

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING



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Galway Historic Landfills – Gort Ground Investigation

Client:

Galway County Council

Client's Representative: Feehily Timoney

Report No.:

Date:

Status:

August 2020

19-1465B

Final for Issue

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stered in Northern Ireland. Company Number: NI610766 Approved: ISO 9001 • ISO 14001 • OHSAS 18001





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Appendix C	Trial pit logs
Appendix D	Trial pit photographs
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Document Control Sheet

Report No.:		19-1465B						
Project Title:		Galway Historic Landfills – Gort						
Client:		Galway County Council						
Client's Repres	entative:	Feehily Timoney						
Revision:	A00	Status:	Final for Issue	Issue Date:	14 August 2020			
Prepared by:		Reviewed by:		Approved by:				
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The works were conducted in accordance with the standard

British Standards Institute (2015) BS \$930:2015, Code of practice for site investigations.

BS EN 1997-2: 2007: Eurocode CGeotechnical 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	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).									
Р	Nominal 100mm diameter undisturbed piston sample.									
В	Bulk disturbed sample.									
LB	Large bulk disturbed sample.									
D	Small disturbed sample.									
С	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 longth 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 vangest residual result (HVR). Results presented in kPa.									
V VR	Shear vane test (borehole). Shear strength stated in kPa. V: undisturbed vane shear strength R: 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 bore of a median relationship of Nx5=Cu is used (as set out in Stroud & Butler 1975).									
dd-mm-yyyy	Date at the end and start of suffits, shown at the relevant borehole depth. Corresponding casing and water depths shown in the adjacent columns.									
\bigtriangledown	Water strike: initial to f strike.									
•	Water strike: depth water rose to.									
Abbreviations relating to	o 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.									





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

FOT INSPECTION PET 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 of 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.

GI Location	Water Level (mbgl)	Comments		
GW01	3.20	Strong strike		
CW02	2.00	Strong strike		
0002	6.50	ther		
LH01	4.60	3		
TP01	3.50 se dio	Slow seepage		
TP02	3.00 ourpequire	Slow seepage		
TP03	3.60 ton ter te	Slow seepage		
TP04	3,40,00	Slow seepage		
TP05 😵	\$4,00	Slow seepage		
TP06	3.50	Slow seepage		
- Ch				

Table 1: Groundwater strikes encountered during the ground investigation

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, Adentification 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

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



APPENDIX A EXPLORATORY HOLE LOCATION PLAN

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APPENDIX B BOREHOLE LOGS

A Export 03-12-2021:02:39:59





2						Proje	ect No.	Project Name: Galway Historic Landfills - Gort	Borehole ID
		CAUS	EW	AY		19-1	L465B	Client: Galway County Council	GW02
	- 14	G	EOTE	СН				Client's Rep: Feehily Timoney	
Met	hod	Plant Us	sed	Top (m)	Base (n	n) Coor	dinates		Sheet 1 of 2
Rotary	Drilling	Hanjin	D8	0.00	10.00	5455	29 97 F	Final Depth: 10.00 m Start Date: 02/07/2020 Driller: KW	Scale: 1:40
						7023	62.06 N	Elevation: 23.55 mOD End Date: 02/07/2020 Logger: SR	FINAL
Depth	Sample /				Casing Wat	^{er} Level	Depth		
(m)	Tests	Field	d Records		Depth Dep (m) (m) mOD	(m)	Legend Description	Backfill
Struck at (m) 2.00 6.50	Wate Casing to (m	Strong water s Water strike a	strike at 2. It 6.50m	00m	ks	22.55 21.55	- 1.00	MADE GROUND: Brown clayey GRAVEL. (Driller's description) Grey weathered LIMESTONE. (Driller's description) Grey LIMESTONE. (D	
Casing	Details	Water A	Added	-					
2.50	200		10 (11)						
				Core	Barrel	Flush	Туре	ermination Reason Last Updated	
								erminated at scheduled depth. 13/08/2020	AGS



