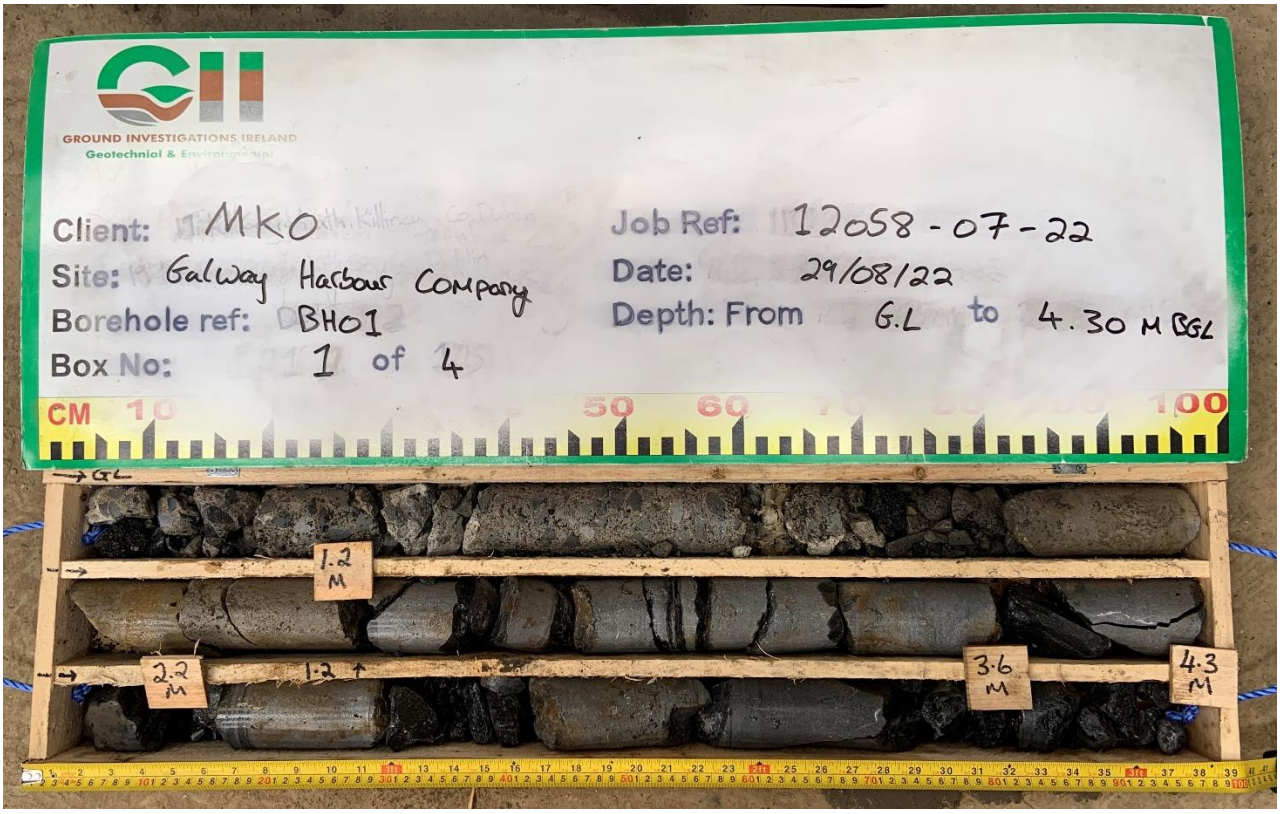
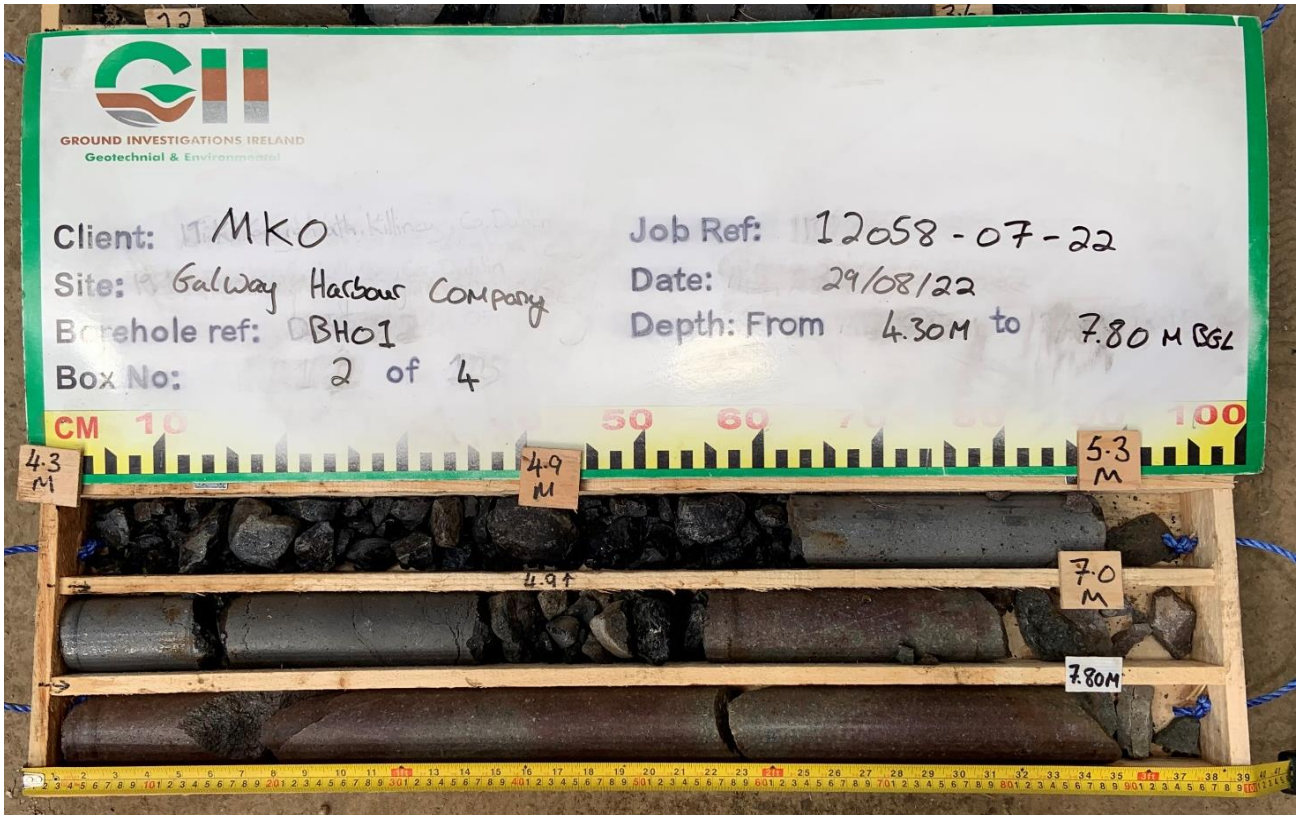
Galway Harbour Company – Rotary Core Photographs

