MP2 PROJECT

Volume 3

ENVIRONMENTAL IMPACT ASSESSMENT REPORT APPENDICES (PART 2A)

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

rps MAKING COMPLEX EASY

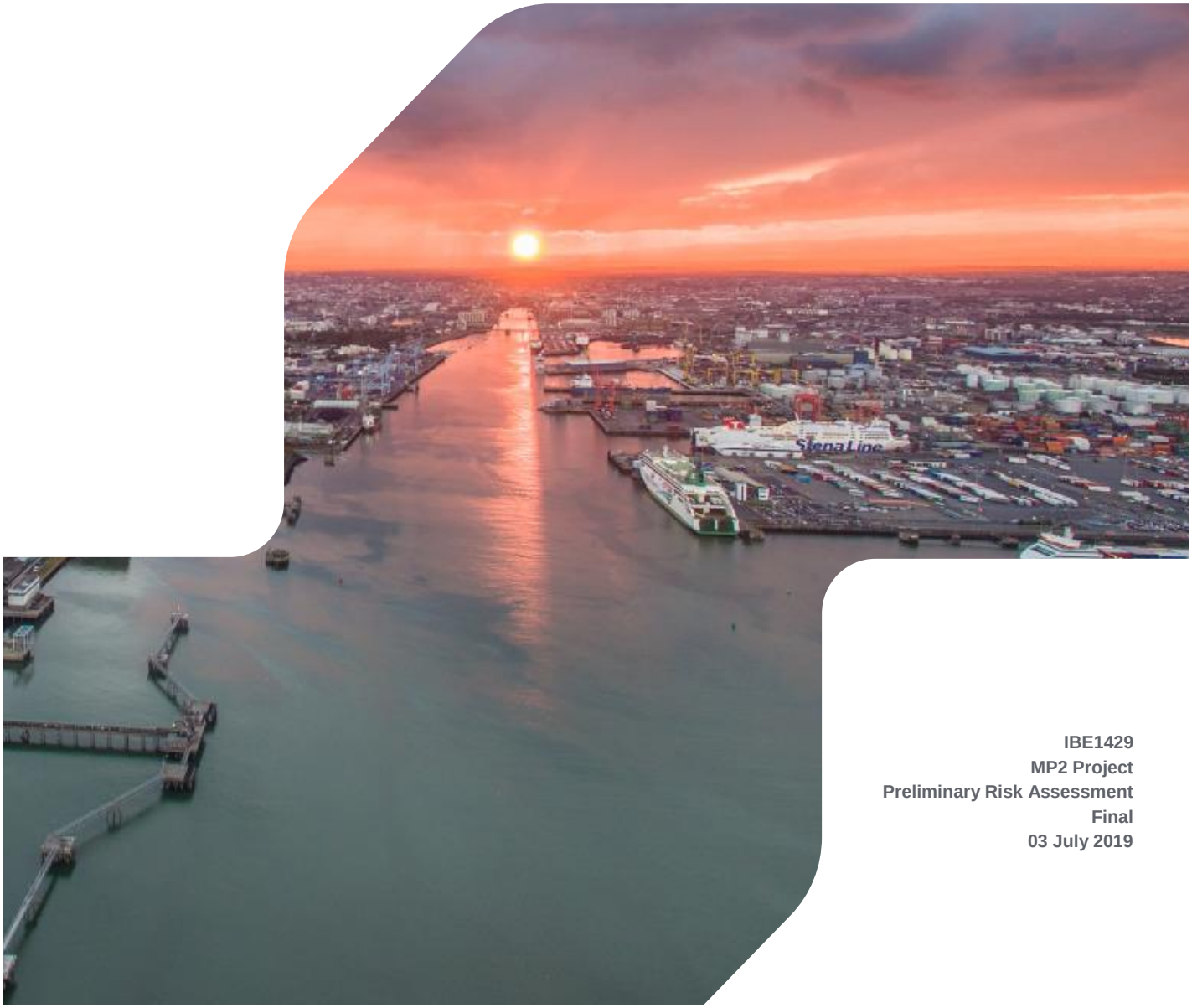
VOLUME 3 (PART 2) – CONTENTS

Appendix 8 – Soils, Geology & Hydrogeology

APPENDIX 8 SOILS, GEOLOGY & HYDROGEOLOGY

Appendix 8-1

MP2 PROJECT
PRELIMINARY RISK ASSESSMENT REPORT



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Preliminary Risk Assessment
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1 INTRODUCTION

RPS was appointed by Dublin Port Company to undertake a Preliminary Risk Assessment (Desk Study) Report for the proposed MP2 Project. The MP2 Project will include the amalgamation of three existing ferry terminals into one, infilling to the east of oil berth 4, demolition of a number of existing buildings and the end of the old eastern breakwater, and extension of a number of berths.

This report describes the research and assessments undertaken to assess the ground conditions and potential for any ground contamination that may have arisen from the site's present and historical use.

1.1 Report objectives and scope

The objectives of this report are as follows:

- Collate desk study information regarding the site and surrounds to allow the identification of potential contaminant sources, potential pathways and potential receptors in accordance with DEFRA's Contaminated Land Report 11. This will form the basis of the Preliminary Risk Assessment and production of a Conceptual Site Model (CSM).
- Collation of existing geo-environmental data to facilitate a risk assessment with regards to potential risks to human health and environmental risks.
- Assessment of the above to determine if intrusive investigation and further assessment will be necessary.

1.2 Sources of information

Sources of information used in the production of this report include:

- Internet based aerial photography
- Ordnance Survey Ireland mapviewer
- (http://maps.osi.ie/publicviewer/#V2,719558,734710,9,7)
- Geological Survey Ireland Spatial Resources Map Viewer – Department of Communications, Climate Action and Environment (http://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228)
- Environmental Protection Agency Radon Map (http://www.epa.ie/radiation/radonmap/)
- Geological Survey of Ireland Geotechnical Data Viewer (http://spatial.dcenr.gov.ie/GeologicalSurvey/GeoTechnicalViewer/index.html)
- Environmental Protection Agency map viewer (https://gis.epa.ie/EPAMaps/)

1.3 Site Description

As shown on Figure 1, the proposed MP2 Project is located at the eastern end of Dublin Port, approximately 4km east of Dublin city centre.

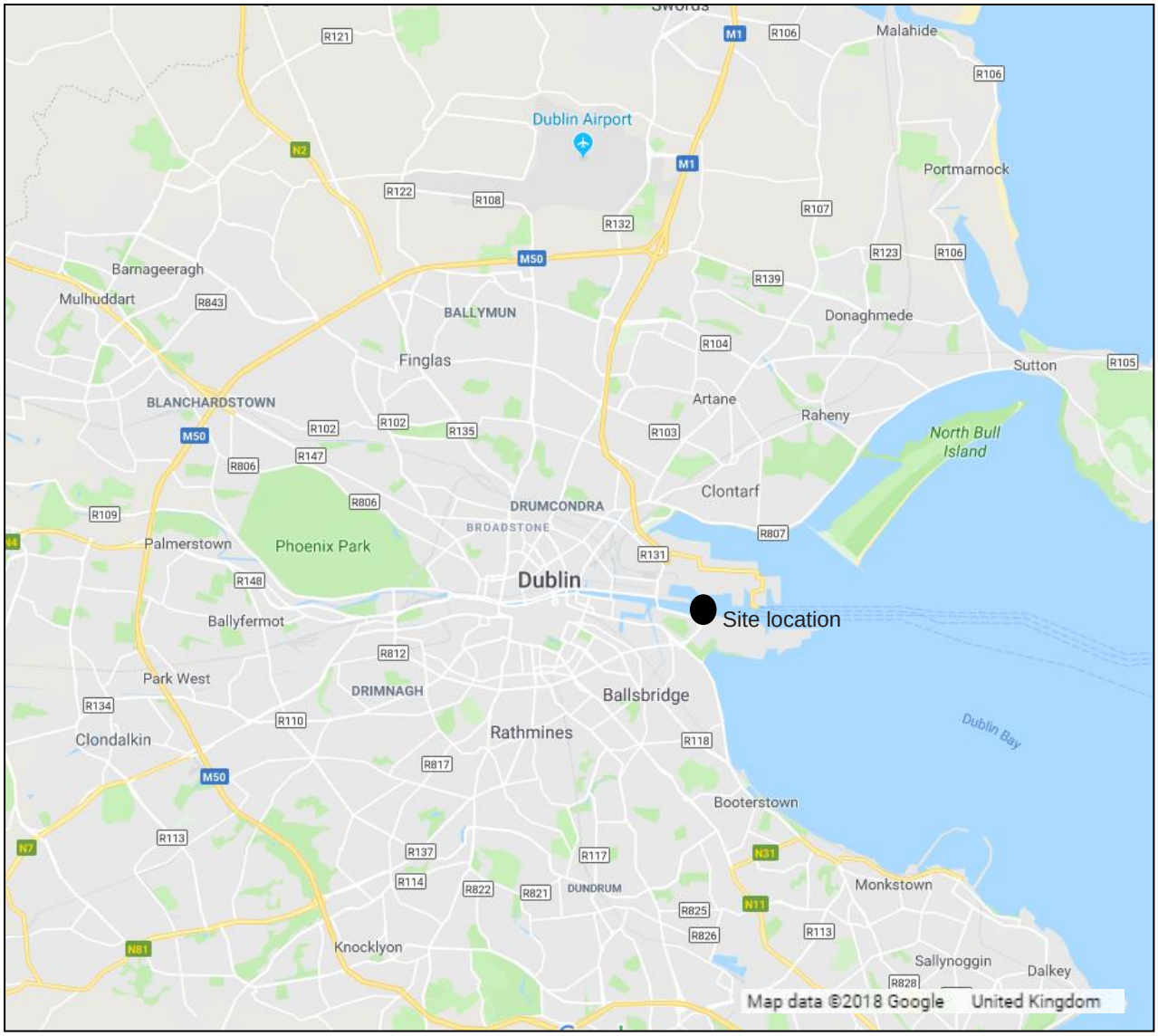


Figure 1 Site location

1.3.1 Study area

A site walkover was completed by RPS personnel on 1st May 2018; a photographic record of the site walkover is included in Appendix A. The application boundary for the MP2 Project is shown on Figure 2.

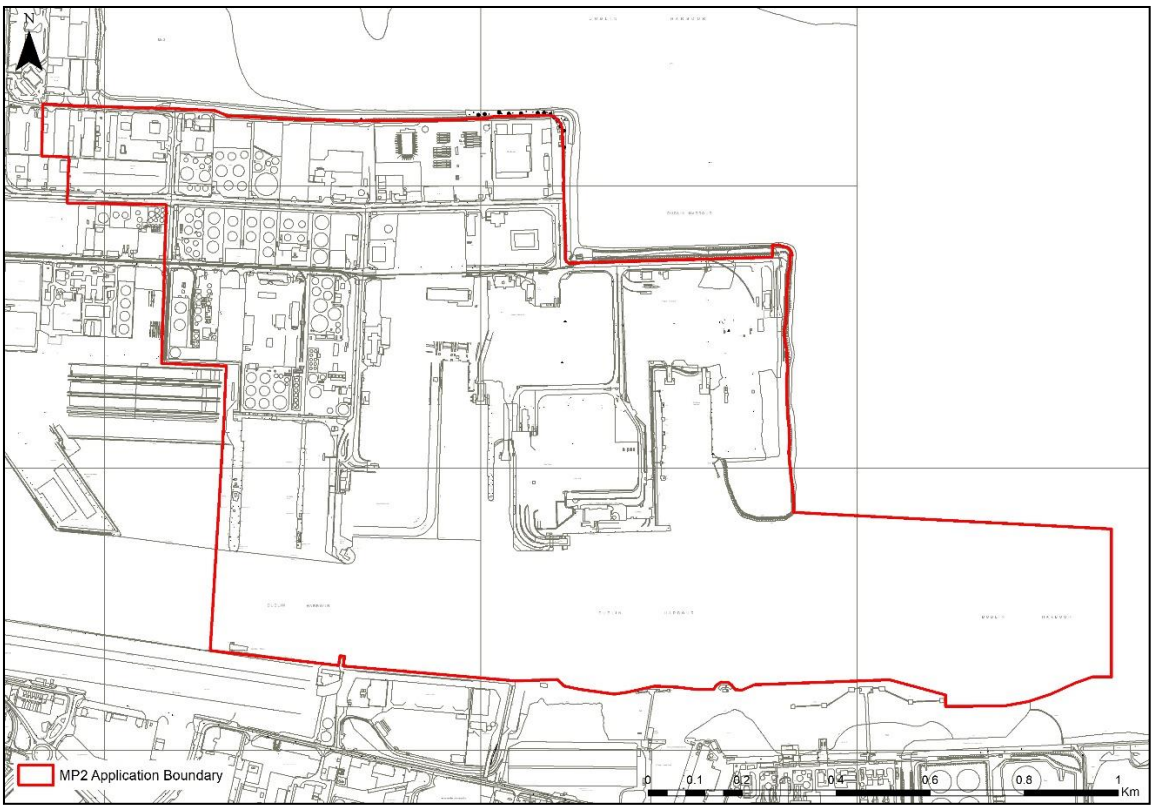


Figure 2 Site layout plan

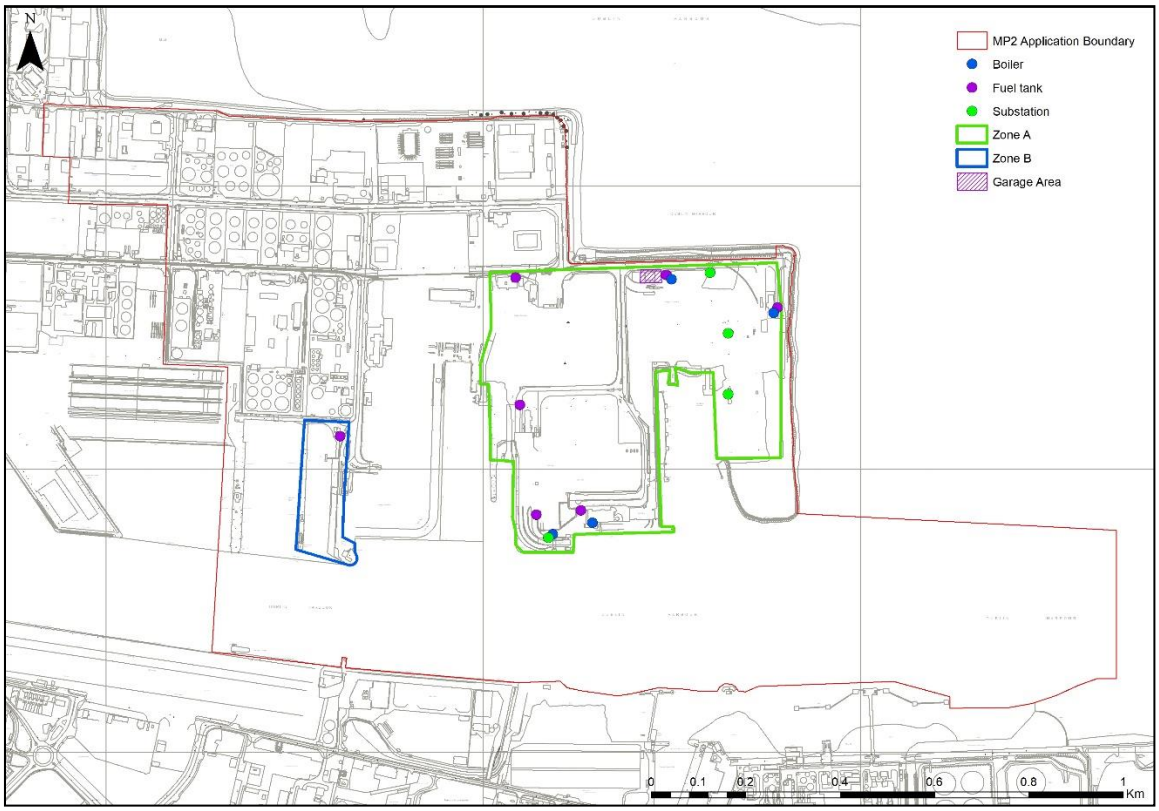


Figure 3 Potential sources of contamination

As shown in Figure 3, a number of potential sources have been identified within the land based area of the proposed MP2 project. It should be noted that a number of structures are to be demolished in advance of the MP2 project as part of other permissions. This includes the warehouses present in the north of the site, which are used by a number of businesses including Ecocem. Ecocem use part of the building for storing and distributing their cement products.

