Galway County Council

Project Name: Galway Historical Landfills - New Inn

Client's Representative: Feehily Timoney

Legend Key



Title:
Site Location Plan

Last Revised:
13/08/2020

Scale:
1:10000

bing
Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation



Project No.: 19-1465C

Client: Galway County Council

Project Name: Galway Historical Landfills - New Inn

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.
19-1465C

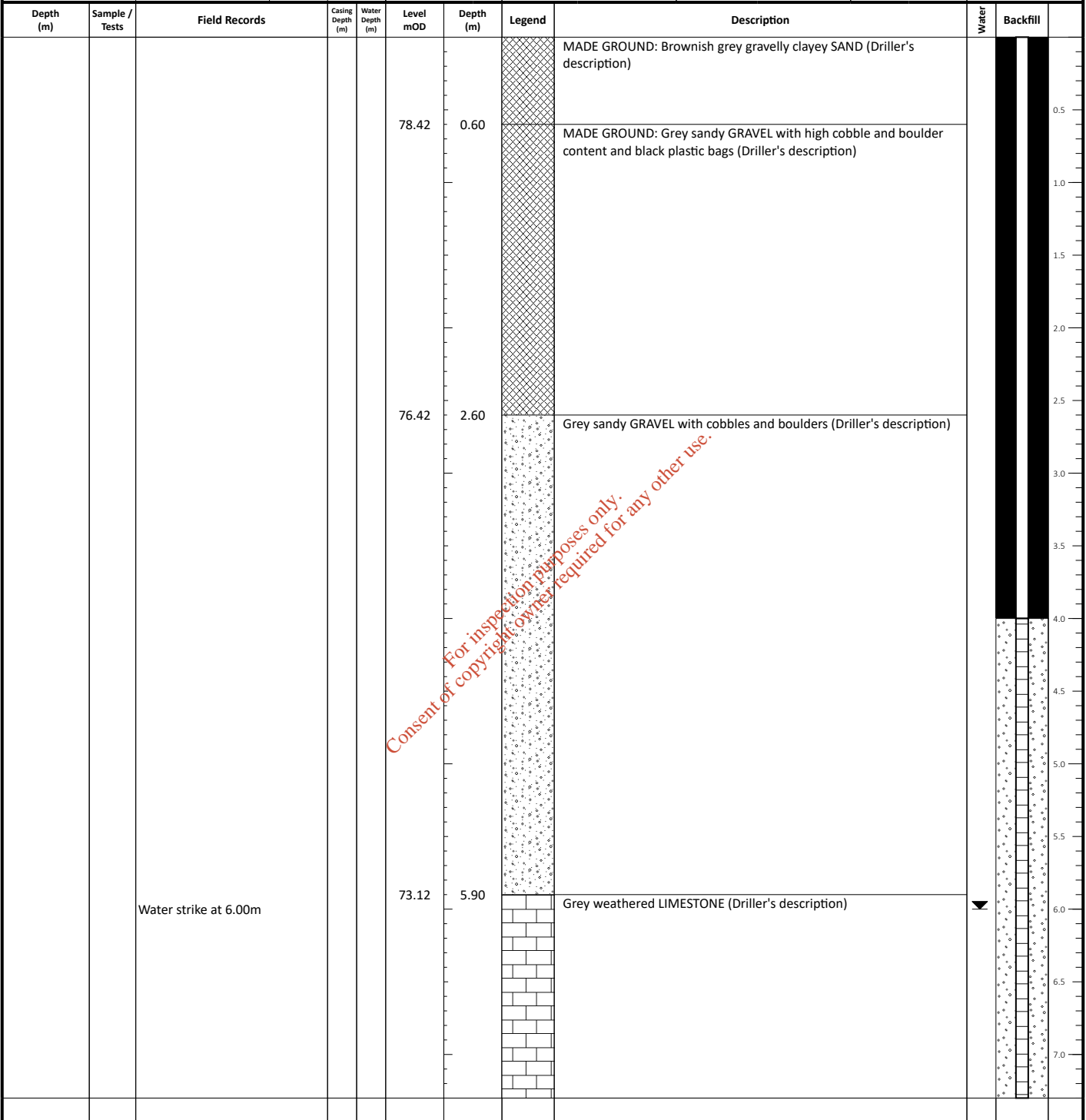
Project Name: Galway Historical Landfills - New Inn