BH01: Box 1 of 4

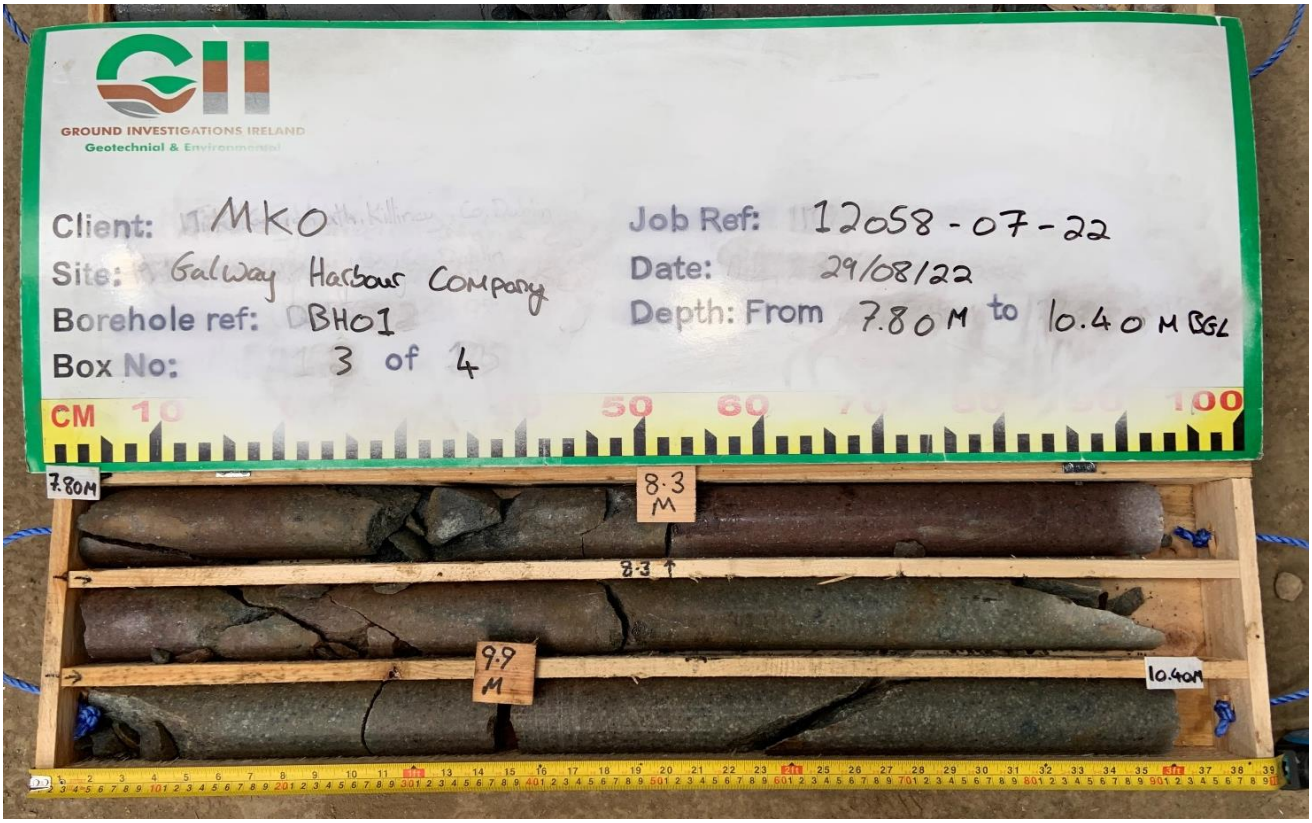


BH01: Box 2 of 4

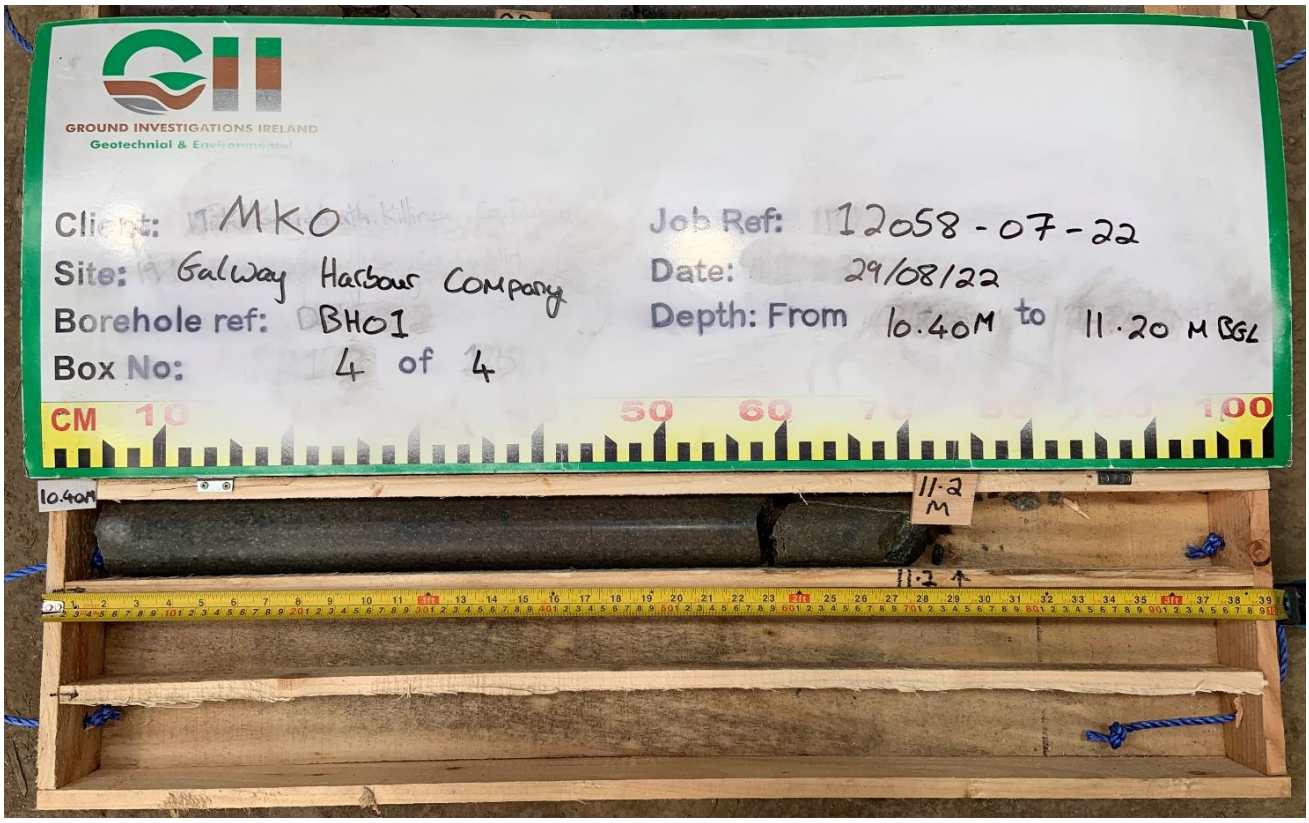


Galway Harbour Company – Rotary Core Photographs

BH01: Box 3 of 4

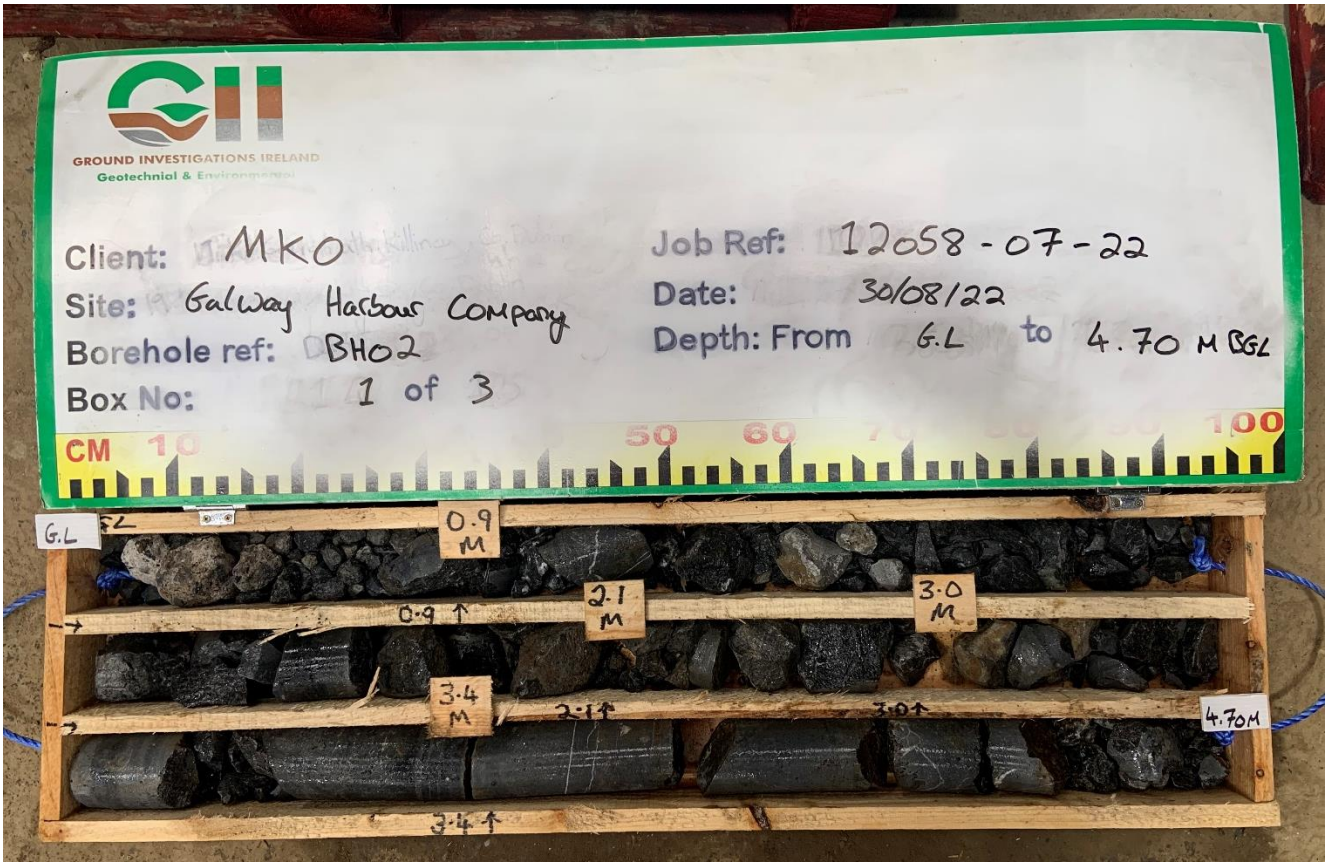


BH01: Box 4 of 4

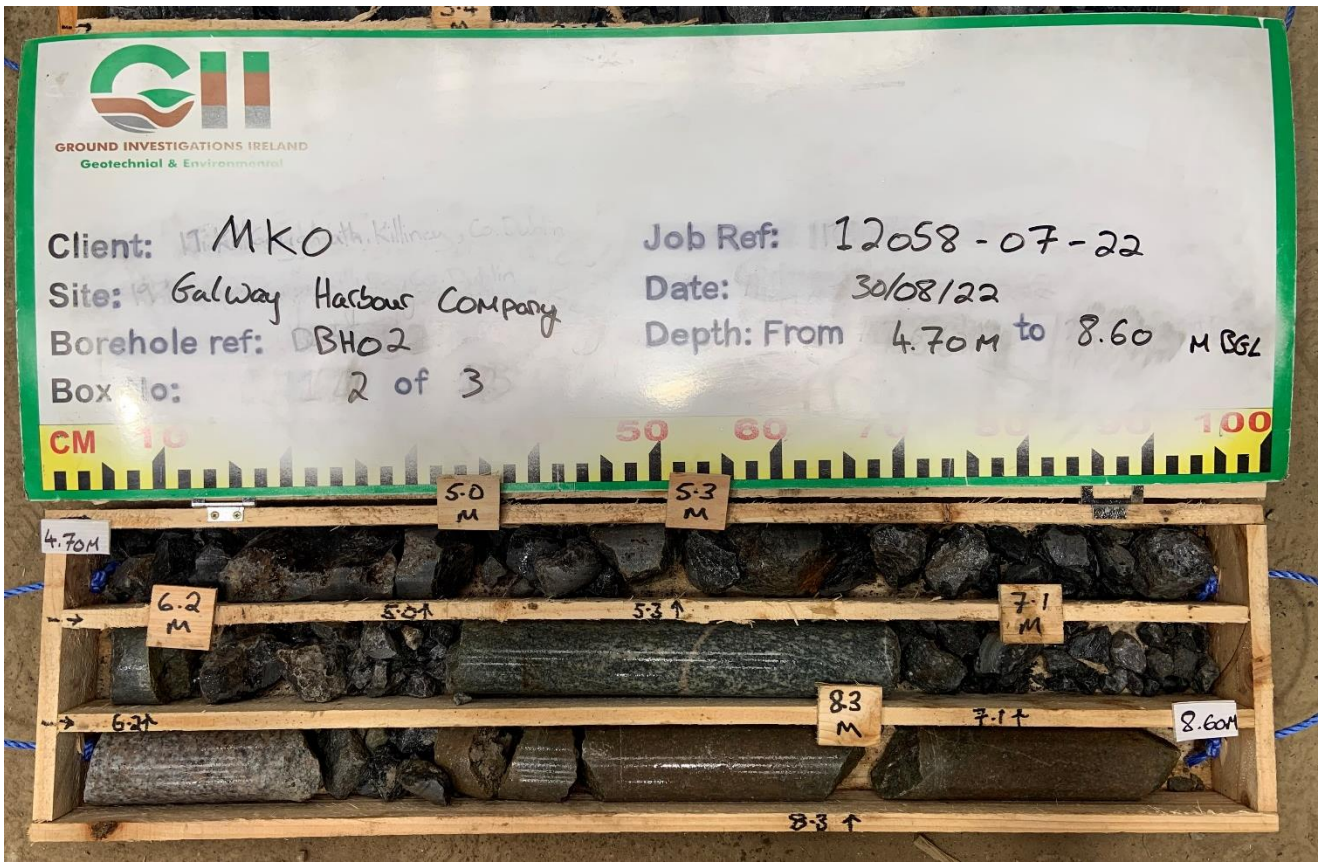


Galway Harbour Company – Rotary Core Photographs

BH02: Box 1 of 3



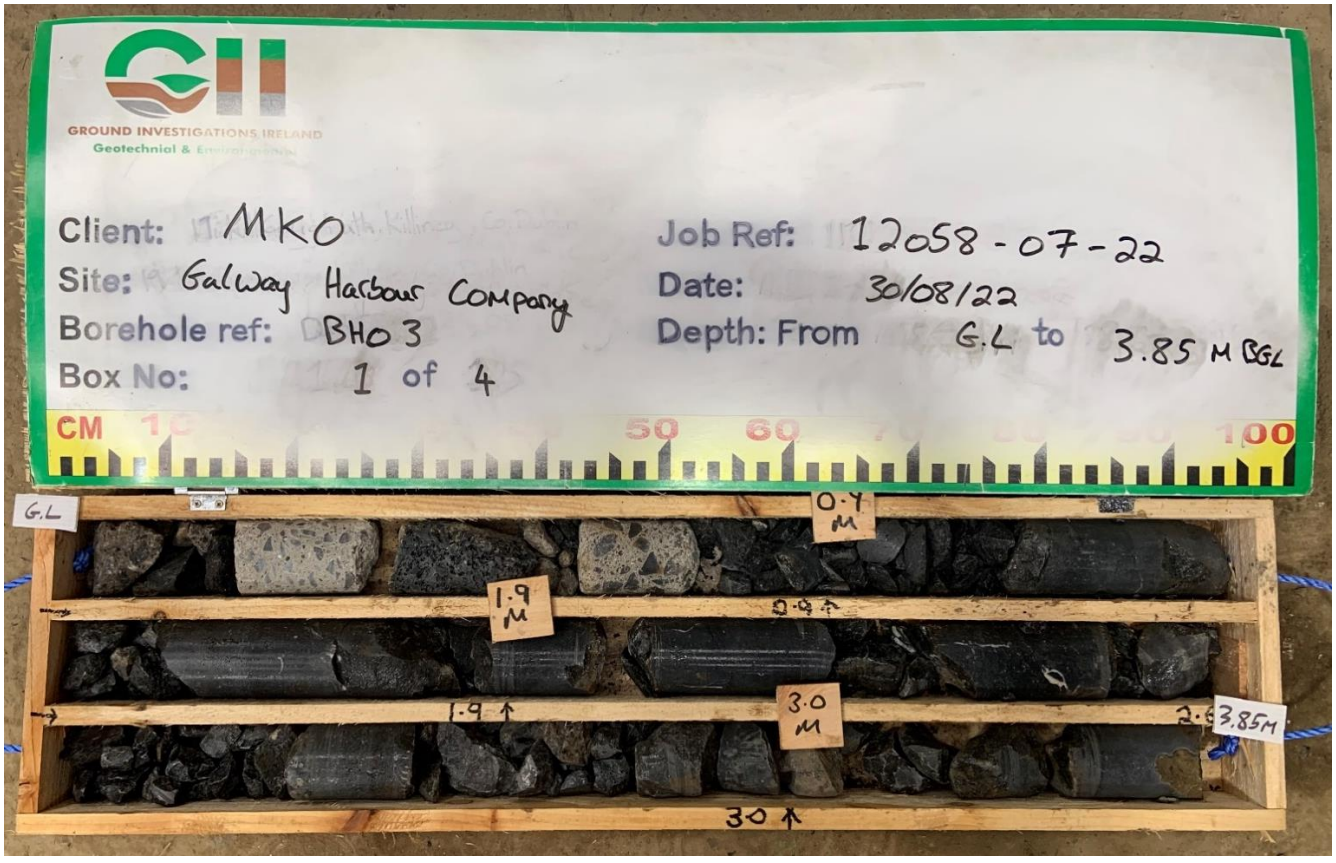
BH02: Box 2 of 3



Galway Harbour Company – Rotary Core Photographs

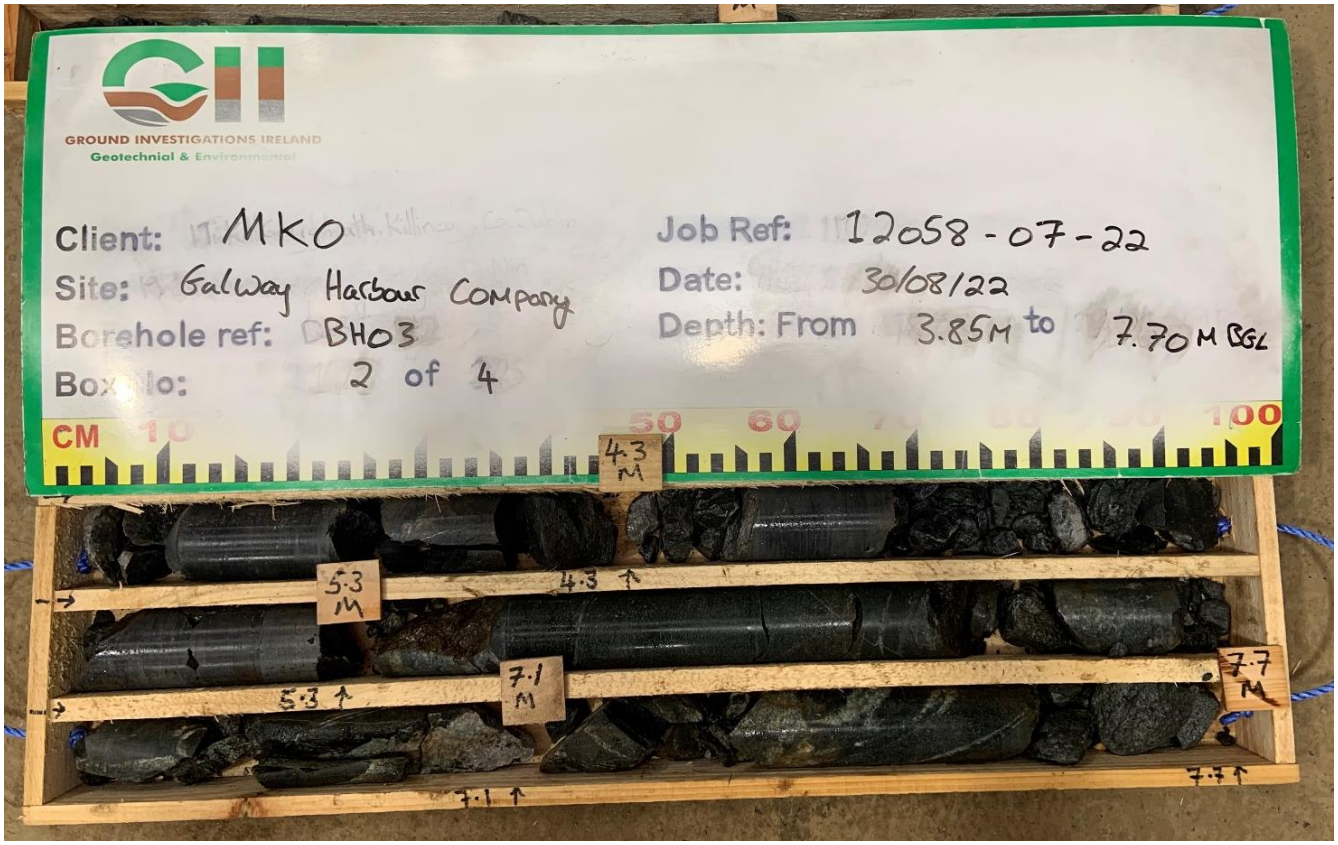
BH02: Box 3 of 3

BH03: Box 1 of 4



Galway Harbour Company – Rotary Core Photographs

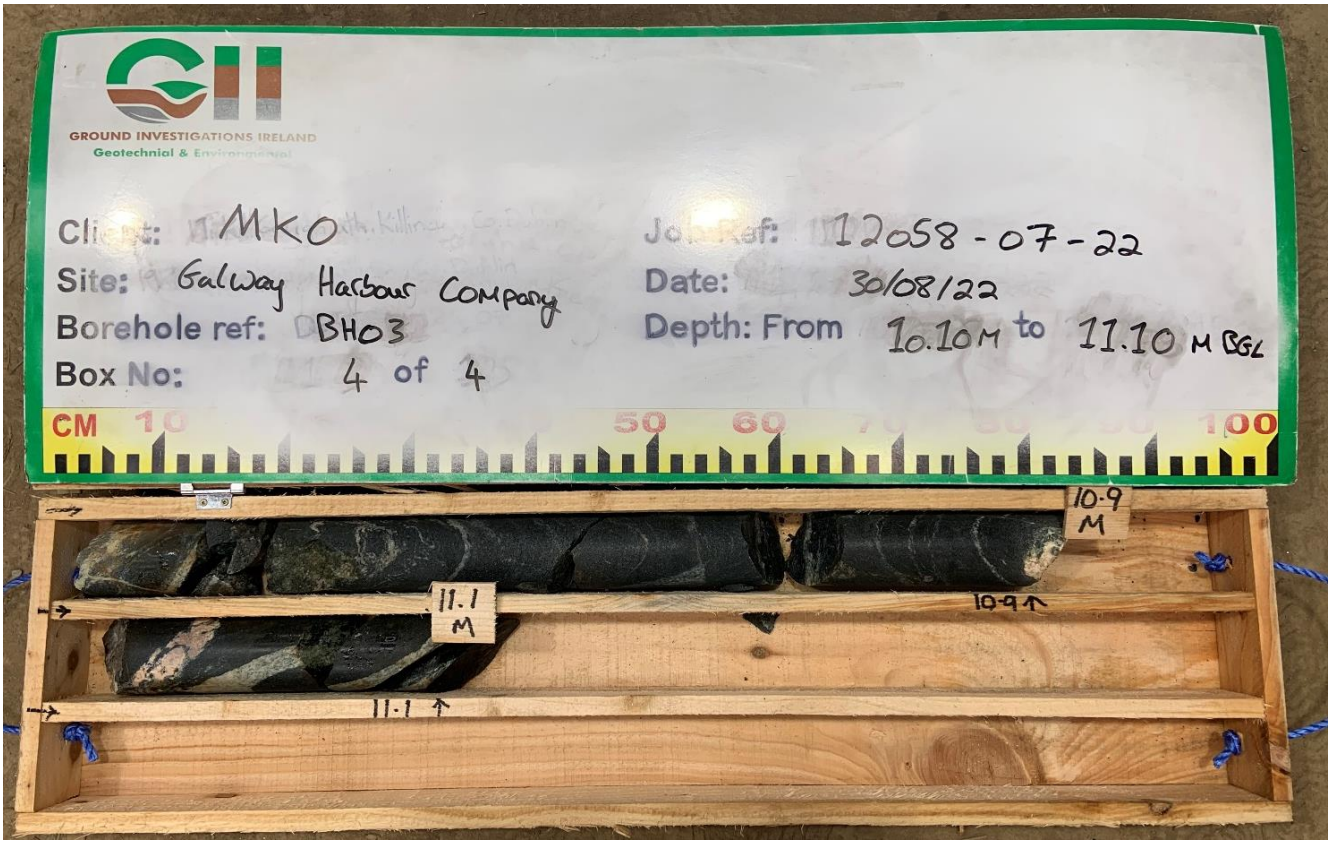
BH03: Box 2 of 4



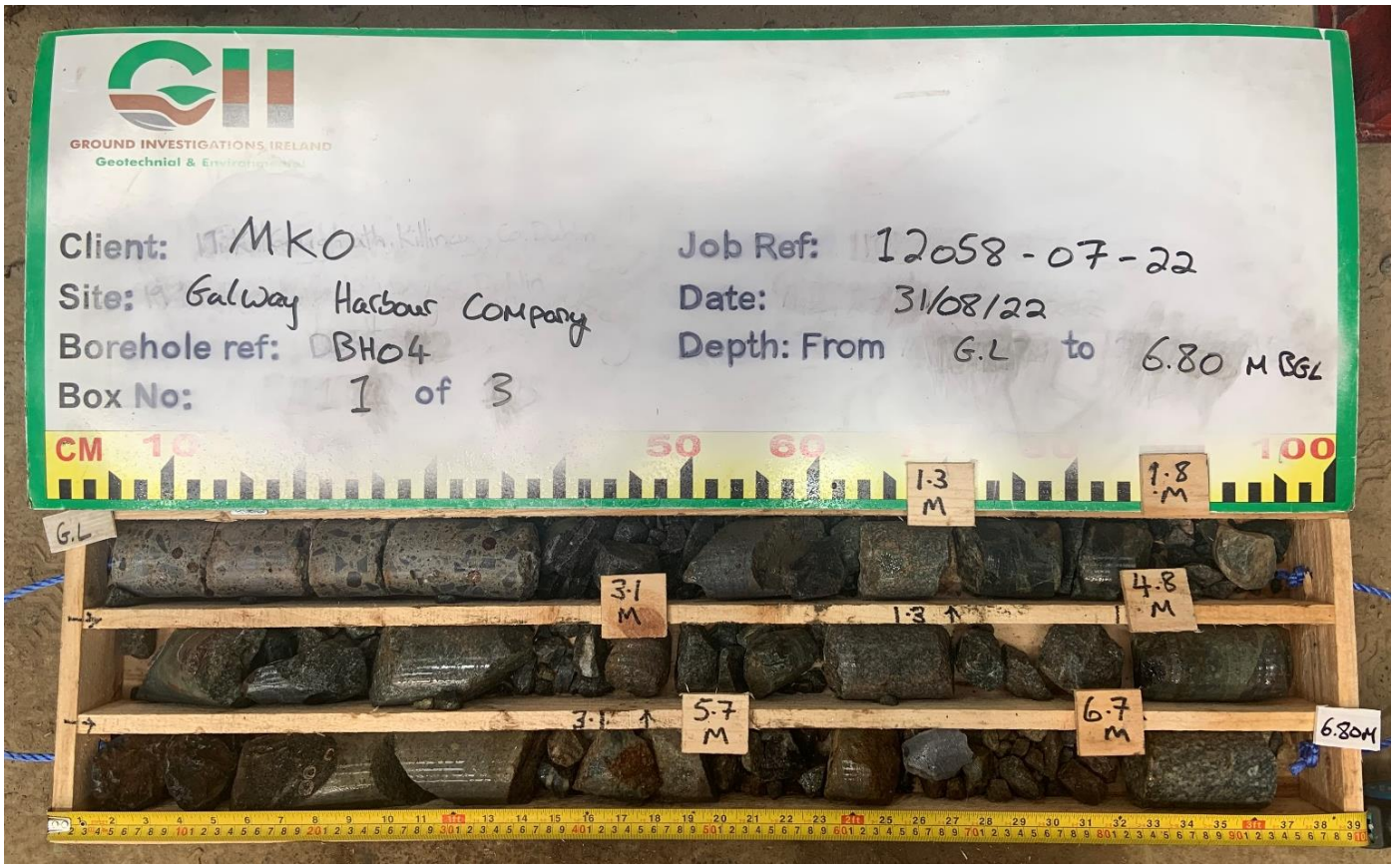
BH03: Box 3 of 4

Galway Harbour Company – Rotary Core Photographs

BH03: Box 4 of 4

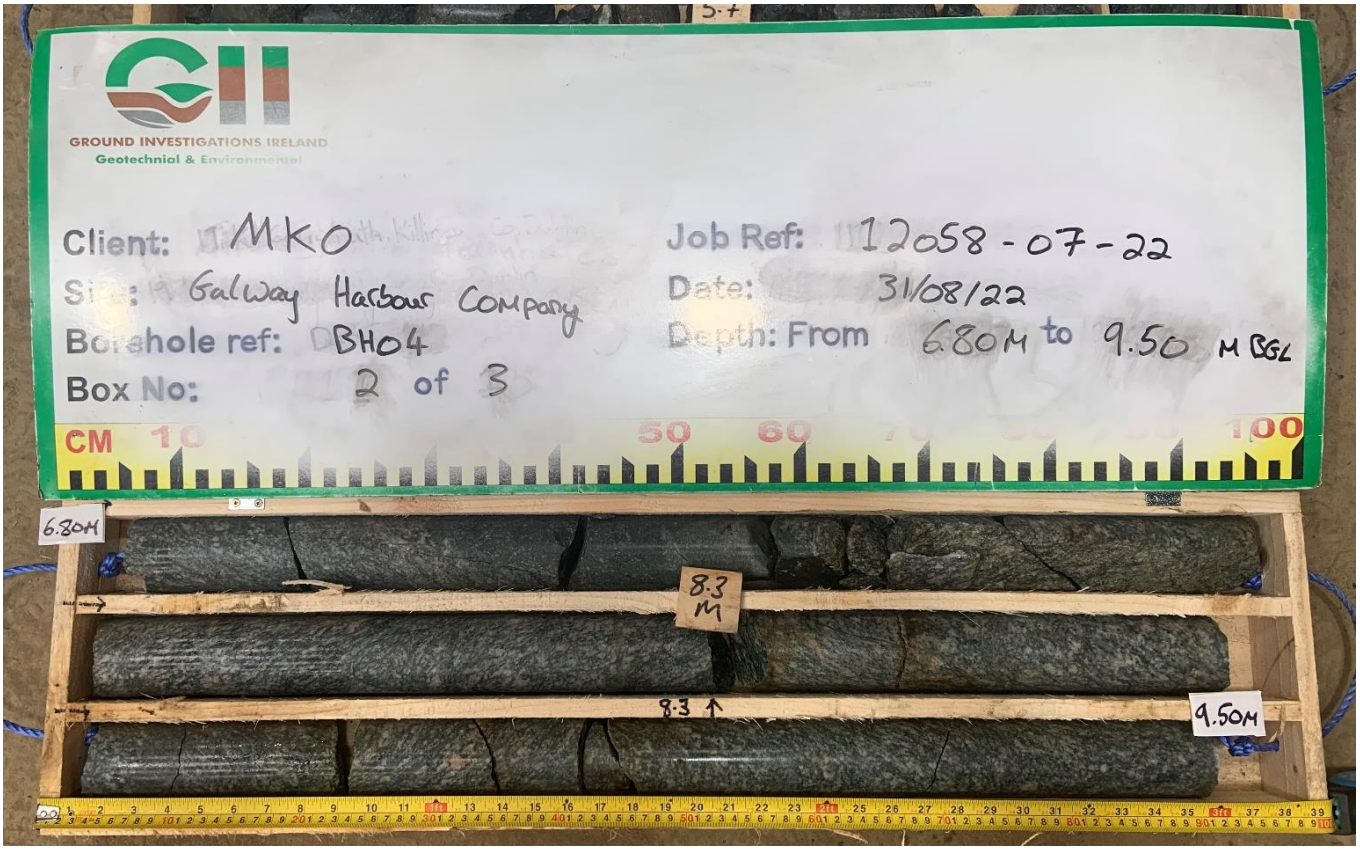


BH04: Box 1 of 3

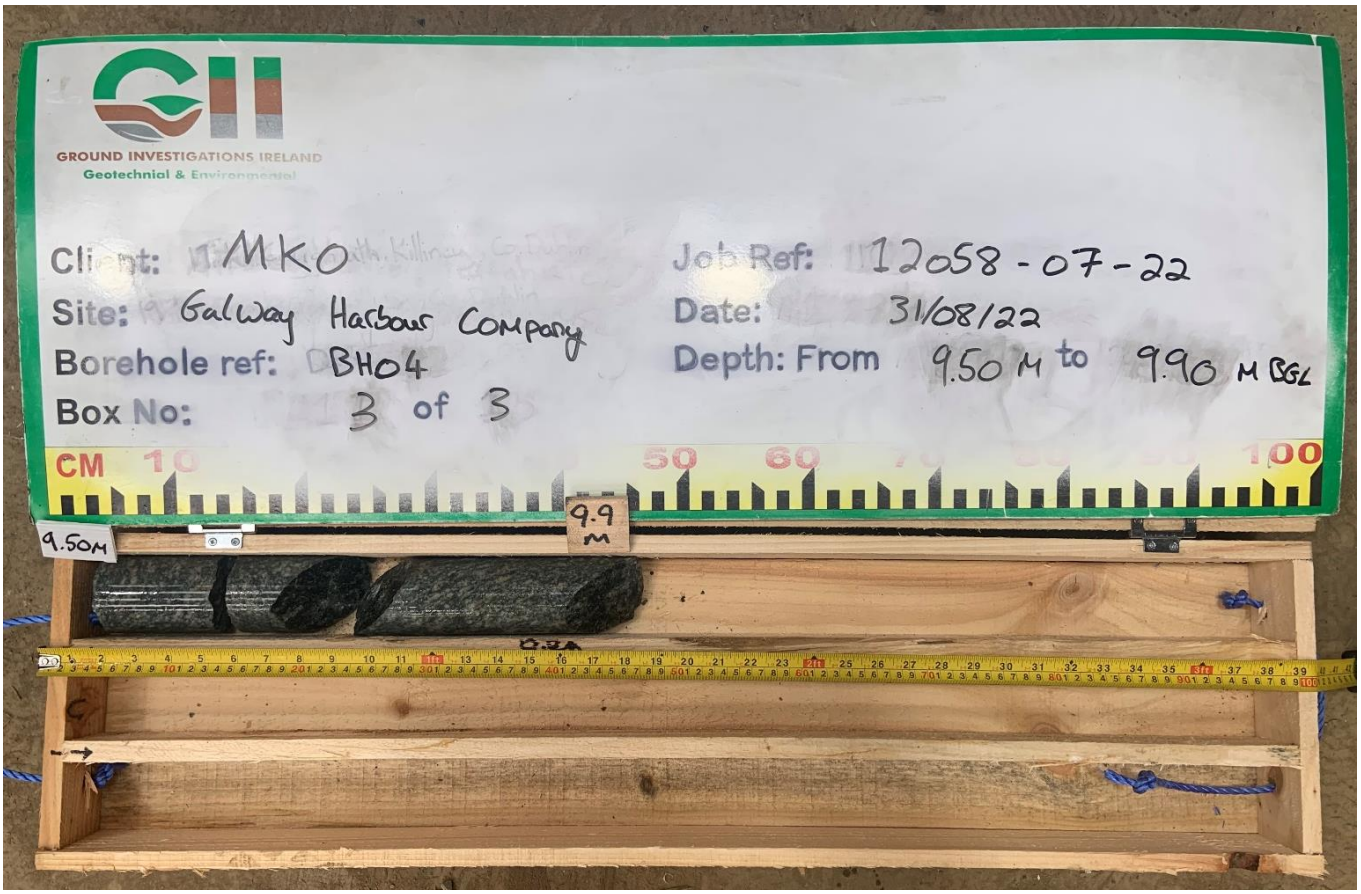


Galway Harbour Company – Rotary Core Photographs

BH04: Box 2 of 3

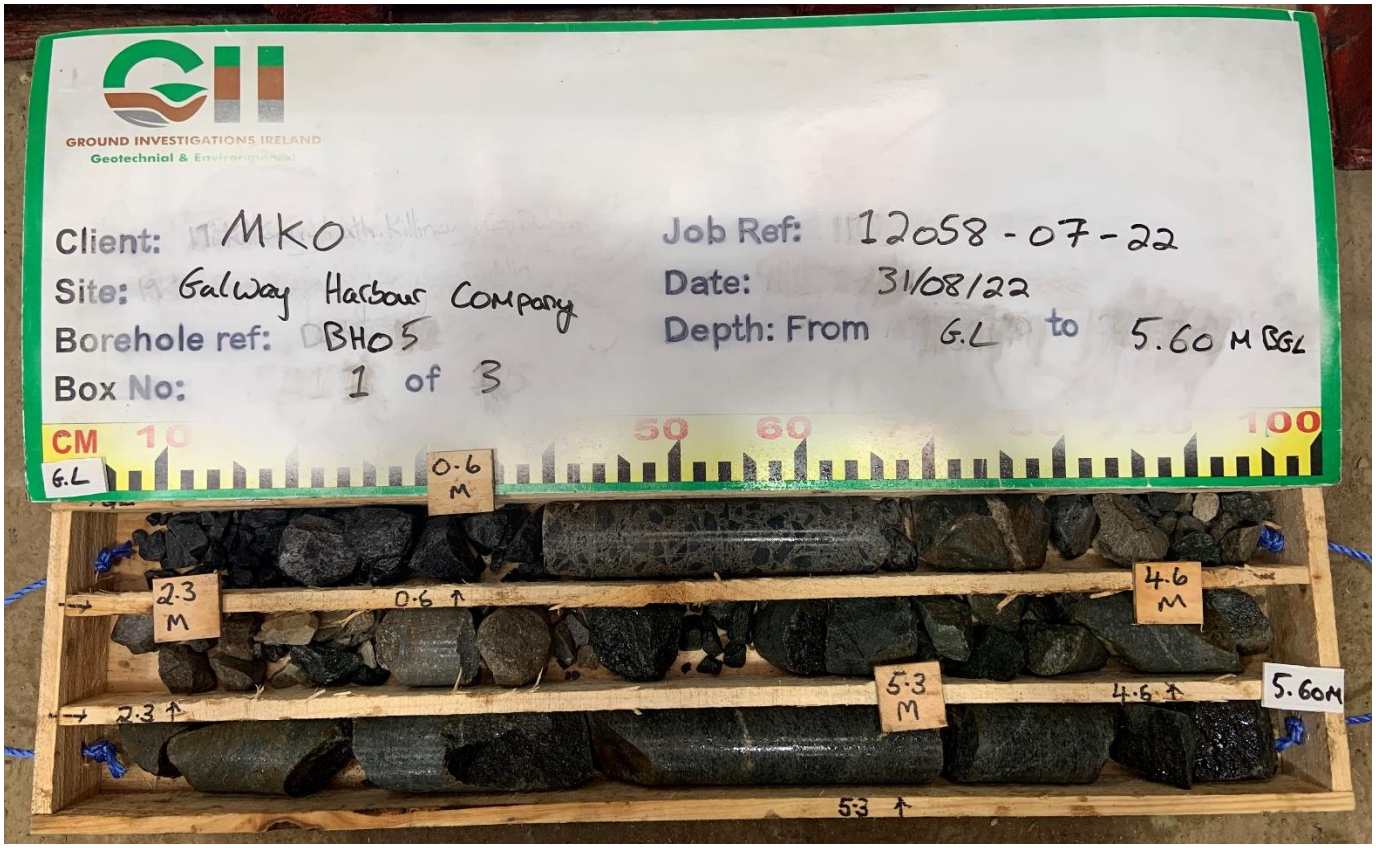


BH04: Box 3 of 3

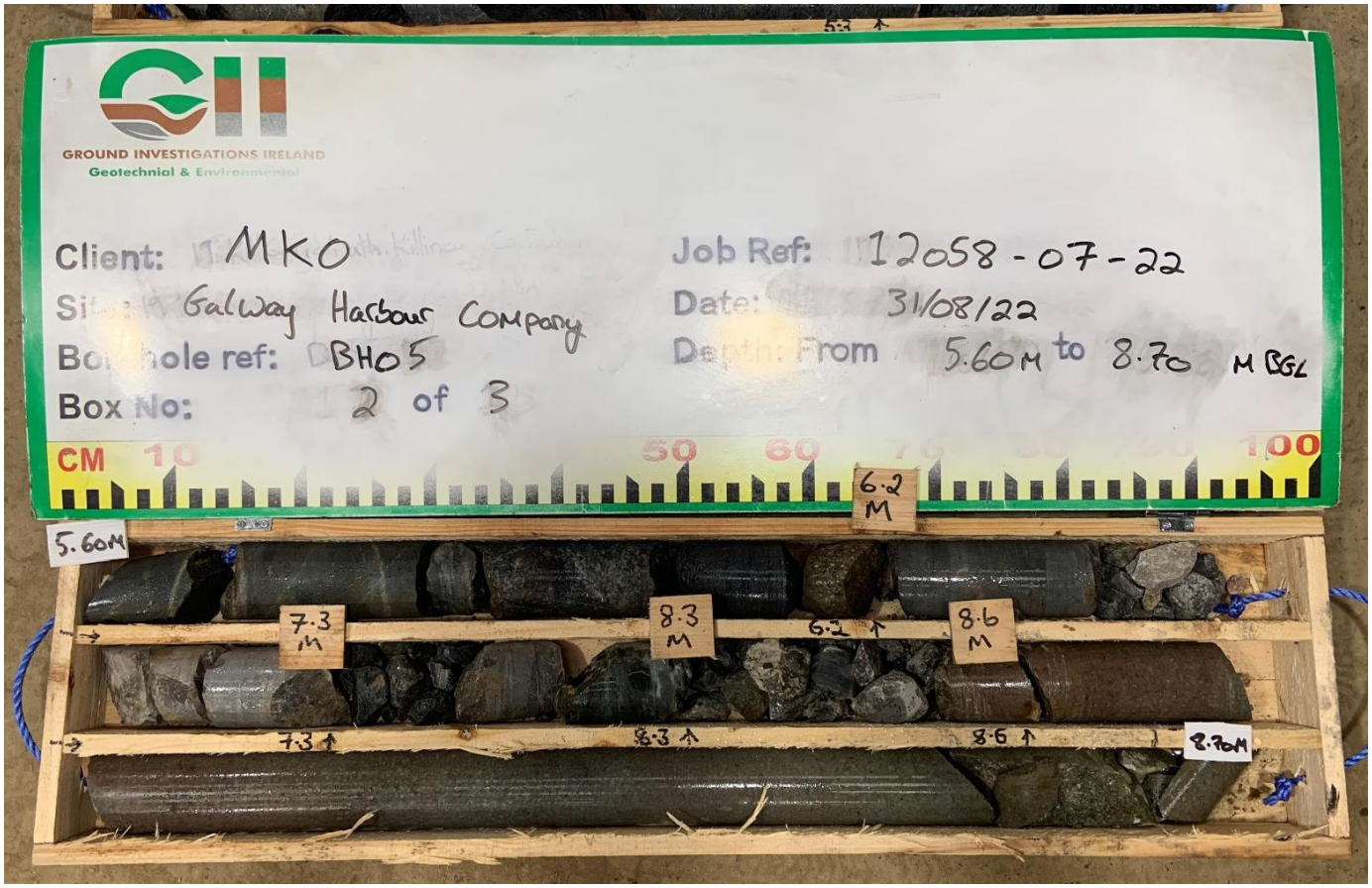


Galway Harbour Company – Rotary Core Photographs

BH05: Box 1 of 3



BH05: Box 2 of 3



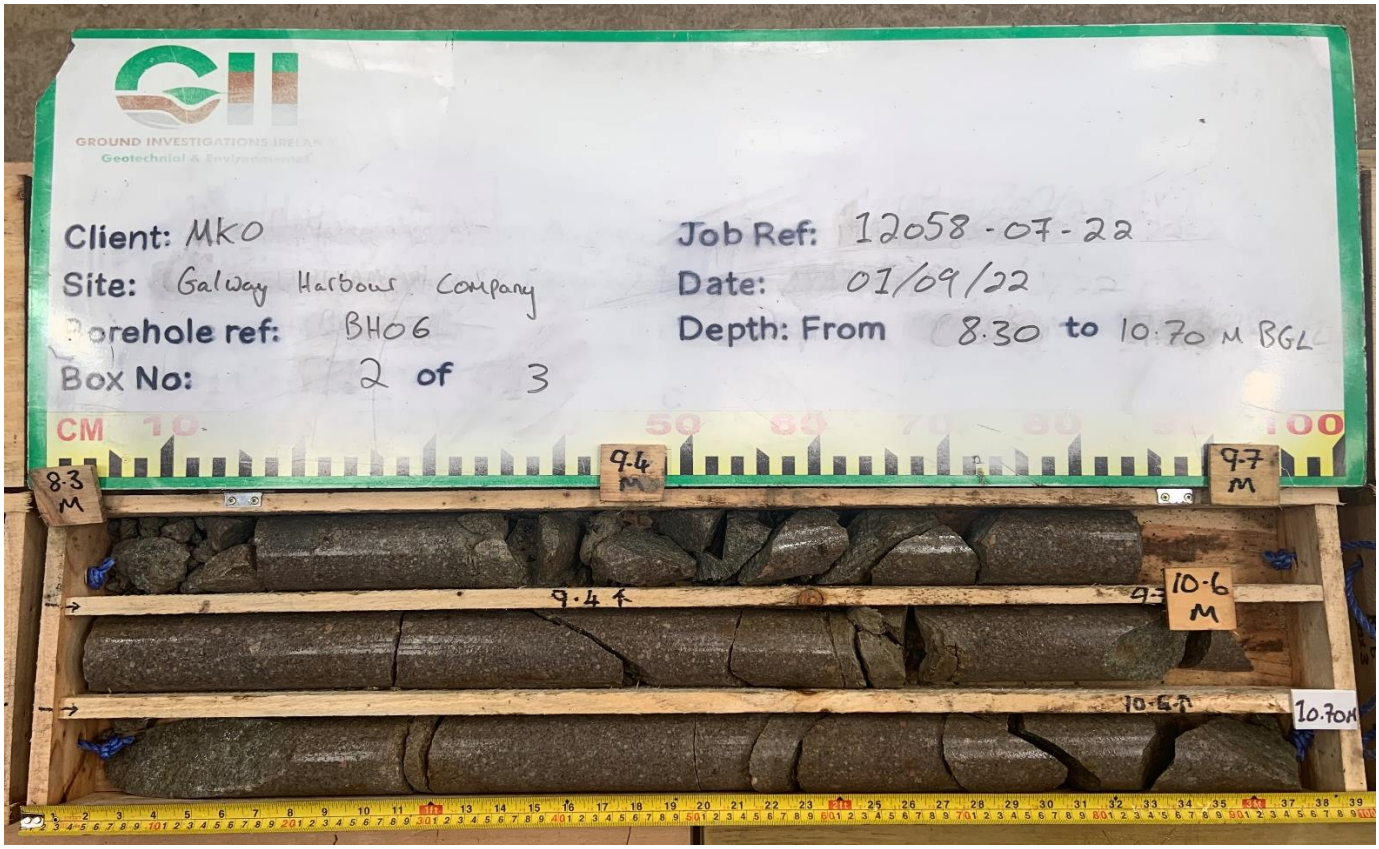
Galway Harbour Company – Rotary Core Photographs