Zone A represents the existing ferry terminals while Zone B represents the area to the east of Oil Berth 4 to be infilled and the end of the old eastern breakwater (to be demolished).

Zone A currently consists of three separate ferry terminals; Terminal 1 Irish Ferries, Terminal 2 Stena Line and Terminal 5 Seatruck. The identified fuel tanks, substations and generators/boilers within Zone A are demonstrated on Figure 3. The existing Terminal 5 has a number of substations present on site; the age of these substations in unknown. A maintenance and refuelling area is present to the north of Terminal 5 with a fuel tank and generator present. Oil staining of the ground surrounding the existing fuel tank is obvious.

Three fuel tanks were identified on the Terminal 1 site. A fuel tank is present to the west of the freight office present in the north west of Terminal 1. Another fuel tank is present to the west of the passenger office in the south of Terminal 1, with boilers present in the south of that building. Another fuel tank is present in the south west of Terminal 1; significant oil staining of the ground surrounds this fuel tank. Oil drums, with a small amount of oil remaining in them, are present surrounding this oil tank. A generator and substation are present to the south east of this oil tank.

A single oil tank was identified to the north of the Stena Line building on Terminal 2. This oil tank appeared to be relatively new and as such in very good condition.

A single oil tank is present to the north east of Oil Berth 4 in Zone B. A large area of bitumen and tar storage is present directly north of Zone B. This area is managed by Hugh Munro & Company Ltd and contains storage for Irish Bitumen Storage Ltd, Dublin Joint Fuels Terminal and Irish Tar & Bitumen Suppliers.

Table 1 Application site details

Site address	Tolka Quay Road, Dublin Port, Dublin, Ireland
Grid reference	320277E 234742N

1.3.2 Surrounding land-use

The pertinent surrounding land uses of the site are given in Table 2.

Table 2 Surrounding land use

Boundary	Surrounding land use
North	South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) is present to the north of the site.
East	South Dublin Bay and River Tolka Estuary SPA is present to the east of the site.
South	The River Liffey is present to the south of the site. Poolbeg Peninsula is present to the south of the River Liffey.
West	Various industrial activities of Dublin Port are present to the west of the site.

1.3.3 Site history

1.3.3.1 Historical development of the site

Two historical maps of the area are provided on the Ordnance Survey Ireland mapviewer; a six inch map from c. 1830s and a twenty-five inch map from c. 1890s. Table 3 provides a summary of potentially contaminating activities during the history of both the site and its surrounding area.

Table 3 Historical site and surrounding area development

Date	Site history	Surrounding land use history
c. 1830s	The site is undeveloped; it consists of mud flats that have not been reclaimed for development.	A Harbour, barracks and Pigeon House Fort was developed to the south of the site, on the opposite bank of the River Liffey. A number of potentially contaminating land uses are present a significant distance to the west of the site where the land extends to, including a glass works and a vitriol works.
c. 1890s	A breakwater has been developed where the modern day Breakwater Road is present.	Increased development is present in the area to the west of the site. Dublin Port has extended closer to the site with a number of quay extensions, a shipbuilding yard, railway line, timber yard, coal yard, chemical manure works and a number of oil tanks present. Increased development is also present on the opposite bank of the River Liffey with electricity works and outfall works present surrounding Pigeon House Fort.

By 1907, many of the principal features of the deepwater port in Dublin were established, including the shipbuilding yard, the North Wall graving dock and the North Quay Extension, which formed the south side of the deepwater facility. Alexandra Quay was built in the 1920s (placed along the north side of Alexandra Basin) and Alexandra Quay East, Ocean Pier, and a number of Oil Jetties were completed by 1955. A new phase of reclamation works was initiated at this time and pushed the boundaries of the

port northwards, along the East Wall, towards the Clontarf shoreline. Further reclamation works to the east define the current extent of Dublin Port; most of the area relevant to the MP2 Project is within the most recently reclaimed area.

1.4 Site geology & hydrogeology

1.4.1 Site geology

Information held online by Geological Survey Ireland at their Spatial Resources Map Viewer was used to identify the geological and hydrogeological conditions of the site. The following describes the findings of this preliminary research.

1.4.1.1 Solid geology

The bedrock geology anticipated in the vicinity of the site is shown on Figure 4. The entire Dublin area is underlain by the Lucan Formation. The formation comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are also rare, dark, coarser grained, calcarenitic limestones, which are sometimes graded, present. The formation ranges from 300m to 800m in thickness and is Carboniferous

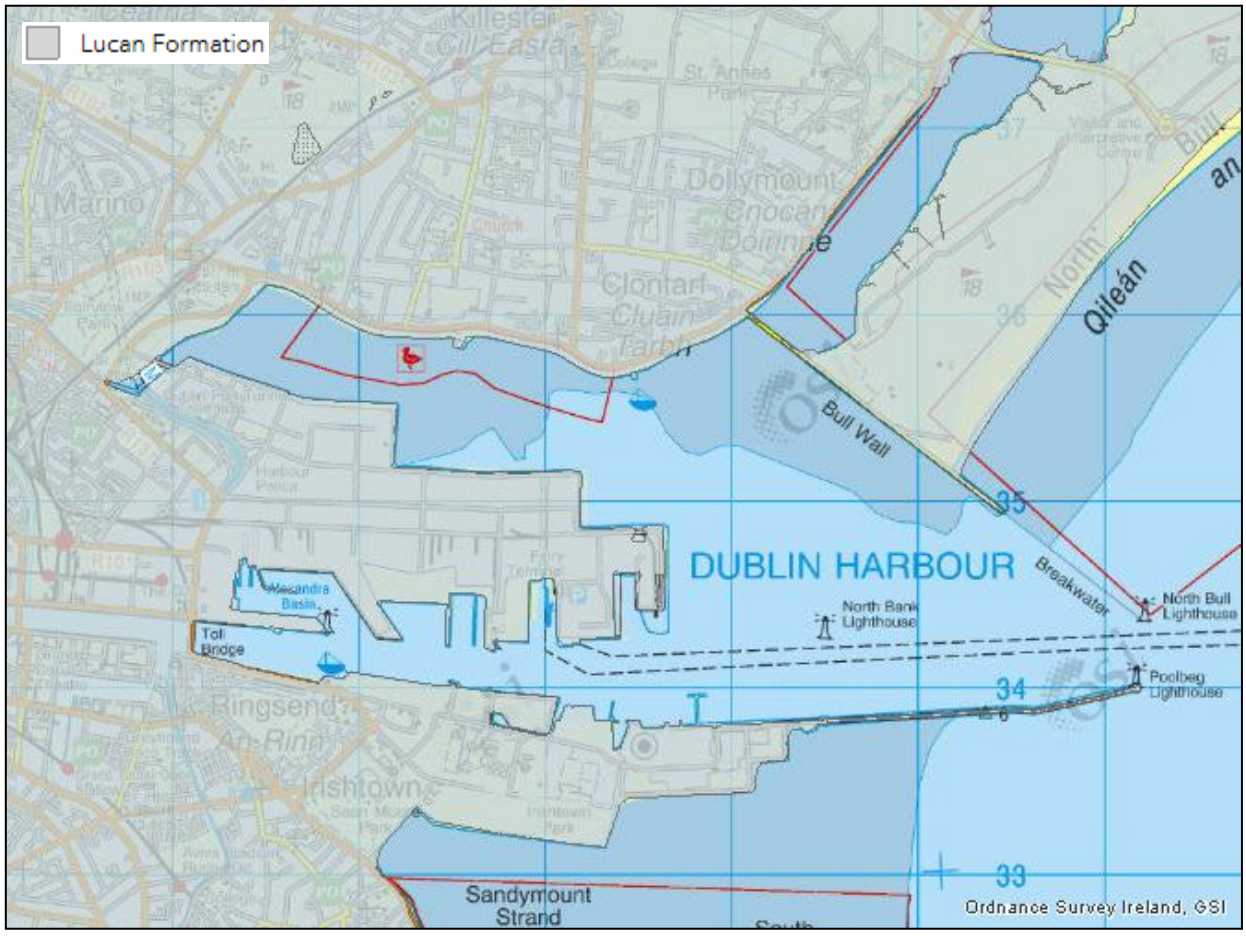


Figure 4 Solid geology (taken from GSI's Spatial Resources portal)

1.4.1.2 Drift geology

Drift is a general term applied to all mineral material (clay, sand, silt, boulders) transported by a glacier and deposited directly by or from the ice, or by running water emanating from the glacier. It generally applies to Pleistocene glacial deposits.

The drift geology of the area is expected to principally reflect the depositional process of the last glaciation when an extensive ice sheet that extended into the Irish Sea covered the region. Typically during the ice advance boulder clays were deposited sub-glacially as lodgement till over the eroded rock head surface, whilst moraine deposits were laid down at the glacier margins. Subsequently, with the progressive retreat of the ice sheet from the region, fluvio-glacial deposits (sand, gravel and silt) were laid down by melt waters discharging from the front of the glacier. Recent deposition prior to reclamation of the site principally reflects marine erosional and depositional processes, which have modified the glacial deposits.

As shown on Figure 5, the site is anticipated to be underlain by made ground. Dublin Port is located entirely on made ground (fill deposits).

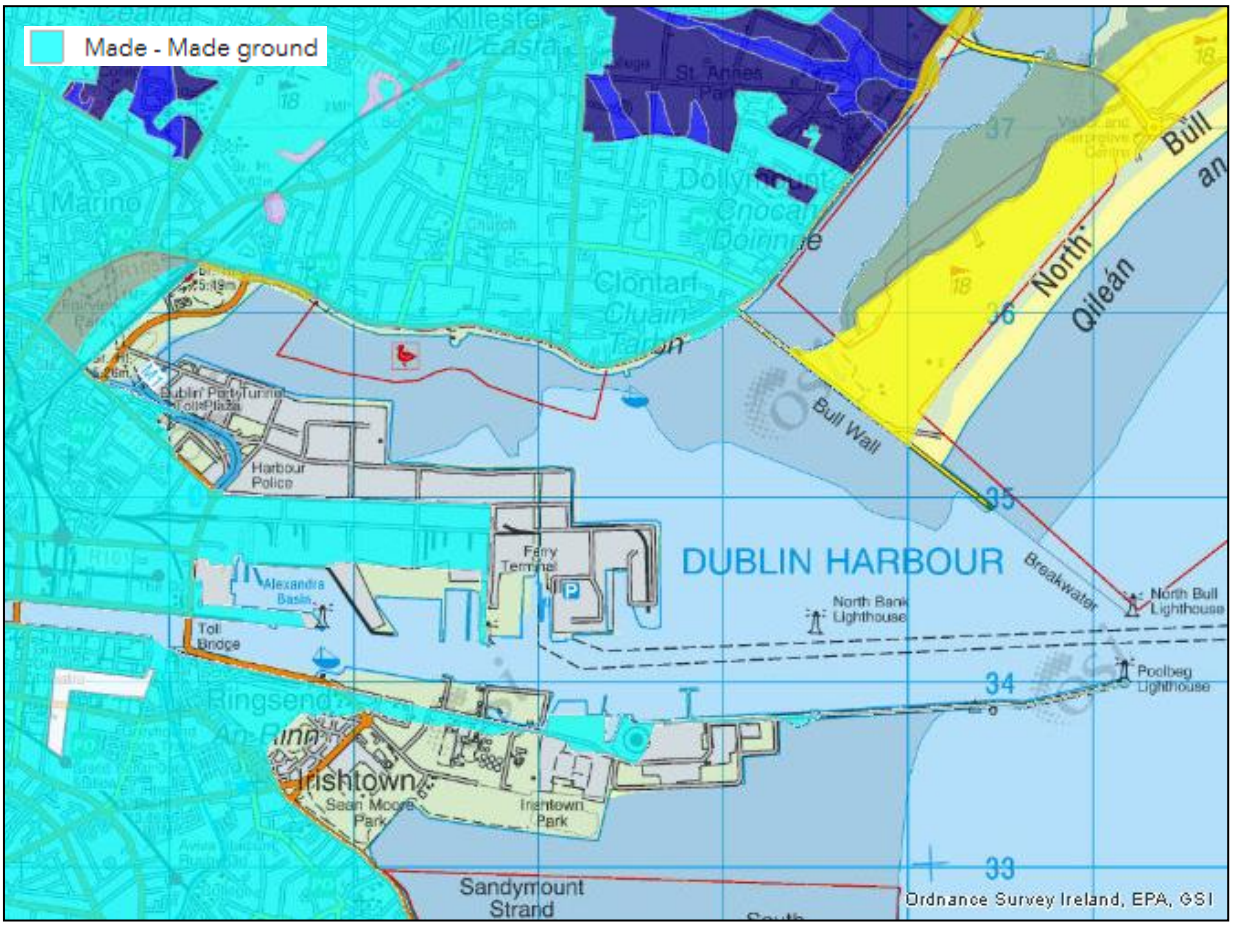


Figure 5 Sub soils (taken from GSI's Spatial Resources portal)

1.4.1.3 Hydrogeology

The hydrogeology of the area has been described by the Geological Survey of Ireland as complex and very variable. The Limestone bedrock is generally considered to be indurated and hence dominated by fissure permeability (e.g. joints and faults). Such permeability is likely to be low except where coarse, clean Limestones where present, have been karstified, dolomitised or are highly fractured.