2						ct No.	Project Name: Galway Historic Landfills - Gort	Borehole ID
		CAUSEW	/AY		19-1	465B	Client: Galway County Council	LH01
	8/ -	GEOT	ECH				Client's Rep: Feehily Timoney	
Met	hod	Plant Used	Top (m) Ba	se (m)	Coord	linates		Sheet 1 of 2
Rotary	Drilling	Hanjin D8	0.00 1	0.00	5/1525	6 3 7 F	Final Depth: 10.00 m Start Date: 02/07/2020 Driller: KW	Scale: 1:40
					70228	9.38 N	Elevation: 22.11 mOD End Date: 02/07/2020 Logger: SR	FINAL
Denth	Sample /		Cas	ing Water	Level	Denth		ษ
(m)	Tests	Field Records	; Dej (n	th Depth i) (m)	mOD	(m)	Legend Description	Backfill ≥
Struck at (m)	Wate Casing to (m	Water strike at 4.60m	Remarks		18.61 18.11 17.61 CORSON	- 3.50 - 4.00 	MADE GROUND: Landfill WASTE	0.5
эсгиск at (m) 4.60	casing to (m	in time (min) Rose to (
Casing	Details	Water Added						
To (m) 7.50	Diam (mm 200) From (m) To (m)	_					
	200		Core Ba	arrel	Flush	Туре	Fermination Reason Last Updated	
							Ferminated at scheduled depth. 13/08/2020	AGS

	GEOTECH				Proje 19-1	ct No. 465B	Project Client:	Name: Galway H Galway (Historic Landfills County Council	s - Gort		Borehole ID LH01	
	H	G	EOTE	СП				Client's	Rep: Feehily T	Timoney			
Met	hod	Plant Us	sed 1	op (m) B	ase (m)	Coord	linates	Final De	pth: 10.00 m	Start Date: 02/	07/2020	Driller: KW	Sheet 2 of 2
Notary I	Jinnig	Tanjiri	58	0.00	10.00	54535 70228	56.32 E 39.38 N	Elevatio	n: 22.11 mOD	End Date: 02/	07/2020	Logger: SR	FINAL
Depth	Sample /	Field	d Records	Ca	sing Water	Level	Depth	Legend		Descriptio	n		ਸ਼ੁੱਲ Backfill
(m)	Tests				m) (m)	mOD	(m)	- Cgciiu	Brownish grey sand	y GRAVEL with cob	bles and bo	oulders. (Driller's	>
Struck at (m) 4.60	Water Casing to (m)	Strikes Time (min) R	Rose to (m)	Remarks		12.11			description)	End of Borehole a	at 10.00m		
	D-+ "			-									
Casing To (m)	Details Diam (mm)	Water A From (m)	Added To (m)										
7.50	200							<u> </u>					
				Core B	arrel	Flush	Туре	Terminati Terminated	on Reason at scheduled depth.			Last Updated	AGS
				1									1



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APPENDIX C TRIAL PIT LOGS

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				ect No.	Project Name:				rial Pit ID
	CAUS	SEWAY	19-	1465B	Galway	Historic Landfills - Gort			TD04
		GEOTECH	Coor	dinates	Galway	county Council			IPUI
Method:			5452	96.23 E	Client'	s Representative:		Sł	neet 1 of 1
Trial Pitting			7023	17.69 N	Feehily	Timoney		S	cale: 1:25
Plant:			Elev	vation	Date:		Logger:		
13t 360 Excavat	tor		21.28	3 mOD	26/06/	2020	RS		FINAL
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description		Water	
				-		Reworked TOPSOIL			_
			21.08	0.20		MADE GROUND: Brownish yellow sandy silty subro	unded fine to coarse	-	_
				-		GRAVEL of limestone with low cobble content.			_
				-					0.5
				-					_
				-					_
			20.48	- 0.80		MADE GROUND: Lenses of soft black clay with mult	ticoloured sheets of		
				-		plastic, plastic bottles, glass bottles, and pieces of v			1.0
				-					_
				-					_
				-					_
				-					1.5 —
				-					_
				-		r use.			_
				-		other			_
				-		0714.2019			2.0
				-		A CONTRACTOR OF			_
				-		Purcedur			_
				-		Net 1			_
									2.5
				For					_
				, de					_
			18.28	3.00				_	3.0
				-		Soft grey CLAY			_
				-	F				_
				-	E				_
		Slow seepage at 3.50m		-				▼	3.5 —
				-	<u> </u>				-
				- -	<u> </u>				
				-	E				-
				-	<u> </u>				4.0
				-	<u> </u>				
				-	<u> </u>				_
			16.70	-	E				_
			×۲۵.78	4.50		End of trial pit at 4.50m]	4.5 -
				-					-
				-					-
				-				_	
Water	Strikes	Denth: 450	Rema	arks:	1				1
Struck at (m)	Remarks	Width: 1 20							
3.50 Slow seepage at 3.50 Length: 4.50									
	Stability:				ason:		Last Updated		
		Stable	Term	inated at s	cheduled	l depth.	13/08/2020		AGS
							-		