BH05: Box 3 of 3

BH06: Box 1 of 3

Galway Harbour Company – Rotary Core Photographs

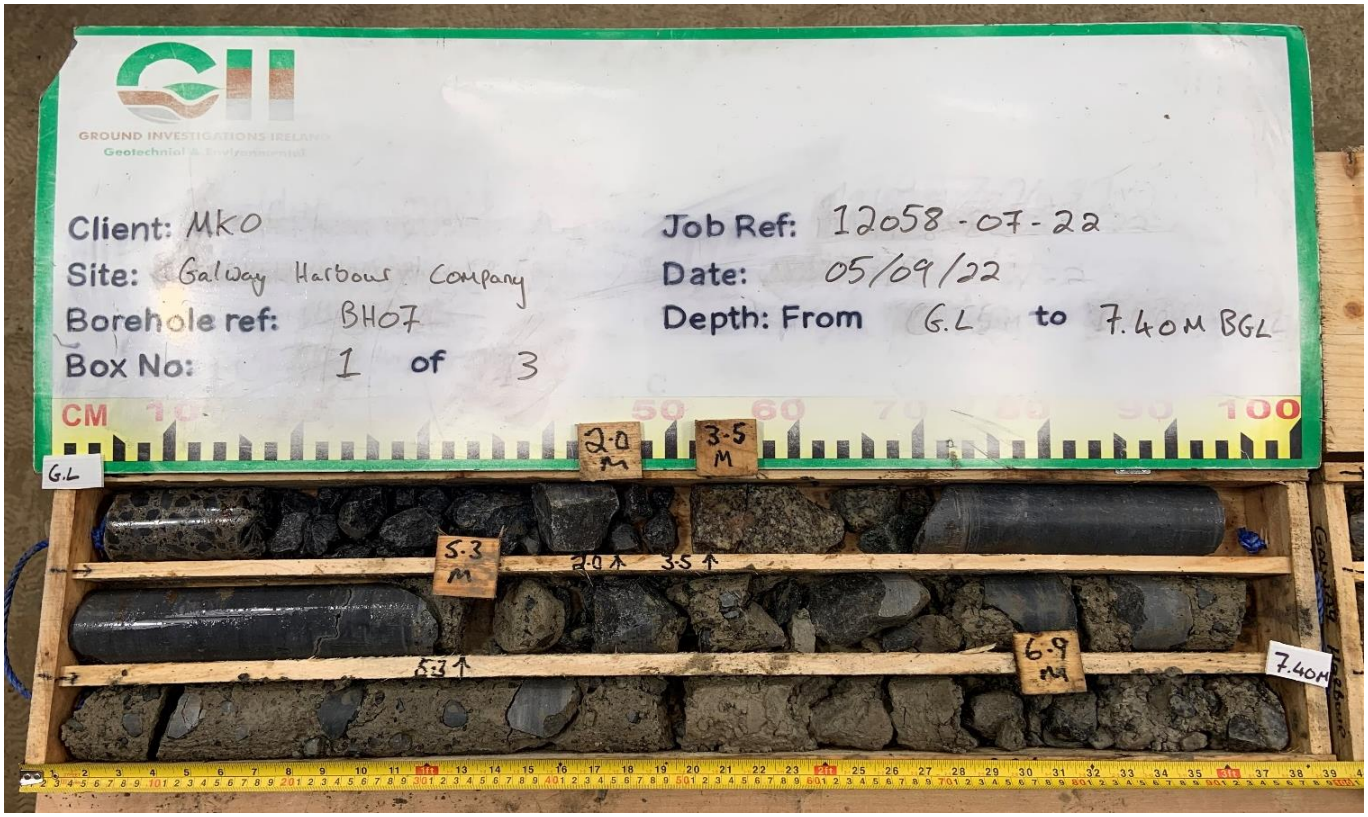
BH06: Box 2 of 3



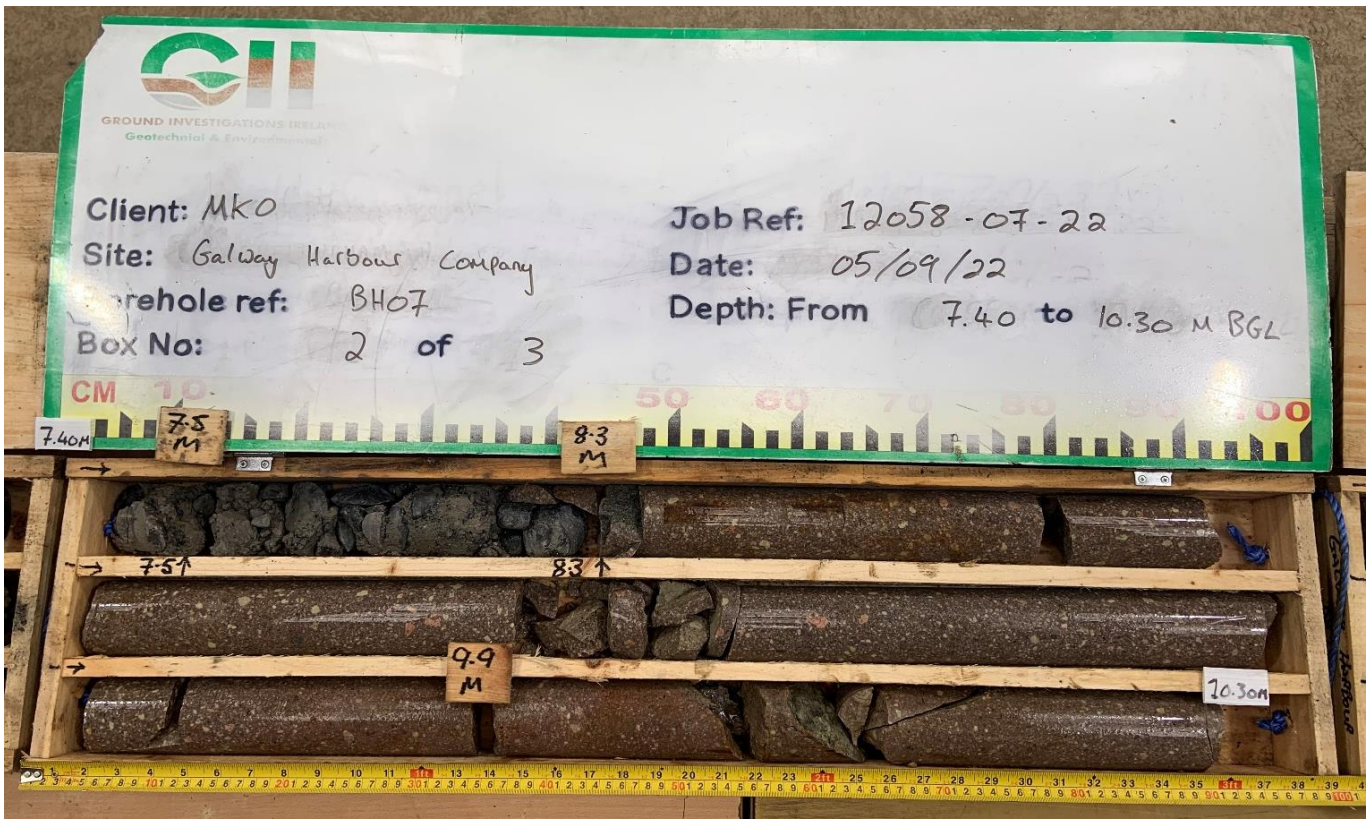
BH06: Box 3 of 3

Galway Harbour Company – Rotary Core Photographs

BH07: Box 1 of 3

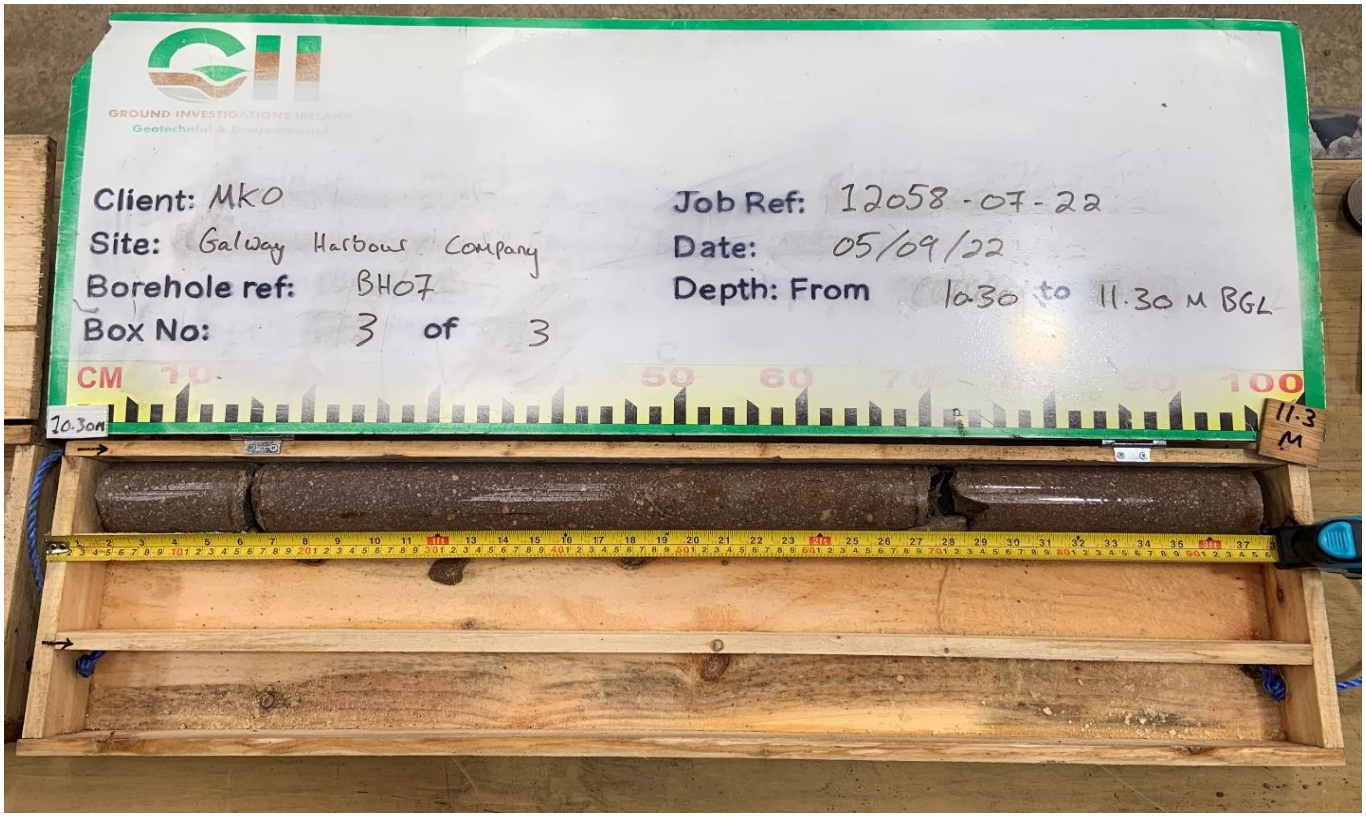


BH07: Box 2 of 3

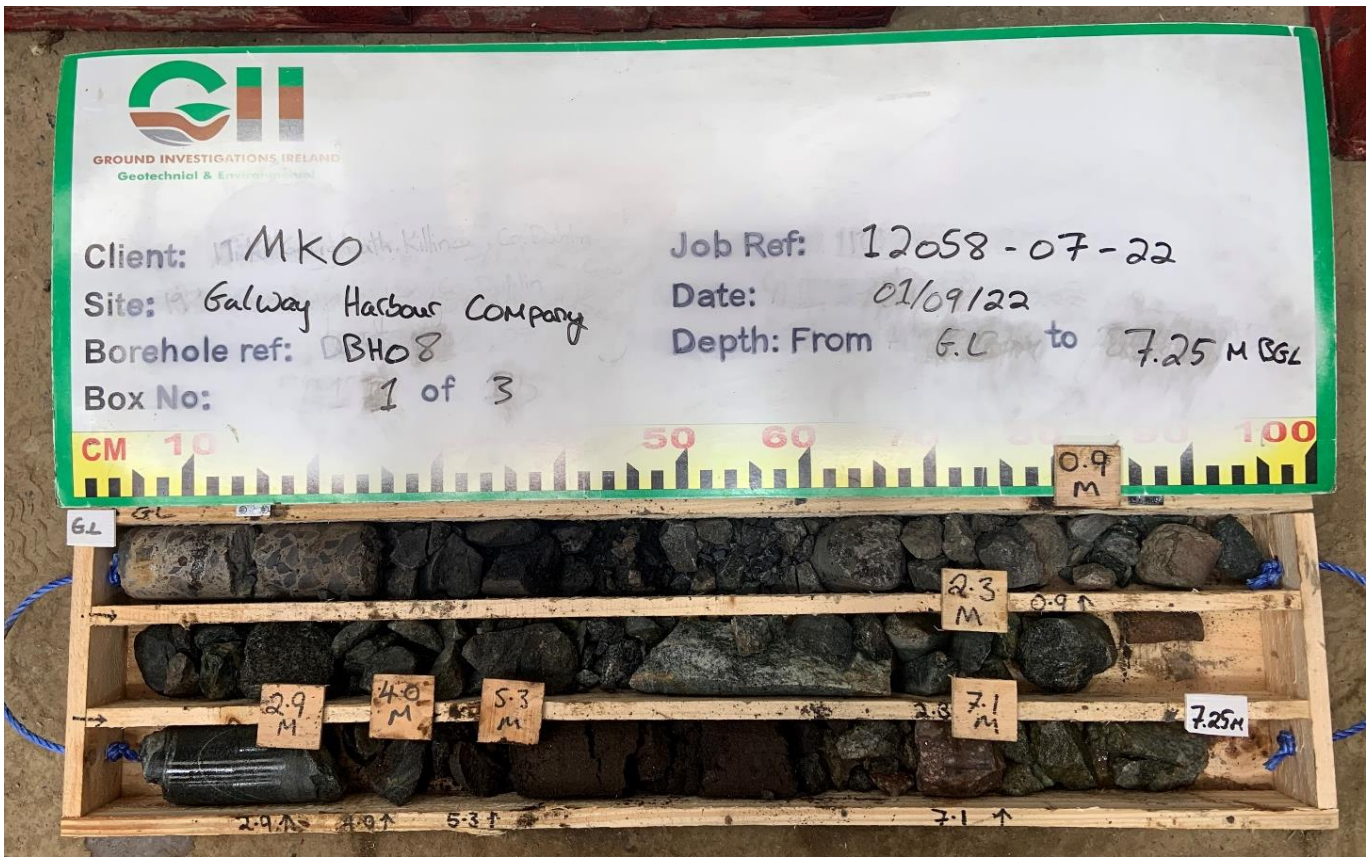


Galway Harbour Company – Rotary Core Photographs

BH07: Box 3 of 3

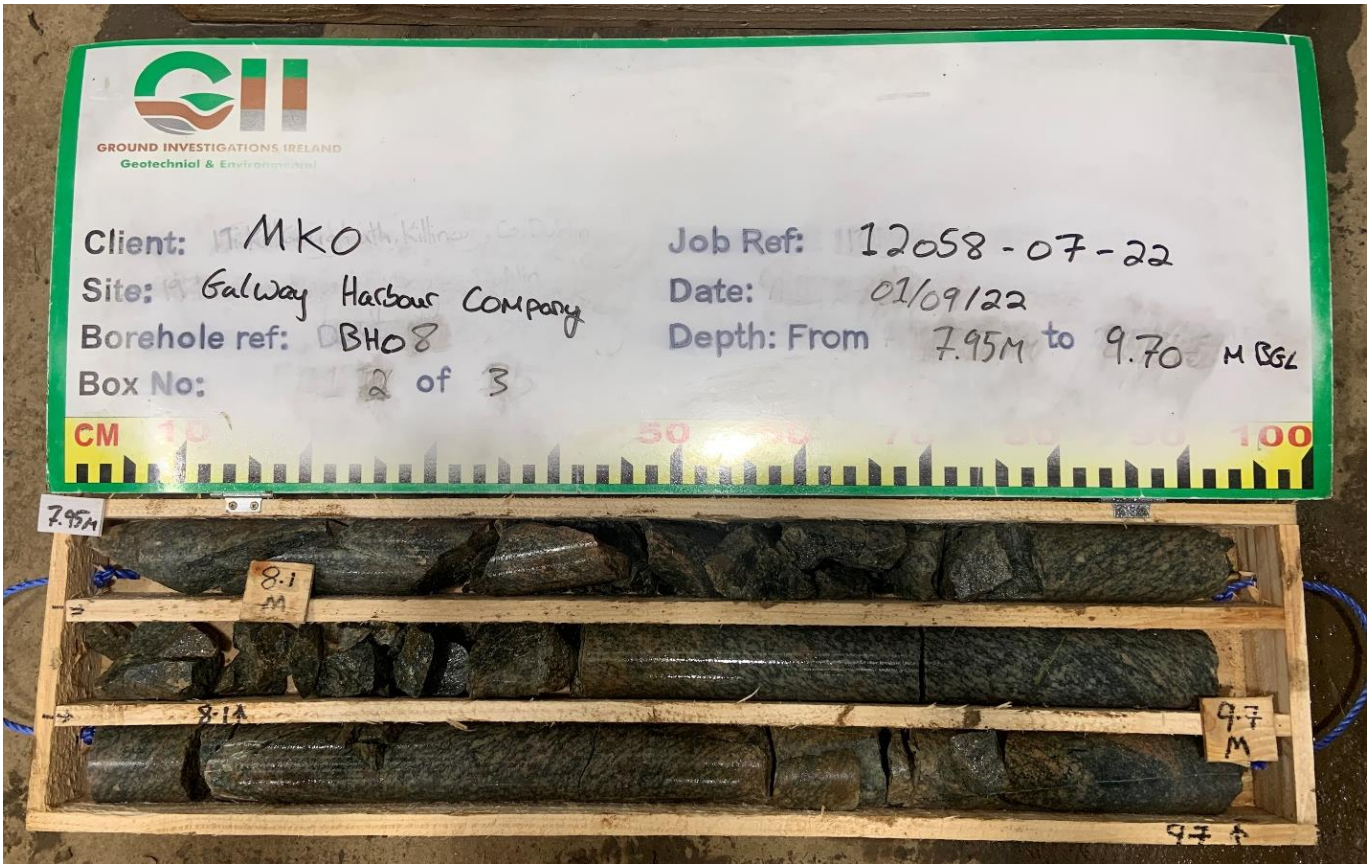


BH08: Box 1 of 3

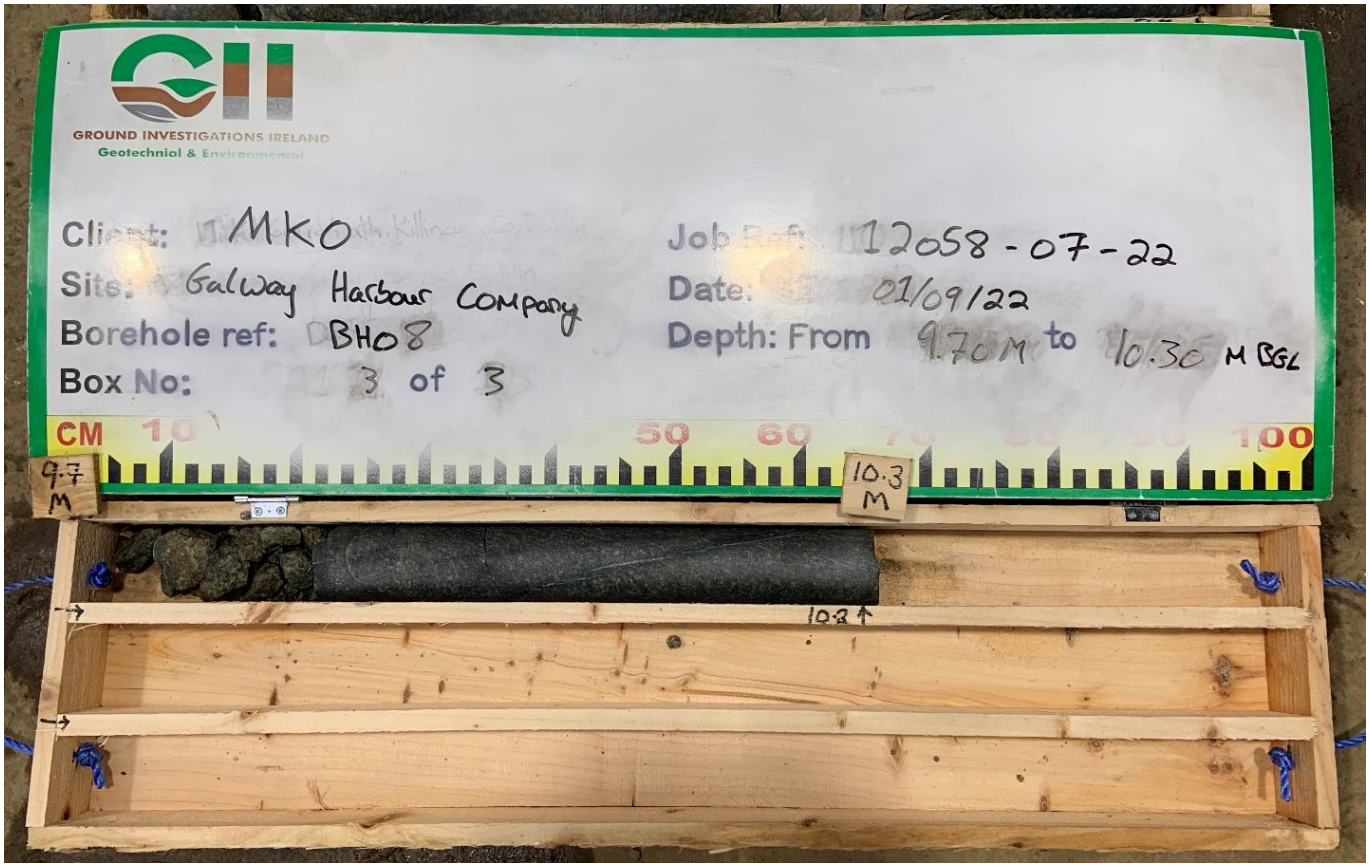


Galway Harbour Company – Rotary Core Photographs

BH08: Box 2 of 3



BH08: Box 3 of 3



Galway Harbour Company – Rotary Core Photographs

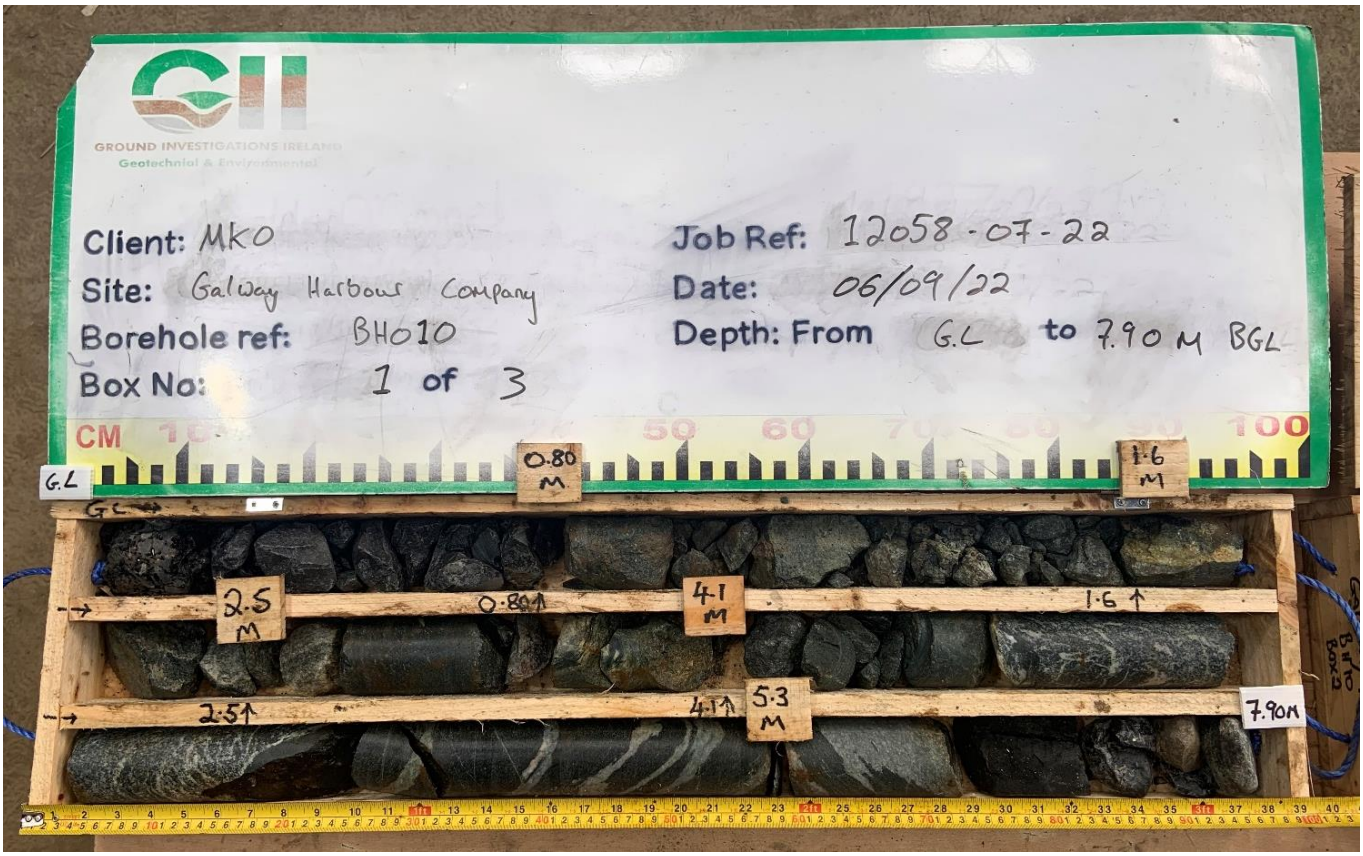
BH09: Box 1 of 3

BH09: Box 2 of 3

Galway Harbour Company – Rotary Core Photographs

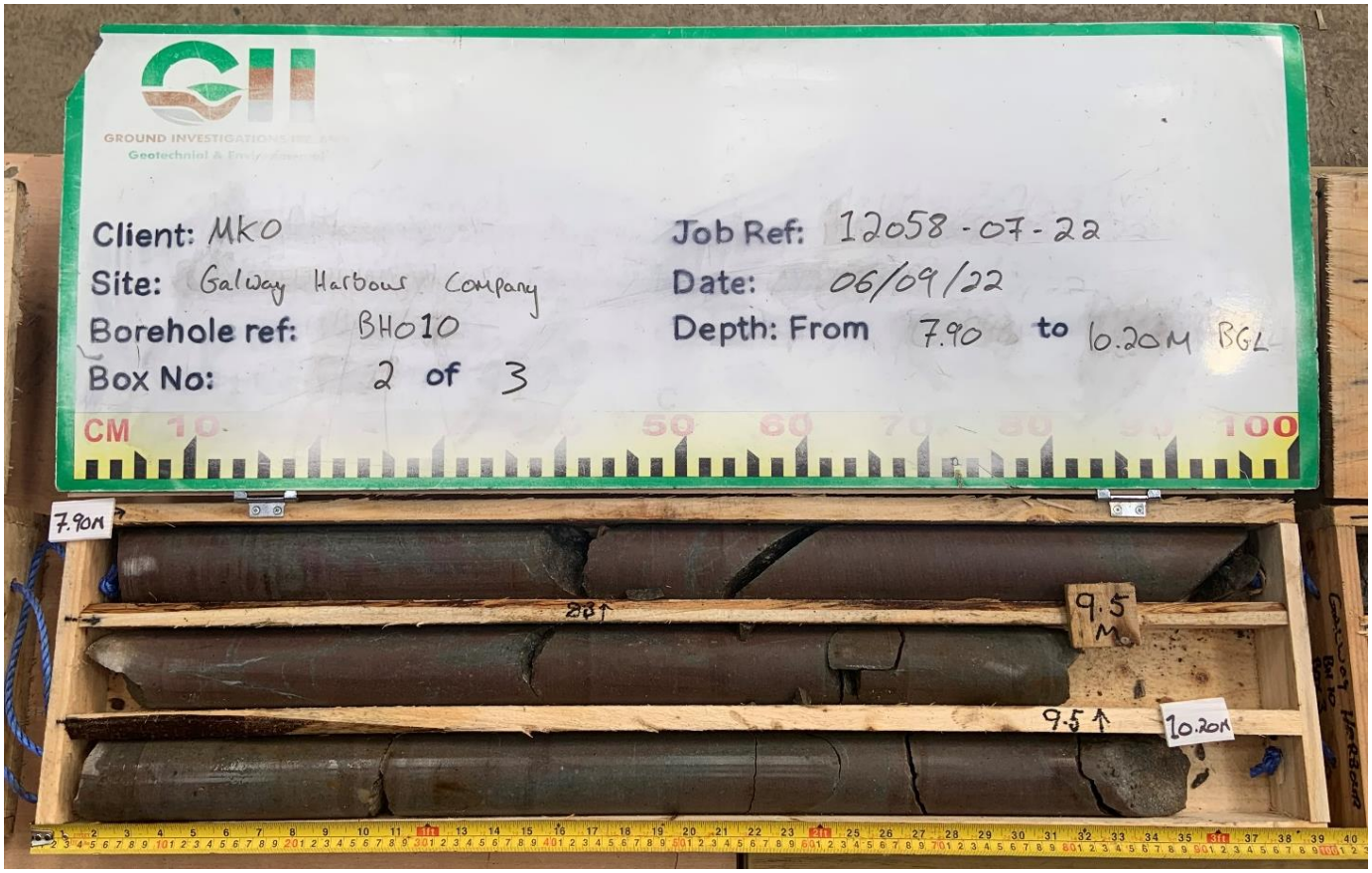
BH09: Box 3 of 3

BH10: Box 1 of 3

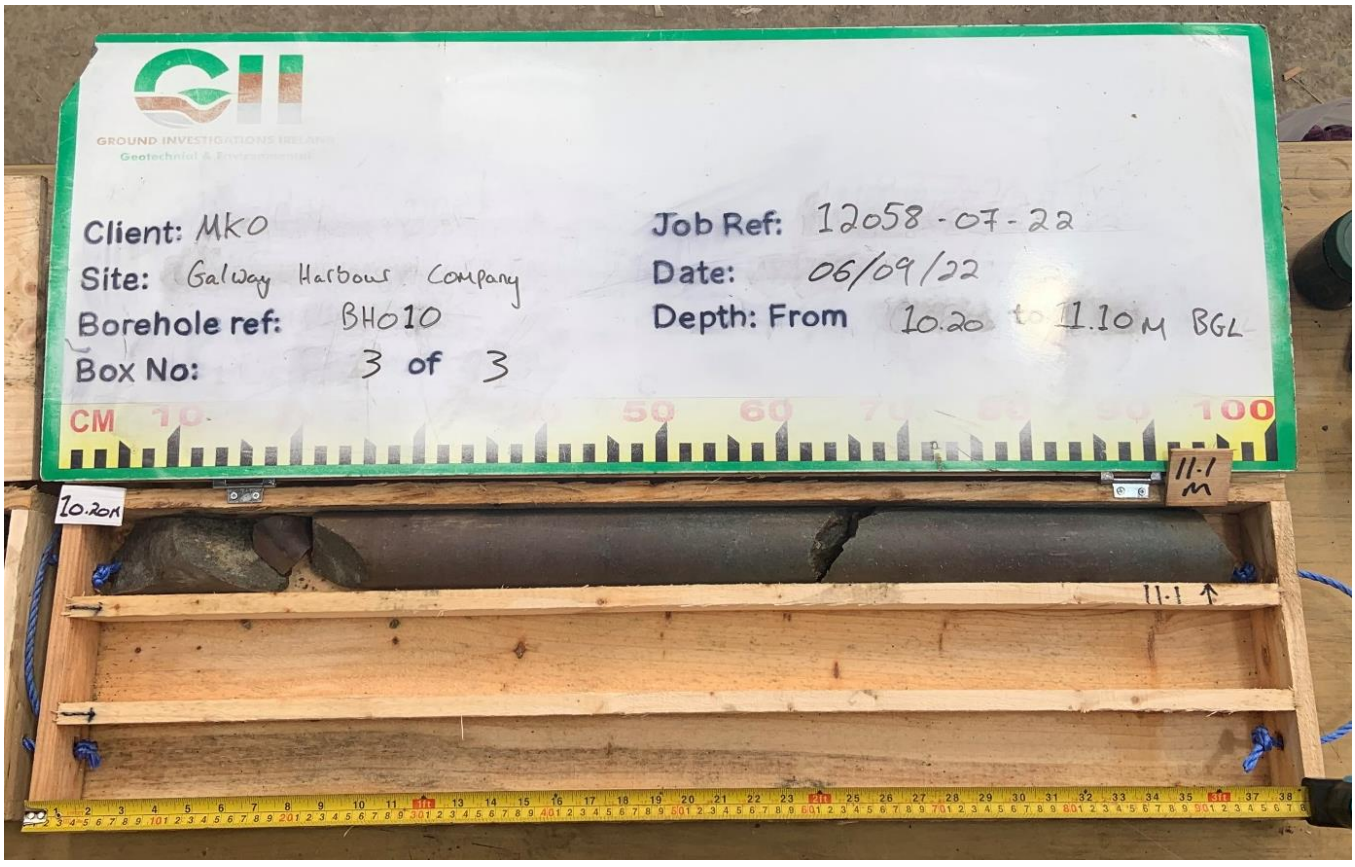


Galway Harbour Company – Rotary Core Photographs

BH10: Box 2 of 3

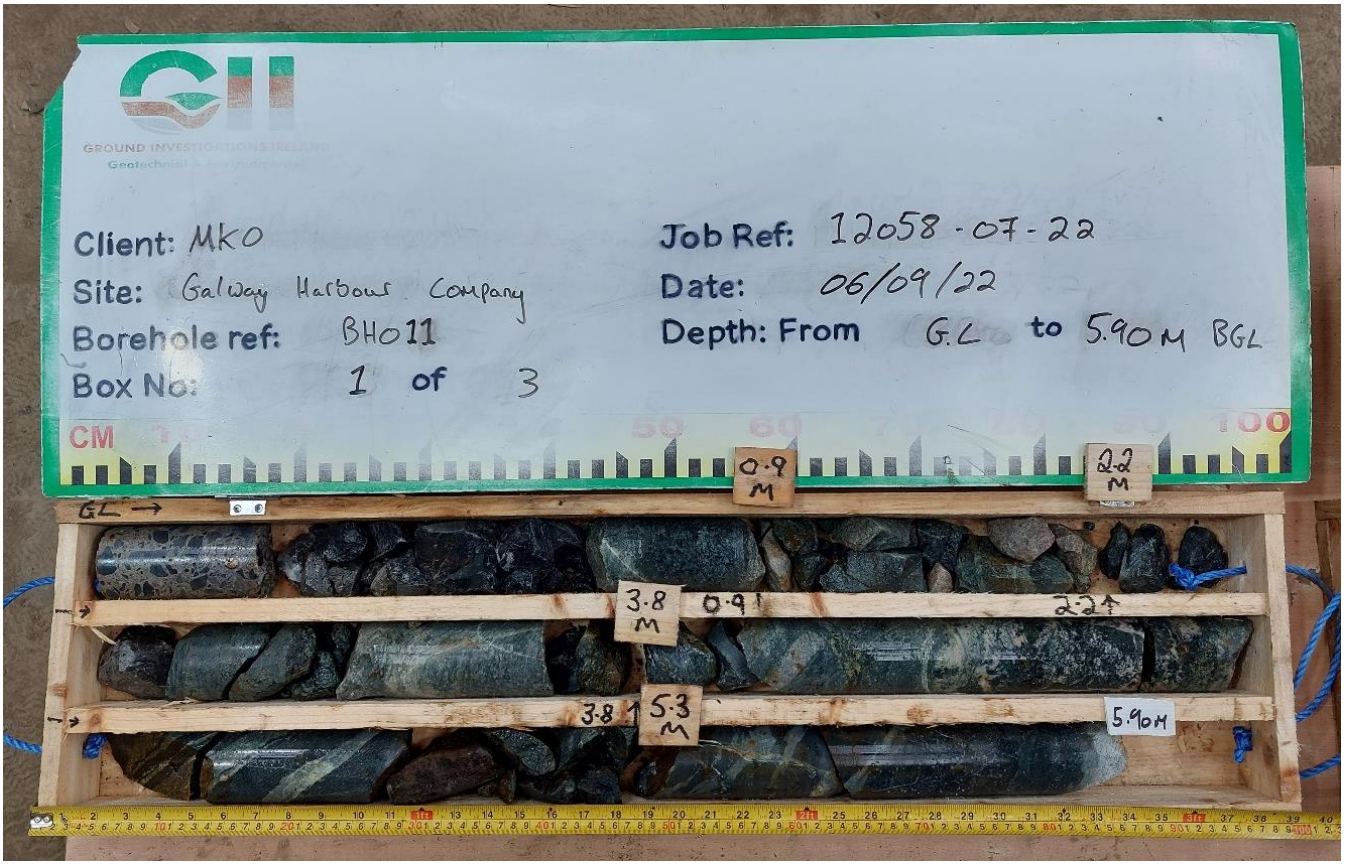


BH10: Box 3 of 3

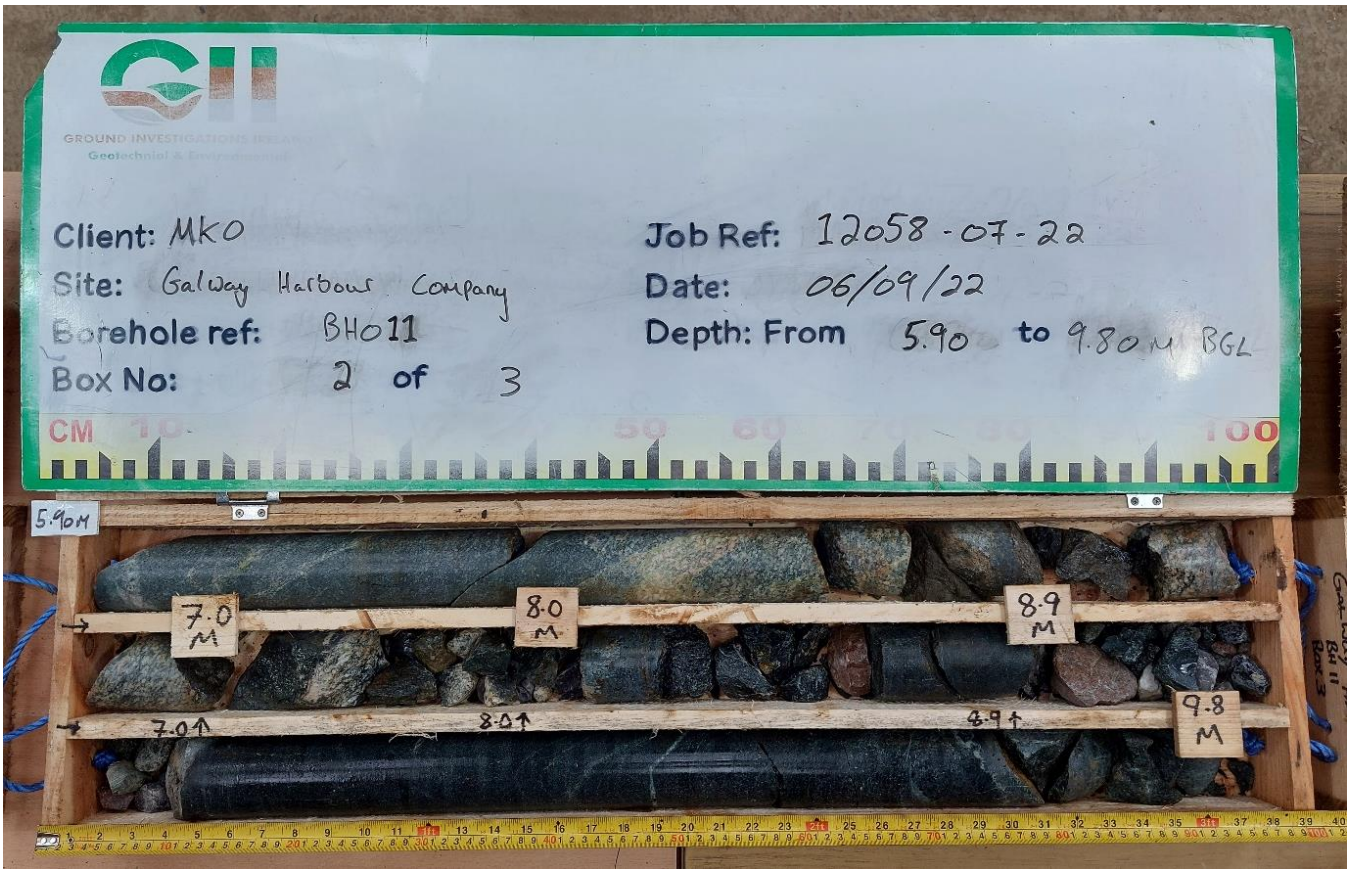


Galway Harbour Company – Rotary Core Photographs

BH11: Box 1 of 3