The Lower Carboniferous rocks that underlie the region have been classified by the Geological Survey of Ireland as “Locally Important Aquifer, bedrock which is moderately productive only in local zones” (Figure 6). These locally productive zones are due to the presence of more permeable strata that are encountered in different parts of the outcrop area due to substantial faults, fractures or fissures. The limited groundwater movement within the rock tends to be restricted to the weathered horizons or to non-extensive fractured zones. These zones tend to have a limited hydraulic continuity, low storage capacity and low potential yield.

The Quaternary drift is considered the principal medium for groundwater movement in the area. The infiltration capacity of the clay deposits would be limited due to their low permeability and hence groundwater movement is likely to be confined to the fluvio-glacial sand and gravel deposits that overlie the clays. The potential importance of the Quaternary drift deposits as a groundwater resource is a function of their permeability, thickness and extent. The low permeable fine grained glacial clays represent aquitards that limit infiltration and restrict recharge to bedrock aquifers when sufficiently thick. The overlying fluvio-glacial sand and gravel deposits represent material with a significantly higher permeability. Consequently these deposits have a high potential recharge and storage capacity.

It is generally expected that groundwater levels beneath the site will remain close to sea level and may exhibit tidal variation. Groundwater at the site is expected to be brackish / saline and unsuitable for potable supply.

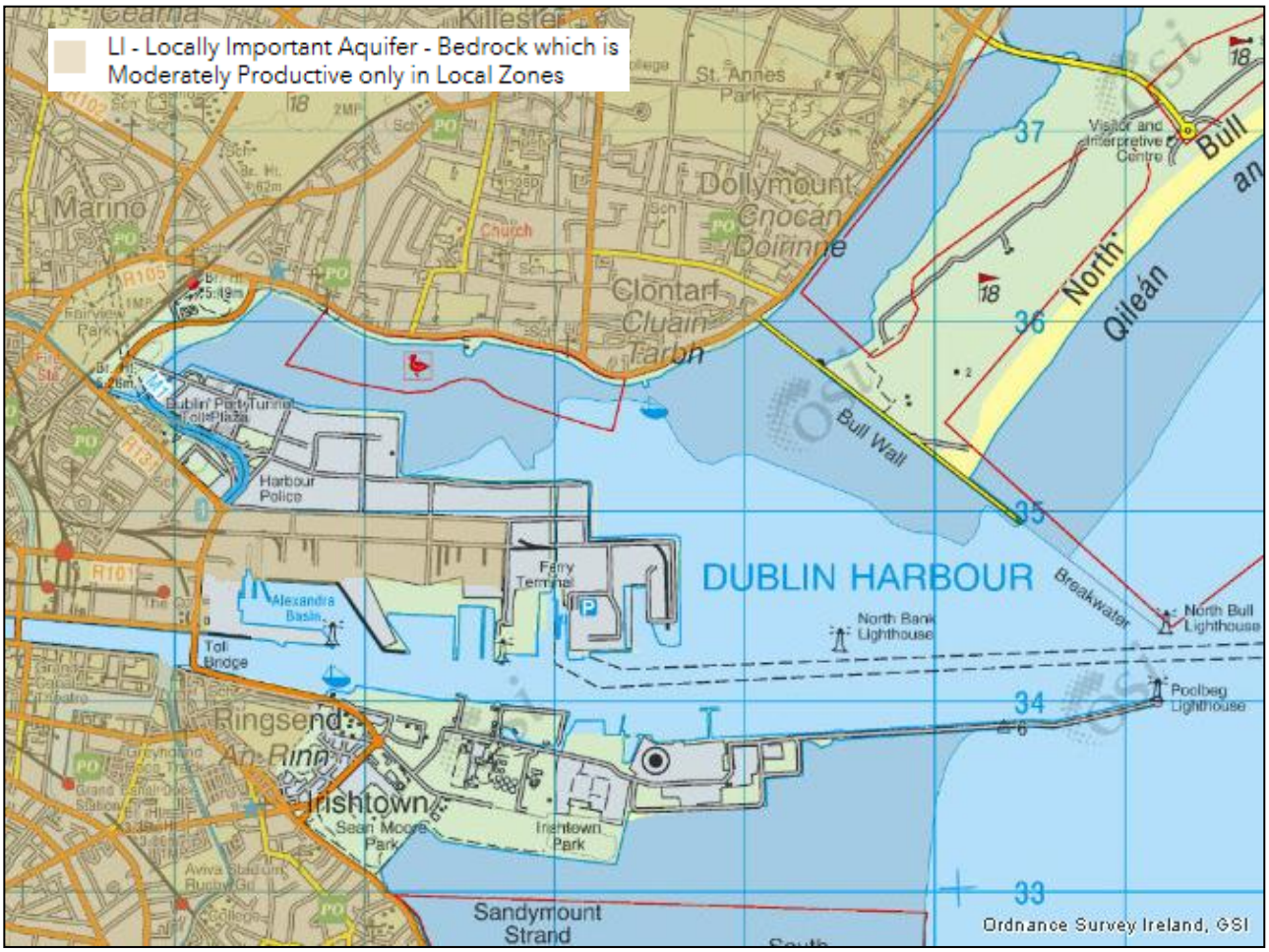


Figure 6 Groundwater aquifer (taken from GSI's Spatial Resources portal)

1.4.1.4 Groundwater vulnerability

In accordance with the Water Framework Directive (2000/60/EC) it is necessary to understand the groundwater vulnerability of the site, which is defined as the tendency and likelihood for general contaminants to reach the water table after introduction at the ground surface.

The site falls within an area of low groundwater vulnerability. A groundwater borehole of unknown use is present to the north west of the site.

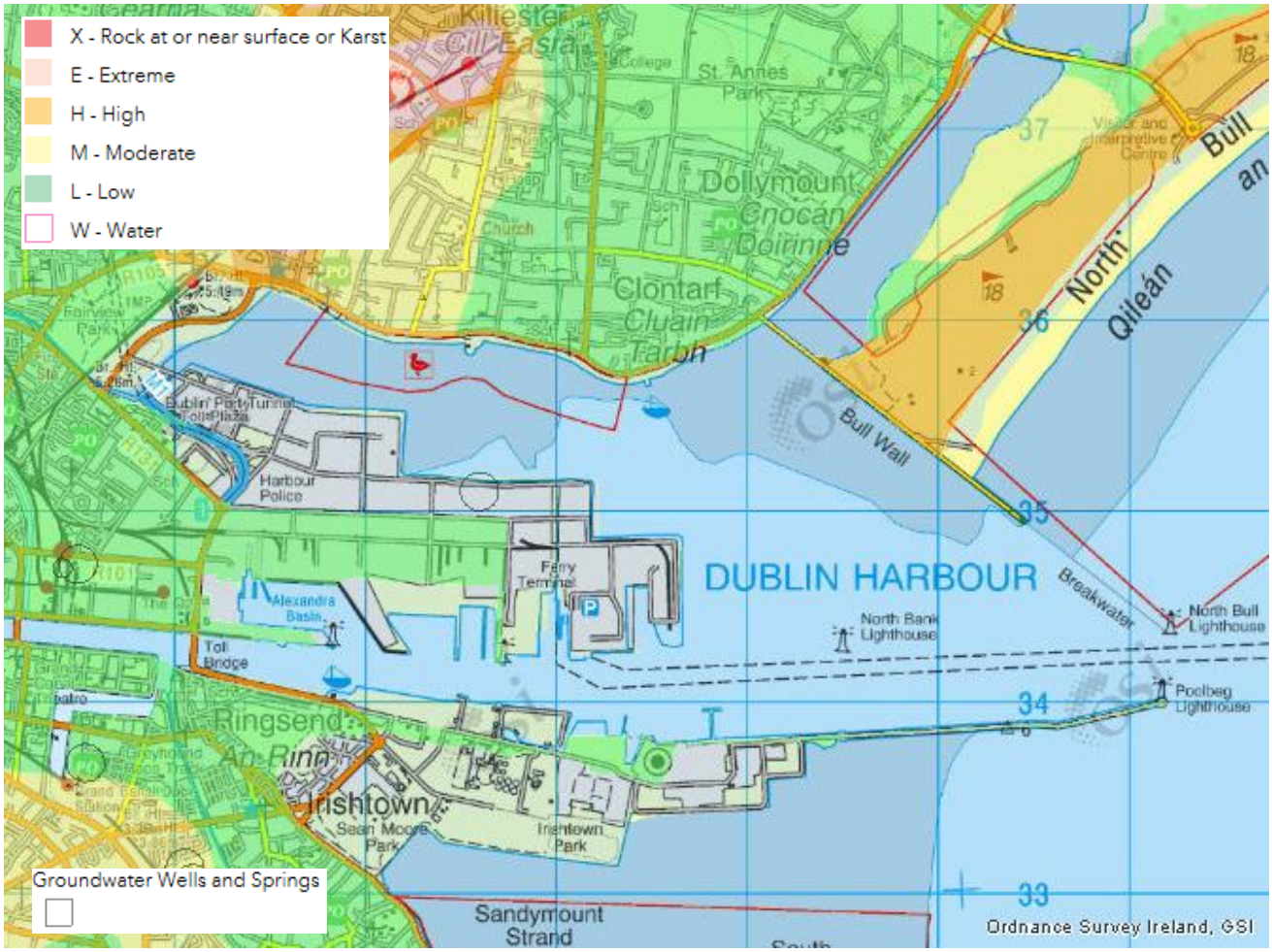


Figure 7 Groundwater vulnerability (taken from GSI's Spatial Resources portal)

1.4.1.5 Surface water hydrology

The South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) is present directly north and west of the site. The River Liffey is present directly south of the site. The Dodder River flows into the River Liffey just west of Tom Clarke Bridge.

1.4.1.6 Licenses and permits

Environmental Protection Agency map viewer

Figure 8 demonstrates the Industrial Emission licences (IELs) and Integrated Pollution Control (IPC) sites which are present surrounding the site. Dublin Port Company have an IEL (licence number P1022-01) on the existing Sea Truck terminal site.

Figure 9 demonstrates the Integrated Pollution Prevention and Control (IPPC) facilities within the vicinity of the site.

Figure 8 IELs and IPC sites in vicinity of site

Figure 9 IPPC sites in vicinity of site

In addition, Indaver Ireland Limited are registered as having a hazardous waste facility (ref. W0036-02) to the north of Tolka Quay Road (just north west of its junction with Breakwater Road South).

The Tolka Estuary and Liffey Estuary Lower are noted to be 'of risk' and of moderate status on the EPA map viewer. The Liffey Estuary Lower is noted to be unpolluted for the 2010-2012 reporting period, while the Tolka Estuary is noted to be potentially eutrophic for the same period. The Dublin groundwater body is noted to be 'not at risk' and of good status.

Tolka Estuary and the Liffey Estuary are classified as nutrient sensitive estuaries under the Urban Waste Water Treatment Directive Sensitive Area. North Dublin Bay and South Dublin Bay are proposed Natural Heritage Areas.

1.5 Previous site investigation

1.5.1 Dublin Port IED application

A number of boreholes were sunk across the wider Dublin Port site as part of the site investigation prior to the Industrial Emissions Directive (IED) licence application. As part of this site investigation, completed by Geotechnical Environmental Services in January-February 2015, four boreholes were sunk within the MP2 Project area; BH6, BH7, BH8 and BH10 (as shown on Figure 9). The logs for these boreholes are included in Appendix B; the boreholes are summarised in Tables 4-7.

Figure 10 IED Licence Monitoring Locations

Table 4 Dublin Port IED application BH6 – February 2015

Depth (m)	Strata
0.00-0.35	Topsoil
0.35-3.60	MADE GROUND: Firm brown with grey and dark brown mottling slightly sandy silty CLAY containing red brick, slate and glass remnants.
3.60-3.90	MADE GROUND: Soft grey slightly sandy slightly gravelly clayey SILT. Gravel is fine to medium, sub-angular to sub-rounded. Steady groundwater strike was recorded at 3.60m, rising to 3.40m in 20 minutes
3.90-7.30	MADE GROUND: Brown and dark brown silty gravelly fine to coarse SAND containing red brick and concrete remnants. Gravel is fine to coarse, sub-angular to sub-rounded.
7.30-9.00	MADE GROUND: Black silty sandy fine to coarse GRAVEL containing red brick, concrete and cinder remnants. Gravel is sub-angular to sub-rounded.
9.00-10.00	Firm dark grey slightly sandy clayey thinly laminated organic SILT containing occasional thinly interbedded grey silty fine SAND layers.
10.00-15.00	Firm dark grey slightly sandy clayey thinly laminated organic SILT containing occasional thinly interbedded grey silty fine SAND layers.

Table 5 Dublin Port IED application BH7 – February 2015

Depth (m)	Strata
0.00-0.40	Topsoil
0.40-3.40	MADE GROUND: Firm dark brown and grey gravelly sandy CLAY containing red brick, mortar, slate, timber and tarmac remnants. Gravel is fine to coarse, sub-angular to sub-rounded.
3.40-11.70	Dark grey and black silty sandy fine to coarse GRAVEL with cobble and boulder content. Gravel is sub-angular to sub-rounded. Steady groundwater strike was recorded at 3.40m
11.70-15.45	Medium dense grey silty fine SAND.