			Proj	ect No.	Project	Name:		Т	rial Pit ID
			19-	1465B	Galway	Historic Landfills - Gort			
KH	CAUS	GEOTECH	Coor	dinates	Client:				TP02
	C		E1E2	30 20 F	Galway	County Council			
Method:	_		 	21 02 NI	Client'	s Representative:		Sł	neet 1 of 1
Trial Pitting			/023	31.U3 IN	Feehily	Feehily Timoney			cale: 1:25
Plant:			Ele	vation	Date:	Date: Logger:			FINAL
13t 360 Excava	tor		20.39	9 mOD	26/06/	2020	RS		
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description		Water	
						MADE GROUND: Firm brown slightly sandy slightly	gravelly CLAY with low	'	
				-		subrounded fine to coarse of limestone.	coarse. Gravel is		_
				-					_
				-					_
				-					0.5 —
			10.68	0.70					_
			19.00	0.70		MADE GROUND: Multicoloured sheets of plastic wi	th plastic bottles,		
				-		glass bottles, pieces of wood and styroroam.			_
									1.0
				-					_
				-					_
				-					
				-					1.5 —
				-					_
				-		2 ⁵⁰ .			_
				-		thert			_
				-		24° - 12 0°			2.0
				-		es oftor a			_
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				- S					_
				FOR					_
				of the second					_
		Slow water strike at		Selle				T	3.0
		3.00m		-					
				-					_
				-					_
				-					35
			16.78	- 3.60				_	
				-	ક કોદ કો કોદ કોદ	Spongy brown pseudo-nbrous PEAI.			_
				-	દ હ્યાદ હ્ય હ્યાદ હ્યાદ				-
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				-	is site si site site				4.0
				-	a sila sil sila sila				_
				-	હ કાહ કો કોદ કોદ				-
			4- 6-	-	હ સાહ સા સાહ સાહ				-
			15.88	- 4.50 -	w	End of trial pit at 4.50m			4.5
				-					
				-					-
				-					-
			-						
Water	Strikes	Depth: 4.50	Rem	arks:					
Strucк at (m) 3.00	Kemarks Slow water st	trike Width: 1.20							
	at 3.00m	Length: 4.00							
Stability:				ination Re	ason:		Last Updated		
		Unstable	Term	inated at so	cheduled	l depth.	13/08/2020		AGS
							. ,	_	

			Proj	ect No.	Project	Name:		Т	rial Pit ID		
	CAUS	FWAY	19-1	1465B	Galway	Historic Landfills - Gort					
		GEOTECH	Coor	dinates	Client:				тр03		
			5453	87 86 F	Galway	County Council					
Method:			7023	37 20 N	Client's	Client's Representative:					
Trial Pitting			7025	57.20 N	Feehily	Timoney		Scale: 1:25			
Plant:			Elev	ation	Date:		Logger:		FINAL		
13t 360 Excava	tor		21.92	2 mOD	26/06/	2020	RS				
Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description		Water			
(,			(-		Reworked TOPSOIL					
				-							
			21.67	0.25		MADE GROUND: Stiff yellowish brown slightly sand	y slightly gravelly SILT	-	_		
				-		with low cobble content. Sand is fine to coarse. Gra	vel is subrounded fine		_		
0.50	B1			-					0.5		
									_		
			21.17	- 0.75				_	_		
				-		styrofoam, wood and plastic bottles.	in pieces of		_		
				-					10		
				a.					_		
				-					-		
				-					_		
				-					-		
				-					1.5 —		
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				-		es of for the			_		
						TPOSTIPOU			_		
				-		Str tear			_		
				-		her					
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				For					_		
				- x 0					_		
				conte					_		
			ර	-					3.0		
				-							
				-					_		
				-					_		
			18.42	3.50		Stiff brown slightly sandy slightly gravelly CLAY. Sand	is fine to coarse.	-	3.5 —		
		Slow seepage at 3.60m		-		Gravel is subrounded fine to coarse of mixed litholo	gies.	▼	_		
				-					_		
				e 9							
			17.92	- - 4.00		End official sit at 4 00		4	4.0		
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				-					A C _		
				-					4.5		
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			<u>t</u> ,								
Water	Strikes	Depth: 4.00	Rema	arks:							
Struck at (m)	Remarks	e at Width: 1.00									
5.00	3.60m	Length: 4.00									
		Stability:	Term	Termination Reason:							
		Stable	Term	inated on a	noscihla I	pedrock/boulder	13/08/2020		AGS		
		STUDIE	herm	rminated on possible bedrock/boulder. 13/08/2020							