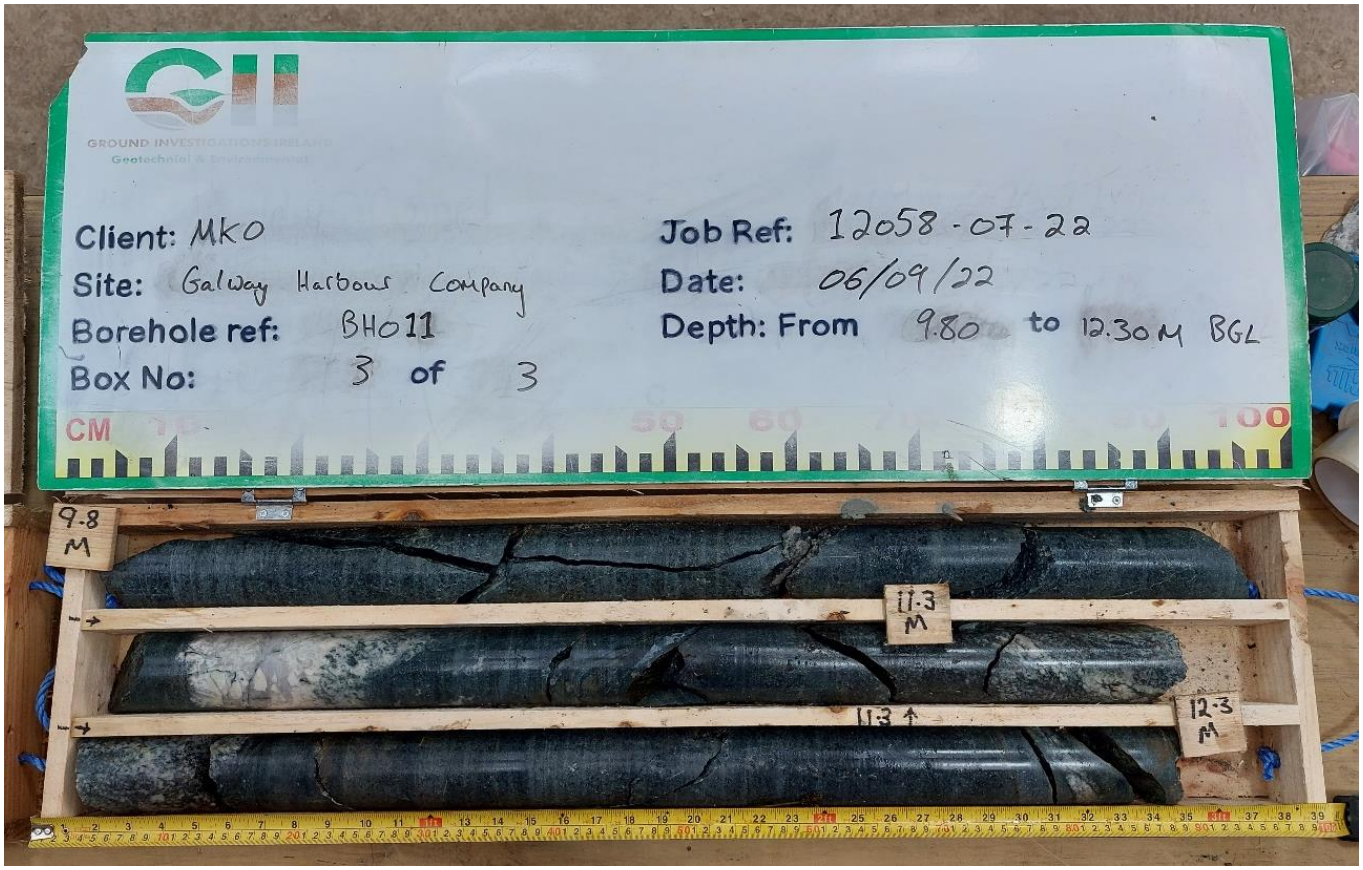


BH11: Box 2 of 3

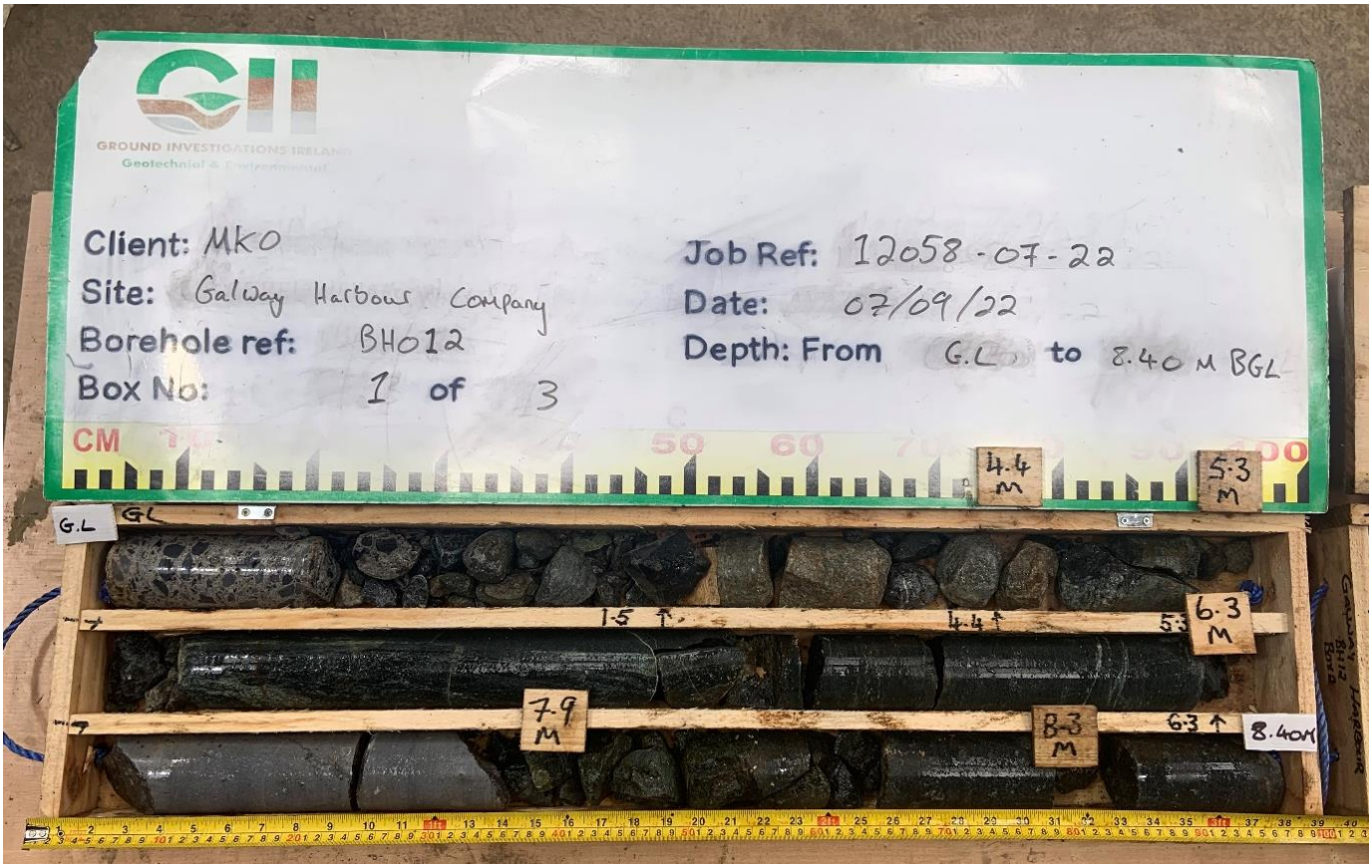


Galway Harbour Company – Rotary Core Photographs

BH11: Box 3 of 3

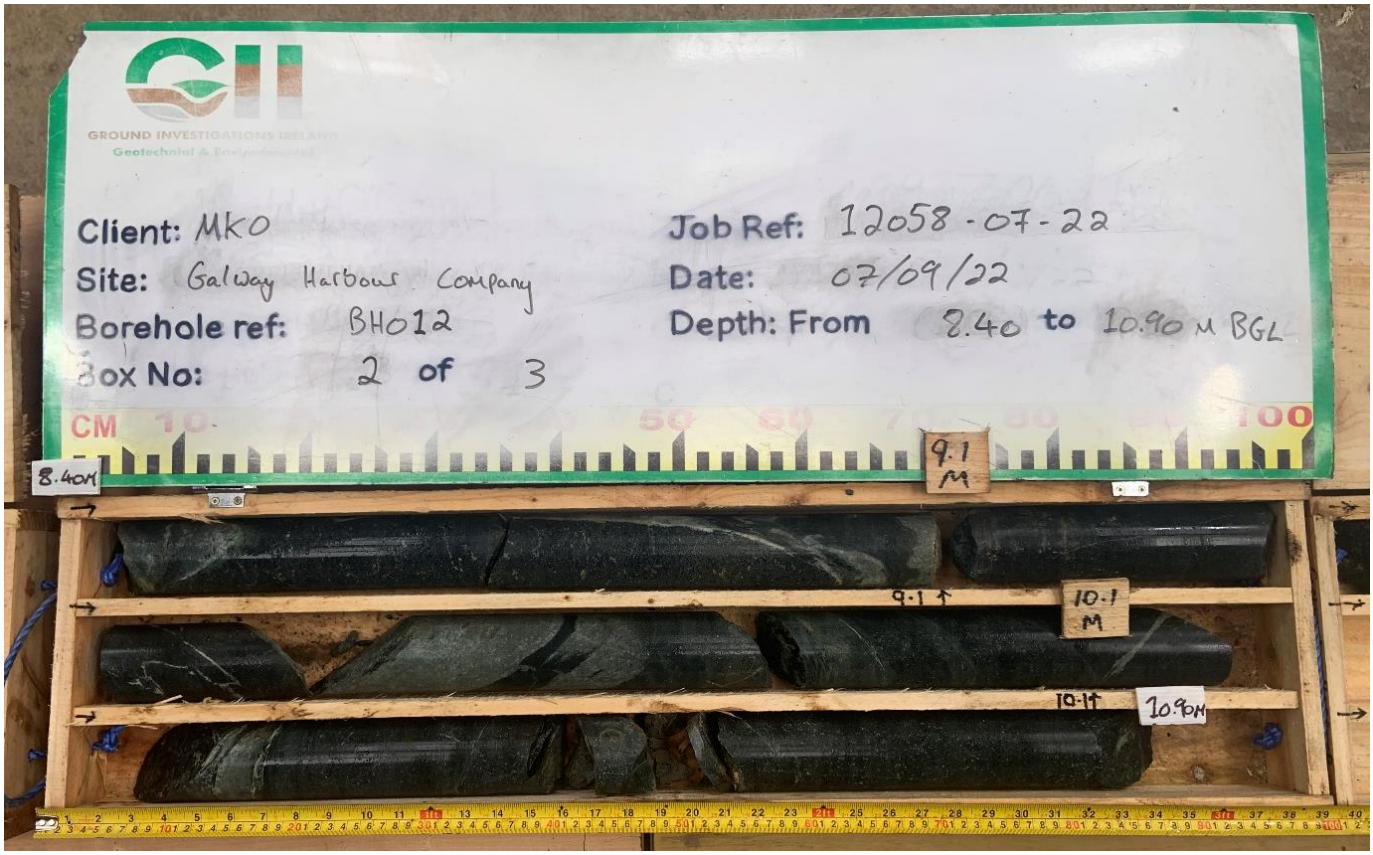


BH12: Box 1 of 3



Galway Harbour Company – Rotary Core Photographs

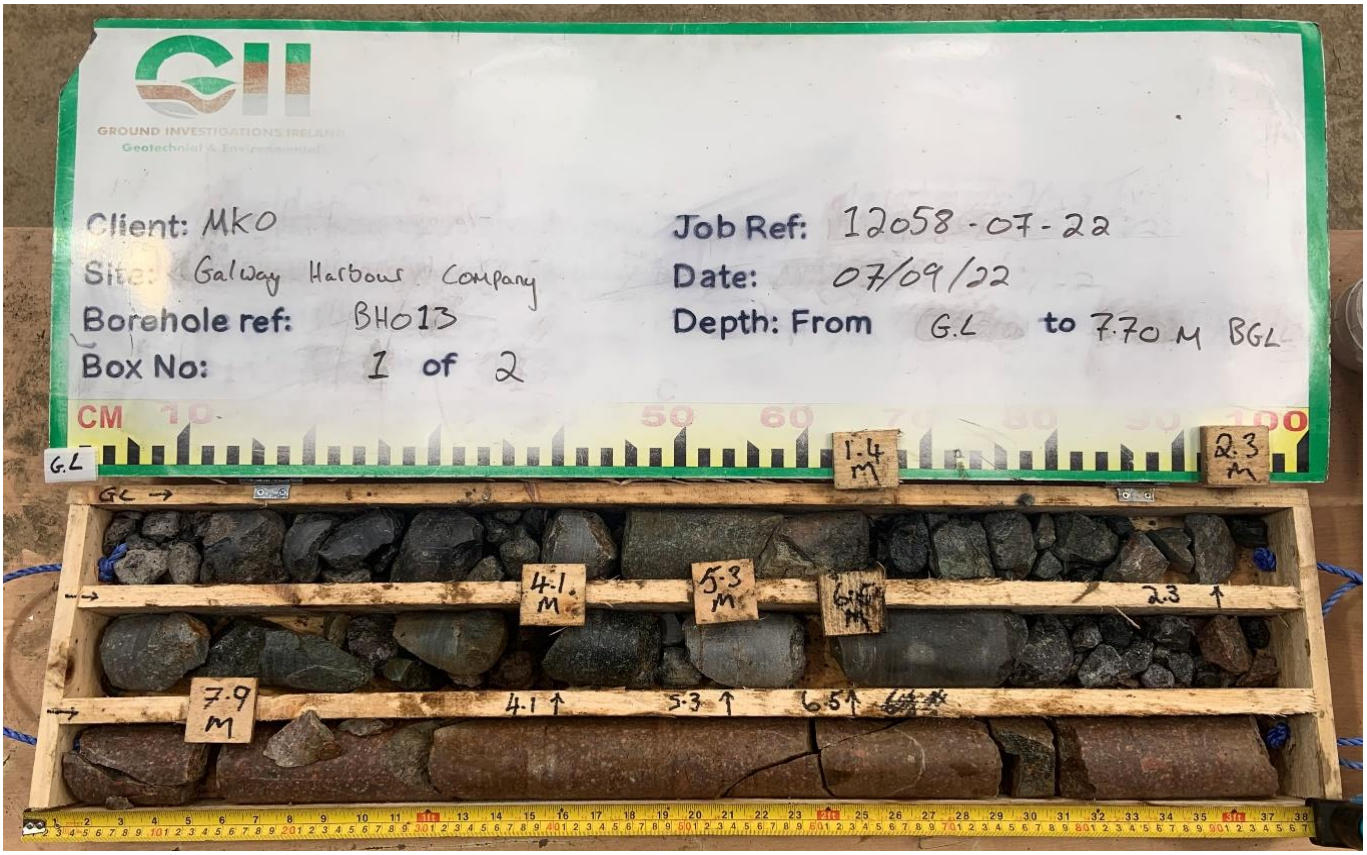
BH12: Box 2 of 3



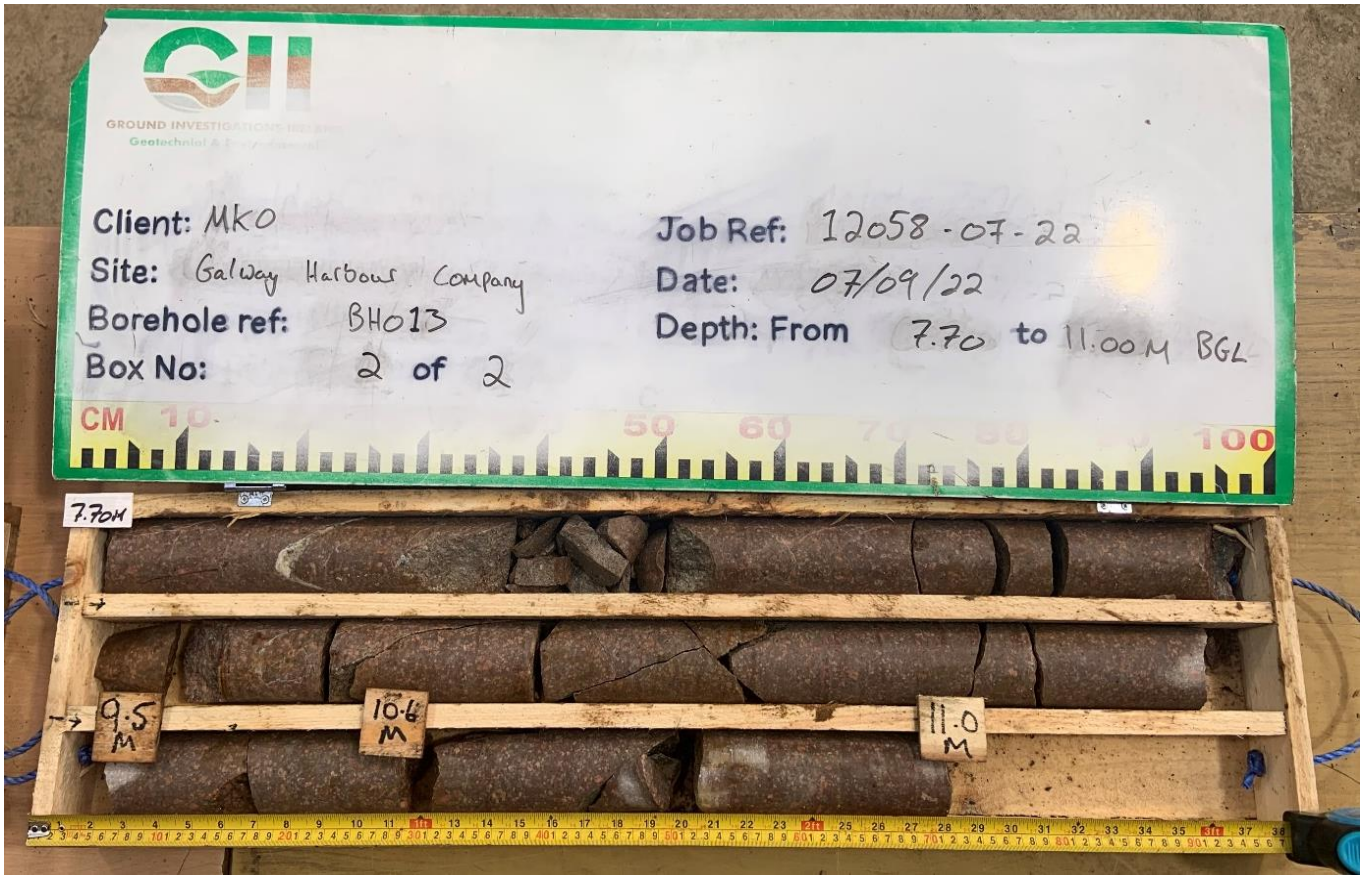
BH12: Box 3 of 3

Galway Harbour Company – Rotary Core Photographs

BH13: Box 1 of 2



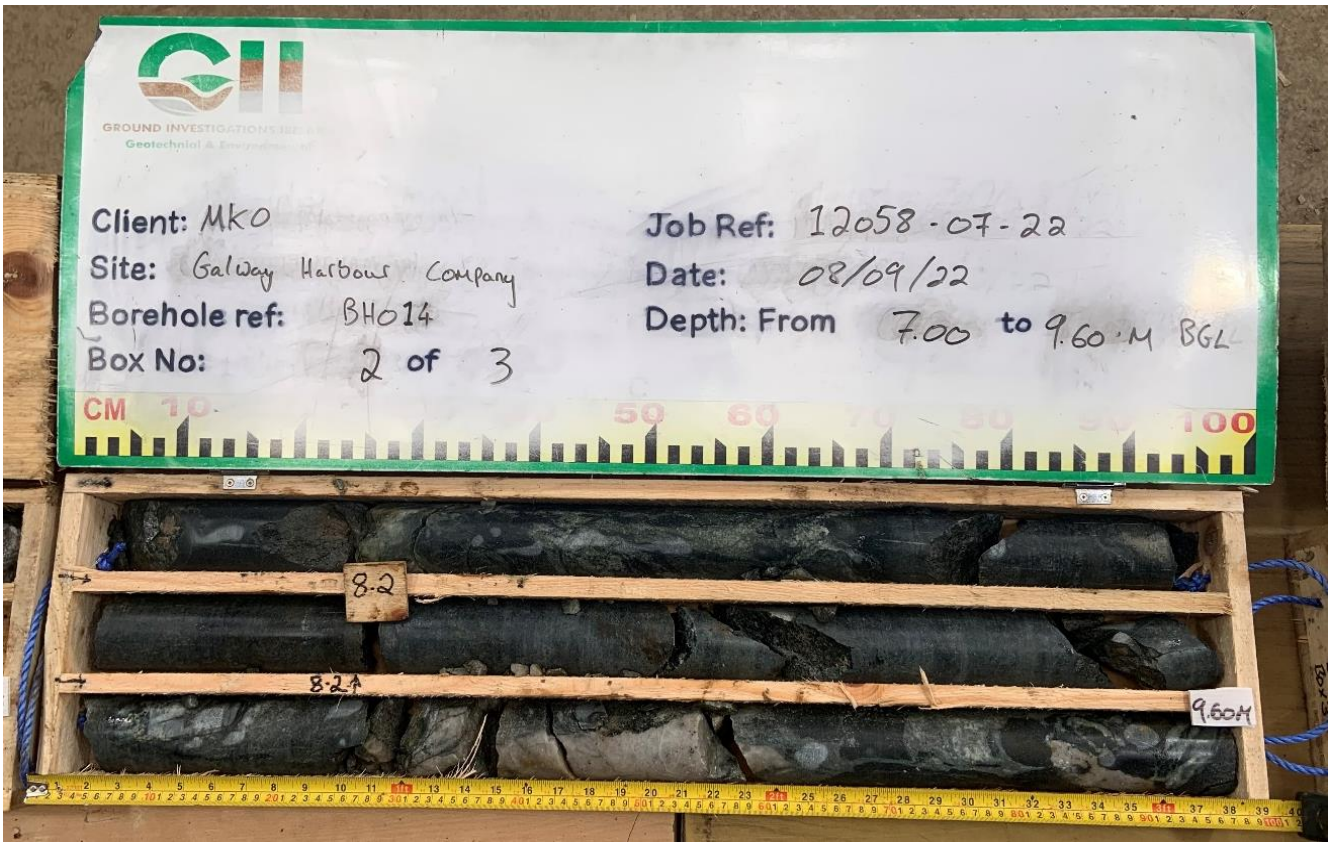
BH13: Box 1 of 2



Galway Harbour Company – Rotary Core Photographs

BH14: Box 1 of 3

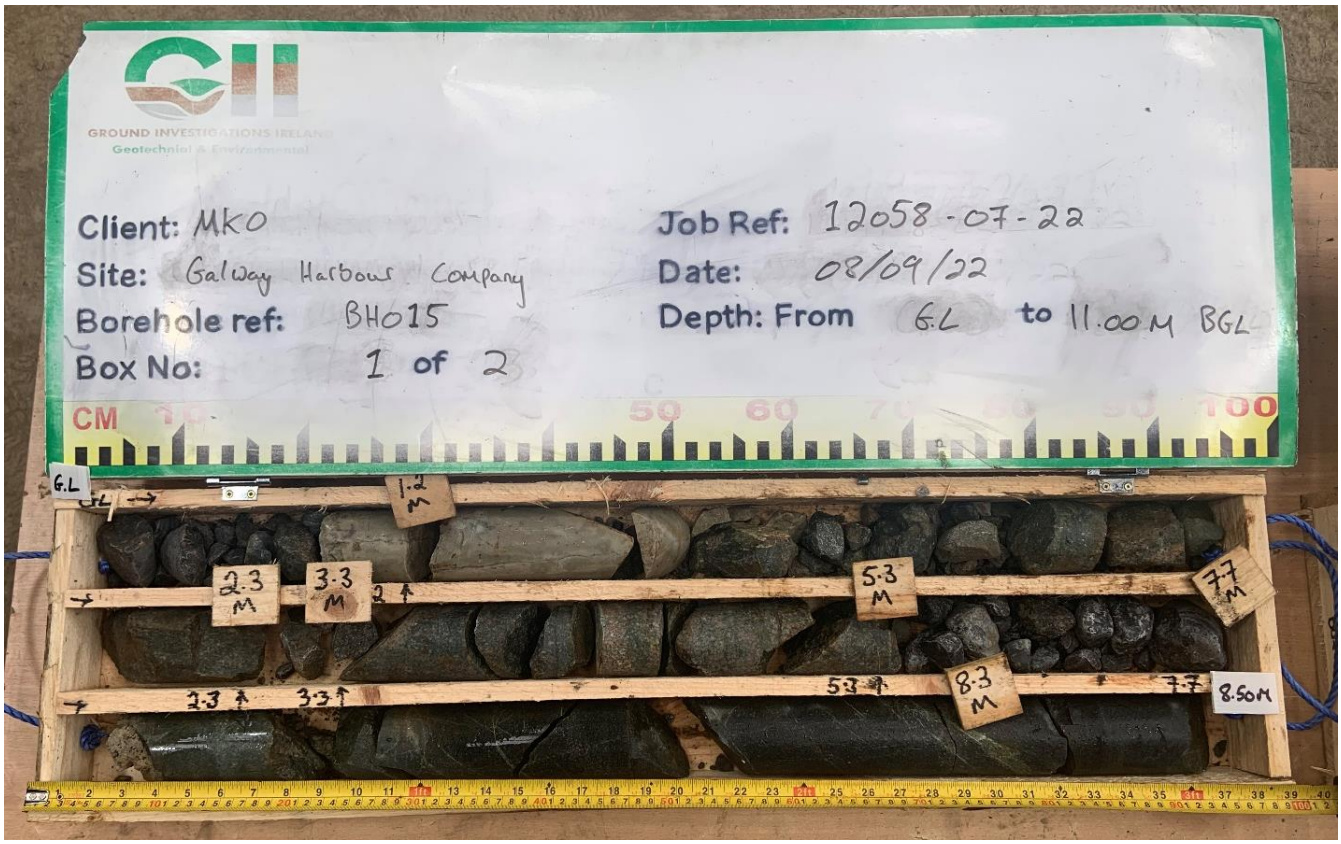
BH14: Box 2 of 3



Galway Harbour Company – Rotary Core Photographs

BH14: Box 3 of 3

BH15: Box 1 of 2



Galway Harbour Company – Rotary Core Photographs

BH15: Box 2 of 2

APPENDIX 4 – Laboratory Testing

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www.element.com

Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention :	Barry Sexton
Date :	18th October, 2022
Your reference :	12058-07-22
Our reference :	Test Report 22/16137 Batch 1
Location :	Galway Harbour Company
Date samples received :	4th October, 2022
Status :	Final Report
Issue :	1