Table 6 Dublin Port IED Application BH8 – February 2015

Depth (m)	Strata
0.00-0.10	Pavlor brick
0.10-0.20	Fill: Quarry dust
0.20-0.70	Concrete
0.70-3.80	MADE GROUND: Firm brown and dark brown slightly sandy slightly gravelly CLAY containing red brick, concrete and timber remnants. Gravel is fine coarse, sub-angular to sub-rounded. Steady groundwater strike was recorded at 3.20m.
3.80-5.60	MADE GROUND: Soft to firm dark grey and black slightly sandy slightly gravelly CLAY containing red brick, concrete and timber remnants. Gravel is fine coarse, sub-angular to sub-rounded.
5.60-7.50	Soft to firm grey slightly sandy silty CLAY.
7.50-15.45	Grey silty fine to medium SAND containing occasional bands of sandy fine to coarse GRAVEL. Gravel is fine to medium, sub-angular to sub-rounded.

Table 7 Dublin Port IED Application BH10 – February 2015

Depth (m)	Strata
0.00-0.15	Tarmac
0.15-0.30	Fill: Hardcore
0.30-0.60	Concrete
0.60-0.90	Fill: Hardcore
0.90-1.40	MADE GROUND: Grey silty slightly gravelly fine to coarse SAND containing shell remnants. Gravel is fine to medium, sub-angular to sub-rounded.
1.40-2.90	MADE GROUND: Soft to fiem brown and dark brown slightly sandy slightly gravelly CLAY with cobble content. Gravel is fine to coarse, sub-angular rto sub-rounded.
2.90-3.50	MADE GROUND: Brown and grey sandy fine to coarse GRAVEL with cobble content. Gravel is sub-angular to sub-rounded. Steady groundwater strike was recorded at 2.90m.
3.50-4.20	MADE GROUND: Soft black slightly sandy slightly gravelly CLAY. Gravel is fine to medium, sub-angular to sub-rounded.
4.20-5.90	Black silty gravelly fine to coarse SAND. Gravel is fine to medium, sub-angular to sub-rounded.
5.90-11.70	Firm dark grey slightly sandy clayey SILT with occasional interbedded silty gravelly fine to coarse SAND. Gravel is fine to medium, sub-angular to sub-rounded.
11.70-15.45	Medium dense grey and grey brown silty gravelly fine to coarse SAND. Gravel is fine to coarse, sub-angular to sub-rounded.

1.5.2 GSI Geotechnical viewer

The GSI Geotechnical viewer was consulted to gain an understanding of historical site investigations undertaken on or in proximity to the site. The full downloaded reports including location plans are included in Appendix C; the relevant boreholes are summarised in the sections below.

1.5.2.1 Port Operations Centre

Two boreholes were historically drilled in proximity to the existing Port Operations Centre. The boreholes were drilled via the rotary core method to a maximum depth of 16m and are summarised in Tables 8 and 9.

Table 8 Borehole 134491 – GSI Report 5533 (March 2003)

Depth (m)	Strata
0.00-13.60	Fill – Made ground
13.60-15.00	Gravel
15.00-16.00	Gravel and silt

Table 9 Borehole 134492 – GSI Report 5533 (March 2003)

Depth (m)	Strata
0.00-13.80	Fill – Made ground
13.80-15.00	Gravel and silt

1.5.2.2 North east of Oil Berth 4

Two boreholes were formerly drilled, via cable percussion (shell and auger), to a maximum depth of 16.77m to the north east of Oil Berth 4 (Tables 10 and 11). As no made ground is denoted on the logs it is assumed that these boreholes were drilled prior to the land being reclaimed.

Table 10 Borehole 92269 – GSI Report 2813 (March 1971)

Depth (m)	Strata
0.00-3.66	Clayey sandy gravel
3.66-6.71	Sand
6.71-7.32	Soft grey organic silt
7.32-8.54	Sandy gravel
8.54-12.80	Sand
12.80-13.72	Soft grey silt
13.72-14.94	Sandy gravel
14.94-16.11	Soft grey silty clay
16.11-16.77	Clayey gravel

Table 11 Borehole 92270 – GSI Report 2813 (March 1971)

Depth (m)	Strata
0.00-2.44	Clayey sandy gravel
2.44-6.09	Sand

1.5.2.3 Terminal 5

Boreholes 92262 and 92265 were drilled in the west and east of terminal 5 respectively. As no made ground is denoted on the logs it is assumed that these boreholes were drilled prior to the land being reclaimed. Both boreholes were drilled via cable percussion (shell and auger) and are summarised in Tables 12 and 13.

Table 12 Borehole 92262 – GSI Report 2816 (June 1969)

Depth (m)	Strata
0.00-1.55	Organic clay
1.55-2.93	Organic clay and gravel
2.93-3.07	Gravelly sand
3.07-4.60	Sand
4.60-10.55	Sandy gravel
10.55-11.77	Organic sand and clay
11.77-12.38	Slightly clayey sand
12.38-13.29	Coarse sand and gravel
13.29-14.82	Gravel
14.82-15.42	Sand and gravel
15.42-15.73	Boulder clay
15.73-16.95	Boulders
16.95-19.08	Boulder clay
19.08-22.74	Bedrock

Table 13 Borehole 92265 – GSI Report 2816 (June 1969)

Depth (m)	Strata
0.00-2.74	Organic silt
2.74-3.50	Fine to medium sand
3.50-7.93	Fine sand
7.93-8.23	Fine to medium sand
8.23-8.54	Fine to medium sand
8.54-10.67	Fine to medium sand
10.67-12.96	Silty clay
12.96-13.57	Clayey silt
13.57-15.10	Gravel
15.10-17.83	Bedrock
17.83-19.60	Bedrock

1.5.2.4 Terminal 1

Borehole 92476 was drilled just south of the existing passenger terminal building at Terminal 1. It was drilled to a depth of 28.5m via cable percussion (shell and auger) and is summarised in Table 14.

Table 14 Borehole 92476 – GSI Report 2847 (December 1997)

Depth (m)	Strata
0.00-5.00	Fill – Made ground
5.00-10.00	Fill – Made ground
10.00-15.30	Fill – Made ground
15.30-16.00	Grey coarse sand
16.00-18.40	Fine to coarse, sandy gravel and cobbles
18.40-20.50	Very stiff, dark grey, very silty clay
20.50-21.50	Fine, sandy gravel
21.50-28.35	Fine to coarse gravel and cobbles
28.35-28.50	Bedrock

1.5.2.5 Terminal 2

Borehole 121168 was drilled just south of the existing freight terminal building at Terminal 2. It was drilled to a depth of 25.5m via cable percussion (shell and auger) and is summarised in Table 15.

Table 15 Borehole 121168 – GSI Report 4170 (November 1999)

Depth (m)	Strata
0.00-0.30	Fill – Made ground
0.30-5.80	Fill – Made ground
5.80-6.20	Soft grey silt
6.20-8.00	Medium dense silty sand
8.00-15.50	Firm grey blue silt
15.50-16.80	Brown fine sand
16.80-17.50	Sandy gravel
17.50-19.40	Dense fine to coarse gravel
19.40-22.90	Stiff grey silty clay
22.90-23.50	Dense grey gravel
23.50-25.50	Grey weathered rock

2 CONSULTATION

Significant consultation regarding the overall Dublin Port Masterplan 2040, reviewed 2018, and the MP2 Project has been completed with the local community, An Bord Pleanála, Dublin City Council and various other Statutory Bodies. No concerns with regard to contaminated land were raised.

3 OVERVIEW OF POTENTIAL CONTAMINATION

The nature of potential contamination that may have arisen from the past activities on and surrounding the site is considered below.

3.1.1 On site sources

3.1.1.1 Current land use

A number of potential sources of contamination have been identified on the existing site. Areas of fuel storage, boilers, substations and a garage area are all present on the site. Obvious staining resulting from fuel spills and/or leaks are present in certain areas of the site.

As the entire area is formed on reclaimed ground, made ground will underlie the MP2 Project. The nature of this made ground is unknown and has the potential to contain contamination.

3.1.1.2 Previous land use – historical development

Historical land uses of the site are unknown. It is likely that the site has always been developed with industrial land uses.

3.1.1.3 Ground borne gases

Made ground or organic rich alluvial soils underlying the site would have the potential to generate elevated levels of ground gases.

3.1.1.4 Radon gas

The site falls across the boundary of two 10km grid squares with regards to Radon gas; the east of the port is within an area where less than 1% of homes would be expected to be above the reference level while the western part of the port is within an area where between 1 and 5% of homes would be expected to be above the reference level.

3.1.2 Off site sources

3.1.2.1 Surrounding land uses – current

Industrial land uses surround the site. The most obvious source of potential contamination is the large area of bitumen and tar storage present directly north of Zone B. This area is managed by Hugh Munro & Company Ltd and contains storage for Irish Bitumen Storage Ltd, Dublin Joint Fuels Terminal and Irish Tar & Bitumen Suppliers.

3.1.2.2 Surrounding land uses – historical

Historical development in the area surrounding the site has included a shipbuilding yard, railway line, timber yard, coal yard, chemical manure works and a number of oil tanks.Conceptual Site Model and Risk Assessment

4 CONCEPTUAL SITE MODEL

Risk estimation involves detailed evaluation of source - pathway - receptor scenarios to determine whether a linkage exists between any sources of contamination and potential receptors. A risk exists where a receptor is exposed to a source of contamination, via a pathway. If any element of the source-pathway-target linkage is absent, then no risk is present.

In order to consider potential risks at the site, a conceptual site model was developed, to examine the potential source - pathway - receptor linkages that may exist on the site. The conceptual model and the risk assessment for the site are illustrated in Table 16.

Table 16 Risk Assessment & Site Conceptual Model

Source	Potential pathway(s)	Potential receptors(s)	Relevant Source – Pathway – Receptor Linkage	Further investigation required
On site sources				
Contaminants within the soils and groundwater	Dermal contact, ingestion of/and direct inhalation of potential contaminants present within soil	Humans in form of future site users (commercial, site workers), landscaping and maintenance workers	Potential sources of contamination present on site include fuel storage, boilers, substations and garage areas. The nature of the made ground underlying the site is unknown; it may have the potential to contain contamination (including asbestos).	Yes Intrusive investigation and collection /analysis of sub-soil and groundwater samples followed by generic risk assessment as per CLR 11 methodology will be required prior to commencement of construction.
	Subsurface infiltration, leaching from sub-soils and groundwater flow Surface run-off	Perched groundwater, bedrock aquifer, South Dublin Bay and River Tolka Estuary SPA, River Liffey	Contaminants in soil have the potential to leach through sub-soils and effect perched groundwater, adjacent surface water and/or the bedrock aquifer.	
Soil gas: Radon	Migration along service trenches	Humans in the form of future site users	According to the radon map for the Republic of Ireland, the east of the port is within an area where less than 1% of homes would be expected to be above the reference level while the western part of the port is within an area where between 1 and 5% of homes would be expected to be above the reference level. No new buildings are proposed	No

Source	Potential pathway(s)	Potential receptors(s)	Relevant Source – Pathway – Receptor Linkage	Further investigation required
			as part of the MP2 Project and as such risks from Radon are not relevant.	
Soil gas: Made Ground or highly organic soils may contain high organic content that is degrading and producing Methane, Carbon dioxide and depleted Oxygen gases	Migration along cracks in foundations and service trenches	Humans in the form of future site users	No new buildings are proposed as part of the MP2 Project and as such risks from ground gas are not relevant.	No
Off site sources				
Current and historical surrounding land uses	Subsurface infiltration, leaching from sub-soils and groundwater flow Surface run-off	Perched groundwater, bedrock aquifer, South Dublin Bay and River Tolka Estuary SPA, River Liffey	Historical development in the area surrounding the site has included a shipbuilding yard, railway line, timber yard, coal yard, chemical manure works and a number of oil tanks.	Yes Intrusive investigation and collection /analysis of sub-soil and groundwater samples followed by generic risk assessment as per CLR 11 methodology will be required prior to commencement of construction.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

- The desk study has highlighted the potential contamination sources, pathways and receptors which are likely to be present on the current site.
- The principal source of contamination is likely to be the presence of fuel storage, boilers, substations and a garage area on site. .
- Made ground is known to underlie the site and has the potential to effect groundwater and contaminants in shallow soils.
- Ground gas/Radon gas is not considered to be an issue as no new buildings are proposed as part of the MP2 Project.
- In accordance with CLR11, an intrusive site investigation and quantitative risk assessment should be carried out if the site is redeveloped to ascertain if the source – pathway – receptor linkages are present.

5.2 Recommendations

- A number of boreholes should be advanced across the site with a density as suggested in BS 10175:2011+A2:2017 having consideration of the development proposals.
- A number of representative sub-soil samples will be collected and sent for laboratory analysis. The suites of analysis will include; Metals, Polycyclic Aromatic Hydrocarbons, Inorganics, Hydrocarbons (TPH CWG), PCBs and Dioxins, Volatile Organic Compounds and Semi Volatile Organic Compounds.
- Boreholes will be installed with monitoring installations to facilitate the collection of groundwater samples. Groundwater samples will be analysed as per a similar suite of analysis as described above for soils.
- A Generic Quantitative Risk Assessment (GQRA) will be undertaken to ascertain the potential risks to future site users (human health) and environmental receptors.
- If deemed necessary from the GQRA, a Detailed Quantitative Risk Assessment (DQRA) will be undertaken to set site specific remedial targets for the development.