			Proj	ect No.	Project Name:				rial Pit ID
	CAUS	SEWAY	19-3	1465B	Galway	Historic Landfills - Gort			TD0 4
		GEOTECH	Coor	dinates	Galway	County Council			1904
Method:			- 5454	22.46 E	Client's	s Representative:		Sł	neet 1 of 1
Trial Pitting			7023	47.02 N	Feehily	Feehily Timoney			cale: 1:25
Plant:			Elev	ation	Date:	Date: Logger:			FINAL
13t 360 Excava	tor		21.67	' mOD	26/06/	2020	RS	-	
(m)	Tests	Field Records	(mOD)	(m)	Legend	Description		Wate	
				-		Reworked TOPSOIL			_
			21.27	- 0.20					_
			21.57	-		MADE GROUND: Stiff yellowish brown slightly sand with fragments of red brick. Sand is fine to coarse.	y slightly gravelly SILT Gravel is subangular		_
				-		fine to coarse of limestone.			0.5 —
				-					_
			20.87	0.80		MADE GROUND: Firm grey slightly sandy slightly gr	avelly SILT. Sand is fine	-	_
				-		to coarse. Gravel is subrounded fine to coarse of lin	nestone.		_
				-					1.0
				-					_
				-					_
				-					1.5 —
			20.07	1.60		MADE GROUND: Firm black slightly sandy slightly g	ravelly CLAY with low	_	_
				-		cobble content and sheets of plastic and broken gla coarse. Gravel is subrounded fine to coarse of limes	ss. Sand is fine to tone.		_
				-		other			_
						0714.254			2.0
				-		on the second se			
				-		Purcount			_
				-		her			25
				and it					_
				to f					_
				atot					_
			ර්	20					3.0
				-					_
				-					_
		Slow seepage at 3.40m		-				▼	-
				-					
				-					_
				-					
			17.67	4.00		End of trial pit at 4.00m		-	4.0
				-					
				-					
				-					_
				-					4.5 —
				-					_
				-					-
				-					
Water	Strikes	Denth : 4.00	Rema	arks:	1			1	
Struck at (m)	Struck at (m) Remarks Width: 1.20								
5.40	3.40m								
		Stability:	Termination Reason:						
		Stable Terminated on possible bedrock/boulder. 13/08/2020						AGS	

		Proj	Project No.		Project Name:			rial Pit ID	
		19-1465B		Galway Historic Landfills - Gort			TRAF		
GEOTECH		Coordinates		Client:			TP05		
		545312.62 E							
Trial Ditting			7022	76.60 N	Client			Sheet 1 of 1	
Plant:			Flor	ation	Deter	Timoney	Loggori	S	cale: 1:25
12+ 260 Even	tor		21.00			2020			FINAL
Donth	Sample /			Denth	20/00/		NJ	r	
(m)	Tests	Field Records	(mOD)	(m)	Legend	Description		Wate	
Depth (m)	Sample / Tests B1 ES2	Field Records	Level (mOD) 21.30	Depth (m)	Legend	Description MADE GROUND: Stiff brown slightly gravelly sandy content and sheets of plastic. Sand is fine to coarse fine to medium of mixed lithologies. Cobbles are of MADE GROUND: Lenses of soft black CLAY with mu plastic with plastic bottles, pipes, pieces of wood an plastic with plastic bottles, pipes, pipes, pipes, pieces of wood an plastic with plastic bottles, pipes, pieces of wood an plastic with plastic bottles, pipes, pipes	SILT with low cobble . Gravel is subrounded limestone. Iticoloured sheets of nd styrofoam.	Water	
		Slow seepage at 4.00m	18.00	4.50		Soft cream CLAY End of trial pit at 4.50m		×	
			L,						
Wate Struck at (m) 4.00	r Strikes Remarks Slow seepag 4.00m	Depth: 4.50 Width: 1.20 Length: 4.50	Rema	arks:					
		Stability:	Term	ination Re	ason:		Last Updated		
		Stable	Term	inated at s	cheduler	ldepth	13/08/2020		AGS
		Studie		accu at 3	encoulet	, acpent	13, 00, 2020		2.40