Eleven samples were received for analysis on 4th October, 2022 of which eleven were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Liza Klebe
Project Co-ordinator

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	LOD/LOR	Units	Method No.
Sample ID	WS203	WS206	WS207	WS208	WS209	WS210	WS211	WS212	WS213	WS214			
Depth	0.00-0.70	0.00-0.50	0.00-0.60	0.00-0.90	0.00-0.60	0.00-0.90	0.00-0.70	0.00-0.60	0.00-0.50	0.00-0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022			
Antimony	<1	<1	<1	<1	<1	<1	1	3	<1	1	<1	mg/kg	TM30/PM15
Arsenic #	2.6	3.5	16.6	1.9	2.5	4.4	4.8	8.8	1.7	2.7	<0.5	mg/kg	TM30/PM15
Barium #	34	10	12	13	12	38	188	140	9	23	<1	mg/kg	TM30/PM15
Cadmium #	0.3	0.2	0.3	0.3	0.3	0.8	2.2	2.0	0.2	0.3	<0.1	mg/kg	TM30/PM15
Chromium #	29.4	14.2	16.0	14.8	31.9	17.1	17.7	80.9	16.2	55.6	<0.5	mg/kg	TM30/PM15
Copper #	7	8	11	5	6	40	15	49	4	14	<1	mg/kg	TM30/PM15
Lead #	<5	8	10	7	<5	78	229	257	<5	15	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.3	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	1.7	1.2	1.6	1.2	2.8	1.1	1.5	3.5	1.3	2.6	<0.1	mg/kg	TM30/PM15
Nickel #	8.5	7.2	7.7	6.3	8.4	4.5	5.7	16.9	5.9	9.9	<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	1	<1	<1	<1	<1	1	<1	<1	<1	mg/kg	TM30/PM15
Zinc #	46	14	23	13	74	135	254	269	7	31	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	0.07	<0.04	0.13	0.20	0.13	0.13	0.15	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	0.10	<0.03	0.15	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.05	<0.04	0.05	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	0.09	<0.03	0.16	0.26	0.40	0.07	0.63	<0.03	0.05	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.15	<0.04	0.23	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	0.04	0.08	0.85	<0.03	1.24	<0.03	0.11	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	0.05	<0.03	0.06	0.11	0.85	0.06	1.08	<0.03	0.11	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	0.07	0.12	0.51	<0.06	0.67	<0.06	0.09	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	0.05	<0.02	0.06	0.14	0.50	0.02	0.66	<0.02	0.06	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	0.11	0.97	<0.07	1.21	<0.07	0.12	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.47	<0.04	0.61	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.48	<0.04	0.48	<0.04	0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	0.04	0.11	<0.04	0.13	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	0.08	0.40	0.05	0.38	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	0.18	<0.04	0.11	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	0.27	3.17	<0.22	3.92	<0.22	0.27	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	1.14	6.15	<0.64	7.78	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	0.08	0.70	<0.05	0.87	<0.05	0.09	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	0.03	0.27	<0.02	0.34	<0.02	0.03	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	95	96	93	96	93	96	95	94	93	94	<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	208	580	208	184	<30	191	163	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	LOD/LOR	Units	Method No.
Sample ID	WS203	WS206	WS207	WS208	WS209	WS210	WS211	WS212	WS213	WS214			
Depth	0.00-0.70	0.00-0.50	0.00-0.60	0.00-0.90	0.00-0.60	0.00-0.90	0.00-0.70	0.00-0.60	0.00-0.50	0.00-0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022			
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	8.7	<0.2	3.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	9	115	<4	13	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	69	48	<7	55	<7	<7	108	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	123	317	174	113	<7	141	55	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_1D_AL)	7	91	34	<7	<7	50	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_1D_AL)	208	580	208	184	<26	191	163	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10 (HS_1D_AL)	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25 (EH_1D_AL)	99	203	<10	82	<10	<10	135	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35 (EH_1D_AL)	62	249	138	76	<10	134	21	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2	<0.2	<0.2	3.9	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	<4	6	<4	19	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	27	30	<7	73	<7	19	23	12	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	140	816	340	190	<7	632	14	87	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_1D_AR)	27	337	97	33	<7	206	<7	10	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_1D_AR)	194	1189	437	319	<26	857	37	109	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	402	1769	645	503	<52	1048	200	109	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 (HS_1D_AR)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25 (EH_1D_AR)	39	45	19	135	<10	46	41	29	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35 (EH_1D_AR)	103	652	282	126	<10	535	<10	68	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE#	<5	<5 SV	<5 SV	<5	<5 SV	<5 SV	<5	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
Benzene#	<5	<5 SV	<5 SV	<5	<5 SV	<5 SV	<5	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
Toluene#	<5	<5 SV	<5 SV	<5	6 SV	<5 SV	22	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
Ethylbenzene#	<5	<5 SV	<5 SV	<5	<5 SV	<5 SV	6	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
m/p-Xylene#	7	<5 SV	<5 SV	<5	<5 SV	<5 SV	28	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
o-Xylene#	6	<5 SV	<5 SV	<5	<5 SV	<5 SV	13	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
PCB 28#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs#	<35	<350 AA	<350 AA	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	LOD/LOR	Units	Method No.
Sample ID	WS203	WS206	WS207	WS208	WS209	WS210	WS211	WS212	WS213	WS214			
Depth	0.00-0.70	0.00-0.50	0.00-0.60	0.00-0.90	0.00-0.60	0.00-0.90	0.00-0.70	0.00-0.60	0.00-0.50	0.00-0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022			
Natural Moisture Content	6.7	4.7	5.3	4.9	4.0	6.5	3.5	7.4	4.6	7.6	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	6.3	4.5	5.0	4.7	3.8	6.1	3.3	6.9	4.4	7.1	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	29.4	14.2	16.0	14.8	31.9	17.1	17.7	80.9	16.2	55.6	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.15	0.69	0.60	0.69	0.50	3.07	0.27	4.67	0.09	0.14	<0.02	%	TM21/PM24
Alkali Reserve	0.596	-	-	-	0.194	-	-	-	0.056	-	<0.000	gNaOH/100g	TM160/PM110
pH #	12.50	8.67	8.52	8.87	12.00	7.65	8.44	8.63	11.55	8.98	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.0961	0.1082	0.098	0.1007	0.0989	0.137	0.0936	0.095	0.0971	0.1006		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	41-44										LOD/LOR	Units	Method No.
Sample ID	WS215												
Depth	0.00-0.50												
COC No / misc													
Containers	V J T												
Sample Date	29/09/2022												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	04/10/2022												
Antimony	1										<1	mg/kg	TM30/PM15
Arsenic #	2.8										<0.5	mg/kg	TM30/PM15
Barium #	69										<1	mg/kg	TM30/PM15
Cadmium #	0.8										<0.1	mg/kg	TM30/PM15
Chromium #	25.0										<0.5	mg/kg	TM30/PM15
Copper #	37										<1	mg/kg	TM30/PM15
Lead #	69										<5	mg/kg	TM30/PM15
Mercury #	<0.1										<0.1	mg/kg	TM30/PM15
Molybdenum #	1.7										<0.1	mg/kg	TM30/PM15
Nickel #	7.8										<0.7	mg/kg	TM30/PM15
Selenium #	<1										<1	mg/kg	TM30/PM15
Zinc #	289										<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	0.12										<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.24										<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05										<0.05	mg/kg	TM4/PM8
Fluorene #	0.04										<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.46										<0.03	mg/kg	TM4/PM8
Anthracene #	0.12										<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.96										<0.03	mg/kg	TM4/PM8
Pyrene #	0.84										<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.42										<0.06	mg/kg	TM4/PM8
Chrysene #	0.53										<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.99										<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.54										<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.51										<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.09										<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.46										<0.04	mg/kg	TM4/PM8
Coronene	0.17										<0.04	mg/kg	TM4/PM8
PAH 6 Total #	3.46										<0.22	mg/kg	TM4/PM8
PAH 17 Total	6.49										<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.71										<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.28										<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1										<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	94										<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	<30										<30	mg/kg	TM5/PM8/PM16

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

EMT Sample No.	41-44												
Sample ID	WS215												
Depth	0.00-0.50												
COC No / misc													
Containers	V J T												
Sample Date	29/09/2022												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	04/10/2022												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1										<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1										<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	0.1										<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2										<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	<4										<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	<7										<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	<7										<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_1D_AL)	<7										<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_1D_AL)	<26										<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10 (HS_1D_AL)	0.1										<0.1	mg/kg	TM36/PM12
>C10-C25 (EH_1D_AL)	<10										<10	mg/kg	TM5/PM8/PM16
>C25-C35 (EH_1D_AL)	<10										<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1										<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1										<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1										<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2										<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	15										<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	48										<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	103										<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_1D_AR)	7										<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_1D_AR)	173										<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	173										<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 (HS_1D_AR)#	<0.1										<0.1	mg/kg	TM36/PM12
>EC10-EC25 (EH_1D_AR)	118										<10	mg/kg	TM5/PM8/PM16
>EC25-EC35 (EH_1D_AR)	93										<10	mg/kg	TM5/PM8/PM16
MTBE#	<5										<5	ug/kg	TM36/PM12
Benzene#	<5										<5	ug/kg	TM36/PM12
Toluene#	<5										<5	ug/kg	TM36/PM12
Ethylbenzene#	<5										<5	ug/kg	TM36/PM12
m/p-Xylene#	6										<5	ug/kg	TM36/PM12
o-Xylene#	<5										<5	ug/kg	TM36/PM12
PCB 28#	<5										<5	ug/kg	TM17/PM8
PCB 52#	<5										<5	ug/kg	TM17/PM8
PCB 101#	<5										<5	ug/kg	TM17/PM8
PCB 118#	<5										<5	ug/kg	TM17/PM8
PCB 138#	<5										<5	ug/kg	TM17/PM8
PCB 153#	<5										<5	ug/kg	TM17/PM8
PCB 180#	<5										<5	ug/kg	TM17/PM8
Total 7 PCBs#	<35										<35	ug/kg	TM17/PM8

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

EMT Sample No.	41-44												
Sample ID	WS215												
Depth	0.00-0.50												
COC No / misc													
Containers	V J T												
Sample Date	29/09/2022												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	04/10/2022												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
Natural Moisture Content	4.1										<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	3.9										<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20
Chromium III	25.0										<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.33										<0.02	%	TM21/PM24
Alkali Reserve	-										<0.000	gNaOH/100g	TM160/PM110
pH #	8.42										<0.01	pH units	TM73/PM11
Mass of raw test portion	0.0953											kg	NONE/PM17
Mass of dried test portion	0.09											kg	NONE/PM17

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : CEN 10:1 1 Batch

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

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	LOD/LOR	Units	Method No.
Sample ID	WS203	WS206	WS207	WS208	WS209	WS210	WS211	WS212	WS213	WS214			
Depth	0.00-0.70	0.00-0.50	0.00-0.60	0.00-0.90	0.00-0.60	0.00-0.90	0.00-0.70	0.00-0.60	0.00-0.50	0.00-0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022			
Dissolved Antimony #	<0.002	<0.002	<0.002	<0.002	<0.002	0.029	0.002	0.002	0.003	0.046	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	0.29	<0.02	0.02	0.03	0.46	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0057	<0.0025	<0.0025	<0.0025	0.0069	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	0.057	<0.025	<0.025	<0.025	0.069	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.128	0.005	0.012	0.015	0.042	0.105	0.051	0.028	0.038	0.047	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	1.28	0.05	0.12	0.15	0.42	1.05	0.51	0.28	0.38	0.47	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	0.0091	<0.0015	<0.0015	<0.0015	0.0062	<0.0015	0.0024	<0.0015	0.0116	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	0.091	<0.015	<0.015	<0.015	0.062	<0.015	0.024	<0.015	0.116	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	0.019	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	0.19	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.005	0.004	0.003	<0.002	<0.002	0.072	<0.002	0.005	0.003	0.025	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.05	0.04	0.03	<0.02	<0.02	0.72	<0.02	0.05	0.03	0.25	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003	<0.003	<0.003	<0.003	0.018	0.013	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	0.18	0.13	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	4	<3	<3	<3	<3	<3	<3	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	9.1	3.8	3.9	2.4	20.1	54.2	1.9	1.5	49.8	4.1	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	91	38	39	24	201	542	19	15	498	41	<5	mg/kg	TM38/PM0
Chloride #	6.1	1.4	1.3	0.6	4.4	18.3	1.0	0.6	11.3	2.4	<0.3	mg/l	TM38/PM0
Chloride #	61	14	13	6	44	183	10	6	113	24	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	11	3	4	3	16	9	9	<2	8	4	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	110	30	40	30	160	90	90	<20	80	40	<20	mg/kg	TM60/PM0
pH	11.97	8.21	8.00	8.04	11.76	8.43	7.94	7.87	11.50	8.17	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	488	59	<35	48	350	257	47	<35	323	97	<35	mg/l	TM20/PM0
Total Dissolved Solids #	4882	590	<350	480	3500	2569	470	<350	3230	970	<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : CEN 10:1 1 Batch

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

EMT Sample No.	41-44												
Sample ID	WS215												
Depth	0.00-0.50										Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V J T												
Sample Date	29/09/2022												
Sample Type	Soil												
Batch Number	1										LOD/LOR	Units	Method No.
Date of Receipt	04/10/2022												
Dissolved Antimony #	0.011										<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	0.11										<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	0.0033										<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	0.033										<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.041										<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.41										<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005										<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005										<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015										<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015										<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007										<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07										<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005										<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05										<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.003										<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.03										<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002										<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02										<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003										<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03										<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003										<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03										<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001										<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001										<0.0001	mg/kg	TM61/PM0
Phenol	<0.01										<0.01	mg/l	TM26/PM0
Phenol	<0.1										<0.1	mg/kg	TM26/PM0
Fluoride	<0.3										<0.3	mg/l	TM173/PM0
Fluoride	<3										<3	mg/kg	TM173/PM0
Sulphate as SO4 #	5.6										<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	56										<5	mg/kg	TM38/PM0
Chloride #	2.9										<0.3	mg/l	TM38/PM0
Chloride #	29										<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	3										<2	mg/l	TM60/PM0
Dissolved Organic Carbon	30										<20	mg/kg	TM60/PM0
pH	8.12										<0.01	pH units	TM73/PM0
Total Dissolved Solids #	68										<35	mg/l	TM20/PM0
Total Dissolved Solids #	680										<350	mg/kg	TM20/PM0

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : EN12457_2

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40						
Sample ID	WS203	WS206	WS207	WS208	WS209	WS210	WS211	WS212	WS213	WS214						
Depth	0.00-0.70	0.00-0.50	0.00-0.60	0.00-0.90	0.00-0.60	0.00-0.90	0.00-0.70	0.00-0.60	0.00-0.50	0.00-0.50						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1						
Date of Receipt	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Solid Waste Analysis																
Total Organic Carbon #	0.15	0.69	0.60	0.69	0.50	3.07	0.27	4.67	0.09	0.14	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025 SV	<0.025 SV	<0.025	<0.025 SV	<0.025 SV	0.069	<0.025 SV	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.350 BA	<0.350 BA	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	208	580	208	184	<30	191	163	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	0.27	3.17	<0.22	3.92	<0.22	0.27	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	1.14	6.15	<0.64	7.78	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	0.057	<0.025	<0.025	<0.025	0.069	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	1.28	0.05	0.12	0.15	0.42	1.05	0.51	0.28	0.38	0.47	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	0.091	<0.015	<0.015	<0.015	0.062	<0.015	0.024	<0.015	0.116	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	0.19	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.05	0.04	0.03	<0.02	<0.02	0.72	<0.02	0.05	0.03	0.25	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	<0.02	<0.02	0.29	<0.02	0.02	0.03	0.46	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	<0.03	<0.03	<0.03	0.18	0.13	<0.03	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	4882	590	<350	480	3500	2569	470	<350	3230	970	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	110	30	40	30	160	90	90	<20	80	40	500	800	1000	<20	mg/kg	TM60/PM0
Dry Matter Content Ratio	93.5	83.5	91.4	89.3	90.8	65.8	95.9	94.6	92.7	89.0	-	-	-	<0.1	%	NONE/PM4
Moisture Content 105C (% Dry Weight)	7.0	19.7	9.4	12.0	10.1	52.0	4.3	5.7	7.8	12.3	-	-	-	<0.1	%	PM4/PM0
pH #	12.50	8.67	8.52	8.87	12.00	7.65	8.44	8.63	11.55	8.98	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3	4	<3	<3	<3	<3	<3	<3	<3	10	150	500	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	91	38	39	24	201	542	19	15	498	41	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	61	14	13	6	44	183	10	6	113	24	800	15000	25000	<3	mg/kg	TM38/PM0

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

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : EN12457_2

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	41-44																
Sample ID	WS215																
Depth	0.00-0.50																
COC No / misc																	
Containers	V J T																
Sample Date	29/09/2022																
Sample Type	Soil																
Batch Number	1																
Date of Receipt	04/10/2022																
												Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Solid Waste Analysis																	
Total Organic Carbon #	0.33											3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025											6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035											1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30											500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	3.46											-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	6.49											100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																	
Arsenic #	0.033											0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.41											20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005											0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015											0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07											2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001											0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.03											0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02											0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05											0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	0.11											0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03											0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03											4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	680											4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	30											500	800	1000	<20	mg/kg	TM60/PM0
Dry Matter Content Ratio	94.4											-	-	-	<0.1	%	NONE/PM4
Moisture Content 105C (% Dry Weight)	5.9											-	-	-	<0.1	%	PM4/PM0
pH #	8.42											-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1											1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3											10	150	500	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	56											1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	29											800	15000	25000	<3	mg/kg	TM38/PM0

Client Name: Ground Investigations Ireland

Reference: 12058-07-22

Location: Galway Harbour Company

Contact: Barry Sexton

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
22/16137	1	WS203	0.00-0.70	1-4	Degraded Diesel, trace of Lubricating Oil, possible Naturally Occurring Compounds
22/16137	1	WS206	0.00-0.50	5-8	possible Degraded Kerosene, possible Lubricating Oil, possible Tarmac/Bitumen
22/16137	1	WS207	0.00-0.60	9-12	possible Lubricating Oil, possible Tarmac/Bitumen
22/16137	1	WS208	0.00-0.90	13-16	possible trace of Degraded Diesel, possible trace of Lubricating Oil, possible Tarmac/Bitumen
22/16137	1	WS209	0.00-0.60	17-20	No Interpretation Possible
22/16137	1	WS210	0.00-0.90	21-24	possible Lubricating Oil, possible Tarmac/Bitumen
22/16137	1	WS211	0.00-0.70	25-28	possible Mineral Insulating Oil, possible Tarmac/Bitumen
22/16137	1	WS212	0.00-0.60	29-32	trace of possible PAHs
22/16137	1	WS213	0.00-0.50	33-36	No Interpretation Possible
22/16137	1	WS214	0.00-0.50	37-40	No Interpretation Possible
22/16137	1	WS215	0.00-0.50	41-44	trace of possible PAHs

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton

Note:

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

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/16137	1	WS203	0.00-0.70	3	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	grey soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS206	0.00-0.50	7	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	brown soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS207	0.00-0.60	11	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	grey soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS208	0.00-0.90	15	Catherine Coles	06/10/2022	**General Description (Bulk Analysis)**	black dusty soil, stone
					Catherine Coles	06/10/2022	**Asbestos Fibres**	NAD
					Catherine Coles	06/10/2022	**Asbestos ACM**	NAD
					Catherine Coles	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS209	0.00-0.60	19	Catherine Coles	06/10/2022	**General Description (Bulk Analysis)**	soil,stone
					Catherine Coles	06/10/2022	**Asbestos Fibres**	NAD
					Catherine Coles	06/10/2022	**Asbestos ACM**	NAD
					Catherine Coles	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS210	0.00-0.90	23	Catherine Coles	06/10/2022	**General Description (Bulk Analysis)**	soil,stones
					Catherine Coles	06/10/2022	**Asbestos Fibres**	NAD
					Catherine Coles	06/10/2022	**Asbestos ACM**	NAD
					Catherine Coles	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS211	0.00-0.70	27	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	brown soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS212	0.00-0.60	31	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	brown soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/16137	1	WS213	0.00-0.50	35	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	grey soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS214	0.00-0.50	39	Catherine Coles	06/10/2022	**General Description (Bulk Analysis)**	soil,stone
					Catherine Coles	06/10/2022	**Asbestos Fibres**	NAD
					Catherine Coles	06/10/2022	**Asbestos ACM**	NAD
					Catherine Coles	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS215	0.00-0.50	43	Catherine Coles	06/10/2022	**General Description (Bulk Analysis)**	soil,stone
					Catherine Coles	06/10/2022	**Asbestos Fibres**	NAD
					Catherine Coles	06/10/2022	**Asbestos ACM**	NAD
					Catherine Coles	06/10/2022	**Asbestos Type**	NAD

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 22/16137						

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

SOILS and ASH

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

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

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

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

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

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

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

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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

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

WATERS

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

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

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

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

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x10 Dilution
BA	x10 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/16137

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

EMT Job No: 22/16137

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.	Yes		AR	Yes

EMT Job No: 22/16137

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM160	Titrimetric determination of acid reserve to pH 4.0 or alkali reserve to pH 10.0 based on method C14.2 Canadian Government (2013).	PM110	Preparation of a 10% (w/w) aqueous solution of soil in distilled water			AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

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CMTL
CONSTRUCTION MATERIALS TESTING LABORATORIES
A PHENNA GROUP COMPANY

Laboratory Test Report
Uniaxial Compressive Strength

Project:	Galway Harbour Company	**Job Number**	12058-07-22
Client:	Ground Investigations Ireland	**Lab Ref No**	ST 19876
	Catherinestown House, Hazelhatch Road	**Date Received**	26/09/2022
	Newcastle. Co. Dublin	**Date Tested**	27/09/2022
Originator:	Scott Graydon	**Date Reported**	28/09/2022

Sample Reference	Moisture Content	Density (Mg/m^3)	Uniaxial Compressive Strength (N/mm^2)
BH01 9.15-9.35m	0.7	2638	144.9
BH02 10.10-10.26m	1.8	2693	82.7
BH03 9.15-9.30m	0.3	2939	61.0
BH04 8.50-8.70m	0.1	2672	142.2
BH05 10.20-10.40m	0.4	2657	93.7
BH06 10.00-10.18m	0.9	2640	70.7
BH07 9.20-9.40m	0.6	2600	100.2
BH08 8.70-8.81m	0.6	2690	94.7
BH09 9.50-9.70m	0.4	3010	67.1
BH10 9.60-9.85m	0.4	2674	119.6
BH11 10.70-10.95m	0.3	2663	85.6
BH12 10.00-10.15m	0.7	2941	200.4
BH13 10.30-10.40m	1.0	2617	80.9
BH14 9.30-9.50m	0.5	2884	61.4
BH15 9.60-9.85m	0.3	2779	62.1

Approved Signature
James Ward, Operations Manager
CMTL Ireland Limited

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CONSTRUCTION MATERIALS TESTING LABORATORIES
A PHENNA GROUP COMPANY

Laboratory Test Report
Point Load Strength Index

Project :	Galway Harbour Company	**Job Number**	12058-07-22
Client :	Ground Investigations Ireland	**Lab Ref No**	ST 19877
	Catherinestown House, Hazelhatch Road	**Date Received**	26/09/2022
	Newcastle, Co. Dublin	**Date Tested**	27/09/2022
Originator	Scott Graydon	**Date Reported**	28/09/2022

Point Load Strength Index

Sample No:-	Depth (m)	Description	Type	Orientation	W (mm)	D (mm)	P (kN)	De^2 (mm^2)	De (mm)	I_s	F	$I_{s(50)}$ MN/m^2
BH01	7.00-7.08	1	D	⊥	70.0	64.0	15.00	4096	64.0	3.662	1.12	4.09
BH01	10.90-11.00	1	D	⊥	64.0	64.0	30.00	4096	64.0	7.324	1.12	8.18
BH02	9.45-9.55	1	D	⊥	66.0	64.0	22.00	4096	64.0	5.371	1.12	6.00
BH02	10.50-10.58	1	D	⊥	64.0	64.0	33.00	4096	64.0	8.057	1.12	9.00

Description 1 : Red/White Rock
Description 2 :
Description 3 :

$I_{s(50)}$ MN/m^2 for	Description 1		
Min	4.09		
Mean	6.82		
Max	9.00		

Test
A = axial
D = diametrical

Relationship to planes of weakness
IL = irregular lump
II = parallel
⊥ = perpendicular

	$I_{s(50)}$ MN/m^2	U.C.S. MN/m^2
Extremely Weak	<0.05	0.6-1.0
Very Weak	0.05-0.20	1.0-5.0
Weak	0.20-0.50	5.0-25.0
Medium Strong	0.50-2.00	25-50
Strong	2.00-4.50	50-100
Very Strong	4.50-9.00	100-250
Extremely Strong	9.00 +	>250

Approved Signature
James Ward, Operations Manager
CMTL Ireland Limited

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CONSTRUCTION MATERIALS TESTING LABORATORIES
A PHENNA GROUP COMPANY

Laboratory Test Report
Point Load Strength Index

Project :	Galway Harbour Company	**Job Number**	12058-07-22
Client :	Ground Investigations Ireland	**Lab Ref No**	ST 19877
	Catherinestown House, Hazelhatch Road	**Date Received**	26/09/2022
	Newcastle, Co. Dublin	**Date Tested**	27/09/2022
Originator	Scott Graydon	**Date Reported**	28/09/2022

Point Load Strength Index

Sample No:-	Depth (m)	Description	Type	Orientation	W (mm)	D (mm)	P (kN)	De^2 (mm^2)	De (mm)	I_s	F	$I_{s(50)}$ MN/m^2
BH03	7.70-7.80	1	D	⊥	64.0	64.0	21.00	4096	64.0	5.127	1.12	5.73
BH03	10.55-11.65	1	D	⊥	64.0	64.0	14.00	4096	64.0	3.418	1.12	3.82
BH04	6.80-6.90	2	D	⊥	65.0	64.0	10.00	4096	64.0	2.441	1.12	2.73
BH04	9.50-9.57	1	D	⊥	65.0	64.0	35.00	4096	64.0	8.545	1.12	9.55

Description 1 : Blue Rock
Description 2 : Blue Rock with cracks
Description 3 :

$I_{s(50)}$ MN/m^2 for	Description 1		
Min	2.73		
Mean	5.46		
Max	9.55		

Test
A = axial
D = diametrical

Relationship to planes of weakness
IL = irregular lump
II = parallel
⊥ = perpendicular

	$I_{s(50)}$ MN/m^2	U.C.S. MN/m^2
Extremely Weak	<0.05	0.6-1.0
Very Weak	0.05-0.20	1.0-5.0
Weak	0.20-0.50	5.0-25.0
Medium Strong	0.50-2.00	25-50
Strong	2.00-4.50	50-100
Very Strong	4.50-9.00	100-250
Extremely Strong	9.00 +	>250

Approved Signature
James Ward, Operations Manager
CMTL Ireland Limited

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CONSTRUCTION MATERIALS TESTING LABORATORIES
A PHENNA GROUP COMPANY

Laboratory Test Report
Point Load Strength Index

Project :	Galway Harbour Company	**Job Number**	12058-07-22
Client :	Ground Investigations Ireland	**Lab Ref No**	ST 19877
	Catherinestown House, Hazelhatch Road	**Date Received**	26/09/2022
	Newcastle, Co. Dublin	**Date Tested**	27/09/2022
Originator	Scott Graydon	**Date Reported**	28/09/2022

Point Load Strength Index

Sample No:-	Depth (m)	Description	Type	Orientation	W (mm)	D (mm)	P (kN)	De^2 (mm^2)	De (mm)	I_s	F	$I_{s(50)}$ MN/m^2
BH05	8.60-8.70	1	D	⊥	66.0	64.0	37.00	4096	64.0	9.033	1.12	10.09
BH05	11.40-11.50	2	D	⊥	67.0	64.0	41.00	4096	64.0	10.010	1.12	11.19
BH06	9.60-970	2	D	⊥	66.0	64.0	35.00	4096	64.0	8.545	1.12	9.55
BH06	12.10-12.18	2	D	⊥	64.0	64.0	38.00	4096	64.0	9.277	1.12	10.37

Description 1 : Red/White Rock
Description 2 : Blue Rock
Description 3 :

$I_{s(50)}$ MN/m^2 for	Description 1		
Min	9.55		
Mean	10.30		
Max	11.19		

Test
A = axial
D = diametrical

Relationship to planes of weakness
IL = irregular lump
II = parallel
⊥ = perpendicular