Appendix A

Photographic record of site walkover

Plate 1: Area east of Oil Berth 4 to be infilled

Plate 2: Dublin Port VTS building at the end of the old eastern breakwater (to be demolished)

Plate 3: Substation present along the northern boundary of Zone A (Figure 3)

Plate 4: Warehouses present in the north of the site

Plate 5: Garage area present in north of Zone A (Figure 3)

Plate 6: Fuel tank present in north of Zone A (Figure 3)

Plate 7: Fuel tank present in north of Zone A (Figure 3)

Plate 8: Substation present in southern portion of Seatruck terminal

Plate 9: Existing Stenaline terminal

Plate 10: Fuel tank present to north of Stenaline terminal building

Plate 11: Fuel tank present directly west of Irish Ferries terminal building

Plate 12: Substation/generator present to south west of Irish Ferries building

Plate 13: Oil storage present to west of Irish Ferries terminal building

Plate 14: Fuel tank present to west of Irish Ferries terminal building with obvious staining of surrounding ground

Appendix B

Relevant IED borehole logs

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH6

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
CME-55 Drill. Hollow stem auger (HSA) drilling and percussion sampling to 15.0m depth.	230mm cased to 15.00m	3.29	Dublin Port Company	01.RI15
	Location 720227.6 E 734325.5 N	**Dates** 05/02/2015-06/02/2015	**Engineer** RPS Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
				Hydrocarbon type odours from strata as recovered		(0.35)	TOPSOIL.			
0.35	D1			between 3.6m and	2.94	0.35	MADE GROUND: Firm brown with grey and dark brown mottling slightly sandy silty CLAY containing red brick, slate and glass remnants.			
0.35-2.00	B1			3.9m depth.						
0.50	E1									
1.30	W2									
1.40	W1									
						(3.25)				
2.10	W3									
2.50	E2									
3.60	D2			Steady(1) at 3.60m,	-0.31	3.60			▼1	
				rose to 3.40m in		(0.30)	MADE GROUND: Soft grey slightly sandy slightly gravelly clayey SILT. Gravel is fine to medium, sub-angular to sub-rounded.		▽1	
3.90	D3			20 mins, sealed at 9.00m.	-0.61	3.90				
							MADE GROUND: Brown and dark brown silty gravelly fine to coarse SAND containing red brick and concrete remnants. Gravel is fine to coarse, sub-angular to sub-rounded.			
5.00-7.00	B2									
						(3.40)				
7.30	D4				-4.01	7.30	MADE GROUND: Black silty sandy fine to coarse GRAVEL containing red brick, concrete and cinder remnants. Gravel is sub-angular to sub-rounded.			
						(1.70)				
9.00	D5			Groundwater	-5.71	9.00				
9.00	E3			perched on upper surface of silt stratum.			Firm dark grey slightly sandy clayey thinly laminated organic SILT containing occasional thinly interbedded grey silty fine SAND layers.			
9.00-10.00	B3			05/02/2015:3.40m		(1.00)				
				06/02/2015:3.20m						
					-6.71	10.00				

Remarks
E=Environmental soil sample comprising 1x400g capacity plastic tub, 1x250g capacity amber glass jar, 1x60g capacity amber glass vial.
W=Environmental groundwater sample comprising 1x1L plastic bottle, 1x500ml capacity clear glass bottle, 3x250ml capacity clear glass bottles, 1x125ml capacity azlon bottle, 2x40ml capacity clear glass vials.
W1/W2=Shallow and deep standpipe samples as taken 20th February 2015.
W3/W4=Shallow and deep standpipe samples as taken 23rd March 2015.

Scale (approx)	Logged By
1:50	JC

Figure No. 01.RI15.BH6

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH6

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
CME-55 Drill. Hollow stem auger (HSA) drilling and percussion sampling to 15.0m depth.	230mm cased to 15.00m	3.29	Dublin Port Company	01.RI15
	Location	**Dates**	**Engineer**	**Sheet**
	720227.6 E 734325.5 N	05/02/2015-06/02/2015	RPS Consulting Engineers	2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.20	W4						Firm dark grey slightly sandy clayey thinly laminated organic SILT containing occasional thinly interbedded grey silty fine SAND layers.			
10.50-10.95	SPT N=11	10.50	3.40	2,2/3,2,3,3						
10.50-10.95	D6									
						(5.00)				
15.00	D7			06/02/2015:6.70m	-11.71	15.00	Complete at 15.00m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 01.RI15.BH6

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH6

Installation Type	Dimensions	Client	Job Number
Double Installation	Internal Diameter of Tube [A] = 50 mm Internal Diameter of Tube [B] = 50 mm Diameter of Filter Zone = 230 mm	Dublin Port Company	01.RI15

Location	Ground Level (mOD)	Engineer	Sheet
	3.29	RPS Consulting Engineers	1/1

Legend	Water	Instr (A) (B)	Level (mOD)	Depth (m)	Description
			3.19	0.10	Concrete
					Bentonite Seal
			1.29	2.00	
	▼1 ▽1				
					Piezometer Tip
			-5.71	9.00	
					Bentonite Seal
			-8.71	12.00	
					Piezometer Tip
			-11.71	15.00	

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings 5 min	Readings 10 min	Readings 15 min	Readings 20 min	Depth Sealed (m)
05/02/15		3.60	3.00	Steady				3.40	9.00

Groundwater Observations During Drilling

Date	Start of Shift Time	Start of Shift Depth Hole (m)	Start of Shift Casing Depth (m)	Start of Shift Water Depth (m)	Start of Shift Water Level (mOD)	End of Shift Time	End of Shift Depth Hole (m)	End of Shift Casing Depth (m)	End of Shift Water Depth (m)	End of Shift Water Level (mOD)
05/02/15		9.00	9.00	3.20	0.09		9.00	9.00	3.40	-0.11
06/02/15							15.00	15.00	6.70	-3.41

Instrument Groundwater Observations

Inst. [A] Type : Slotted Standpipe **Inst. [B] Type :** Slotted Standpipe

Date	Instrument [A] Time	Instrument [A] Depth (m)	Instrument [A] Level (mOD)	Instrument [B] Time	Instrument [B] Depth (m)	Instrument [B] Level (mOD)	Remarks
20/02/15		1.30	1.99		1.40	1.89	
23/03/15		2.10	1.19		3.80	-0.51	

Remarks
Flush lockable cover installed.
Geotextile filter sock surround to well screen section.

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH7

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
CME-55 Drill. Hollow stem auger (HSA) drilling and percussion sampling to 15.0m depth.	230mm cased to 15.00m	3.22	Dublin Port Company	01.RI15
	Location 720268.4 E 734507.6 N	**Dates** 10/02/2015	**Engineer** RPS Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.40)	TOPDOIL.			
0.40	D1				2.82	0.40	MADE GROUND: Firm dark brown and grey gravelly sandy CLAY containing red brick, mortar, slate, timber and tarmac remnants. Gravel is fine to coarse, sub-angular to sub-rounded.			
0.50	E1									
1.00-3.00	B1									
1.56	W3									
1.60	W1									
						(3.00)				
3.00	W2									
3.40	D2			Steady(1) at 3.40m.	-0.18	3.40	Dark grey and black silty sandy fine to coarse GRAVEL with cobble and boulder content. Gravel is sub-angular to sub-rounded.		▽1	
3.50	E2									
4.17	W4									
5.00-6.00	B2									
						(6.60)				
					-6.78	10.00				

Remarks
No obvious visual or olfactory evidence of contamination.
E=Environmental soil sample comprising 1x400g capacity plastic tub, 1x250g capacity amber glass jar, 1x60g capacity amber glass vial.
W=Environmental groundwater sample comprising 1x1L plastic bottle, 1x500ml capacity clear glass bottle, 3x250ml capacity clear glass bottles, 1x125ml capacity azlon bottle, 2x40ml capacity clear glass vials.
W1/W2=Shallow and deep standpipe samples as taken 20th February 2015.
W3/W4=Shallow and deep standpipe samples as taken 23rd March 2015.
Water added from 4.50m to 15.00m.

Scale (approx)	Logged By
1:50	JC

Figure No. 01.RI15.BH7

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH7

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
CME-55 Drill. Hollow stem auger (HSA) drilling and percussion sampling to 15.0m depth.	230mm cased to 15.00m	3.22	Dublin Port Company	01.RI15
	Location 720268.4 E 734507.6 N	**Dates** 10/02/2015	**Engineer** RPS Consulting Engineers	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(1.70)	Dark grey and black silty sandy fine to coarse GRAVEL with cobble and boulder content. Gravel is sub-angular to sub-rounded.			
11.70	D3				-8.48	11.70				
12.00-12.45	SPT N=29	12.00	0.10	3,3/6,7,8,8			Medium dense grey silty fine SAND.			
12.00-12.45	D4									
12.00-13.00	B3									
						(3.75)				
15.00-15.45	SPT N=23	15.00	0.10	3,4/4,6,7,6						
15.00-15.45	D5									
				10/02/2015:0.10m	-12.23	15.45	Complete at 15.45m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 01.RI15.BH7

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH7

Installation Type	Dimensions	Client	Job Number
Double Installation	Internal Diameter of Tube [A] = 50 mm Internal Diameter of Tube [B] = 50 mm Diameter of Filter Zone = 230 mm	Dublin Port Company	01.RI15

Location	Ground Level (mOD)	Engineer	Sheet
	3.22	RPS Consulting Engineers	1/1

Legend	Water	Instr (A) (B)	Level (mOD)	Depth (m)	Description
			3.12	0.10	Concrete
					Bentonite Seal
			2.22	1.00	
					Piezometer Tip
			0.22	3.00	
	▽1				Bentonite Seal
			-1.78	5.00	
					Piezometer Tip
			-7.78	11.00	
					Bentonite Seal
			-8.78	12.00	
					Bottom Fill
			-12.23	15.45	

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings 5 min	Readings 10 min	Readings 15 min	Readings 20 min	Depth Sealed (m)
10/02/15		3.40	3.00	Steady					

Groundwater Observations During Drilling

Date	Start of Shift Time	Start of Shift Depth Hole (m)	Start of Shift Casing Depth (m)	Start of Shift Water Depth (m)	Start of Shift Water Level (mOD)	End of Shift Time	End of Shift Depth Hole (m)	End of Shift Casing Depth (m)	End of Shift Water Depth (m)	End of Shift Water Level (mOD)
10/02/15							15.45	15.00	0.10	3.12

Instrument Groundwater Observations

Inst. [A] Type : Slotted Standpipe **Inst. [B] Type :** Slotted Standpipe

Date	Instrument [A] Time	Instrument [A] Depth (m)	Instrument [A] Level (mOD)	Instrument [B] Time	Instrument [B] Depth (m)	Instrument [B] Level (mOD)	Remarks
20/02/15		3.00	0.22		1.60	1.62	
23/03/15		4.17	-0.95		1.56	1.66	

Remarks

Flush lockable cover installed.
Geotextile filter sock surround to well screen section.

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH8

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
CME-55 Drill. Hollow stem auger (HSA) drilling and percussion sampling to 15.0m depth.	230mm cased to 15.00m	3.11	Dublin Port Company	01.RI15
	Location	**Dates**	**Engineer**	**Sheet**
	720275.5 E 734644.5 N	13/02/2015-16/02/2015	RPS Consulting Engineers	1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					3.01	0.10	Pavior BRICK.			
					2.91	0.20	FILL: Quarry DUST.			
						(0.10)				
						(0.50)	CONCRETE.			
					2.41	0.70				
0.70	D1						MADE GROUND: Firm brown and dark brown slightly sandy slightly gravelly CLAY containing red brick, concrete and timber remnants. Gravel is fine coarse, sub-angular to sub-rounded.			
0.85	E1									
1.00-3.00	B1									
						(3.10)				
2.60	W1								▼1	
				Steady(1) at 3.20m, rose to 3.20m in 20 mins.						
3.52	W4									
3.65	W3									
3.80	W2				-0.69	3.80				
3.80	D2						MADE GROUND: Soft to firm dark grey and black slightly sandy slightly gravelly CLAY containing red brick, concrete and timber remnants. Gravel is fine coarse, sub-angular to sub-rounded.			
3.80-5.00	B2									
4.00	E2									
						(1.80)				
				13/02/2015:3.20m						
				16/02/2015:3.20m						
5.60	D3				-2.49	5.60	Soft to firm grey slightly sandy silty CLAY.			
6.00	E3									
6.00-7.00	B3									
						(1.90)				
7.50	D4				-4.39	7.50	Grey silty fine to medium SAND containing occasional bands of sandy fine to coarse GRAVEL. Gravel is fine to medium, sub-angular to sub-rounded.			
						(2.50)				
					-6.89	10.00				

Remarks

No obvious visual or olfactory evidence of contamination.
E=Environmental soil sample comprising 1x400g capacity plastic tub, 1x250g capacity amber glass jar, 1x60g capacity amber glass vial.
W=Environmental groundwater sample comprising 1x1L plastic bottle, 1x500ml capacity clear glass bottle, 3x250ml capacity clear glass bottles, 1x125ml capacity azlon bottle, 2x40ml capacity clear glass vials.
W1/W2=Shallow and deep standpipe samples as taken 20th February 2015.
W3/W4=Shallow and deep standpipe samples as taken 24th March 2015.
Water added from 5.60m to 15.00m.

Scale (approx)	Logged By
1:50	JC

Figure No. 01.RI15.BH8

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH8

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
CME-55 Drill. Hollow stem auger (HSA) drilling and percussion sampling to 15.0m depth.	230mm cased to 15.00m	3.11	Dublin Port Company	01.RI15
	Location	**Dates**	**Engineer**	**Sheet**
	720275.5 E 734644.5 N	13/02/2015-16/02/2015	RPS Consulting Engineers	2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
							Grey silty fine to medium SAND containing occasional bands of sandy fine to coarse GRAVEL. Gravel is fine to medium, sub-angular to sub-rounded.			
12.00	D5					(5.45)				
15.00-15.45	SPT N=16	15.00	2.30	2,2/3,4,5,4						
15.00-15.45	D6									
				16/02/2015:2.30m	-12.34	15.45	Complete at 15.45m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 01.RI15.BH8

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin

Borehole Number
BH8

Installation Type
Double Installation

Dimensions
Internal Diameter of Tube [A] = 50 mm
Internal Diameter of Tube [B] = 50 mm
Diameter of Filter Zone = 230 mm

Client
Dublin Port Company

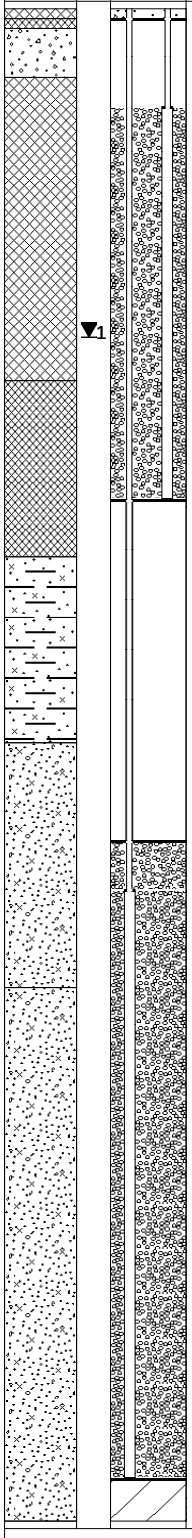
Job Number
01.RI15

Location

Ground Level (mOD)
3.11

Engineer
RPS Consulting Engineers

Sheet
1/1



Level (mOD)	Depth (m)	Description
3.01	0.10	Concrete
		Bentonite Seal
2.11	1.00	
		Piezometer Tip
-1.89	5.00	
		Bentonite Seal
-5.39	8.50	Gravel Filter
-5.89	9.00	
		Piezometer Tip
-11.89	15.00	Bottom Fill
-12.34	15.45	

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings 5 min	Readings 10 min	Readings 15 min	Readings 20 min	Depth Sealed (m)
13/02/15		3.20	3.00	Steady				3.20	

Groundwater Observations During Drilling

Date	Start of Shift Time	Start of Shift Depth Hole (m)	Start of Shift Casing Depth (m)	Start of Shift Water Depth (m)	Start of Shift Water Level (mOD)	End of Shift Time	End of Shift Depth Hole (m)	End of Shift Casing Depth (m)	End of Shift Water Depth (m)	End of Shift Water Level (mOD)
13/02/15							5.00	5.00	3.20	-0.09
16/02/15		5.00	5.00	3.20	-0.09		15.45	15.00	2.30	0.81

Instrument Groundwater Observations

Inst. [A] Type : Slotted Standpipe **Inst. [B] Type :** Slotted Standpipe

Date	Instrument [A] Time	Instrument [A] Depth (m)	Instrument [A] Level (mOD)	Instrument [B] Time	Instrument [B] Depth (m)	Instrument [B] Level (mOD)	Remarks
20/02/15		3.80	-0.69		2.60	0.51	
24/03/15		3.52	-0.41		3.65	-0.54	

Remarks
Flush lockable cover installed.
Geotextile filter sock surround to well screen section.