Borehole ID
GW01

Client: Galway County Council

Client's Rep: Feehily Timoney

Method Rotary Drilling	Plant Used Comacchio 405	Top (m) 0.00	Base (m) 8.50	Coordinates 566130.92 E 727138.98 N	Final Depth: 8.50 m	Start Date: 29/06/2020	Driller: TA	Sheet 1 of 2 Scale: 1:40
					Elevation: 79.02 mOD	End Date: 29/07/2020	Logger: CH	



Water Strikes				Remarks							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)								
6.00	6.00										
Casing Details				Water Added							
To (m)	Diam (mm)	From (m)	To (m)								
				Core Barrel	Flush Type	Termination Reason		Last Updated			
						Terminated at scheduled depth.		13/08/2020			



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Project No.
19-1465C

Project Name: Galway Historical Landfills - New Inn

Borehole ID
GW01

Client: Galway County Council

Client's Rep: Feehily Timoney

Method Rotary Drilling	Plant Used Comacchio 405	Top (m) 0.00	Base (m) 8.50	Coordinates 566130.92 E 727138.98 N	Final Depth: 8.50 m	Start Date: 29/06/2020	Driller: TA	Sheet 2 of 2 Scale: 1:40
					Elevation: 79.02 mOD	End Date: 29/07/2020	Logger: CH	

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					71.42	7.60		Grey weathered LIMESTONE (Driller's description)		
								Grey LIMESTONE (Driller's description)		
					70.52	8.50		End of Borehole at 8.50m		

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Water Strikes				Remarks							
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)								
6.00	6.00										
Casing Details				Water Added							
To (m)	Diam (mm)	From (m)	To (m)								
				Core Barrel	Flush Type	Termination Reason	Last Updated				
						Terminated at scheduled depth.	13/08/2020				



Project No.
19-1465C

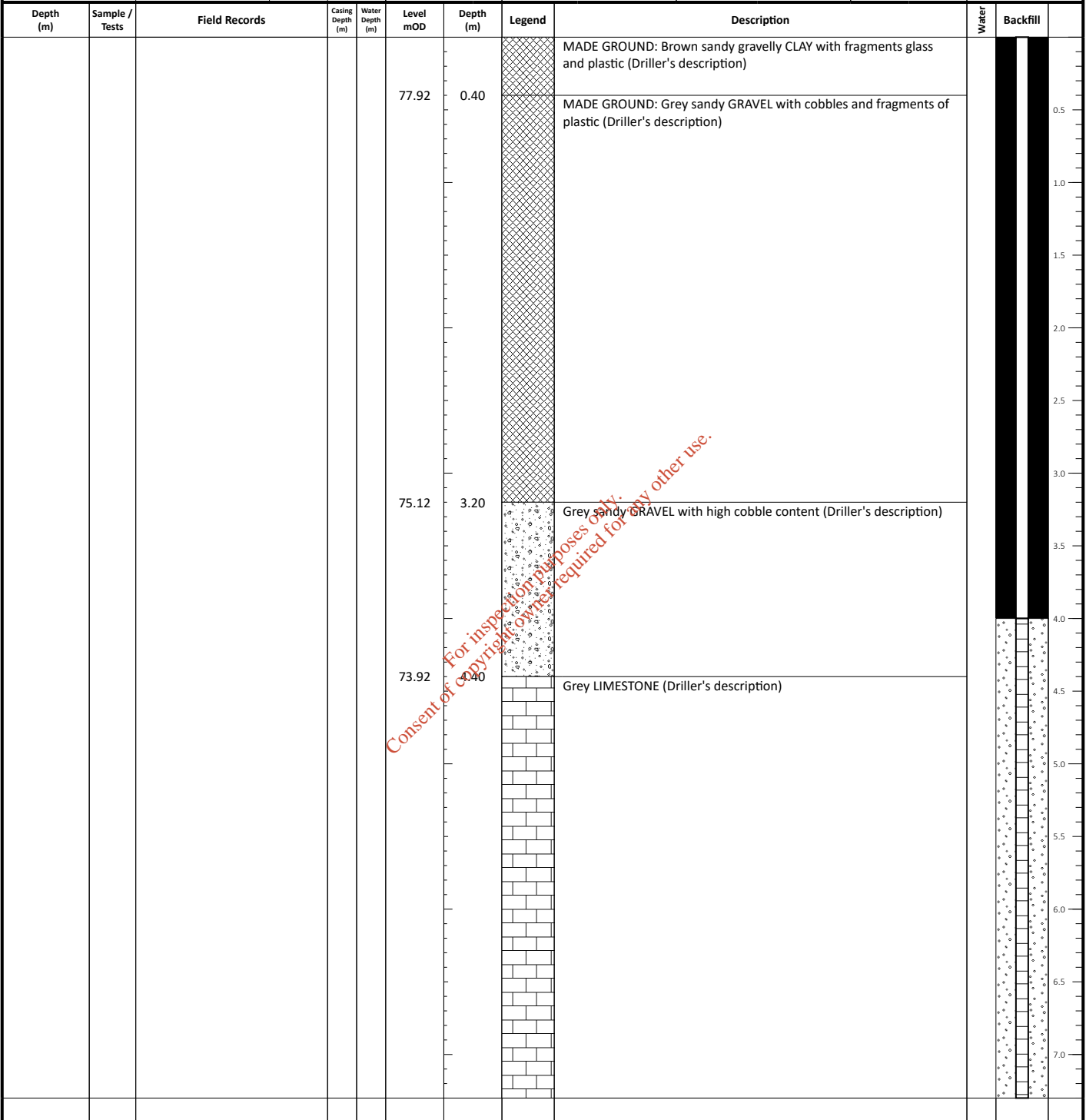
Project Name: Galway Historical Landfills - New Inn