	$I_{s(50)}$ MN/m^2	U.C.S. MN/m^2
Extremely Weak	<0.05	0.6-1.0
Very Weak	0.05-0.20	1.0-5.0
Weak	0.20-0.50	5.0-25.0
Medium Strong	0.50-2.00	25-50
Strong	2.00-4.50	50-100
Very Strong	4.50-9.00	100-250
Extremely Strong	9.00 +	>250

Approved Signature
James Ward, Operations Manager
CMTL Ireland Limited

CMTL Ireland Limited
Unit D, Zone 5, Clonminam Business Park
Portlaoise, Co. Laois R32 W30Y
Tel: 057 8664885

CONSTRUCTION MATERIALS TESTING LABORATORIES
A PHENNA GROUP COMPANY

Laboratory Test Report
Point Load Strength Index

Project :	Galway Harbour Company	**Job Number**	12058-07-22
Client :	Ground Investigations Ireland	**Lab Ref No**	ST 19877
	Catherinestown House, Hazelhatch Road	**Date Received**	26/09/2022
	Newcastle, Co. Dublin	**Date Tested**	27/09/2022
Originator	Scott Graydon	**Date Reported**	28/09/2022

Point Load Strength Index

Sample No:-	Depth (m)	Description	Type	Orientation	W (mm)	D (mm)	P (kN)	De^2 (mm^2)	De (mm)	I_s	F	$I_{s(50)}$ MN/m^2
BH07	8.65-8.75	1	D	⊥	66.0	64.0	25.00	4096	64.0	6.104	1.12	6.82
BH07	11.20-11.30	1	D	⊥	65.0	64.0	32.00	4096	64.0	7.813	1.12	8.73
BH08	8.30-8.40	2	D	⊥	66.0	64.0	40.00	4096	64.0	9.766	1.12	10.91
BH08	9.90-10.00	3	D	⊥	67.0	64.0	16.00	4096	64.0	3.906	1.12	4.37

Description 1 : Pink/White Rock
Description 2 : Blue/Grey Rock
Description 3 : Blue/Grey with cracks

$I_{s(50)}$ MN/m^2 for	Description 1		
Min	4.37		
Mean	7.71		
Max	10.91		

Test
A = axial
D = diametrical

Relationship to planes of weakness
IL = irregular lump
II = parallel
⊥ = perpendicular

	$I_{s(50)}$ MN/m^2	U.C.S. MN/m^2
Extremely Weak	<0.05	0.6-1.0
Very Weak	0.05-0.20	1.0-5.0
Weak	0.20-0.50	5.0-25.0
Medium Strong	0.50-2.00	25-50
Strong	2.00-4.50	50-100
Very Strong	4.50-9.00	100-250
Extremely Strong	9.00 +	>250

Approved Signature
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CONSTRUCTION MATERIALS TESTING LABORATORIES
A PHENNA GROUP COMPANY

Laboratory Test Report
Point Load Strength Index

Project :	Galway Harbour Company	**Job Number**	12058-07-22
Client :	Ground Investigations Ireland	**Lab Ref No**	ST 19877
	Catherinestown House, Hazelhatch Road	**Date Received**	26/09/2022
	Newcastle, Co. Dublin	**Date Tested**	27/09/2022
Originator	Scott Graydon	**Date Reported**	28/09/2022

Point Load Strength Index

Sample No:-	Depth (m)	Description	Type	Orientation	W (mm)	D (mm)	P (kN)	De^2 (mm^2)	De (mm)	I_s	F	$I_{s(50)}$ MN/m^2
BH09	8.20-8.30	2	D	⊥	65.0	64.0	22.00	4096	64.0	5.371	1.12	6.00
BH09	10.80-10.90	2	D	⊥	64.0	64.0	25.00	4096	64.0	6.104	1.12	6.82
BH10	8.30-8.40	1	D	⊥	68.0	64.0	20.00	4096	64.0	4.883	1.12	5.46
BH10	10.70-10.80	1	D	⊥	69.0	64.0	32.00	4096	64.0	7.813	1.12	8.73

Description 1 : Pink/White Rock
Description 2 : Blue/Grey Rock
Description 3 :

$I_{s(50)}$ MN/m^2 for	Description 1		
Min	5.46		
Mean	6.75		
Max	8.73		

Test
A = axial
D = diametrical

Relationship to planes of weakness
IL = irregular lump
II = parallel
⊥ = perpendicular

	$I_{s(50)}$ MN/m^2	U.C.S. MN/m^2
Extremely Weak	<0.05	0.6-1.0
Very Weak	0.05-0.20	1.0-5.0
Weak	0.20-0.50	5.0-25.0
Medium Strong	0.50-2.00	25-50
Strong	2.00-4.50	50-100
Very Strong	4.50-9.00	100-250
Extremely Strong	9.00 +	>250

Approved Signature
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CONSTRUCTION MATERIALS TESTING LABORATORIES
A PHENNA GROUP COMPANY

Laboratory Test Report
Point Load Strength Index

Project :	Galway Harbour Company	**Job Number**	12058-07-22
Client :	Ground Investigations Ireland	**Lab Ref No**	ST 19877
	Catherinestown House, Hazelhatch Road	**Date Received**	26/09/2022
	Newcastle, Co. Dublin	**Date Tested**	27/09/2022
Originator	Scott Graydon	**Date Reported**	28/09/2022

Point Load Strength Index

Sample No:-	Depth (m)	Description	Type	Orientation	W (mm)	D (mm)	P (kN)	De^2 (mm^2)	De (mm)	I_s	F	$I_{s(50)}$ MN/m^2
BH11	9.60-9.70	1	D	⊥	64.0	64.0	14.00	4096	64.0	3.418	1.12	3.82
BH11	12.05-12.15	2	D	⊥	67.0	64.0	19.00	4096	64.0	4.639	1.12	5.18
BH12	8.30-8.42	2	D	⊥	68.0	64.0	11.00	4096	64.0	2.686	1.12	3.00
BH12	10.95-11.05	1	D	⊥	64.0	64.0	41.00	4096	64.0	10.010	1.12	11.19

Description 1 : Blue/Grey Rock
Description 2 : Blue/Grey Rock with cracks
Description 3 :

$I_{s(50)}$ MN/m^2 for	Description 1		
Min	3.00		
Mean	5.80		
Max	11.19		

Test
A = axial
D = diametrical

Relationship to planes of weakness
IL = irregular lump
II = parallel
⊥ = perpendicular

	$I_{s(50)}$ MN/m^2	U.C.S. MN/m^2
Extremely Weak	<0.05	0.6-1.0
Very Weak	0.05-0.20	1.0-5.0
Weak	0.20-0.50	5.0-25.0
Medium Strong	0.50-2.00	25-50
Strong	2.00-4.50	50-100
Very Strong	4.50-9.00	100-250
Extremely Strong	9.00 +	>250

Approved Signature
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CONSTRUCTION MATERIALS TESTING LABORATORIES
A PHENNA GROUP COMPANY

Laboratory Test Report
Point Load Strength Index

Project :	Galway Harbour Company	**Job Number**	12058-07-22
Client :	Ground Investigations Ireland	**Lab Ref No**	ST 19877
	Catherinestown House, Hazelhatch Road	**Date Received**	26/09/2022
	Newcastle, Co. Dublin	**Date Tested**	27/09/2022
Originator	Scott Graydon	**Date Reported**	28/09/2022

Point Load Strength Index

Sample No:-	Depth (m)	Description	Type	Orientation	W (mm)	D (mm)	P (kN)	De^2 (mm^2)	De (mm)	I_s	F	$I_{s(50)}$ MN/m^2
BH13	9.40-9.48	2	D	⊥	68.0	64.0	16.00	4096	64.0	3.906	1.12	4.37
BH13	10.80-10.95	1	D	⊥	68.0	64.0	30.00	4096	64.0	7.324	1.12	8.18
BH14	7.90-8.00	3	D	⊥	65.0	64.0	25.00	4096	64.0	6.104	1.12	6.82
BH14	9.97-10.04	3	D	⊥	64.0	64.0	26.00	4096	64.0	6.348	1.12	7.09

Description 1 : Red/White Rock
Description 2 : Red/White Rock with cracks
Description 3 : Blue Rock

$I_{s(50)}$ MN/m^2 for	Description 1		
Min	4.37		
Mean	6.62		
Max	8.18		

Test
A = axial
D = diametrical

Relationship to planes of weakness
IL = irregular lump
II = parallel
⊥ = perpendicular

	$I_{s(50)}$ MN/m^2	U.C.S. MN/m^2
Extremely Weak	<0.05	0.6-1.0
Very Weak	0.05-0.20	1.0-5.0
Weak	0.20-0.50	5.0-25.0
Medium Strong	0.50-2.00	25-50
Strong	2.00-4.50	50-100
Very Strong	4.50-9.00	100-250
Extremely Strong	9.00 +	>250

Approved Signature
James Ward, Operations Manager
CMTL Ireland Limited

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Unit D, Zone 5, Clonminam Business Park
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CONSTRUCTION MATERIALS TESTING LABORATORIES
A PHENNA GROUP COMPANY

Laboratory Test Report
Point Load Strength Index

Project :	Galway Harbour Company	**Job Number**	12058-07-22
Client :	Ground Investigations Ireland	**Lab Ref No**	ST 19877
	Catherinestown House, Hazelhatch Road	**Date Received**	26/09/2022
	Newcastle, Co. Dublin	**Date Tested**	27/09/2022
Originator	Scott Graydon	**Date Reported**	28/09/2022

Point Load Strength Index

Sample No:-	Depth (m)	Description	Type	Orientation	W (mm)	D (mm)	P (kN)	De² (mm²)	De (mm)	I_s	F	$I_{s(50)}$MN/m²
BH15	8.30-8.36	2	D	⊥	65.0	64.0	11.00	4096	64.0	2.686	1.12	3.00
BH15	10.85-10.95	1	D	⊥	70.0	64.0	32.00	4096	64.0	7.813	1.12	8.73

Description 1 : Blue Rock
Description 2 : Blue Rock with cracks
Description 3 :

$I_{s(50)}$MN/m² for	Description 1		
Min	3.00		
Mean	5.87		
Max	8.73		

Test
A = axial
D = diametrical

Relationship to planes of weakness
IL = irregular lump
II = parallel
⊥ = perpendicular

	$I_{s(50)}$MN/m²	U.C.S. MN/m²
Extremely Weak	<0.05	0.6-1.0
Very Weak	0.05-0.20	1.0-5.0
Weak	0.20-0.50	5.0-25.0
Medium Strong	0.50-2.00	25-50
Strong	2.00-4.50	50-100
Very Strong	4.50-9.00	100-250
Extremely Strong	9.00 +	>250

Approved Signature
James Ward, Operations Manager
CMTL Ireland Limited

APPENDIX 5 – Groundwater Monitoring

Ground Investigations Ireland Groundwater Monitoring - Round 2

Project Number	12058-07-22						Sample Date		11-12 / 10 / 2022						
Client	GALWAY HARBOUR COMPANY						Current Weather		Overcast with heavy showers						
Site Name	GALWAY HARBOUR						Weather Prev 24 hours								
Sampler I.D.	S. Graydon						Sampling Method								
Sample I.D.	**BH-01**	**BH-02**	**BH-03**	**BH-04**	**BH-05**	**BH-06**	**BH-07**	**BH-08**	**BH-09**	**BH-10**	**BH-11**	**BH-12**	**BH-13**	**BH-14**	**BH-15**
Casing Diameter (mm)	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98
Standpipe Diameter (mm)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Stick Up (mm)	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush
Cover Condition	Broken	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Broken	Good	Good
Standpipe Type uPVC etc.															
Total Well Depth (m)	10.98	10.89	10.72	9.81	11.67	11.94	11.04	10.07	11.11	10.95	11.93	10.67	10.35	10.38	10.92
Water Level (mBBGL)	4.25	3.92	4.49	4.46	4.38	3.93	3.76	2.9	3.43	4.70	4.82	4.98	4.09	3.92	3.55
Purge Volume (liters)	40.5	42	37	32	44	48	44	43	46	38	43	34	38	39	44
Sampling Time	11:30	10:45	14:30	15:00	16:35	17:05	17:30	08:10	08:45	12:30	12:00	11:40	09:50	10:10	10:40
Litres Purged															
pH	7.72	7.53	7.89	7.92	7.7	7.76	6.96	7.12	7.15	7.14	7.38	7.43	7.31	7.29	7.11
EC (mS/cm)	12.88	20	20	20	20	18.3	7.34	19.26	19.48	11.99	20.2	20	18.08	5.98	18.24
Temp (Degrees)	14.1	13.5	14	13.1	13.2	13.1	13.4	14.3	14.1	13.9	14	13.8	14.3	13.7	13.2
ORP (mV)	-28	-49	38	36	40	39	98	90	84	104	103	105	122	118	63
DO (mg/l)															
(unit ppt)	10	10	10	10	10	9.43	3.82	10	10	6.23	10	10	9.39	3.11	9.49
Colour	Clear	Clear	Cloudy brown	Clear	Yellowish	Clear	Clear with oil sheen	Cloudy brown	Cloudy	Slightly cloudy	Clear	Clear	Clear	Clear	Brown
Odour	None	Organic	None	None	None	None	hydrocarbon	None	None	Organic	None	None	Hydrocarbon	None	None
Additional Comments	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022

APPENDIX 2

MONITORING RECORDS

Ground Investigations Ireland Groundwater Monitoring - Round 2

Project Number	12058-07-22						Sample Date		11-12 / 10 / 2022						
Client	GALWAY HARBOUR COMPANY						Current Weather		Overcast with heavy showers						
Site Name	GALWAY HARBOUR						Weather Prev 24 hours								
Sampler I.D.	S. Graydon						Sampling Method								
Sample I.D.	**BH-01**	**BH-02**	**BH-03**	**BH-04**	**BH-05**	**BH-06**	**BH-07**	**BH-08**	**BH-09**	**BH-10**	**BH-11**	**BH-12**	**BH-13**	**BH-14**	**BH-15**
Casing Diameter (mm)	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98
Standpipe Diameter (mm)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Stick Up (mm)	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush
Cover Condition	Broken	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Broken	Good	Good
Standpipe Type uPVC etc.															
Total Well Depth (m)	10.98	10.89	10.72	9.81	11.67	11.94	11.04	10.07	11.11	10.95	11.93	10.67	10.35	10.38	10.92
Water Level (mBBGL)	4.25	3.92	4.49	4.46	4.38	3.93	3.76	2.9	3.43	4.70	4.82	4.98	4.09	3.92	3.55
Purge Volume (liters)	40.5	42	37	32	44	48	44	43	46	38	43	34	38	39	44
Sampling Time	11:30	10:45	14:30	15:00	16:35	17:05	17:30	08:10	08:45	12:30	12:00	11:40	09:50	10:10	10:40
Litres Purged															
pH	7.72	7.53	7.89	7.92	7.7	7.76	6.96	7.12	7.15	7.14	7.38	7.43	7.31	7.29	7.11
EC (mS/cm)	12.88	20	20	20	20	18.3	7.34	19.26	19.48	11.99	20.2	20	18.08	5.98	18.24
Temp (Degrees)	14.1	13.5	14	13.1	13.2	13.1	13.4	14.3	14.1	13.9	14	13.8	14.3	13.7	13.2
ORP (mV)	-28	-49	38	36	40	39	98	90	84	104	103	105	122	118	63
DO (mg/l)															
(unit ppt)	10	10	10	10	10	9.43	3.82	10	10	6.23	10	10	9.39	3.11	9.49
Colour	Clear	Clear	Cloudy brown	Clear	Yellowish	Clear	Clear with oil sheen	Cloudy brown	Cloudy	Slightly cloudy	Clear	Clear	Clear	Clear	Brown
Odour	None	Organic	None	None	None	None	hydrocarbon	None	None	Organic	None	None	Hydrocarbon	None	None
Additional Comments	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

GROUNDWATER MONITORING

Galway Harbour Company

BOREHOLE	DATE	TIME	GROUNDWATER (m BGL)	Comments
BH01	11/11/2022	09:50:00	3.72	
BH02	10/11/2022	13:35:00	4.19	
BH03	11/11/2022	10:00:00	4.13	
BH04	11/11/2022	10:03:00	3.99	
BH05	11/11/2022	10:06:00	4.44	
BH06	11/11/2022	10:08:00	4.39	
BH07	11/11/2022	10:10:00	3.64	
BH08	11/11/2022	10:15:00	3.99	
BH09	11/11/2022	10:18:00	3.70	
BH10	10/11/2022	15:20:00	4.54	
BH11	10/11/2022	15:10:00	4.89	
BH12	10/11/2022	15:15:00	5.02	
BH13	11/11/2022	10:22:00	4.15	
BH14	11/11/2022	10:25:00	4.05	
BH15	11/11/2022	10:30:00	3.66	

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Ground Investigations Ireland Gas Monitoring Field Sheet (Revision V2 September 2020)

Project Number	12058-07-22	Sample Date	10th & 11th Nov. 2022	
Client	Galway Harbour Company	Current Weather	Windy with light rain showers	
Site Name	Galway Harbour	Weather Prev 24 hours	Rain showers	
Sampler I.D.	S Graydon	Gas Meter Model		

Sample I.D.	WS04	WS09	WS10	WS12	WS14	WS16	WS18	WS22	WS23		
Casing Diameter (mm)	100	100	100	100	100	100	100	100	100		
Standpipe Diameter (mm)	50	50	50	50	50	50	50	50	50		
Stick Up (mm)	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush		
Cover Condition	Good	Good	Good	Good	Good	Good	Good	Good	Good		
Standpipe Type uPVC etc.	-	-	-	-	-	-	-	-	-		
Total Well Depth (m)	2.00	1.62	1.92	2.00	2.30	Unable to remove Cap	2.72	5.72	2.43		
Water Level (mBBGL)	1.58	None	None	None	None		2.60	4.36	None		
Odour	None	None	None	None	None	None	None	None	None		
Gas Valve/Cap Condition	Poor	Poor	Poor	Good	Good	Poor	Poor	N/A	Good		
Flow (litre/hour)	0.2	0.1	Gas tap Damaged	0.2	0.2	0.1	0.1	No gas tap over install	0		
CH4 (%)	0	0		0	0	0	0		0		
CO2 (%)	0.2	0.2		0.2	0.1	0.1	1.7		0.1		
CO (%)	0	0		0	0	1	0		0		
H2S (ppm)	0	0		0	0	0	0		0		
O2 (%)	20.7	21.2		21.5	20.8	21.2	18.7		21.6		
Barometric Pressure	1007	1004		1004	1004	1004	1004		1004		
Relative	-0.1	-0.5		0.09	0.1	0.02	-0.03		-0.48		
Bal	79.1	78.6		78.4	79.1	78.8	79.3		78.3		
Date	11/11/2022	10/11/2022	10/11/2022	10/11/2022	10/11/2022	10/11/2022	10/11/2022	11/11/2022	10/11/2022		
Time	09:30	15:55	16:10	15:40	13:45	14:15	14:40	10:50	15:00		
Additional Comment											

APPENDIX 3

LABORATORY RESULTS

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

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F: +44 (0) 1244 833781
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Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention :	Barry Sexton
Date :	18th October, 2022
Your reference :	12058-07-22
Our reference :	Test Report 22/16137 Batch 1
Location :	Galway Harbour Company
Date samples received :	4th October, 2022
Status :	Final Report
Issue :	1

Eleven samples were received for analysis on 4th October, 2022 of which eleven were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Liza Klebe
Project Co-ordinator

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	LOD/LOR	Units	Method No.
Sample ID	WS203	WS206	WS207	WS208	WS209	WS210	WS211	WS212	WS213	WS214			
Depth	0.00-0.70	0.00-0.50	0.00-0.60	0.00-0.90	0.00-0.60	0.00-0.90	0.00-0.70	0.00-0.60	0.00-0.50	0.00-0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022			
Antimony	<1	<1	<1	<1	<1	<1	1	3	<1	1	<1	mg/kg	TM30/PM15
Arsenic #	2.6	3.5	16.6	1.9	2.5	4.4	4.8	8.8	1.7	2.7	<0.5	mg/kg	TM30/PM15
Barium #	34	10	12	13	12	38	188	140	9	23	<1	mg/kg	TM30/PM15
Cadmium #	0.3	0.2	0.3	0.3	0.3	0.8	2.2	2.0	0.2	0.3	<0.1	mg/kg	TM30/PM15
Chromium #	29.4	14.2	16.0	14.8	31.9	17.1	17.7	80.9	16.2	55.6	<0.5	mg/kg	TM30/PM15
Copper #	7	8	11	5	6	40	15	49	4	14	<1	mg/kg	TM30/PM15
Lead #	<5	8	10	7	<5	78	229	257	<5	15	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.3	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	1.7	1.2	1.6	1.2	2.8	1.1	1.5	3.5	1.3	2.6	<0.1	mg/kg	TM30/PM15
Nickel #	8.5	7.2	7.7	6.3	8.4	4.5	5.7	16.9	5.9	9.9	<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	1	<1	<1	<1	<1	1	<1	<1	<1	mg/kg	TM30/PM15
Zinc #	46	14	23	13	74	135	254	269	7	31	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	0.07	<0.04	0.13	0.20	0.13	0.13	0.15	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	0.10	<0.03	0.15	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.05	<0.04	0.05	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	0.09	<0.03	0.16	0.26	0.40	0.07	0.63	<0.03	0.05	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.15	<0.04	0.23	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	0.04	0.08	0.85	<0.03	1.24	<0.03	0.11	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	0.05	<0.03	0.06	0.11	0.85	0.06	1.08	<0.03	0.11	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	0.07	0.12	0.51	<0.06	0.67	<0.06	0.09	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	0.05	<0.02	0.06	0.14	0.50	0.02	0.66	<0.02	0.06	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	0.11	0.97	<0.07	1.21	<0.07	0.12	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.47	<0.04	0.61	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	0.48	<0.04	0.48	<0.04	0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	0.04	0.11	<0.04	0.13	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	0.08	0.40	0.05	0.38	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	0.18	<0.04	0.11	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	0.27	3.17	<0.22	3.92	<0.22	0.27	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	1.14	6.15	<0.64	7.78	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	0.08	0.70	<0.05	0.87	<0.05	0.09	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	0.03	0.27	<0.02	0.34	<0.02	0.03	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	95	96	93	96	93	96	95	94	93	94	<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	208	580	208	184	<30	191	163	<30	<30	<30	<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	LOD/LOR	Units	Method No.
Sample ID	WS203	WS206	WS207	WS208	WS209	WS210	WS211	WS212	WS213	WS214			
Depth	0.00-0.70	0.00-0.50	0.00-0.60	0.00-0.90	0.00-0.60	0.00-0.90	0.00-0.70	0.00-0.60	0.00-0.50	0.00-0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022			
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	8.7	<0.2	3.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	9	115	<4	13	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	69	48	<7	55	<7	<7	108	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	123	317	174	113	<7	141	55	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_1D_AL)	7	91	34	<7	<7	50	<7	<7	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_1D_AL)	208	580	208	184	<26	191	163	<26	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10 (HS_1D_AL)	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25 (EH_1D_AL)	99	203	<10	82	<10	<10	135	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35 (EH_1D_AL)	62	249	138	76	<10	134	21	<10	<10	<10	<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2	<0.2	<0.2	3.9	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	<4	6	<4	19	<4	<4	<4	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	27	30	<7	73	<7	19	23	12	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	140	816	340	190	<7	632	14	87	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_1D_AR)	27	337	97	33	<7	206	<7	10	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_1D_AR)	194	1189	437	319	<26	857	37	109	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	402	1769	645	503	<52	1048	200	109	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 (HS_1D_AR)#	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1 SV	<0.1	<0.1 SV	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25 (EH_1D_AR)	39	45	19	135	<10	46	41	29	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35 (EH_1D_AR)	103	652	282	126	<10	535	<10	68	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE#	<5	<5 SV	<5 SV	<5	<5 SV	<5 SV	<5	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
Benzene#	<5	<5 SV	<5 SV	<5	<5 SV	<5 SV	<5	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
Toluene#	<5	<5 SV	<5 SV	<5	6 SV	<5 SV	22	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
Ethylbenzene#	<5	<5 SV	<5 SV	<5	<5 SV	<5 SV	6	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
m/p-Xylene#	7	<5 SV	<5 SV	<5	<5 SV	<5 SV	28	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
o-Xylene#	6	<5 SV	<5 SV	<5	<5 SV	<5 SV	13	<5 SV	<5	<5	<5	ug/kg	TM36/PM12
PCB 28#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 153#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 180#	<5	<50 AA	<50 AA	<5	<5	<5	<5	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs#	<35	<350 AA	<350 AA	<35	<35	<35	<35	<35	<35	<35	<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	LOD/LOR	Units	Method No.
Sample ID	WS203	WS206	WS207	WS208	WS209	WS210	WS211	WS212	WS213	WS214			
Depth	0.00-0.70	0.00-0.50	0.00-0.60	0.00-0.90	0.00-0.60	0.00-0.90	0.00-0.70	0.00-0.60	0.00-0.50	0.00-0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022			
Natural Moisture Content	6.7	4.7	5.3	4.9	4.0	6.5	3.5	7.4	4.6	7.6	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	6.3	4.5	5.0	4.7	3.8	6.1	3.3	6.9	4.4	7.1	<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Chromium III	29.4	14.2	16.0	14.8	31.9	17.1	17.7	80.9	16.2	55.6	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.15	0.69	0.60	0.69	0.50	3.07	0.27	4.67	0.09	0.14	<0.02	%	TM21/PM24
Alkali Reserve	0.596	-	-	-	0.194	-	-	-	0.056	-	<0.000	gNaOH/100g	TM160/PM110
pH #	12.50	8.67	8.52	8.87	12.00	7.65	8.44	8.63	11.55	8.98	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.0961	0.1082	0.098	0.1007	0.0989	0.137	0.0936	0.095	0.0971	0.1006		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	41-44										LOD/LOR	Units	Method No.
Sample ID	WS215												
Depth	0.00-0.50												
COC No / misc													
Containers	V J T												
Sample Date	29/09/2022												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	04/10/2022												
Antimony	1										<1	mg/kg	TM30/PM15
Arsenic #	2.8										<0.5	mg/kg	TM30/PM15
Barium #	69										<1	mg/kg	TM30/PM15
Cadmium #	0.8										<0.1	mg/kg	TM30/PM15
Chromium #	25.0										<0.5	mg/kg	TM30/PM15
Copper #	37										<1	mg/kg	TM30/PM15
Lead #	69										<5	mg/kg	TM30/PM15
Mercury #	<0.1										<0.1	mg/kg	TM30/PM15
Molybdenum #	1.7										<0.1	mg/kg	TM30/PM15
Nickel #	7.8										<0.7	mg/kg	TM30/PM15
Selenium #	<1										<1	mg/kg	TM30/PM15
Zinc #	289										<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	0.12										<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.24										<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05										<0.05	mg/kg	TM4/PM8
Fluorene #	0.04										<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.46										<0.03	mg/kg	TM4/PM8
Anthracene #	0.12										<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.96										<0.03	mg/kg	TM4/PM8
Pyrene #	0.84										<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.42										<0.06	mg/kg	TM4/PM8
Chrysene #	0.53										<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.99										<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.54										<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.51										<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.09										<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.46										<0.04	mg/kg	TM4/PM8
Coronene	0.17										<0.04	mg/kg	TM4/PM8
PAH 6 Total #	3.46										<0.22	mg/kg	TM4/PM8
PAH 17 Total	6.49										<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.71										<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.28										<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1										<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	94										<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	<30										<30	mg/kg	TM5/PM8/PM16

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

EMT Sample No.	41-44												
Sample ID	WS215												
Depth	0.00-0.50												
COC No / misc													
Containers	V J T												
Sample Date	29/09/2022												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	04/10/2022												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1										<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1										<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	0.1										<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2										<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	<4										<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	<7										<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	<7										<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_1D_AL)	<7										<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_1D_AL)	<26										<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10 (HS_1D_AL)	0.1										<0.1	mg/kg	TM36/PM12
>C10-C25 (EH_1D_AL)	<10										<10	mg/kg	TM5/PM8/PM16
>C25-C35 (EH_1D_AL)	<10										<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1										<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1										<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1										<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2										<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	15										<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	48										<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	103										<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_1D_AR)	7										<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_1D_AR)	173										<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	173										<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 (HS_1D_AR)#	<0.1										<0.1	mg/kg	TM36/PM12
>EC10-EC25 (EH_1D_AR)	118										<10	mg/kg	TM5/PM8/PM16
>EC25-EC35 (EH_1D_AR)	93										<10	mg/kg	TM5/PM8/PM16
MTBE#	<5										<5	ug/kg	TM36/PM12
Benzene#	<5										<5	ug/kg	TM36/PM12
Toluene#	<5										<5	ug/kg	TM36/PM12
Ethylbenzene#	<5										<5	ug/kg	TM36/PM12
m/p-Xylene#	6										<5	ug/kg	TM36/PM12
o-Xylene#	<5										<5	ug/kg	TM36/PM12
PCB 28#	<5										<5	ug/kg	TM17/PM8
PCB 52#	<5										<5	ug/kg	TM17/PM8
PCB 101#	<5										<5	ug/kg	TM17/PM8
PCB 118#	<5										<5	ug/kg	TM17/PM8
PCB 138#	<5										<5	ug/kg	TM17/PM8
PCB 153#	<5										<5	ug/kg	TM17/PM8
PCB 180#	<5										<5	ug/kg	TM17/PM8
Total 7 PCBs#	<35										<35	ug/kg	TM17/PM8

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : Solid

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

EMT Sample No.	41-44												
Sample ID	WS215												
Depth	0.00-0.50												
COC No / misc													
Containers	V J T												
Sample Date	29/09/2022												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	04/10/2022												

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
Natural Moisture Content	4.1										<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	3.9										<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3										<0.3	mg/kg	TM38/PM20
Chromium III	25.0										<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.33										<0.02	%	TM21/PM24
Alkali Reserve	-										<0.000	gNaOH/100g	TM160/PM110
pH #	8.42										<0.01	pH units	TM73/PM11
Mass of raw test portion	0.0953											kg	NONE/PM17
Mass of dried test portion	0.09											kg	NONE/PM17