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH10

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
CME-55 Drill. Hollow stem auger (HSA) drilling and percussion sampling to 18.0m depth.	230mm cased to 15.00m	3.26	Dublin Port Company	01.RI15
	Location	**Dates**	**Engineer**	**Sheet**
	720448.6 E 734610.3 N	17/02/2015-18/02/2015	RPS Consulting Engineers	1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					3.11	0.15	TARMAC.			
					2.96	0.30	FILL: HARDCORE.			
						(0.30)	CONCRETE.			
					2.66	0.60				
						(0.30)	FILL: HARDCORE.			
0.90	D1				2.36	0.90	MADE GROUND: Grey silty slightly gravelly fine to coarse SAND containing shell remnants. Gravel is fine to medium, sub-angular to sub-rounded.			
1.00	E1					(0.50)				
1.40	D2				1.86	1.40	MADE GROUND: Soft to fiem brown and dark brown slightly sandy slightly gravelly CLAY with cobble content. Gravel is fine to coarse, sub-angular rto sub-rounded.			
1.40-2.90	B1					(1.50)				
2.90	D3			Steady(1) at 2.90m, rose to 2.90m in 20 mins.	0.36	2.90	MADE GROUND: Brown and grey sandy fine to coarse GRAVEL with cobble content. Gravel is sub-angular to sub-rounded.		▼1	
2.90-3.50	B2					(0.60)				
3.20	W1									
3.20	W2									
3.50	D4				-0.24	3.50	MADE GROUND: Soft black slightly sandy slightly gravelly CLAY. Gravel is fine to medium, sub-angular to sub-rounded.			
4.00	E2					(0.70)				
4.20	D5				-0.94	4.20	Black silty gravelly fine to coarse SAND. Gravel is fine to medium, sub-angular to sub-rounded.			
4.30	W3					(1.70)				
5.90	D6				-2.64	5.90	Firm dark grey slightly sandy clayey SILT with occasional interbedded silty gravelly fine to coarse SAND. Gravel is fine to medium, sub-angular to sub-rounded.			
6.00	E3					(4.10)				
					-6.74	10.00				

Remarks
No obvious visual or olfactory evidence of contamination.
E=Environmental soil sample comprising 1x400g capacity plastic tub, 1x250g capacity amber glass jar, 1x60g capacity amber glass vial.
W=Environmental groundwater sample comprising 1x1L plastic bottle, 1x500ml capacity clear glass bottle, 3x250ml capacity clear glass bottles, 1x125ml capacity azlon bottle, 2x40ml capacity clear glass vials.
W1/W2=Shallow and deep standpipe samples as taken 20th February 2015.
W3=Deep standpipe sample as taken 24th March 2015 (shallow standpipe dry).

Scale (approx)	Logged By
1:50	JC

Figure No. 01.RI15.BH10

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH10

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
CME-55 Drill. Hollow stem auger (HSA) drilling and percussion sampling to 18.0m depth.	230mm cased to 15.00m	3.26	Dublin Port Company	01.RI15
	Location	**Dates**	**Engineer**	**Sheet**
	720448.6 E 734610.3 N	17/02/2015-18/02/2015	RPS Consulting Engineers	2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(1.70)	Firm dark grey slightly sandy clayey SILT with occasional interbedded silty gravelly fine to coarse SAND. Gravel is fine to medium, sub-angular to sub-rounded.			
11.70	D7				-8.44	11.70				
12.00-12.45	D8			17/02/2015:0.60m			Medium dense grey and grey brown silty gravelly fine to coarse SAND. Gravel is fine to coarse, sub-angular to sub-rounded.			
12.00-12.45	SPT N=14	12.00	0.50	18/02/2015:1.40m 2,2/3,3,4,4						
						(3.75)				
15.00-15.45 15.00-15.45	SPT N=18 D9	15.00	0.60	2,2/3,5,5,5						
				18/02/2015:0.50m	-12.19	15.45	Complete at 15.50m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 01.RI15.BH10

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin

Borehole Number
BH10

Installation Type
Double Installation

Dimensions
Internal Diameter of Tube [A] = 50 mm
Internal Diameter of Tube [B] = 50 mm
Diameter of Filter Zone = 230 mm

Client
Dublin Port Company

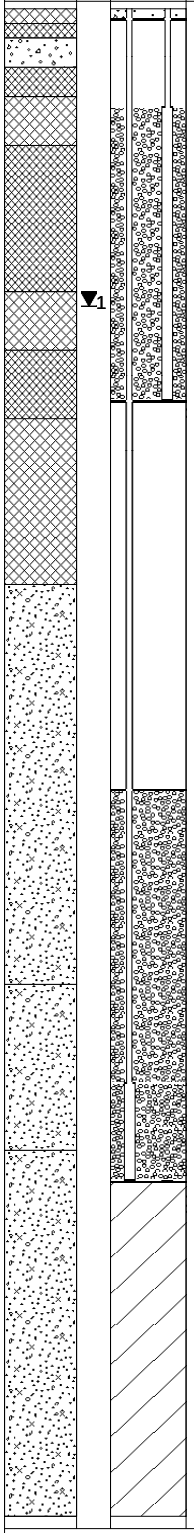
Job Number
01.RI15

Location

Ground Level (mOD)
3.26

Engineer
RPS Consulting Engineers

Sheet
1/1



Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings 5 min	Readings 10 min	Readings 15 min	Readings 20 min	Depth Sealed (m)
17/02/15		2.90	2.00	Steady				2.90	

Groundwater Observations During Drilling

Date	Start of Shift: Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	End of Shift: Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)
17/02/15							12.00	12.00	0.60	2.66
18/02/15		11.20	12.00	1.40	1.86		15.45	15.00	0.50	2.76

Instrument Groundwater Observations

Inst. [A] Type : Slotted Standpipe **Inst. [B] Type :** Slotted Standpipe

Date	Instrument [A] Time	Depth (m)	Level (mOD)	Instrument [B] Time	Depth (m)	Level (mOD)	Remarks
20/02/15		3.20	0.06		3.20	0.06	
24/03/15		4.30	-1.04		DRY		

Remarks
Flush lockable cover installed.
Geotextile filter sock surround to well screen section.

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH12

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
CME-55 Drill. Hollow stem auger (HSA) drilling and percussion sampling to 15.0m depth.	230mm cased to 15.00m	2.94	Dublin Port Company	01.RI15
	Location 720494 E 734401.1 N	**Dates** 11/02/2015	**Engineer** RPS Consulting Engineers	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					2.84	0.10	TARMAC.			
0.10	D1					(0.50)	MADE GROUND: Light grey brown sandy gravelly SILT with cobble content. Gravel is fine to medium, sub-angular to sub-rounded.			
0.50	E1									
0.60	D2				2.34	0.60	MADE GROUND: CONCRETE, red BRICK and HARDCORE.			
2.30	W1					(3.70)				
2.30	W2									
2.40	W4									
				Steady(1) at 2.90m.					▽1	
3.22	W3									
4.30	D3				-1.36	4.30	Grey silty slightly gravelly fine to medium SAND containing occasional shells. Gravel is fine to medium, sub-angular to sub-rounded.			
5.00	E2									
6.00-7.00	B1					(5.10)				
9.40	D4				-6.46	9.40	Dark grey silty fine SAND.			
						(0.60)				
					-7.06	10.00				

Remarks
No obvious visual or olfactory evidence of contamination.
E=Environmental soil sample comprising 1x400g capacity plastic tub, 1x250g capacity amber glass jar, 1x60g capacity amber glass vial.
W=Environmental groundwater sample comprising 1x1L plastic bottle, 1x500ml capacity clear glass bottle, 3x250ml capacity clear glass bottles, 1x125ml capacity azlon bottle, 2x40ml capacity clear glass vials.
W1/W2=Shallow and deep standpipe samples as taken 20th February 2015.
W3/W4=Shallow and deep standpipe samples as taken 23rd March 2015.

Scale (approx)	Logged By
1:50	JC

Figure No. 01.RI15.BH12

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH12

Boring Method	Diameter	Ground Level (mOD)	Client	Job Number
CME-55 Drill. Hollow stem auger (HSA) drilling and percussion sampling to 15.0m depth.	230mm cased to 15.00m	2.94	Dublin Port Company	01.RI15
	Location	**Dates**	**Engineer**	**Sheet**
	720494 E 734401.1 N	11/02/2015	RPS Consulting Engineers	2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
							Dark grey silty fine SAND.			
10.50-11.50	B2									
						(5.45)				
15.00-15.45	SPT N=13	15.00	2.60	2,3/2,4,4,3						
15.00-15.45	D5									
				11/02/2015:2.60m	-12.51	15.45				
							Complete at 15.45m			

Remarks

Scale (approx)	Logged By
1:50	JC

Figure No. 01.RI15.BH12

GEOTECHNICAL AND ENVIRONMENTAL SERVICES

Site	Borehole Number
Dublin Port IED Application, Alexandra Basin and Berths 52/53, Dublin Port, Dublin	BH12

Installation Type
Double Installation

Dimensions
Internal Diameter of Tube [A] = 50 mm
Internal Diameter of Tube [B] = 50 mm
Diameter of Filter Zone = 230 mm

Client
Dublin Port Company

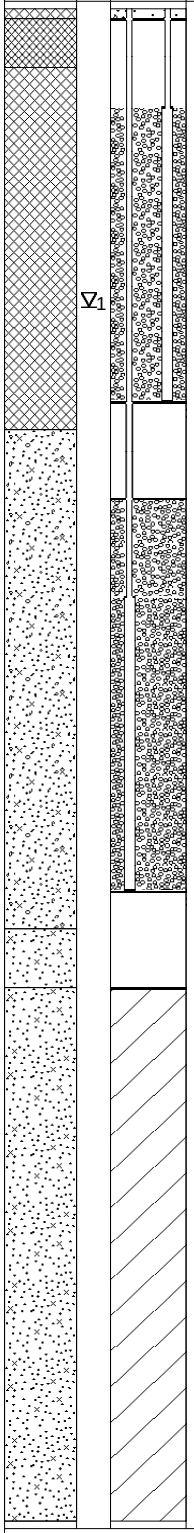
Job Number
01.RI15

Location

Ground Level (mOD)
2.94

Engineer
RPS Consulting Engineers

Sheet
1/1



Level (mOD)	Depth (m)	Description
2.84	0.10	Concrete
		Bentonite Seal
1.94	1.00	
		Piezometer Tip
-1.06	4.00	
		Bentonite Seal
-2.06	5.00	
		Gravel Filter
-3.06	6.00	
		Piezometer Tip
-6.06	9.00	
		Bentonite Seal
-7.06	10.00	
		Bottom Fill
-12.51	15.45	

Groundwater Strikes During Drilling

Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings 5 min	Readings 10 min	Readings 15 min	Readings 20 min	Depth Sealed (m)
11/02/15		2.90	2.00	Steady					

Groundwater Observations During Drilling

Date	Start of Shift Time	Start of Shift Depth Hole (m)	Start of Shift Casing Depth (m)	Start of Shift Water Depth (m)	Start of Shift Water Level (mOD)	End of Shift Time	End of Shift Depth Hole (m)	End of Shift Casing Depth (m)	End of Shift Water Depth (m)	End of Shift Water Level (mOD)
11/02/15							15.45	15.00	2.60	0.34

Instrument Groundwater Observations

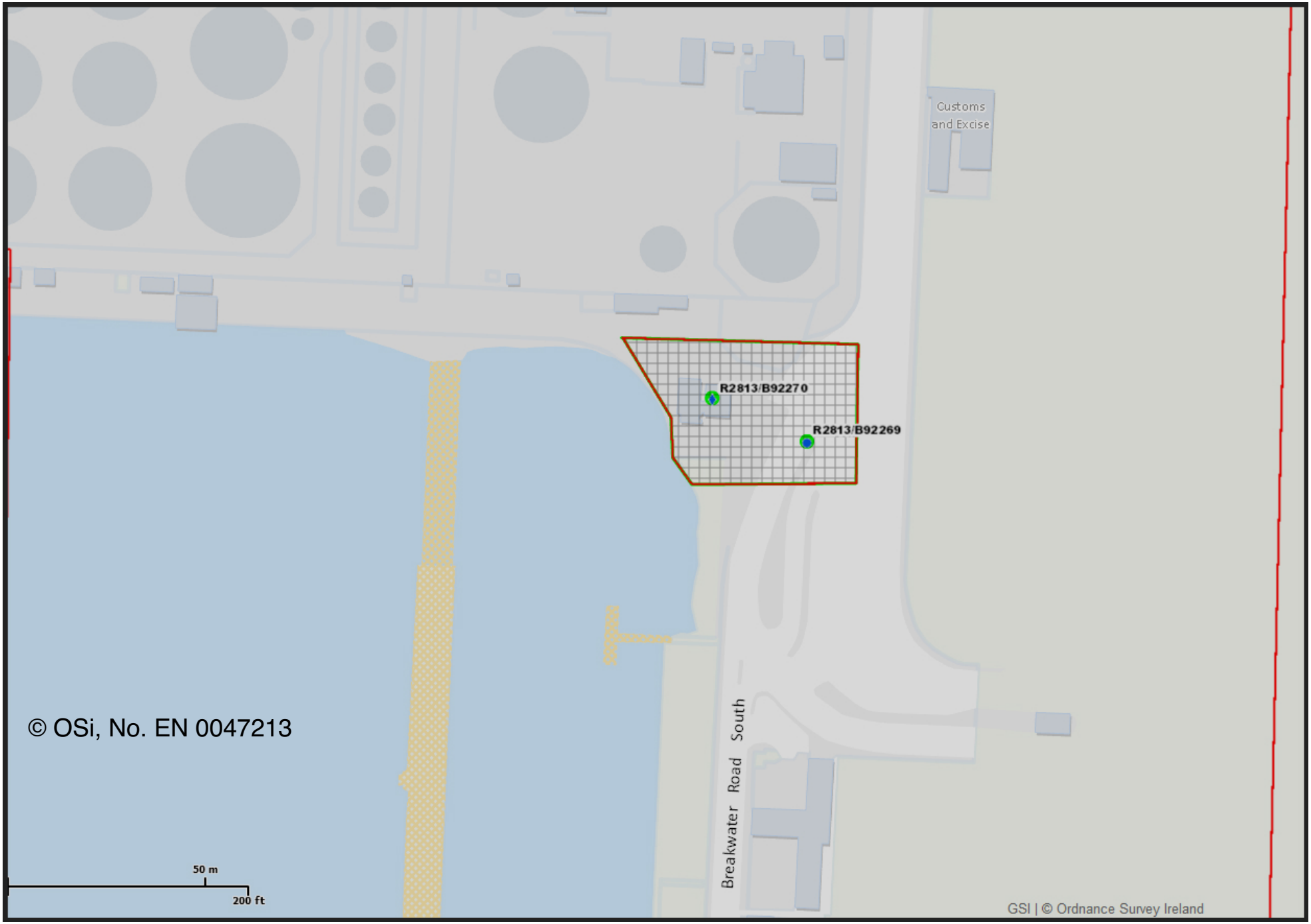
Inst. [A] Type : Slotted Standpipe **Inst. [B] Type :** Slotted Standpipe