		Proj	Project No.		Project Name:			rial Pit ID	
CAUSEWAY		19-1465B		Galway	Historic Landfills - Gort				
GEOTECH		Coor	Coordinates		Client:			TP06	
GEOTECH		545380 64 F		Galway County Council					
Method:					Client's	s Representative:		Sheet 1 of 1	
Trial Pitting			7022	90.49 N	Feehily	Timoney		S	cale: 1:25
Plant:			Elev	vation	Date:		Logger:		EINIAI
13t 360 Excava	tor		22.30) mOD	26/06/	2020	RS		TINAL
Depth (m)	Sample /	Field Records	Level	Depth (m)	Legend	Description		Vater	
()	16363			- (11)		MADE GROUND: Stiff brown slightly sandy slightly g	ravelly CLAY with low	-	
				-		cobble content. Sand is fine to coarse. Gravel is sub	rounded fine to		_
				-		course of mixed infinitegies. couples are of infestor			
				-					_
0.50	B1			-					0.5 —
				-					_
				-					_
				-					_
				-					-
			21.20	- 1 10					1.0
			21.20	1.10		MADE GROUND: Lenses of soft black CLAY with mul	ticoloured sheets of		_
				-		plastic, plastic bottles, pipes, pieces of wood and st	yroroann.		_
				-					_
				-					1.5 —
				-					_
				-		NSC.			_
				e e		thet			
				-		14.02			2.0
				-		50 FOT AL			_
				-		100 sted			-
				-		Quitedit			-
				-		net			_
2.50	ES2					-			2.5
				For					_
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				ent					-
			්	27 -					3.0
				-					_
				-					_
				-					_
		Slow seepage at 3.50m		-				▼	3.5 —
				-					-
				-					-
			19.40	-					_
			10.40	3.90	××	Grey gravelly silty fine to coarse SAND. Gravel is sub	prounded fine to		4.0
				-	×××	course of ninestone.			_
				-	$\left \begin{array}{c} \times & \times \\ \times & \times \end{array} \right $				-
				-	××××				
					××××				_
			17.80	- 4.50	<u></u>	End of trial pit at 4.50m			4.5
									_
				-					_
				-					-
Water	Strikes	Depth: 4.50	Rema	arks:					
Struck at (m)	Remarks	Width: 1.20							
3.50	3.50m	Length: 4.00							
		Stability:	Term	Termination Reasons					
		Stable	T	insted -+	chodul-	I donth	12/09/2020		AGS
		Stable	lerm	mated at s	cheauleo	ו מפענוו.	13/08/2020		