Borehole ID
GW02

Client: Galway County Council

Client's Rep: Feehily Timoney

Method Rotary Drilling	Plant Used Comacchio 405	Top (m) 0.00	Base (m) 10.00	Coordinates 566234.14 E 727271.03 N	Final Depth: 10.00 m	Start Date: 30/06/2020	Driller: TA	Sheet 1 of 2 Scale: 1:40
					Elevation: 78.32 mOD	End Date: 30/07/2020	Logger: CH	



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Water Strikes				Remarks No groundwater encountered.
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
Casing Details		Water Added		
To (m)	Diam (mm)	From (m)	To (m)	
Core Barrel	Flush Type	Termination Reason	Last Updated	
		Terminated at scheduled depth.	13/08/2020	





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Project No.
19-1465C

Project Name: Galway Historical Landfills - New Inn

Borehole ID
GW02

Client: Galway County Council

Client's Rep: Feehily Timoney

Method Rotary Drilling	Plant Used Comacchio 405	Top (m) 0.00	Base (m) 10.00	Coordinates 566234.14 E 727271.03 N	Final Depth: 10.00 m	Start Date: 30/06/2020	Driller: TA	Sheet 2 of 2 Scale: 1:40
					Elevation: 78.32 mOD	End Date: 30/07/2020	Logger: CH	

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
					68.32	10.00		Grey LIMESTONE (Driller's description)		
								End of Borehole at 10.00m		

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Water Strikes				Remarks No groundwater encountered.
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	
Casing Details		Water Added		
To (m)	Diam (mm)	From (m)	To (m)	
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. 19-1465C	Project Name: Galway Historical Landfills - New Inn	Trial Pit ID TP01
Coordinates 566197.27 E 727215.83 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	Elevation 79.50 mOD	Date: 06/07/2020
	Logger: JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
1.00 1.00	ES ES1		79.45	0.05		Reworked TOPSOIL	
			78.90	0.60		MADE GROUND: Light grey and grey slightly gravelly silty fine to coarse SAND with low cobble content with fragments of plywood, plastic bags, aluminum, plastic pipes, timber, polystyrene, glass bottles, clothing, tin and brick. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Cobbles are subrounded of mixed lithologies.	
			76.90	2.60		Light grey slightly gravelly silty fine to coarse SAND with high cobble and boulder content. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Cobbles and boulders are subrounded of mixed lithologies.	
			76.10	3.40		End of trial pit at 3.40m	

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Water Strikes		Depth: 3.40 Width: 1.20 Length: 3.20	Remarks: Strong pungent odour from 0.60 to 2.60m. No groundwater encountered.
Struck at (m)	Remarks		
		Stability: Unstable	Termination Reason: Terminated due to instability.
		Last Updated 13/08/2020	