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : CEN 10:1 1 Batch

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

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	LOD/LOR	Units	Method No.
Sample ID	WS203	WS206	WS207	WS208	WS209	WS210	WS211	WS212	WS213	WS214			
Depth	0.00-0.70	0.00-0.50	0.00-0.60	0.00-0.90	0.00-0.60	0.00-0.90	0.00-0.70	0.00-0.60	0.00-0.50	0.00-0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022			
Dissolved Antimony #	<0.002	<0.002	<0.002	<0.002	<0.002	0.029	0.002	0.002	0.003	0.046	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	0.29	<0.02	0.02	0.03	0.46	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0057	<0.0025	<0.0025	<0.0025	0.0069	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	0.057	<0.025	<0.025	<0.025	0.069	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.128	0.005	0.012	0.015	0.042	0.105	0.051	0.028	0.038	0.047	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	1.28	0.05	0.12	0.15	0.42	1.05	0.51	0.28	0.38	0.47	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	0.0091	<0.0015	<0.0015	<0.0015	0.0062	<0.0015	0.0024	<0.0015	0.0116	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	0.091	<0.015	<0.015	<0.015	0.062	<0.015	0.024	<0.015	0.116	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	0.019	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	0.19	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.005	0.004	0.003	<0.002	<0.002	0.072	<0.002	0.005	0.003	0.025	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.05	0.04	0.03	<0.02	<0.02	0.72	<0.02	0.05	0.03	0.25	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003	<0.003	<0.003	<0.003	0.018	0.013	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	0.18	0.13	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	0.4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	4	<3	<3	<3	<3	<3	<3	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	9.1	3.8	3.9	2.4	20.1	54.2	1.9	1.5	49.8	4.1	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	91	38	39	24	201	542	19	15	498	41	<5	mg/kg	TM38/PM0
Chloride #	6.1	1.4	1.3	0.6	4.4	18.3	1.0	0.6	11.3	2.4	<0.3	mg/l	TM38/PM0
Chloride #	61	14	13	6	44	183	10	6	113	24	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	11	3	4	3	16	9	9	<2	8	4	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	110	30	40	30	160	90	90	<20	80	40	<20	mg/kg	TM60/PM0
pH	11.97	8.21	8.00	8.04	11.76	8.43	7.94	7.87	11.50	8.17	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	488	59	<35	48	350	257	47	<35	323	97	<35	mg/l	TM20/PM0
Total Dissolved Solids #	4882	590	<350	480	3500	2569	470	<350	3230	970	<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : CEN 10:1 1 Batch

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

EMT Sample No.	41-44												
Sample ID	WS215												
Depth	0.00-0.50										Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V J T												
Sample Date	29/09/2022												
Sample Type	Soil												
Batch Number	1										LOD/LOR	Units	Method No.
Date of Receipt	04/10/2022												
Dissolved Antimony #	0.011										<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	0.11										<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	0.0033										<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	0.033										<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.041										<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.41										<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005										<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005										<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015										<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015										<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007										<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07										<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005										<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05										<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.003										<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.03										<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002										<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02										<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003										<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03										<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003										<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03										<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001										<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001										<0.0001	mg/kg	TM61/PM0
Phenol	<0.01										<0.01	mg/l	TM26/PM0
Phenol	<0.1										<0.1	mg/kg	TM26/PM0
Fluoride	<0.3										<0.3	mg/l	TM173/PM0
Fluoride	<3										<3	mg/kg	TM173/PM0
Sulphate as SO4 #	5.6										<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	56										<5	mg/kg	TM38/PM0
Chloride #	2.9										<0.3	mg/l	TM38/PM0
Chloride #	29										<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	3										<2	mg/l	TM60/PM0
Dissolved Organic Carbon	30										<20	mg/kg	TM60/PM0
pH	8.12										<0.01	pH units	TM73/PM0
Total Dissolved Solids #	68										<35	mg/l	TM20/PM0
Total Dissolved Solids #	680										<350	mg/kg	TM20/PM0

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : EN12457_2

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40						
Sample ID	WS203	WS206	WS207	WS208	WS209	WS210	WS211	WS212	WS213	WS214						
Depth	0.00-0.70	0.00-0.50	0.00-0.60	0.00-0.90	0.00-0.60	0.00-0.90	0.00-0.70	0.00-0.60	0.00-0.50	0.00-0.50						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022	29/09/2022						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1						
Date of Receipt	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	04/10/2022	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Solid Waste Analysis																
Total Organic Carbon #	0.15	0.69	0.60	0.69	0.50	3.07	0.27	4.67	0.09	0.14	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025 SV	<0.025 SV	<0.025	<0.025 SV	<0.025 SV	0.069	<0.025 SV	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.350 BA	<0.350 BA	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	208	580	208	184	<30	191	163	<30	<30	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	0.27	3.17	<0.22	3.92	<0.22	0.27	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	1.14	6.15	<0.64	7.78	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	0.057	<0.025	<0.025	<0.025	0.069	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	1.28	0.05	0.12	0.15	0.42	1.05	0.51	0.28	0.38	0.47	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	0.091	<0.015	<0.015	<0.015	0.062	<0.015	0.024	<0.015	0.116	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	0.19	<0.07	<0.07	<0.07	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.05	0.04	0.03	<0.02	<0.02	0.72	<0.02	0.05	0.03	0.25	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	<0.02	<0.02	0.29	<0.02	0.02	0.03	0.46	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	<0.03	<0.03	<0.03	0.18	0.13	<0.03	<0.03	<0.03	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	4882	590	<350	480	3500	2569	470	<350	3230	970	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	110	30	40	30	160	90	90	<20	80	40	500	800	1000	<20	mg/kg	TM60/PM0
Dry Matter Content Ratio	93.5	83.5	91.4	89.3	90.8	65.8	95.9	94.6	92.7	89.0	-	-	-	<0.1	%	NONE/PM4
Moisture Content 105C (% Dry Weight)	7.0	19.7	9.4	12.0	10.1	52.0	4.3	5.7	7.8	12.3	-	-	-	<0.1	%	PM4/PM0
pH #	12.50	8.67	8.52	8.87	12.00	7.65	8.44	8.63	11.55	8.98	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3	4	<3	<3	<3	<3	<3	<3	<3	10	150	500	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	91	38	39	24	201	542	19	15	498	41	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	61	14	13	6	44	183	10	6	113	24	800	15000	25000	<3	mg/kg	TM38/PM0

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

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16137

Report : EN12457_2

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	41-44																
Sample ID	WS215																
Depth	0.00-0.50																
COC No / misc																	
Containers	V J T																
Sample Date	29/09/2022																
Sample Type	Soil																
Batch Number	1																
Date of Receipt	04/10/2022																
												Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Solid Waste Analysis																	
Total Organic Carbon #	0.33											3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025											6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035											1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30											500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	3.46											-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	6.49											100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																	
Arsenic #	0.033											0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.41											20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005											0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015											0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07											2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001											0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.03											0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02											0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05											0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	0.11											0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03											0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03											4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	680											4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	30											500	800	1000	<20	mg/kg	TM60/PM0
Dry Matter Content Ratio	94.4											-	-	-	<0.1	%	NONE/PM4
Moisture Content 105C (% Dry Weight)	5.9											-	-	-	<0.1	%	PM4/PM0
pH #	8.42											-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1											1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3											10	150	500	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	56											1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	29											800	15000	25000	<3	mg/kg	TM38/PM0

Client Name: Ground Investigations Ireland

Reference: 12058-07-22

Location: Galway Harbour Company

Contact: Barry Sexton

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
22/16137	1	WS203	0.00-0.70	1-4	Degraded Diesel, trace of Lubricating Oil, possible Naturally Occurring Compounds
22/16137	1	WS206	0.00-0.50	5-8	possible Degraded Kerosene, possible Lubricating Oil, possible Tarmac/Bitumen
22/16137	1	WS207	0.00-0.60	9-12	possible Lubricating Oil, possible Tarmac/Bitumen
22/16137	1	WS208	0.00-0.90	13-16	possible trace of Degraded Diesel, possible trace of Lubricating Oil, possible Tarmac/Bitumen
22/16137	1	WS209	0.00-0.60	17-20	No Interpretation Possible
22/16137	1	WS210	0.00-0.90	21-24	possible Lubricating Oil, possible Tarmac/Bitumen
22/16137	1	WS211	0.00-0.70	25-28	possible Mineral Insulating Oil, possible Tarmac/Bitumen
22/16137	1	WS212	0.00-0.60	29-32	trace of possible PAHs
22/16137	1	WS213	0.00-0.50	33-36	No Interpretation Possible
22/16137	1	WS214	0.00-0.50	37-40	No Interpretation Possible
22/16137	1	WS215	0.00-0.50	41-44	trace of possible PAHs

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton

Note:

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

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/16137	1	WS203	0.00-0.70	3	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	grey soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS206	0.00-0.50	7	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	brown soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS207	0.00-0.60	11	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	grey soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS208	0.00-0.90	15	Catherine Coles	06/10/2022	**General Description (Bulk Analysis)**	black dusty soil, stone
					Catherine Coles	06/10/2022	**Asbestos Fibres**	NAD
					Catherine Coles	06/10/2022	**Asbestos ACM**	NAD
					Catherine Coles	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS209	0.00-0.60	19	Catherine Coles	06/10/2022	**General Description (Bulk Analysis)**	soil,stone
					Catherine Coles	06/10/2022	**Asbestos Fibres**	NAD
					Catherine Coles	06/10/2022	**Asbestos ACM**	NAD
					Catherine Coles	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS210	0.00-0.90	23	Catherine Coles	06/10/2022	**General Description (Bulk Analysis)**	soil,stones
					Catherine Coles	06/10/2022	**Asbestos Fibres**	NAD
					Catherine Coles	06/10/2022	**Asbestos ACM**	NAD
					Catherine Coles	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS211	0.00-0.70	27	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	brown soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS212	0.00-0.60	31	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	brown soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
22/16137	1	WS213	0.00-0.50	35	Andrew Alker	06/10/2022	**General Description (Bulk Analysis)**	grey soil and stone
					Andrew Alker	06/10/2022	**Asbestos Fibres**	NAD
					Andrew Alker	06/10/2022	**Asbestos ACM**	NAD
					Andrew Alker	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS214	0.00-0.50	39	Catherine Coles	06/10/2022	**General Description (Bulk Analysis)**	soil,stone
					Catherine Coles	06/10/2022	**Asbestos Fibres**	NAD
					Catherine Coles	06/10/2022	**Asbestos ACM**	NAD
					Catherine Coles	06/10/2022	**Asbestos Type**	NAD
22/16137	1	WS215	0.00-0.50	43	Catherine Coles	06/10/2022	**General Description (Bulk Analysis)**	soil,stone
					Catherine Coles	06/10/2022	**Asbestos Fibres**	NAD
					Catherine Coles	06/10/2022	**Asbestos ACM**	NAD
					Catherine Coles	06/10/2022	**Asbestos Type**	NAD

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 22/16137						

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

SOILS and ASH

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

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

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

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

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

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

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

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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

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

WATERS

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

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

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

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

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x10 Dilution
BA	x10 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/16137

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

EMT Job No: 22/16137

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.	Yes		AR	Yes

EMT Job No: 22/16137

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM160	Titrimetric determination of acid reserve to pH 4.0 or alkali reserve to pH 10.0 based on method C14.2 Canadian Government (2013).	PM110	Preparation of a 10% (w/w) aqueous solution of soil in distilled water			AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

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Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention :	Barry Sexton
Date :	31st October, 2022
Your reference :	12058-07-22
Our reference :	Test Report 22/16949 Batch 1
Location :	Galway Harbour Company
Date samples received :	17th October, 2022
Status :	Final Report
Issue :	1

Fifteen samples were received for analysis on 17th October, 2022 of which fifteen were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Bruce Leslie
Project Manager

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16949

Report : Liquid

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

EMT Sample No.	1-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64	65-72	73-80	LOD/LOR	Units	Method No.
Sample ID	BH01	BH02	BH03	BH04	BH05	BH06	BH07	BH08	BH09	BH10			
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G			
Sample Date	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	12/10/2022			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022			
Dissolved Arsenic #	3.9	<2.5	<2.5	<2.5	<2.5	<2.5	2.9	<2.5	<2.5	<2.5	<2.5	ug/l	TM30/PM14
Dissolved Boron	2725	2408	2148	1946	1885	1731	649	1511	1633	909	<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	1.7	<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	11	<7	<7	<7	14	<7	7	<7	<7	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM30/PM14
Dissolved Manganese #	<2	48	9	9	<2	4	47	111	54	<2	<2	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2	<2	<2	<2	<2	<2	3	2	<2	<2	ug/l	TM30/PM14
Dissolved Phosphorus #	19	32	11	21	10	17	62	12	11	89	<5	ug/l	TM30/PM14
Dissolved Potassium #	330.7 AA	296.5 AA	255.4 AA	199.7 AA	238.7 AA	189.1 AA	58.7	192.7 AA	199.3 AA	90.0	<0.1	mg/l	TM30/PM14
Dissolved Zinc #	8	15	15	9	7	9	52	27	19	7	<3	ug/l	TM30/PM14
PAH MS													
Naphthalene #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM4/PM30
Acenaphthylene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Acenaphthene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Fluorene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Phenanthrene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.116	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Anthracene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Fluoranthene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Pyrene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.330	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Benzo(a)anthracene #	<0.005+	<0.005+	<0.005+	<0.005+	<0.005	<0.005	0.050	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Chrysene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.105	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene #	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.036	<0.008	<0.008	<0.008	<0.008	ug/l	TM4/PM30
Benzo(a)pyrene #	<0.005+	<0.005+	<0.005+	<0.005+	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene #	<0.005+	<0.005+	<0.005+	<0.005+	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	<0.005+	<0.005+	<0.005+	<0.005+	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ug/l	TM4/PM30
PAH 16 Total #	<0.173	<0.173	<0.173	<0.173	<0.173	<0.173	0.637	<0.173	<0.173	<0.173	<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.026	<0.008	<0.008	<0.008	<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.010	<0.008	<0.008	<0.008	<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	94	94	90	92	88	95	85	79	90	88	<0	%	TM4/PM30
Methyl Tertiary Butyl Ether #	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	101	96	102	101	100	102	100	103	101	99	<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	102	94	100	99	101	100	101	102	100	99	<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16949

Report : Liquid

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

EMT Sample No.	1-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64	65-72	73-80	LOD/LOR	Units	Method No.
Sample ID	BH01	BH02	BH03	BH04	BH05	BH06	BH07	BH08	BH09	BH10			
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G			
Sample Date	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	12/10/2022			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022			
TPH CWG													
Aliphatics													
>C5-C6 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM36/PM12
>C6-C8 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM36/PM12
>C8-C10 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM36/PM12
>C10-C12 #	<5	<5	<5	<5	<5	<5	1752	<5	<5	<5	<5	ug/l	TM5/PM16/PM30
>C12-C16 #	<10	<10	<10	<10	<10	<10	12490	<10	<10	<10	<10	ug/l	TM5/PM16/PM30
>C16-C21 #	<10	<10	<10	<10	<10	<10	16980	<10	<10	<10	<10	ug/l	TM5/PM16/PM30
>C21-C35 #	<10	<10	<10	<10	<10	<10	3900	<10	<10	<10	<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 #	<10	<10	<10	<10	<10	<10	35122	<10	<10	<10	<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM36/PM12
>EC7-EC8 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM36/PM12
>EC8-EC10 #	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	ug/l	TM36/PM12
>EC10-EC12 #	<5	<5	<5	<5	<5	<5	45	<5	<5	<5	<5	ug/l	TM5/PM16/PM30
>EC12-EC16 #	<10	<10	<10	<10	<10	<10	1700	<10	<10	<10	<10	ug/l	TM5/PM16/PM30
>EC16-EC21 #	<10	<10	<10	<10	<10	<10	4790	<10	<10	<10	<10	ug/l	TM5/PM16/PM30
>EC21-EC35 #	<10	<10	<10	<10	<10	<10	1650	<10	<10	<10	<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 #	<10	<10	<10	<10	<10	<10	8185	<10	<10	<10	<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) #	<10	<10	<10	<10	<10	<10	43307	<10	<10	<10	<10	ug/l	TM5/TM36/PM12/PM16/PM30
Phenol #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Sulphate as SO4 #	1882.4	1677.7	1410.0	1187.2	1203.7	1014.9	356.7	1003.5	1007.3	631.2	<0.5	mg/l	TM38/PM0
Chloride #	13249.1 AB	11902.6 AB	11005.4	9659.4	9745.8	8273.2	2452.7	8204.6	8285.4	4383.5	<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	0.7	<0.2	<0.2	0.8	<0.2	0.7	1.7	<0.2	0.6	11.5	<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	0.03	0.50	<0.02	<0.02	<0.02	<0.02	0.10	0.60	0.20	<0.02	<0.02	mg/l	TM38/PM0
Total Cyanide #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as NH3 #	<0.03	0.18	0.86	0.07	0.90	0.80	0.21	0.57	0.22	0.59	<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	mg/l	TM38/PM0
Electrical Conductivity @25C #	38489	35235	30272	26914	27195	23897	7877	23324	23642	15294	<2	uS/cm	TM76/PM0
pH #	7.85	7.74	7.92	7.95	8.01	7.92	7.56	7.67	7.81	7.69	<0.01	pH units	TM73/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16949

Report : Liquid

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

EMT Sample No.	81-88	89-96	97-104	105-112	113-120						LOD/LOR	Units	Method No.
Sample ID	BH11	BH12	BH13	BH14	BH15								
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G								
Sample Date	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022								
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water								
Batch Number	1	1	1	1	1								
Date of Receipt	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022								
Dissolved Arsenic #	<2.5	<2.5	4.5	<2.5	10.7						<2.5	ug/l	TM30/PM14
Dissolved Boron	1168	1126	1146	485	1206						<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	1.4	<0.5	<0.5						<0.5	ug/l	TM30/PM14
Total Dissolved Chromium #	1.7	<1.5	3.8	<1.5	4.8						<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	17	<7	19						<7	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	30	<5	22						<5	ug/l	TM30/PM14
Dissolved Manganese #	47	44	304	<2	445						<2	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	<1	<1						<1	ug/l	TM30/PM14
Dissolved Nickel #	<2	<2	4	<2	4						<2	ug/l	TM30/PM14
Dissolved Phosphorus #	161	166	357	50	303						<5	ug/l	TM30/PM14
Dissolved Potassium #	128.4_{AA}	134.5_{AA}	120.0_{AA}	45.5	137.4_{AA}						<0.1	mg/l	TM30/PM14
Dissolved Zinc #	9	9	65	6	32						<3	ug/l	TM30/PM14
PAH MS													
Naphthalene #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	ug/l	TM4/PM30
Acenaphthylene #	<0.005	<0.005	<0.005	<0.005	<0.005						<0.005	ug/l	TM4/PM30
Acenaphthene #	<0.005	<0.005	<0.005	<0.005	<0.005						<0.005	ug/l	TM4/PM30
Fluorene #	<0.005	<0.005	<0.005	<0.005	<0.005						<0.005	ug/l	TM4/PM30
Phenanthrene #	<0.005	<0.005	0.008	<0.005	0.006						<0.005	ug/l	TM4/PM30
Anthracene #	<0.005	<0.005	<0.005	<0.005	<0.005						<0.005	ug/l	TM4/PM30
Fluoranthene #	<0.005	<0.005	0.012	<0.005	0.005						<0.005	ug/l	TM4/PM30
Pyrene #	<0.005	<0.005	0.010	<0.005	0.005						<0.005	ug/l	TM4/PM30
Benzo(a)anthracene #	<0.005	<0.005	0.008	<0.005	<0.005						<0.005	ug/l	TM4/PM30
Chrysene #	<0.005	<0.005	0.007	<0.005	<0.005						<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene #	<0.008	<0.008	0.010	<0.008	<0.008						<0.008	ug/l	TM4/PM30
Benzo(a)pyrene #	<0.005	<0.005	0.007	<0.005	<0.005						<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene #	<0.005	<0.005	<0.005	<0.005	<0.005						<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	<0.005	<0.005	<0.005	<0.005	<0.005						<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene #	<0.005	<0.005	<0.005	<0.005	<0.005						<0.005	ug/l	TM4/PM30
PAH 16 Total #	<0.173	<0.173	<0.173	<0.173	<0.173						<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.008	<0.008	<0.008	<0.008	<0.008						<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.008	<0.008	<0.008	<0.008	<0.008						<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	86	90	91	93	91						<0	%	TM4/PM30
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	<5						<5	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	102	100	106	104	102						<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	102	99	105	103	99						<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
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Contact: Barry Sexton
EMT Job No: 22/16949

Report : Liquid

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

EMT Sample No.	81-88	89-96	97-104	105-112	113-120							
Sample ID	BH11	BH12	BH13	BH14	BH15							
Depth												
COC No / misc												
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G							
Sample Date	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water							
Batch Number	1	1	1	1	1							
Date of Receipt	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022							

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>C6-C8 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>C8-C10 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>C10-C12 #	<5	<5	<5	<5	<5						<5	ug/l	TM5/PM16/PM30
>C12-C16 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
>C16-C21 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
>C21-C35 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>EC7-EC8 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>EC8-EC10 #	<10	<10	<10	<10	<10						<10	ug/l	TM36/PM12
>EC10-EC12 #	<5	<5	<5	<5	<5						<5	ug/l	TM5/PM16/PM30
>EC12-EC16 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
>EC16-EC21 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
>EC21-EC35 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 #	<10	<10	<10	<10	<10						<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) #	<10	<10	<10	<10	<10						<10	ug/l	TM5/TM36/PM12/PM16/PM30
Phenol #	<0.01	<0.01	<0.01	<0.01	<0.01						<0.01	mg/l	TM26/PM0
Sulphate as SO4 #	704.5	706.7	761.9	992.3	821.6						<0.5	mg/l	TM38/PM0
Chloride #	5622.7	5620.3	5793.8	1574.5	6971.2						<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	9.2	8.9	14.0	3.7	0.6						<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	<0.02	<0.02	<0.02	<0.02	<0.02						<0.02	mg/l	TM38/PM0
Total Cyanide #	<0.01	<0.01	<0.01	<0.01	<0.01						<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as NH3 #	0.64	0.67	0.85	<0.03	0.25						<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<0.006	<0.006	<0.006	<0.006	<0.006						<0.006	mg/l	TM38/PM0
Electrical Conductivity @25C #	16698	16925	17403	6476	20711						<2	uS/cm	TM76/PM0
pH #	7.83	7.80	7.73	7.79	7.65						<0.01	pH units	TM73/PM0

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16949

VOC Report : **Liquid**

EMT Sample No.	1-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64	65-72	73-80	LOD/LOR	Units	Method No.
Sample ID	BH01	BH02	BH03	BH04	BH05	BH06	BH07	BH08	BH09	BH10			
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G			
Sample Date	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	11/10/2022	12/10/2022			
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022			
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	ug/l	TM15/PM10
Styrene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	101	96	102	101	100	102	100	103	101	99	<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	102	94	100	99	101	100	101	102	100	99	<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

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

Client Name: Ground Investigations Ireland
Reference: 12058-07-22
Location: Galway Harbour Company
Contact: Barry Sexton
EMT Job No: 22/16949

VOC Report : **Liquid**

EMT Sample No.	81-88	89-96	97-104	105-112	113-120						LOD/LOR	Units	Method No.
Sample ID	BH11	BH12	BH13	BH14	BH15								
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G								
Sample Date	12/10/2022	12/10/2022	12/10/2022	12/10/2022	12/10/2022								
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water								
Batch Number	1	1	1	1	1								
Date of Receipt	17/10/2022	17/10/2022	17/10/2022	17/10/2022	17/10/2022								
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	<5						<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	6	6	15	11	<3						<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1	<1						<1	ug/l	TM15/PM10
Styrene	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4	<4						<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2	<2						<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3	<3						<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	102	100	106	104	102						<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	102	99	105	103	99						<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland

Reference: 12058-07-22

Location: Galway Harbour Company

Contact: Barry Sexton

Matrix : Liquid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
22/16949	1	BH01		1-8	GRO, Vinyl Chloride, VOC	Sample holding time exceeded
22/16949	1	BH02		9-16	GRO, Vinyl Chloride, VOC	Sample holding time exceeded
22/16949	1	BH03		17-24	GRO, Vinyl Chloride, VOC	Sample holding time exceeded
22/16949	1	BH04		25-32	GRO, Vinyl Chloride, VOC	Sample holding time exceeded
22/16949	1	BH05		33-40	GRO, Vinyl Chloride, VOC	Sample holding time exceeded
22/16949	1	BH06		41-48	GRO, Vinyl Chloride, VOC	Sample holding time exceeded
22/16949	1	BH07		49-56	GRO, Vinyl Chloride, VOC	Sample holding time exceeded
22/16949	1	BH08		57-64	GRO, Vinyl Chloride, VOC	Sample holding time exceeded
22/16949	1	BH09		65-72	GRO, Vinyl Chloride, VOC	Sample holding time exceeded

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

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/16949

SOILS and ASH

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

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

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

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

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

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

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

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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

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

WATERS

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

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

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

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

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.
Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x20 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/16949

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			

EMT Job No: 22/16949

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			

APPENDIX 4

ASSESSMENT TABLES

ASSESSMENT CRITERIA

Table 4.1 below sets out MKOs rationale for generic assessment criteria (GAC) adoption in order to evaluate risks posed to potential receptors at Galway Harbour Site from identified chemical contamination. The results of the assessment for the Galway Harbour Site are then presented in Tables 4.2 to 4.7 of this appendix.

Table 4.1. Rationale for Assessment Criteria Adoption

Source / Media	MKO's Approach & Rationale
Risks to Human Health	
Soil Contaminants	▪ Laboratory test results have been compared against Generic Assessment Criteria (GAC) derived by LQM/CIEH (Suitable 4 Use Levels) for a number of end use scenarios including Residential (without Private Gardens) and Commercial land use scenario. ▪ It is noted that the Soil Guideline Value (SGV) for lead has been withdrawn and that the Category 4 Screening Level (C4SL) for lead will be used in its place. ▪ Where the dataset is of appropriate size, assessment against the applicable GAC or C4SL is carried out at the 95th percentile of the sample mean (designated US95), which is considered to represent a reasonable worst-case scenario. An assessment of the normality of the data has been undertaken. Where datasets are normally distributed the one sample t-test has been applied to calculate the US95. In the case of non-parametric datasets, the Chebychev Theorem has been applied. The Grubbs Test has also been used to identify potential outliers within datasets. ▪ At this time an authoritative GAC is not available for asbestos fibres in soil. A positive identification of asbestos fibres in a soil sample by the laboratory is considered sufficient to warrant additional assessment of risks. Laboratory identification and quantification by microscopy may be required subject to source of material.
Ground Gas	Concentrations and flow rates of carbon dioxide and methane in ground gas are converted to Gas Screening Values (GSVs) in accordance with CIRIA C665 (2007).
Risks to Controlled Waters	
Dissolved Contaminants	Results have been directly compared to Environmental Quality Standards (EQS) and Groundwater Threshold Values (GTV) as an initial screen of water quality. These are considered to be conservative screening criteria. In the absence of specific EQS and GTV values, EPA interim guideline values (IGV) have been used.
Risks to Buildings and Structures	
Water supply Pipes	The evaluation of water supply pipe requirements at the site has been undertaken in general accordance with guidance and criteria produced by the UK Water Industry (2011).

Risks to Vegetation and Plants	
Soil Contaminants	Risks to plant growth (i.e. phytotoxicity) have been assessed for specific contaminants where the limits for phytotoxic effect proposed (e.g. by BS 3882) are significantly lower than the health GAC.

Table 4.2 Summary of soil contamination (risks to human health) from Made Ground

Contaminant	GAC @ 1% SOM for Residential without Private Gardens land-use (mg/kg)	Measured range (mg/kg)	US95 (mg/kg)	US95 > Assessment Criteria? (Y/N) #- outlier detected
Soil Organic Matter	-	0.16 to 35.4	-	-
Arsenic	40	1.7 to 79.5	24.28	N
Cadmium	85	0.1 to 115.3	18.04	N#
Chromium (total)	910	10.8 to 131.9	59.85	N
Chromium VI	6.0	<0.3	0.3	N
Lead	310	5 to 4,882	1,248.35	Y
Mercury (inorganic)	56	<0.1 to 1.5	0.46	N#
Selenium	430	<1.0 to 6.0	1.76	N#
Copper	7,100	<1.0 to 2,146	325.19	N#
Nickel	180	4.5 to 47.8	17.02	N#
Zinc	40,000	7.0 to 10,741	2,007.58	N
Barium	*	9.0 to 2,381	624.07	*
BTEX compounds[2]				
Benzene	0.38	<0.005	0.005	N
Toluene	880	<0.005 to 0.02	0.008	N#
Ethyl benzene	83	<0.005 to 0.01	0.005	N#
m-xylene[6]	82	<0.005 to 0.03	0.008	N#
o-xylene[6]	88	<0.005 to 0.013	0.005	N
Total Petroleum Hydrocarbons (TPH)[2]				
TPH aliphatic EC5-6	42	<0.1	0.1	N
TPH aliphatic EC>6-8	100	<0.1	0.1	N
TPH aliphatic EC>8-10	27	<0.1 to 1.0	0.215	N#
TPH aliphatic EC>10-12	130	<0.2 to 8.7	1.42	N#
TPH aliphatic EC>12-16	1,100	<4.0 to 115	18.89	N#
TPH aliphatic EC>16-35	65,000	<14.0 to 740.0	160.95	N
TPH aromatic EC5-7	370	<0.1	0.1	N
TPH aromatic EC>7-8	860	<0.1	0.1	N
TPH aromatic EC>8-10	47	<0.1	0.1	N
TPH aromatic EC>10-12	250	<0.2 to 3.9	0.68	N#
TPH aromatic EC>12-16	1,800	<4.0 to 19.0	7.12	N#
TPH aromatic EC>16-21	1,900	<7.0 to 117	33.75	N#
TPH aromatic EC>21-35	1,900	<7.0 to 1,284	345.2	N

Contaminant	GAC @ 1% SOM for Residential without Private Gardens land-use (mg/kg)	Measured range (mg/kg)	US95 (mg/kg)	US95 > Assessment Criteria? (Y/N) #- outlier detected
Polycyclic Aromatic Hydrocarbons (PAH) [2]				
Acenaphthene	3,000	<0.05 to 0.5	0.17	N#
Anthracene	31,000	<0.04 to 1.82	0.56	N
Benzo(a)anthracene	11	<0.06 to 8.24	2.14	N
Benzo(a)pyrene	3.2	<0.04 to 12.7	2.83	N
Benzo(b)fluoranthene	3.9	<0.05 to 14.05	3.53	N
Benzo(g,h,i)perylene	360	<0.04 to 13.63	2.44	N#
Benzo(k)fluoranthene	110	<0.02 to 5.46	1.37	N
Chrysene	30	<0.02 to 6.77	2.01	N
Dibenzo(a,h)anthracene	0.31	<0.04 to 2.17	0.48	**Y#**
Fluoranthene	1,500	<0.03 to 10.51	2.98	N
Fluorene	2,800	<0.04 to 0.52	0.175	N#
Indeno(1,2,3-cd)pyrene	45	<0.04 to 12.85	2.35	N#
Naphthalene	2.3	<0.04 to 1.18	0.31	N#
Pyrene	3,700	<0.03 to 9.12	2.68	N
Phenol	750	<0.1	0.1	N

1. * = No values defined or given.
2. The S4ULs have been generated assuming a sandy loam soil type and a Soil Organic Material of 1%.