		Proj	Project No.		Project Name:					
CAUSEWAY		19-1465B		Galway Historic Landfills - Gort						
GEOTECH			Coordinates		Client:				TP07	
		545422.93 F		Galway County Council						
Method:		1 545422.93 E		Client's	Representative:		Sheet 1 of 1			
Trial Pitting			1025	10.01 N	Feehily	Timoney		Scale: 1:25		
Plant:			Elev	vation	Date:		Logger:			
13t 360 Excavat	tor		21.70) mOD	26/06/	2020	RS		FINAL	
Depth (m)	Sample /	Field Records	Level	Depth (m)	Legend	Description		Vater		
(11)	lesis			- (11)		MADE GROUND: Firm orangish brown slightly sand	y gravelly CLAY. Sand	>		
				-		is fine to coarse. Gravel is subrounded fine to coars	e of mixed lithologies.		_	
			21.50	- 0.20		MADE GROUND: Firm grey slightly sandy slightly gr	avelly SILT with low		_	
				-		cobble and boulder content, sheets of plastic, tree pieces of carpet, waste pipe, nylon straps, and styre	trunks, glass bottles, bfoam.		_	
				-					0.5 —	
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				-					1.0	
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				-					1.5 —	
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				-		when any other			-	
			10.60	- 2 10		only and			2.0	
			15.00	- 2.10		End of trial pit at 2.10m			_	
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				-					3.5 —	
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				-					4.0	
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				-					4.5	
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Water	Strikes	Depth: 2 10	Rema	arks:						
Struck at (m)	Remarks	Width: 1 20	No gr	oundwate	r encoun	tered				
		Length: 2.50								
		Stability	T e	ination D			loct lindet - d			
		Stability:	lerm	mation Re	ason:		Last Updated		ACC	
	Term	Terminated due to collapsing sides. 13/08/2020								

		Proje	Project No.		Project Name:						
CALISEWAY		19-1	19-1465B		Galway Historic Landfills - Gort						
GEOTECH			Coordinates		Client:				TP08		
	9		E4E277 20 F		Galway County Council						
Method:			7022	77.30 E	Client's	Representative:		Sheet 1 of 1			
Trial Pitting			/022:	54.34 N	Feehily	Timoney		5	icale: 1:25		
Plant:			Elev	vation	Date:		Logger:				
13t 360 Excava	tor		21.46	5 mOD	26/06/	2020	RS		FINAL		
Depth (m)	Sample /	Field Records	Level	Depth (m)	Legend	Description		Vater			
(11)	10515		(1100)	- (11)		MADE GROUND: Firm brown slightly gravelly sandy	SILT with low cobble				
				-		content and sheets of plastic. Sand is fine to coarse.	Gravel is subrounded	1	_		
				a a		The to mean of mixed inhologies. coblies are of	innestone.				
				-					_		
0.50	B1			-					0.5		
			20.86	- 0.60		MADE GROUND: Lenses of soft black clay with mult	icoloured sheets of	_			
						plastic, pieces of wood, glass bottles, plastic bottles,	carpet, and				
				-		styrofoam.			-		
				-					-		
				-					1.0		
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1.50	ES2			-					1.5 —		
				-					-		
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				-		and and			2.0		
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				-		100 ited			-		
				-		Purcell			-		
			19.06	2.40		oft cream CLAY		-	-		
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				For	<u>100</u>				_		
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				ent	<u> </u>						
			්	2 ²	<u> </u>				3.0		
			18.36	- 3.10		End of trial pit at 3.10m			-		
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				-					3.5 —		
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				-					-		
				-					4.5		
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				-							
				-							
				-							
Water	Strikes	Denth 2 10	Rema	arks:	1			-1			
Struck at (m)	Remarks	Width: 1.20	No gr	oundwate	r encoun	tered					
		Length: 1.20									
		Length: 4.00		·			1				
		Stability:	Term	ination Re	ason:		Last Updated		٨٣٢		
		Stable	Termi	inated on p		AUD					

		Proj	Project No.		Project Name:					
CAUSEWAY		19-1465B		Galway Historic Landfills - Gort						
GEOTECH			Coor	Coordinates				TP09		
			5151	545490 72 E		Galway County Council				
Method:			03.73 E	Client's	Representative:		Sheet 1 of 1			
Trial Pitting			/025	57.96 N	Feehily	Timoney		Scale: 1:25		
Plant:			Elev	vation	Date:		Logger:	FINIAL		
13t 360 Excava	ator		22.77	7 mOD	26/06/	2020	RS		FINAL	
Depth (m)	Sample /	Field Records	Level	Depth (m)	Legend	Description		Vater		
				-		MADE GROUND: Brown slightly sandy slightly grave cobble content and sheets of plastic and fragments fine to coarse. Gravel is subangular fine to coarse o are of limestone	Ily SILT with low of concrete. Sand is f limestone. Cobbles		-	
0.50 0.50	B1 ES2		22.17	- - - - 0.60				_	0.5	
				- - - -	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Yellowish grey gravelly slity fine to coarse SAND wit Gravel is subangular fine to coarse of limestone. Co limestone.	h low cobble content. bbles are of		-	
				- - - - -	**************************************				1.0	
			21.47	- 1.30	<u>, -</u> X. X	End of trial pit at 1.30m		_	-	
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				-		N. Noteris				
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				- - - -					4.5	
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14/-+	Strikes		Rema	arks:						
Struck at (m)	Remarks	Depth: 1.30 Width: 1.00 Length: 3.50	No gr	roundwate	r encour	tered				
	Stability: Unstable			Termination Reason: Last Updated Terminated on possible bedrock/boulder. 13/08/2020						