Date	Instrument [A] Time	Instrument [A] Depth (m)	Instrument [A] Level (mOD)	Instrument [B] Time	Instrument [B] Depth (m)	Instrument [B] Level (mOD)	Remarks
20/02/15		2.30	0.64		2.30	0.64	
23/03/15		2.40	0.54		3.22	-0.28	

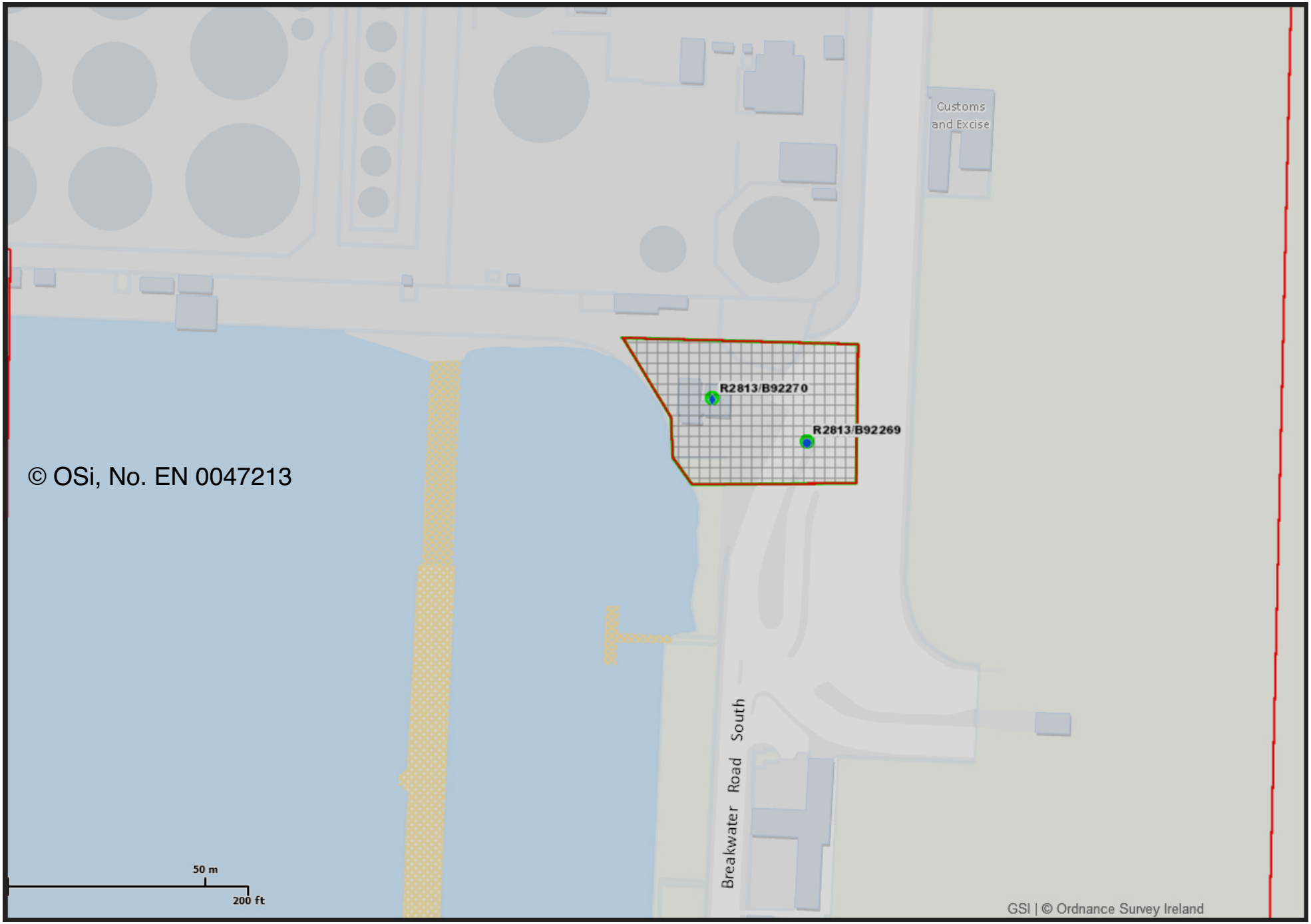
Remarks
Flush lockable cover installed.
Geotextile filter sock surround to well screen section.

Appendix C

GSI Geotechnical Borehole Logs



Overview Map for GSI Report 2813: ICI Jetty Quay
Dublin Port, Co. Dublin
Points Observed: 2


Customs and Excise
R2813/B92270
R2813/B92269
© OSi, No. EN 0047213
Breakwater Road South
50 m
200 ft
GSI | © Ordnance Survey Ireland

GSI REPORT 2813

ICI Jetty Quay

Dublin Port, Co. Dublin

Borehole List:

Borehole	Name	Depth	DTB	ODMALIN	Easting	Northing	Description
92269	BH1	16.77		3.4	319716	234473	Cable Percussion (Shell and Auger)
92270	BH2	6.09		3.4	319692	234484	Cable Percussion (Shell and Auger)

GSI REPORT 2813

ICI Jetty Quay

LAYERS FOR BOREHOLE 92269 (Company Name: BH1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9226901	0	3.66			Clayey Sandy	Gravel	Gravel
9226902	3.66	6.71				Sand	Sand
9226903	6.71	7.32	Soft	Grey	Organic	Silt	Silt
9226904	7.32	8.54			Sandy	Gravel	Gravel
9226905	8.54	12.8				Sand	Sand
9226906	12.8	13.72	Soft	Grey		Silt	Silt
9226907	13.72	14.94			Sandy	Gravel	Gravel
9226908	14.94	16.11	Soft	Grey	Silty	Clay	Clay
9226909	16.11	16.77			Clayey	Gravel	Gravel

GSI REPORT 2813

ICI Jetty Quay

LAYERS FOR BOREHOLE 92270 (Company Name: BH2)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9227001	0	2.44				Sand	Sand
9227002	2.44	6.09	Very Soft	Dark Brown	Silty Stony	Clay	Clay

GSI REPORT 2813

ICI Jetty Quay

TESTS FOR LAYER 9226901 IN BOREHOLE 92269 (Company Name: BH1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	2.62	FIELD	Standard Penetration Test	64	NBLOW

GSI REPORT 2813

ICI Jetty Quay

TESTS FOR LAYER 9226902 IN BOREHOLE 92269 (Company Name: BH1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
2	3.84	FIELD	Standard Penetration Test	23	NBLOW
3	5.06	FIELD	Standard Penetration Test	21	NBLOW
4	6.28	FIELD	Standard Penetration Test	19	NBLOW

GSI REPORT 2813

ICI Jetty Quay

TESTS FOR LAYER 9226905 IN BOREHOLE 92269 (Company Name: BH1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
5	8.72	FIELD	Standard Penetration Test	22	NBLOW
6	9.94	FIELD	Standard Penetration Test	20	NBLOW
7	11.16	FIELD	Standard Penetration Test	22	NBLOW
8	12.38	FIELD	Standard Penetration Test	21	NBLOW

GSI REPORT 2813

ICI Jetty Quay

TESTS FOR LAYER 9226907 IN BOREHOLE 92269 (Company Name: BH1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
9	13.9	FIELD	Standard Penetration Test	22	NBLOW

GSI REPORT 2813

ICI Jetty Quay

TESTS FOR LAYER 9226908 IN BOREHOLE 92269 (Company Name: BH1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
10	15.43	FIELD	Standard Penetration Test	6	NBLOW

GSI REPORT 2813

ICI Jetty Quay

TESTS FOR LAYER 9226909 IN BOREHOLE 92269 (Company Name: BH1)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
11	16.65	FIELD	Standard Penetration Test	21	NBLOW

GSI REPORT 2813

ICI Jetty Quay

TESTS FOR LAYER 9227001 IN BOREHOLE 92270 (Company Name: BH2)

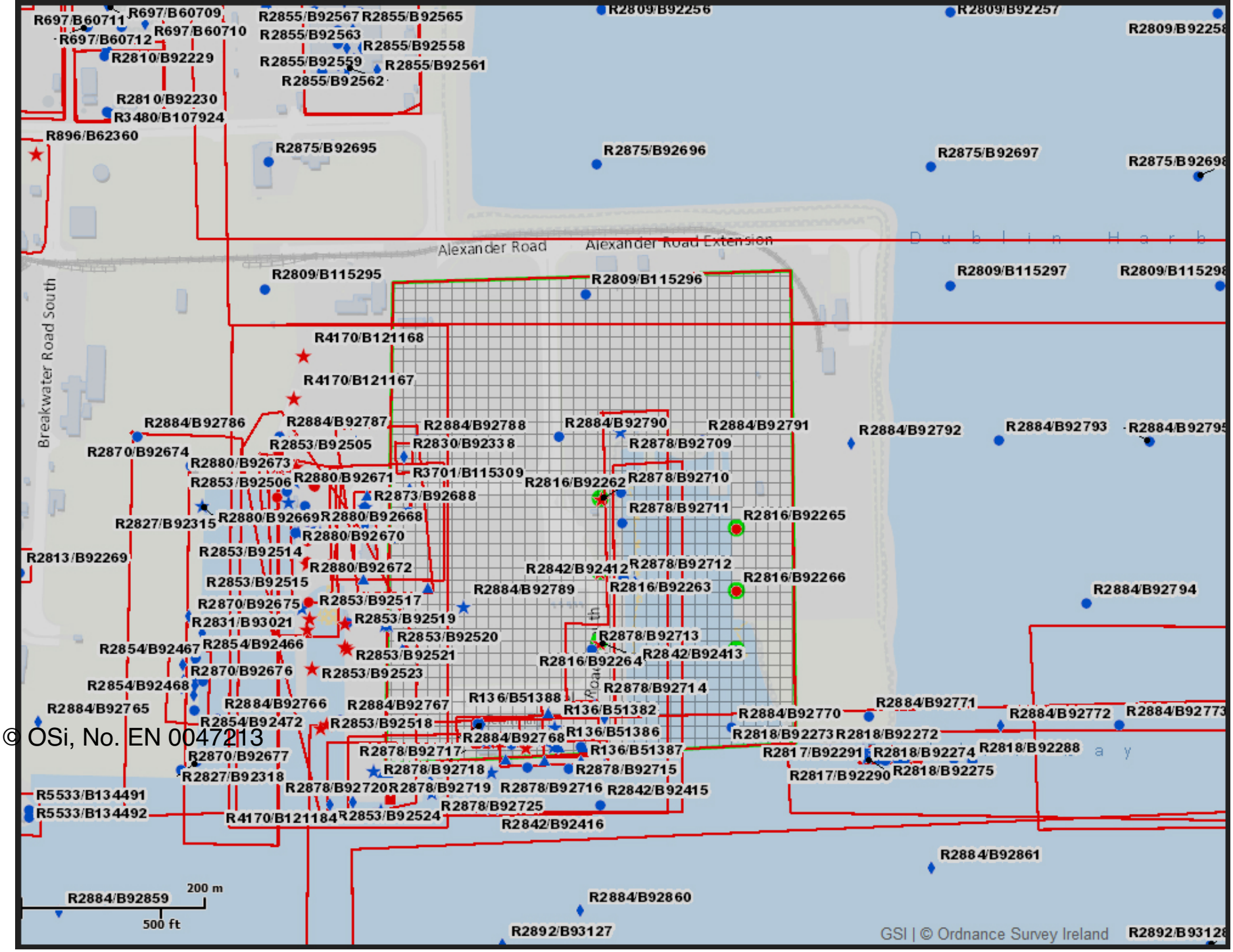
TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	.79	FIELD	Standard Penetration Test	6	NBLOW
2	1.4	FIELD	Standard Penetration Test	5	NBLOW
3	2.01	FIELD	Standard Penetration Test	6	NBLOW