Table 4.3 Summary of soil contamination (risks to human health) from Made Ground

Contaminant	GAC @ 1% SOM for Commercial land-use (mg/kg)	Measured range (mg/kg)	US95 (mg/kg)	US95 > Assessment Criteria? (Y/N) # - outlier detected
Soil Organic Matter	-	0.16 to 35.4	-	-
Arsenic	640	1.7 to 79.5	24.28	N
Cadmium	190	0.1 to 115.3	18.04	N#
Chromium (total)	8,600	10.8 to 131.9	59.85	N
Chromium VI	33.0	<0.3	0.3	N
Lead	2,300	5 to 4,882	1,248.35	N
Mercury (inorganic)	1,100	<0.1 to 1.5	0.46	N
Selenium	12,000	<0.1 to 6.0	1.76	N#
Copper	68,000	<0.1 to 2,146	325.19	N#
Nickel	980	4.5 to 47.8	17.02	N#
Zinc	730,000	7.0 to 10,741	2,007.58	N
Barium	*	9.0 to 2,381	624.07	*
BTEX compounds[2]				
Benzene	27	<0.005	0.005	N
Toluene	56,000	<0.005 to 0.02	0.008	N#
Ethyl benzene	5,700	<0.005 to 0.01	0.005	N#
m-xylene[6]	6,200	<0.005 to 0.03	0.008	N#
o-xylene[6]	6,600	<0.005 to 0.013	0.005	N
Total Petroleum Hydrocarbons (TPH)[2]				
TPH aliphatic EC5-6	3,200	<0.1	0.1	N
TPH aliphatic EC>6-8	7,800	<0.1	0.1	N
TPH aliphatic EC>8-10	2,000	<0.1 to 1.0	0.215	N#
TPH aliphatic EC>10-12	9,700	<0.2 to 8.7	1.42	N#
TPH aliphatic EC>12-16	59,000	<4.0 to 115	18.89	N#
TPH aliphatic EC>16-35	1,600000	<14.0 to 740.0	160.95	N
TPH aromatic EC5-7	26,000	<0.1	0.1	N
TPH aromatic EC>7-8	56,000	<0.1	0.1	N
TPH aromatic EC>8-10	3,500	<0.1	0.1	N
TPH aromatic EC>10-12	16,000	<0.2 to 3.9	0.68	N#
TPH aromatic EC>12-16	36,000	<4.0 to 19.0	7.12	N#
TPH aromatic EC>16-21	28,000	<7.0 to 117	33.75	N#
TPH aromatic EC>21-35	28,000	<7.0 to 1,284	345.2	N

Contaminant	GAC @ 1% SOM for Commercial land-use (mg/kg)	Measured range (mg/kg)	US95 (mg/kg)	US95 > Assessment Criteria? (Y/N) # - outlier detected
Polycyclic Aromatic Hydrocarbons (PAH) [2]				
Acenaphthene	84,000	<0.05 to 0.5	0.17	N#
Anthracene	520,000	<0.04 to 1.82	0.56	N
Benzo(a)anthracene	170	<0.06 to 8.24	2.14	N
Benzo(a)pyrene	35	<0.04 to 12.7	2.83	N
Benzo(b)fluoranthene	44	<0.05 to 14.05	3.53	N
Benzo(g,h,i)perylene	3,900	<0.04 to 13.63	2.44	N
Benzo(k)fluoranthene	1,200	<0.02 to 5.46	1.37	N
Chrysene	350	<0.02 to 6.77	2.01	N
Dibenzo(a,h)anthracene	3.5	<0.04 to 2.17	0.48	N#
Fluoranthene	23,000	<0.03 to 10.51	2.98	N
Fluorene	63,000	<0.04 to 0.52	0.175	N#
Indeno(1,2,3-cd)pyrene	500	<0.04 to 12.85	2.35	N#
Naphthalene	190	<0.04 to 1.18	0.31	N#
Pyrene	54,000	<0.03 to 9.12	2.68	N
Phenol	760	<0.1	0.1	N

1. * = No values defined or given.
2. The S4ULs have been generated assuming a sandy loam soil type and a Soil Organic Material of 1%.

Table 4.4 Summary of soil contamination (risks to human health) from Natural Soil

Contaminant	GAC @ 1% SOM for Residential without Plant Uptake land-use (mg/kg)	Measured range (mg/kg)	Concentration > Assessment Criteria? (Y/N)
Soil Organic Matter	-	0.14 to 1.24	-
Arsenic	40	2.0 to 5.4	N
Cadmium	85	0.3 to 1.0	N
Chromium (total)	910	60.2 to 88.6	N
Chromium VI	6.0	<0.3	N
Lead	310	9 to 46.0	N
Mercury (inorganic)	56	<0.1	N
Selenium	430	<1.0	N
Copper	7,100	9.0 to 21.0	N
Nickel	180	6.9 to 22.8	N
Zinc	40,000	24.0 to 76.0	N
Barium	*	21.0 to 65.0	*
BTEX compounds[2]			
Benzene	0.38	<0.005	N
Toluene	880	<0.005	N
Ethyl benzene	83	<0.005	N
m-xylene[6]	82	<0.005	N
o-xylene[6]	88	<0.005	N
Total Petroleum Hydrocarbons (TPH) [2]			
TPH aliphatic EC5-6	42	<0.1	N
TPH aliphatic EC>6-8	100	<0.1	N
TPH aliphatic EC>8-10	27	<0.1	N
TPH aliphatic EC>10-12	130	<0.2	N
TPH aliphatic EC>12-16	1,100	<4.0	N
TPH aliphatic EC>16-35	65,000	<14.0 to 94.0	N
TPH aromatic EC5-7	370	<0.1	N
TPH aromatic EC>7-8	860	<0.1	N
TPH aromatic EC>8-10	47	<0.1	N
TPH aromatic EC>10-12	250	<0.2	N
TPH aromatic EC>12-16	1,800	<4.0	N
TPH aromatic EC>16-21	1,900	<7.0	N
TPH aromatic EC>21-35	1,900	<7.0	N

Contaminant	GAC @ 1% SOM for Residential without Plant Uptake land-use (mg/kg)	Measured range (mg/kg)	Concentration > Assessment Criteria? (Y/N)
Polycyclic Aromatic Hydrocarbons (PAH) [2]			
Acenaphthene	3,000	<0.05	N
Anthracene	31,000	<0.04	N
Benzo(a)anthracene	11	<0.06 to 0.14	N
Benzo(a)pyrene	3.2	<0.04 to 0.12	N
Benzo(b)fluoranthene	3.9	<0.05 to 0.17	N
Benzo(g,h,i)perylene	360	<0.04 to 0.10	N
Benzo(k)fluoranthene	110	<0.02 to 0.07	N
Chrysene	30	<0.02 to 0.12	N
Dibenzo(a,h)anthracene	0.31	<0.04	N
Fluoranthene	1,500	<0.03 to 0.17	N
Fluorene	2,800	<0.04	N
Indeno(1,2,3-cd)pyrene	45	<0.04 to 0.09	N
Naphthalene	2.3	<0.04	N
Pyrene	3,700	<0.03 to 0.17	N
Phenol	750	<0.1	N

1. * = No values defined or given.
2. The S4ULs have been generated assuming a sandy loam soil type and a Soil Organic Material of 1%.

Table 4.5 Summary of soil contamination (risks to human health) from Natural Soils

Contaminant	GAC @ 1% SOM for Commercial land-use (mg/kg)	Measured range (mg/kg)	Concentration > Assessment Criteria? (Y/N)
Soil Organic Matter	-	0.14 to 1.24	-
Arsenic	640	2.0 to 5.4	N
Cadmium	190	0.3 to 1.0	N
Chromium (total)	8,600	60.2 to 88.6	N
Chromium VI	33.0	<0.3	N
Lead	2,300	9 to 46.0	N
Mercury (inorganic)	1,100	<0.1	N
Selenium	12,000	<1.0	N
Copper	68,000	9.0 to 21.0	N
Nickel	980	6.9 to 22.8	N
Zinc	730,000	24.0 to 76.0	N
Barium	*	21.0 to 65.0	*
BTEX compounds[2]			
Benzene	27	<0.005	N
Toluene	56,000	<0.005	N
Ethyl benzene	5,700	<0.005	N
m-xylene[6]	6,200	<0.005	N
o-xylene[6]	6,600	<0.005	N
Total Petroleum Hydrocarbons (TPH) [2]			
TPH aliphatic EC5-6	3,200	<0.1	N
TPH aliphatic EC>6-8	7,800	<0.1	N
TPH aliphatic EC>8-10	2,000	<0.1	N
TPH aliphatic EC>10-12	9,700	<0.2	N
TPH aliphatic EC>12-16	59,000	<4.0	N
TPH aliphatic EC>16-35	1,600000	<14.0 to 94.0	N
TPH aromatic EC5-7	26,000	<0.1	N
TPH aromatic EC>7-8	56,000	<0.1	N
TPH aromatic EC>8-10	3,500	<0.1	N
TPH aromatic EC>10-12	16,000	<0.2	N
TPH aromatic EC>12-16	36,000	<4.0	N
TPH aromatic EC>16-21	28,000	<7.0	N
TPH aromatic EC>21-35	28,000	<7.0	N

Contaminant	GAC @ 1% SOM for Commercial land-use (mg/kg)	Measured range (mg/kg)	Concentration > Assessment Criteria? (Y/N)
Polycyclic Aromatic Hydrocarbons (PAH) [2]			
Acenaphthene	84,000	<0.05	N
Anthracene	520,000	<0.04	N
Benzo(a)anthracene	170	<0.06 to 0.14	N
Benzo(a)pyrene	35	<0.04 to 0.12	N
Benzo(b)fluoranthene	44	<0.05 to 0.17	N
Benzo(g,h,i)perylene	3,900	<0.04 to 0.10	N
Benzo(k)fluoranthene	1,200	<0.02 to 0.07	N
Chrysene	350	<0.02 to 0.12	N
Dibenzo(a,h)anthracene	3.5	<0.04	N
Fluoranthene	23,000	<0.03 to 0.17	N
Fluorene	63,000	<0.04	N
Indeno(1,2,3-cd)pyrene	500	<0.04 to 0.09	N
Naphthalene	190	<0.04	N
Pyrene	54,000	<0.03 to 0.17	N
Phenol	760	<0.1	N

1. * = No values defined or given.
2. The S4ULs have been generated assuming a sandy loam soil type and a Soil Organic Material of 1%.

Table 4.6. Summary of groundwater result (response zone in the Made Ground and Metagabbro/Gneiss)

Contaminant	AA-EQS (µg/l)	GTV (µg/l)	IGV (µg/l)	Measured range (µg/l)	No. of samples exceeding AA-EQS	No. of samples exceeding GTV	No. of samples exceeding IGV
Arsenic	25	7.5	10	<2.5 – 10.7	0 of 15	**1 of 15**	**1 of 15**
Cadmium	0.25	*	5	<0.5 – 1.4	**1 of 15**[2]	*	0 of 15
Chromium VI	3.4	7.5	30	<6	0 of 15[2]	0 of 15	0 of 15
Lead	1.2	7.5	10	<5.0 - 30	**2 of 15**[2]	**2 of 15**	**2 of 15**
Mercury	0.07	0.75	1	<1	0 of 15[2]	0 of 15[2]	0 of 15
Boron	*	*	1,000	485 – 2,725	*	*	**12 of 15**
Copper	30	*	30	<7.0 - 19	0 of 15	*	0 of 15
Nickel	4	15	20	<2.0 - 4	0 of 15	0 of 15	0 of 15
Zinc	100	75	100	6 - 65	0 of 15	0 of 15	0 of 15
Total Cyanide	10	*	10	<10 to 20	**1 of 15**	*	**1 of 15**
Phenol	8	*	0.5	<10	0 of 15[2]		
Sulphate (mg/l)	*	187.5	200	357 – 1,882	*	**15 of 15**	**15 of 15**
Total Petroleum Hydrocarbons	*	7.5	10	<10 - 43,307	*	**1 of 15**[2]	**1 of 15**
Anthracene	0.1	*	10,000	<0.005	0 of 15	*	0 of 15
Benzo(a)pyrene	0.00017	0.0075	0.01	<0.005 – 0.007	**1 of 15**[2]	0 of 15[2]	0 of 15[2]
Benzo(b+k) fluoranthene	0.017	*	0.5 (b) 0.05 (k)	<0.008 – 0.036	**1 of 15**[2]	*	0 of 15[2]
Benzo(ghi) perylene\ Indeno(1,2,3-cd)pyrene	0.00082	*	0.05 (benzo) 0.05 (ind)	<0.005	0 of 15[2]	*	0 of 15[2]
Fluoranthene	0.0063	*	1	<0.005 – 0.012	**1 of 15**[2]	*	0 of 15
Naphthalene	2	*	1	<0.1	0 of 15	*	0 of 15
Benzene	10	0.75	1	<0.5	0 of 15	0 of 15	0 of 15
Toluene	10	525	10	<5.0	0 of 15	0 of 15	0 of 15
Ethylbenzene	*	*	10	<1.0	*	*	0 of 15
Xylenes	10	*	10	<1.0	0 of 15	*	0 of 15
Hardness (mg/l $CaCO_3$)	*	*	*	1,507 – 2,229[3]	*	*	*
Ammoniacal Nitrogen as N	*	65	*	<30 - 900	*	**13 of 15**	*
pH	*	*	≥6.5 and ≤9.5	7.56 – 8.01	*	*	0 of 15

1. * = No values defined or given.

2. Laboratory limit of detection greater than assessment criteria.
3. Hardness values obtained from groundwater samples that were retrieved from two boreholes that were previously installed at the site by RSK

Table 4.7. Standard Water Supply Pipe Assessment

Test Group[1]	Testing Required?	PE threshold (mg/kg)	Metal Pipes / Barrier Pipe	Laboratory Detection Limit (mg/kg)	Testing UKAS accredited Y/N	Maximum concentration at proposed pipeline depth[2] (mg/kg)	Maximum site concentration[3] (mg/kg)	Locations and depths where concentrations exceed proposed pipeline threshold.
Total BTEX & MTBE		**0.1**	**Pass**	0.005	Y	0.019	0.102	WS211 (0 to 0.7mbgl)
EC5–EC10 aliphatic and aromatic hydrocarbons		**2**	**Pass**	0.1	Y	<0.1	1	No exceedances
EC10-EC16 aliphatic and aromatic hydrocarbons		**10**	**Pass**	0.2, 4	Y	<8.4 to 39	122	WS-13, WS16, WS18 (0 to 1.0mbgl), WS208 (0.9mbgl)
EC16-EC40 aliphatic and aromatic hydrocarbons		**500**	**Pass**	<7	Y	<7 to 1,834	1,837	WS-12 (0 to 1mbgl), WS-18 (1.0 to 2mbgl), WS-19 (0 to 1mbgl), WS208 (0 to 0.9mbgl)
Phenols		**2**	**Pass**	0.1	Y	0.1	<0.1	No exceedances
Corrosive	**Conductivity** **Redox** **pH**	**Pass**	**Note**[4]	N/A N/A N/A	N	N/A	38.85 mS Not measured 8.01	No exceedances

[1] Tests Groups as per Appendix G of UKWIR Guidance.

[2] Water pipes are normally laid 0.75-1.35 metres below finished ground level.

[3] State if liquid free product is present in soil or groundwater.

[4] Threshold: For wrapped steel, corrosive if pH<7 and conductivity >400 µs/cm. For wrapped ductile iron corrosive if pH<5, Eh not neutral and conductivity >400 µs/cm. For copper, corrosive if pH<5 or>8 and Eh positive.

Geo-environmental Interpretative Report

Phase 1 - Galway Inner Harbour, Galway

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APPENDICES

Appendix 1 – Photograph Records
Appendix 2 – Historical Mapping
Appendix 3 – Exploratory hole logs
Appendix 4 – Monitoring Records
Appendix 5 – Laboratory Results
Appendix 6 – Assessment Tables

1. INTRODUCTION

1.1 General

MKO has been commissioned by Galway Harbour Company to undertake a desk study and intrusive investigation at the Galway Inner Harbour site for due diligence purposes and to support the planning and design processes.

1.1.1 Statement of Authority

This Geo-environmental Interpretive Report (GIR) has been prepared by Eoin O'Sullivan and reviewed by Michael Watson, both of MKO. Eoin is an experienced geo-environmental engineer and has over ten years' experience in the design, implementation and interpretation of all phases of geo-environmental site investigation and risk assessment. Eoin is also proficient in undertaking detailed quantitative risk assessments for the protection of controlled waters. Eoin holds an MSc in Environmental Engineering and is a Chartered Member of the Chartered Institute of Water and Environmental Management (CWEM) and Chartered Environmentalist (CEnv) with the Society of Environment.

Michael has over seventeen years' experience in the environmental sector and has been involved in the preparation of environmental risk assessments for Waste Licensed and other EPA licensed facilities since 2001. Michael completed an MA in Environmental Management at NUI, Maynooth in 1999. Michael is a professional geologist (PGeo) and full member of IEMA (MIEMA) as well as a Chartered Environmentalist (CEnv). Michael is also a Chartered Member of the Institution of Waste Management (MCIWM) and has over 17 years' experience working in the waste management sector.

1.2 Objectives

The objective of the investigation is to provide information that may have an operational, financial or environmental implication on the future development of the site. To this end, the following actions have been undertaken:

- Provide a review and understanding of the history and environmental setting;
- Provide information on the ground and groundwater conditions;
- Provide an assessment and recommendations relating to the potential for soil and groundwater contamination and ground gas; and
- An assessment of the potential risks arising from soil and groundwater contamination onsite and recommendations for their mitigation where appropriate.

This report describes the work completed and presents the findings of the assessment and recommendations.

2. SITE LOCATION AND DESCRIPTION

2.1 Site location

The site is located in Galway Bay, Galway City. The approximate location for the centre of the site is E130168, N224899. The site is bounded by commercial and residential properties to the north and west and Galway Harbour to the east and south of the site. Galway Harbour Enterprise Park is located further to the east and is separated from the site by a bridge. Forthhill Graveyard is located at the north western boundary of the site and is separated from the site by Lough Atalia Road. A site location plan is included as Figure 2-1.

2.2 Site description

The site is approximately 11 Ha in area, irregular in shape and is predominantly flat. The main section of the site can be accessed from Lough Atalia Road to the north of the site. Access to the western section of the site is via Dock Street and Dock Road. The site is currently occupied by the Galway Harbour Offices, Galway Lifeboat Station, Lasta Mara steel fabrication, Mor Oil, Texaco Petrol Station, City Direct Bus, Galway Bay Seafoods and car parking. The wider area surrounding the site includes a mixture of residential, commercial and industrial properties.

2.2.1 Site walkover survey

Site walkover surveys were undertaken by Eoin O'Sullivan, Senior Environmental Scientist from MKO on 14th and 21st August 2019. For ease of reference, the physical characteristics and layout of the site is illustrated in Figure 2-2. The photographic records of the site walkover are included within Appendix 1. The details of the current site conditions are discussed below.

The site currently comprises various land uses which are described separately below for ease of reference.

2.2.1.1 Area 1

Area 1 currently comprises the Galway Harbour Office and associated car parking, Galway Lifeboat Station and launch area, Lasta Mara steel fabrication, Irish Sea Fisheries Board and Galway Bay Seafoods. A transit shed is located to the rear of the Galway Harbour Office. Area 1 also consists of a weighbridge and divers shed, a former ice tower building and a number of vacant commercial buildings.

During the site walkover no internal access to the building was possible. Externally the ground cover comprised concrete and tarmac hardstanding. The concrete and tarmac hardstanding appeared to be in good conditions in most areas. Given the age of the buildings in Area 1, asbestos containing materials are likely to be present within the construction of the existing buildings/structures.

2.2.1.2 Area 2

Area 2 currently comprises the Contract Car Park which was formally the Tynagh Mines site. The Tynagh Mines site was historically used to store iron ore from the Tynagh lead and zinc mine in East Galway. The large circular grey shed used to store the iron ore was demolished in 2005. A car park was subsequently developed on the site. Area 2 also comprises the car parking area in the vicinity of the Harbour Hotel and apartment building, car parking alongside Dock Road and Commercial and Dun Aengus Docks to the west of the site. On the day of the walkover, the tarmac and concrete hardstanding ground cover in the Area 2 appeared to be in good condition in most areas.

It is understood that scrap metal is occasionally stored at Dun Aengus Dock pending shipment to overseas markets. There was no scrap metal stored at the site on the day of the walkover.

2.2.1.3 Area 3

Area 3 currently comprises the former coal yard and oil depot site. On the day of the walkover, both sites were vacant and were predominately covered in concrete hardstanding. There was evidence of bases presumed to be the former storage tank supports although no storage tanks were evident at the time of the walkover. Information provided by a representative from the Galway Harbour Company confirmed that the eleven oil storage tanks were decommissioned and disposed offsite in 2017. No obvious staining or hydrocarbon odours were noted in the vicinity of the former tank area. Wooden pallets and tyres were being stored along the boundary wall in this area.

The former coal yard was noted to have car park markings on the hardstanding but was vacant on the day of the walkover. There was a number of site office containers located to the north of this section of the site. There did not appear to be any visible signs of staining or vegetation die back as a result of contamination incidents in this area.

2.2.1.4 Area 4

Area 4 currently comprises the Texaco Petrol Station, shop and car wash, Mor Oil and City Direct Bus office and parking area located in the northern section of the site. Area 4 also comprises the swathe of land to the rear and north of the Mor Oil building. Access to the majority of Area 4 was not possible on the day of the walkover.

2.2.1.5 General Site Observations

There did not appear to be any visible signs of staining or vegetation die back as a result of contamination incidents at the site.

Buried utilities were noted to be present across the site including electric, water, gas and telecoms. The site is connected to the public foul and storm water network.

The site is surrounded by a secure boundary fence in places and lockable access gates to prevent unauthorized access.

2.2.1.6 Surrounding Land Uses

The surrounding land uses of the study area are summarised below in Table 2-1.

Table 2-1 Surrounding Land Uses

Boundary	Land Use
North	Ceannt bus, railway station and railway line. Lough Atalia. Forthhill Graveyard,
South	River Corrib/ Galway Harbour
East	Galway Harbour Enterprise Park includes Sutton Oil, Pat Rynn Engineering, Topaz Oil Depot, Bus Eireann garage and maintenance depot, Cold Chon Ltd, Highway Oil and Iggy Madden Transport Ltd. The Galway Harbour Enterprise Park is accessed via a bridge which separates the two sites.
West	Harbour Hotel and apartments, residential and commercial properties.

Map Legend

Site Location

GALWAY
Gaillimh

Galway Bay
Cuan na Gaillimhe

Oranmore Bay
Cuan Órán Mór

MAP TITLE: **Site Location**	MAP NO.: **Figure 2.1**	SCALE: **1:35,000**
PROJECT TITLE: **Phase 1 - Galway Inner Harbour, Galway**		DATE: **03-10-2019**
DRAWING BY: **Eoin O'Sullivan**	CHECKED BY: **Michael Watson**	ISSUE NO.: **190532-2019.10.03-D1**

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Map Legend

- Site Location
- Area 1
- Area 2
- Area 3
- Area 4

Area 1

Area 2

Area 3

Area 4

Commercial Dock

Dún Aengus Dock

Forthill Grave Yard

Oil Depot

Hotel

Cé Na Mara

Galway Harbour Enterprise Park

Tanks

0.71

1.32

MAP TITLE: **Site Layout**		MAP NO.: **Figure 2.2**	SCALE: **1:1,800**
PROJECT TITLE: **Phase 1 - Galway Inner Harbour, Galway**			DATE: **03-10-2019**
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3. HISTORICAL DEVELOPMENT

3.1 Sources of Information

The historical development of the site has been traced from extracts of Ordnance Survey maps dating from 1837 to 2012. The distances quoted are approximate and are taken from the centre of the site. The historical development of the site and surrounding area is shown below in Table 3-1 and selected historical maps are presented in Appendix 2.

Table 3-1 Summary of the Historical Development of the Site and Surrounding Area

Year	On Site	Off Site
1837 to 1842	The map indicates that much of the site was un-reclaimed. *New Dock* was present on the site. The map indicates that there were a number of buildings present on the site. An access road was shown to transverse the site.	*Fonthill Grave Yard* was located approximately 20m to the northwest of the site. *Gas Works* and Gasometers were located approximately 220m to the northwest of the site. A *Foundry* was located approximately 240m to the west of the site. *Corn Stores* were located approximately 240m to the northwest of the site.
1888 to 1913	The map indicates that the southern section of the site was reclaimed from the sea. Two additional docks were shown to be present on the reclaimed land. The *Harbour Commissioners Office* was present at *New Dock*. The map indicates that a number of cranes were present at *New Dock*. A railway track was shown to be present in the dock area of the site.	A *Lime Kiln* was located beside *Fonthill Grave Yard*. A *Grain Store* was located on *Dock Road* to the north of the site. A railway terminus and all associated works was located at the northern boundary of the site. A *Saw Mill* was located approximately 220m to the north west of the site. A *Cholera Hospital* was located across the channel at a distance of approximately 100m to the southeast of the site. A *Coach Factory* was located approximately 240m to the northwest of the site.
1830 to 1930	The docks were identified as *Commercial Dock* and *Dun Aengus Dock*.	The *Cholera Hospital* was named as the *Port Sanitary Intercepting Hospital*. Kelp Stores were located to the west of the site.
Circa 2005	The map indicates that an oil depot with a number of tank was located to the east of the site. An oil depot was also present to the north of the site. A large tank base was also noted to be present in the south of the site. A car park was shown to be present to the north of Dock Road. The map indicates that there were a number of	An oil depot and tanks was located to the north of Bothar Na Long Road. Tanks were also present at Galway Harbour Enterprise Park to the east of the site. A car park and hotel was present to the northwest of the site.

Year	On Site	Off Site
	unidentifiable buildings present on the site.	
1995 Aerial Map	The aerial map indicates that tanks were present in the west of the site. A coal yard was also present on the site. A large tank was present in the south of the site.	The oil depot and tanks was noted to be present to the northwest of the site.
2000 Aerial Map	No significant change noted.	No significant change noted.
2005 Aerial Map	No significant change noted.	No significant change noted.
2005-2012 Aerial Map	The map indicates that the large tank was no longer present in the south of the site. A car park was now present in this location. There was additional development in the north of the site on the site of the current Texaco Petrol Station.	The oil tanks located to the northwest of the site were no longer present.

3.2 Galway Harbour Company Discussions

MKO held discussions with the Harbour Master from the Galway Harbour Company on 21st August 2019. Pertinent information from the discussion is summarised below:

- There was 11 no. fuel storage tanks located on the 'Leeside' site between 1972 and 2009. The tanks were decommissioned in 2017.
- The majority of the site was initially covered in tarmac which was subsequently covered in concrete hardstanding.
- The coal yard which was located in the west of the site was established on the site in 1954. It is understood there was no specific containment on the coal yard site.
- The site of the Tynagh Mines 'Dome' and storage shed was located in the south of the site. The site which was used for the storage and export of iron ore was established on the site in the mid-1960s. The shed and dome were demolished circa 2005. The site was subsequently developed into a car park.
- Scrap metal is currently stored at the Galway Docks prior to shipment overseas. The material is classed as 'inert' waste.
- 'Swarf' or fine metal material is no longer stored at the docks. The material which is classed as a waste is delivered to the docks at the time of ship loading.

4. ENVIRONMENTAL SETTING

4.1 Environmental Setting

A desk study of the environmental setting of the facility and surrounding area was undertaken by MKO. This involved collecting all relevant geological, hydrological and hydrogeological information for the site. The following sources were consulted:

- Environmental Protection Agency (EPA) database (www.epa.ie);
- Geological Survey of Ireland (GSI) - Geology Database (www.gsi.ie);
- Geological Survey of Ireland (GSI) - Groundwater Database (www.gsi.ie);
- Bedrock 1:100,000 Digital Geological Map 2018. Geological Survey of Ireland (GSI, 2018);
- Teagasc Soil Map (http://gis.teagasc.ie/soils/map.php);
- Ordinance Survey of Ireland – Discovery Series and 1:50,000 maps; and
- Ordinance Survey of Ireland – aerial photographs.

4.2 Published geology

Based on the Geological Survey Ireland (GSI) subsoils map (www.gsi.ie) and the Environmental Protection Agency (EPA) published soils map (www.epa.ie), the site is generally underlain by Made Ground. Limestone Till, Alluvium and surface bedrock is also present locally and maybe encountered on site.

The Made Ground overlies the Metagabbro and Orthogneiss Suite. The rocks of the Metagabbro are mainly comprised of Hornblende Gabbros and Hornblende Gabbronorites. The rocks of the Orthogneiss Suite were metamorphosed during crystallisation and usually have a marked foliation. The rocks of the Orthogenesis Suite are comprised of quartz diorite, tonalite, granodiorite and granite. Limestone and Calcareous Shale is also present locally and maybe encountered on site.

The geology of the site is presented on Figure 4-1 and Figure 4-2.

4.3 Hydrogeology

The rocks of the Orthogneiss Suite, which underlie the site are classified by the GSI and EPA as being a Poor Aquifer, having bedrock which is generally unproductive except for local zones (Pl).

The GSI and EPA has assigned a groundwater vulnerability rating of 'Moderate' for a majority of the site. The classification is likely to be as a result of the presence of at least 10 metres of low permeability silts and clays underlying the site. The remainder of the site has been assigned a groundwater vulnerability rating of 'High' which may indicate that there is 3m to 4m of moderate permeability silts or clays underlying this section of the site.

The groundwater body which underlies the proposed site has an assigned 'Good Status' , (www.epa.ie), which applies to both quantitative status and chemical status.

The site is not located in a groundwater Source Protection Zone based on GSI records. The nearest groundwater well/spring is located some 2 kilometres to the east of the site.

The groundwater vulnerability mapping is presented on Figure 4-3.