Project No. 19-1465C	Project Name: Galway Historical Landfills - New Inn	Trial Pit ID TP02
Coordinates 566220.10 E 727245.96 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	Elevation 87.44 mOD	Date: 06/07/2020
		Logger: JG
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.10 - 0.30	B1		87.34	0.10		Reworked TOPSOIL	
0.30 - 0.60	B2	Slow seepage at 0.60m	86.84	0.60		MADE GROUND: Light grey very gravelly silty fine to coarse SAND with low cobble content and fragments of glass, plastic, and brick fragments. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Cobbles are subrounded of mixed lithologies.	▼
						MADE GROUND: Dark grey and grey gravelly silty fine to coarse SAND with fragments of plastic bags, glass bottles, clothing, tyres, steel wire, plastic pipes, bicycle, rope, timber, steel drum, and cardboard. Gravel is subangular to subrounded fine to coarse of mixed lithologies.	
			82.94	4.50		End of trial pit at 4.50m	

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Water Strikes		Depth: 4.50 Width: 1.20 Length: 3.10	Remarks: Strong pungent odour from 0.60 to 4.50m.
Struck at (m)	Remarks		
0.60	Slow seepage at 0.60m	Stability: Slightly Unstable	Termination Reason: Terminated at scheduled depth
		Last Updated 13/08/2020	



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Project No. 19-1465C	Project Name: Galway Historical Landfills - New Inn	Trial Pit ID TP03
Coordinates 566277.11 E 727255.13 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	Elevation 78.54 mOD	Date: 06/07/2020
	Logger: JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			78.49	0.05		Reworked TOPSOIL	
			78.24	0.30		MADE GROUND: Light greyish brown and brown very gravelly silty fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of mixed lithologies.	
			77.64	0.90		MADE GROUND: Light grey very sandy subangular to subrounded fine to coarse GRAVEL of mixed lithologies with high cobble content. Sand is fine to coarse. Cobbles are subrounded of mixed lithologies.	
						MADE GROUND: Black gravelly clayey fine to coarse SAND with fragments of plastic bags, timber, glass, food waste, steel wire, fabric, cardboard, plastic pipes, aluminum cans, and nails. Gravel is subangular to subrounded fine to coarse of mixed lithologies.	
		Seepage at 3.40m	75.14	3.40		Light grey gravelly silty fine to coarse SAND with low cobble content and lenses of soft light grey and grey SILT. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Cobbles are subrounded of mixed lithologies.	▼
			74.54	4.00		End of trial pit at 4.00m	

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Water Strikes		Depth: 4.00 Width: 1.20 Length: 3.20	Remarks: Strong pungent odour from 0.90 to 3.40m.
Struck at (m)	Remarks		
3.40	Seepage at 3.40m	Stability: Unstable	Termination Reason: Terminated due to instability.
		Last Updated 13/08/2020	



Project No. 19-1465C	Project Name: Galway Historical Landfills - New Inn	Trial Pit ID TP04
Coordinates 566279.70 E 727280.23 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	Elevation 78.24 mOD	Date: 06/07/2020
	Logger: JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			78.19	0.05		Reworked TOPSOIL	
			78.04	0.20		MADE GROUND: Light grey fine to coarse SAND with underlying geotextile membrane.	
						MADE GROUND: Black clayey fine to coarse SAND with fragments of plastic, timber, glass, oil drums, polystyrene, clothing, aluminum cans, steel wire, plastic cables, nappies, cardboard and paper. Gravel is subangular to subrounded fine to coarse of mixed lithologies.	
1.00	ES						
1.00	ES1						
							0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5
			74.04	4.20		End of trial pit at 4.20m	

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Water Strikes		Depth: 4.20 Width: 1.30 Length: 3.40	Remarks: Strong pungent odour from 0.20 to 4.20m. No groundwater encountered.
Struck at (m)	Remarks		
Stability: Unstable	Termination Reason: Terminated due to instability.	Last Updated 13/08/2020	