Number 23 1-050 Selection PED 0 Selection				Project No.		Project Name:				Trial Pit ID		
Operation Contraction Contraction Contraction P100 Method: Trub 2 Hings 202497.87 Ft 1202479.87 Ft Particitic 20200 Isolate 1.02 Isolate 1.02 Particitic Sector 1.01 Isolate 1.02 Particitic Sector 1.01 Particitic Sector 1.01 Particit Sector 1.01 Particitic				19-1465B		Galway Historic Landfills - Gort						
Number Number Sector 201	GEOTECH			Coordinates		Client:				TP10		
Method: Description Security 2232 Control of the con						Galway						
Under State Value 12 state Under State Sequel: 2.125 Sequel: 2.1	Method:			7022	77 70 NI	Client's	Representative:		Sheet 1 of 1			
Plant: Set: Dogs: Cogger Find 28.302 Exclusion 2.43.300 26/07/2000 95.0 7 1 Deth Stepil-/ Field Records 600 9 1 2000000000000000000000000000000000000	Trial Pitting			/023	12.79 N	Feehily	Timoney		Scale: 1:25			
Display Excession Privat Pr	Plant:			Elev	ation	Date:		Logger:	EINIAL			
Upper (m) Single / heat Field Records Upper (m)	13t 360 Excavat	or		24.53	mOD	26/06/	2020	RS	FINAL			
Well: Degin: 1.00 Remarks: For productive encountered Sector State 1.00 Well: Skilling: Remarks: Normalized encountered Remarks: Normali	Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description		Water			
Weter Striket Dept:: 1.00 Remarkst: Name of processes used is subangular fine to coarse of simestrone. Image: 1.00 Weter Striket Dept:: 1.00 Remarkst: Remarkst: Remarkst: Remarkst: Struck at (m) Remarkst: Note: Subangular fine to coarse of simestrone. Image: 1.00 Remarkst: Remarkst: Struck at (m) Remarkst: Remarkst: <td>,</td> <td></td> <td></td> <td>,</td> <td>····/</td> <td></td> <td>MADE GROUND: Firm brown slightly sandy slightly gr</td> <td>avelly silty CLAY.</td> <td></td> <td></td>	,			,	····/		MADE GROUND: Firm brown slightly sandy slightly gr	avelly silty CLAY.				
Wet Striet Dept:: 100 Remark: Notice of the second of					-		sand is fine to coarse. Gravel is subangular fine to coa	irse of limestone.		_		
Water Striket Depth: 100 Struck at (m) Remarkt: Width: Remarkt: No Struck at (m) Remarkt: Struck at (m) Remarkt: Struck at (m) Remarkt: Struck at (m) Remarkt: No No					-					_		
Water Stiller Depth: 100 Remark: Notestiller Remark: Notestiller Remark: Notestiller Notestiller Mark Stiller Notestiller				24.13	0.40		MADE GROUND: Yellowish grey gravelly silty fine to c	parse SAND. Gravel	-	_		
Vector Strike: Vector: Pert: 1.00 End of trial pit at 1.00n 1.00 Struck at (m) Remark: Pert: 1.00 End of trial pit at 1.00n 1.00 Struck at (m) Remark: Pert: 1.00 End of trial pit at 1.00n 1.00 Struck at (m) Remark: Pert: 1.00 End of trial pit at 1.00n 1.00 Struck at (m) Remark: Pert: 1.00 End of trial pit at 1.00n 1.00 Struck at (m) Remark: Pert: 1.00 End of trial pit at 1.00n 1.00 Struck at (m) Remark: Pert: 1.00 End of trial pit at 1.00n 1.00 Struck at (m) Remark: Pert: 1.00 End of trial pit at 1.00n 1.00 Struck at (m) Remark: Pert: 1.00 End of trial pit at 1.00 I.00					-		is subangular fine to coarse of limestone.			0.5		
water Strike Pept: 1.00 Remark: Remar					-					_		
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water strike: Popth: 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00					-					_		
Water Strikes Dept::::100 Nemarks: <					-					_		
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weter Strikes Dept:::1.00 Vidth:::0.00 Ength:::2.00 Stable Dept:::1.00 Vidth:::0.00 Ength:::2.00 Stable MemalS: MemalSing MemalSin					-					15		