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Project No. 19-1465C	Project Name: Galway Historical Landfills - New Inn	Trial Pit ID TP05
Coordinates 566333.27 E 727313.91 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	Elevation 74.81 mOD	Date: 06/07/2020
		Logger: JG
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			74.71	0.10		TOPSOIL	
						Light grey sandy subangular to subrounded fine to coarse GRAVEL of mixed lithologies with high cobble content. Sand is fine to coarse. Cobbles are subrounded of mixed lithologies.	
		Rapid water strike at 1.80m	73.31	1.50		Orangish brown and brown sandy silty subangular to subrounded fine to coarse GRAVEL of mixed lithologies with low cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are subrounded of mixed lithologies.	▼
			72.71	2.10		End of trial pit at 2.10m	

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Water Strikes		Depth: 2.10 Width: 1.20 Length: 3.20	Remarks: Strong pungent odour from 1.50 to 2.10m.
Struck at (m)	Remarks		
1.80	Rapid water strike at 1.80m		
Stability: Unstable		Termination Reason: Terminated due to instability and water inflow.	Last Updated 13/08/2020





Project No. 19-1465C	Project Name: Galway Historical Landfills - New Inn	Trial Pit ID TP06
Coordinates 566382.79 E 727339.38 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	Elevation 75.11 mOD	Date: 06/07/2020
		Logger: JG
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			75.01	0.10		MADE GROUND: Light grey very sandy subangular to subrounded fine to coarse GRAVEL of mixed lithologies. Sand is fine to coarse.	
						MADE GROUND: Greyish green and brown sandy subangular to subrounded fine to coarse GRAVEL of mixed lithologies with high cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are subrounded of mixed lithologies.	
			73.91	1.20		MADE GROUND: Orangish sandy clayey subangular to subrounded fine to coarse GRAVEL of mixed lithologies with high cobble content. Sand is fine to coarse. Cobbles are subrounded of mixed lithologies.	
			73.31	1.80		Light grey and grey sandy clayey subangular to subrounded fine to coarse GRAVEL of mixed lithologies with high cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are subrounded of mixed lithologies.	
		Steady flow at 2.20m	72.91	2.20		End of trial pit at 2.20m	

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Water Strikes		Depth: 2.20 Width: 1.20 Length: 3.10	Remarks: Strong pungent odour from 1.20 to 2.20m.
Struck at (m)	Remarks		
2.20	Steady flow at 2.20m	Stability: Unstable	Termination Reason: Terminated due to instability.
		Last Updated 13/08/2020	



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Project No. 19-1465C	Project Name: Galway Historical Landfills - New Inn	Trial Pit ID TP07
Coordinates 566428.37 E 727383.80 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	Elevation 73.81 mOD	Date: 06/07/2020
	Logger: JG	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			73.71	0.10		TOPSOIL	
			73.51	0.30		MADE GROUND: Grey and reddish brown slightly sandy angular fine to coarse GRAVEL of mixed lithologies. Sand is fine to coarse.	
						Light grey very gravelly silty fine to coarse SAND with high cobble and boulder content with lenses of orangish brown clay. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Cobbles and boulders are subrounded of mixed lithologies.	
		Water strike at 2.30m	71.51	2.30		Very stiff slight grey slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Cobbles and boulders are subrounded of mixed lithologies.	▼
			70.71	3.10		End of trial pit at 3.10m	



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Water Strikes		Depth: 3.10 Width: 1.20 Length: 2.80	Remarks:
Struck at (m)	Remarks		
2.30	Water strike at 2.30m		
Stability: Unstable	Termination Reason: Terminated due to instability.	Last Updated 13/08/2020	




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GEOTECH

Project No. 19-1465C	Project Name: Galway Historical Landfills - New Inn	Trial Pit ID TP08
Coordinates 566468.48 E 727435.79 N	Client: Galway County Council	
Method: Trial Pitting	Client's Representative: Feehily Timoney	Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	Elevation 73.47 mOD	Date: 06/07/2020
		Logger: JG
		FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			73.36	0.10	 TOPSOIL	Light grey very gravelly silty fine to coarse SAND with high cobble and boulder content. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Cobbles and boulders are subrounded of mixed lithologies.	
		Strong inflow at 1.80m					
			71.46	2.00		End of trial pit at 2.00m	▼

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Water Strikes		Depth: 2.00 Width: 1.20 Length: 2.80	Remarks:
Struck at (m)	Remarks		
1.80	Strong inflow at 1.80m		
Stability: Unstable	Termination Reason: Terminated due to instability and high groundwater inflow.	Last Updated 13/08/2020	



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APPENDIX D
TRIAL PIT PHOTOGRAPHS

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TP01



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