Water Strikes Dept:: 1.00 Vidti: Remarks: Normalized Provide Reson: Struck at (m) Remarks: Remarks: Remarks: Normalized Reson: Stable Remarks: Terminated na possible bedrack/boulder. List Updated 130/2020					-							
Water Strikes Depti: 1.00 Victit: 1.00 Struck at (m) Depti: 1.00 Victit: 1.00 Stable Remarks: Termination Reason: Stable Remarks: Termination Reason: Stable Remarks: Termination Reason: Stable Last Updated Termination Reason: Stable					-		-C)*			_		
Water Strikes Deptr. 1.00 Width: 1.00 Struck at (m) Deptr. 1.00 Width: 1.00 Stable Remarks: No groundwater encountered Remarks: No groundwater encountered Last Update diagonalise					-		- of the			_		
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Vater Strike Pepth: 1.00 Length: 3.00 Pepth: 1.00 Pepth: 1.00 Length: 3.00 Pepth: 1.00 Length: 3.00 Pepth: 1.00 Length: 3.00 Pepth: 1.00 Length: 3.00 Pepth: 1.00					-		only, and			2.0		
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Water Strikes Petti: 1.00 Widti: 1.00 Ength: 3.20 Petti: 1.00 Petti: 1.00 Ength: 3.20 Remarks: Petrinated on possible bedrock/boulder. Istal Updated 13/08/2020 Istal Updated 13/08/2020					-	tion				_		
Water Struck at (m) Deptr.: 1.00 Improvement Remarks: Remarks: Struck at (m) Remarks: No groundwater encountered Improvement Improvement Improvement Struck at (m) Remarks: No groundwater encountered Improvement					-	aper of				2.5 —		
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Wate Strikes Depth: 1.00 Struck at (m) Remarks Width: 1.00 Struck at (m) Remarks Stability: Ferminated on possible bedrock/boulder. Stability: Ferminated on possible bedrock/boulder.					-					-		
Vater Strikes Depth: 1.00 Widt: 1.00 Length: 3.20 Remarks: No groundwater encountered Istable Last Updated 13/08/2020 Istable Market Strikes										_		
Water Strikes Depth: 1.00 No and the second se					-					3.5 —		
Water Strikes Depth: 1.00 Remarks: Remarks: No and the strike of					-					_		
Water Struck at (m) Remarks: Struck at (m) Remarks: Vidth: 1.00 Length: 3.20 Stability: Terminated on possible bedrock/boulder. Stable Terminated on possible bedrock/boulder.					-					_		
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		Project No.		Project Name:				rial Pit ID			
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GEOTECH		Coordinates		Client:				TP11			
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Method:		545526.26 E		Client's	Sheet 1 of 1						
Trial Pitting			70240	05.23 N	Feehily	Timoney		Scale: 1:25			
Plant:			Elev	vation	Date:		Logger:				
13t 360 Excavat	or		26.64	l mOD	26/06/	2020	RS		FINAL		
Depth	Sample /	Field Records	Level	Depth	Legend	Description		ater			
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			26.54	0.10		limestone. Sand is fine to coarse.			-		
						MADE GROUND: Stiff yellowish grey slightly sandy s with lenses of orange clay and low cobble and bould	lightly gravelly SILT der content. Sand is		-		
				-		fine to coarse. Gravel is subrounded fine to coarse of	f limestone. Cobbles		_		
				-		and boulders are of limestone.		ľ	0.5		
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APPENDIX D TRIAL PIT PHOTOGRAPHS

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TP01



August 2020

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