GSI REPORT 2813

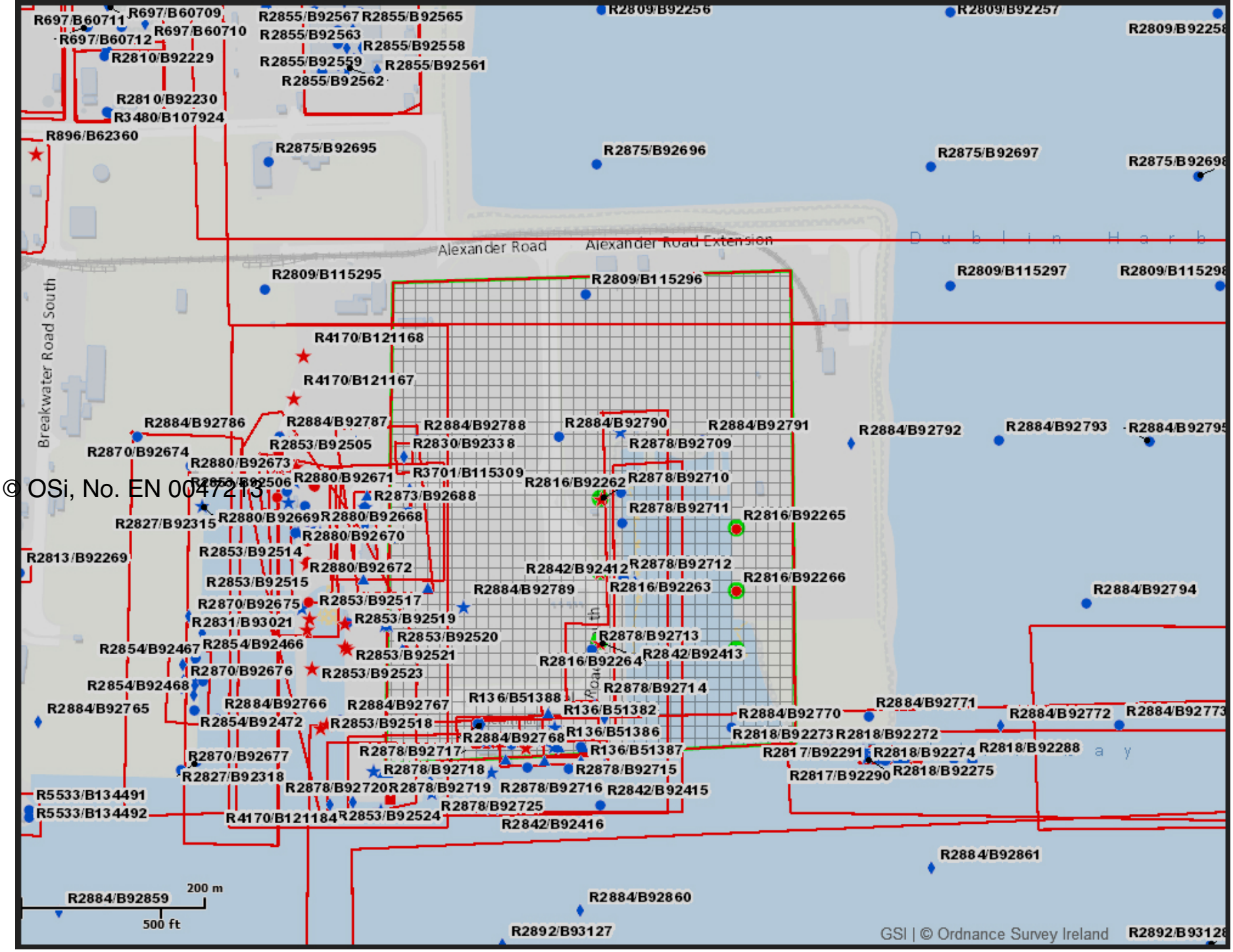
ICI Jetty Quay

TESTS FOR LAYER 9227002 IN BOREHOLE 92270 (Company Name: BH2)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
4	3.84	FIELD	Standard Penetration Test	26	NBLOW
5	5.06	FIELD	Standard Penetration Test	30	NBLOW
6	6.09	FIELD	Standard Penetration Test	34	NBLOW



Overview Map for GSI Report 2816: Container Terminal (east of Car Ferry)
Dublin Port, Dublin , Co. Dublin
Points Observed: 7



GSI REPORT 2816

Container Terminal (east of Car Ferry)

Dublin Port, Dublin , Co. Dublin

Borehole List:

Borehole	Name	Depth	DTB	ODMALIN	Easting	Northing	Description
92262	BH253	22.74	18.78	-2.46	320349	234552	Cable Percussion(shell&auger) and Rotary Coring
92263	BH254	21.83	19.08	-2.46	320348	234473	Cable Percussion(shell&auger) and Rotary Coring
92264	BH255	25.51	21.86	-2.64	320348	234397	Cable Percussion(shell&auger) and Rotary Coring
92265	BH256	19.66	17.83	-2.67	320497	234520	Cable Percussion(shell&auger) and Rotary Coring
92266	BH257	19.08	15.43	-2.77	320497	234452	Cable Percussion(shell&auger) and Rotary Coring
92267	BH258	14.24		-1.45	320497	234388	Cable Percussion(shell&auger) and Rotary Coring
92268	BH258B	22.07	19.02	-3.62			Cable Percussion(shell&auger) and Rotary Coring

GSI REPORT 2816

Container Terminal (east of Car Ferry)

LAYERS FOR BOREHOLE 92262 (Company Name: BH253)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9226201	0	1.55			Organic	Clay	Clay
9226202	1.55	2.93			Organic	Clay And Gravel	Clay And Gravel
9226203	2.93	3.07			Gravelly	Sand	Sand
9226204	3.07	4.6				Sand	Sand
9226205	4.6	10.55			Sandy	Gravel	Gravel
9226206	10.55	11.77			Organic	Sand And Clay	Sand And Clay
9226207	11.77	12.38			Slightly Clayey	Sand	Sand
9226209	12.38	13.29	Coarse			Sand And Gravel	Sand And Gravel
9226210	13.29	14.82				Gravel	Gravel
9226211	14.82	15.42				Sand And Gravel	Sand And Gravel
9226212	15.42	15.73				Boulder Clay	Boulder Clay
9226213	15.73	16.95				Boulders	Boulders
9226214	16.95	19.08				Boulder Clay	Boulder Clay
9226215	19.08	22.74				Bedrock	Bedrock

GSI REPORT 2816

Container Terminal (east of Car Ferry)

LAYERS FOR BOREHOLE 92263 (Company Name: BH254)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9226301	0	1.4			Organic	Silt	Silt
9226302	1.4	2.47				Gravel	Gravel
9226303	2.47	3.08			Medium	Sand And Gravel	Sand And Gravel
9226304	3.08	3.69				Sand	Sand
9226305	3.69	5.52			Gravelly	Sand	Sand
9226306	5.52	10.55				Sand	Sand
9226307	10.55	12.38			Slightly Silty	Sand	Sand
9226308	12.38	12.99			Medium	Sand And Clay	Sand And Clay
9226309	12.99	13.6			Silty	Clay	Clay
9226310	13.6	13.75		Dark Grey	Silty	Clay	Clay
9226311	13.75	14.66				Sand	Sand
9226312	14.66	16.03		Dark Grey	Silty	Clay	Clay
9226313	16.03	16.34				Clay	Clay
9226314	16.34	16.95				Gravel	Gravel
9226315	16.95	17.56				Boulders	Boulders
9226316	17.56	19.08				Gravel	Gravel
9226317	19.08	21.83				Bedrock	Bedrock

GSI REPORT 2816

Container Terminal (east of Car Ferry)

LAYERS FOR BOREHOLE 92264 (Company Name: BH255)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9226401	0	.97			Organic	Sand	Sand
9226402	.97	1.28			Gravelly	Sand	Sand
9226403	1.28	1.76			Sandy	Gravel	Gravel
9226404	1.76	2.65			Gravelly	Sand	Sand
9226405	2.65	4.02				Sand	Sand
9226406	4.02	7.07				Sand	Sand
9226407	7.07	7.22				Sand	Sand
9226408	7.22	7.68			Very Silty	Clay	Clay
9226409	7.68	9.36			Silty	Sand	Sand
9226410	9.36	10.12				Sand	Sand
9226411	10.12	11.49			Silty	Clay	Clay
9226412	11.49	12.1			Slightly Silty	Sand	Sand
9226413	12.1	12.8				Sand And Gravel	Sand And Gravel
9226414	12.8	12.37			Silty	Clay	Clay
9226415	12.37	16.68			Silty	Clay	Clay
9226416	16.68	20.33				Boulder Clay	Boulder Clay
9226417	20.33	22.16				Boulder Clay	Boulder Clay
9226418	22.16	25.51				Bedrock	Bedrock

GSI REPORT 2816

Container Terminal (east of Car Ferry)

LAYERS FOR BOREHOLE 92265 (Company Name: BH256)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9226501	0	2.74			Organic	Silt	Silt
9226502	2.74	3.5			Fine to Medium	Sand	Sand
9226503	3.5	7.93			Fine	Sand	Sand
9226504	7.93	8.23			Fine to Medium	Sand	Sand
9226505	8.23	8.54			Fine to Medium	Sand	Sand
9226506	8.54	10.67			Fine to Medium	Sand	Sand
9226507	10.67	12.96			Silty	Clay	Clay
9226508	12.96	13.57			Clayey	Silt	Silt
9226509	13.57	15.1				Gravel	Gravel
9226510	15.1	17.83				Bedrock	Bedrock
9226511	17.83	19.6				Bedrock	Bedrock

GSI REPORT 2816

Container Terminal (east of Car Ferry)

LAYERS FOR BOREHOLE 92266 (Company Name: BH257)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9226601	0	1.4			Slightly Silty	Sand	Sand
9226602	1.4	3.08			Slightly Silty	Sand And Gravel	Sand And Gravel
9226603	3.08	3.84			Fine to Medium	Sand	Sand
9226604	3.84	4.6			Fine	Sand	Sand
9226605	4.6	5.36			Fine Silty	Sand	Sand
9226606	5.36	5.52			Fine Silty	Sand And Gravel	Sand And Gravel
9226607	5.52	6.89			Fine Silty	Sand	Sand
9226608	6.89	12.38			Fine Silty	Sand And Gravel	Sand And Gravel
9226609	12.38	12.99			Silty	Sand	Sand
9226610	12.99	13.6				Sand And Gravel	Sand And Gravel
9226611	13.6	15.73				Gravel	Gravel
9226612	15.73	19.08				Bedrock	Bedrock

GSI REPORT 2816

Container Terminal (east of Car Ferry)

LAYERS FOR BOREHOLE 92267 (Company Name: BH258)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9226701	0	2.04				Gravel	Gravel
9226702	2.04	3.26			Gravelly	Sand	Sand
9226703	3.26	3.87			Medium	Sand	Sand
9226704	3.87	4.48	Coarse			Sand	Sand
9226705	4.48	6.92			Fine to Medium	Sand	Sand
9226706	6.92	7.53			Fine	Sand	Sand
9226707	7.53	8.75			Fine Silty	Sand	Sand
9226708	8.75	9.36			Clayey Sandy	Silt	Silt
9226709	9.36	10.58			Sandy Clayey	Silt	Silt
9226710	10.58	11			Silty	Clay	Clay
9226711	11	11.95			Silty Sandy	Clay	Clay
9226712	11.95	13.62			Silty	Sand And Gravel	Sand And Gravel
9226713	13.62	13.63				Gravel	Gravel
9226714	13.63	14.24				Gravel And Clay	Gravel And Clay

GSI REPORT 2816

Container Terminal (east of Car Ferry)

LAYERS FOR BOREHOLE 92268 (Company Name: BH258B)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9226801	0	2.71			Gravelly	Sand	Sand
9226802	2.71	4.08			Medium	Sand	Sand
9226803	4.08	5.91			Fine to Medium	Sand	Sand
9226804	5.91	7.9			Fine	Sand	Sand
9226805	7.9	9.27			Clayey Sandy	Silt	Silt
9226806	9.27	15.06				Clay	Clay
9226807	15.06	15.52			Gravelly	Clay	Clay
9226808	15.52	17.2			Fine Sandy	Gravel	Gravel
9226809	17.2	19.02			Gravelly	Clay	Clay
9226810	19.02	22.07				Bedrock	Bedrock

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226202 IN BOREHOLE 92262 (Company Name: BH253)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	2.47	FIELD	Standard Penetration Test	20	NBLOW
2	2.62	FIELD	Standard Penetration Test	31	NBLOW
22	2.01	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	50	%pass
23	2.01	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	64	%pass
24	2.01	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	72	%pass
25	2.47	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	34	%pass
26	2.47	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	70	%pass
27	2.47	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	80	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226204 IN BOREHOLE 92262 (Company Name: BH253)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	4	FIELD	Standard Penetration Test	10	NBLOW
4	4.15	FIELD	Standard Penetration Test	14	NBLOW
28	3.23	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	46	%pass
29	3.23	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	60	%pass
30	3.23	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	67	%pass
31	3.99	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	32	%pass
32	3.99	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	49	%pass
33	3.99	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	60	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226205 IN BOREHOLE 92262 (Company Name: BH253)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
5	5.52	FIELD	Standard Penetration Test	6	NBLOW
6	5.67	FIELD	Standard Penetration Test	8	NBLOW
7	5.97	FIELD	Standard Penetration Test	8	NBLOW
8	7.04	FIELD	Standard Penetration Test	11	NBLOW
9	8.57	FIELD	Standard Penetration Test	10	NBLOW
10	8.72	FIELD	Standard Penetration Test	21	NBLOW
11	10.1	FIELD	Standard Penetration Test	6	NBLOW
12	10.24	FIELD	Standard Penetration Test	10	NBLOW
34	4.76	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	11	%pass
35	4.76	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	18	%pass
36	5.52	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	15	%pass
37	5.52	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	23	%pass
38	5.52	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	42	%pass
39	7.04	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	2	%pass
40	7.04	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	9	%pass
41	9.33	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	3	%pass
42	9.33	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	9	%pass
43	9.33	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	16	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226207 IN BOREHOLE 92262 (Company Name: BH253)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
14	11.92	FIELD	Standard Penetration Test	14	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226209 IN BOREHOLE 92262 (Company Name: BH253)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
15	13.14	FIELD	Standard Penetration Test	10	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226210 IN BOREHOLE 92262 (Company Name: BH253)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
17	13.9	FIELD	Standard Penetration Test	55	NBLOW
18	14.05	FIELD	Standard Penetration Test	22	NBLOW
19	14.66	FIELD	Standard Penetration Test	27	NBLOW
47	14.05	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	5	%pass
48	14.05	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	20	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226212 IN BOREHOLE 92262 (Company Name: BH253)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
21	15.58	FIELD	Standard Penetration Test	70	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226302 IN BOREHOLE 92263 (Company Name: BH254)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	2.01	FIELD	Standard Penetration Test	16	NBLOW
2	2.16	FIELD	Standard Penetration Test	62	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226305 IN BOREHOLE 92263 (Company Name: BH254)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	4.91	FIELD	Standard Penetration Test	4	NBLOW
4	5.06	FIELD	Standard Penetration Test	10	NBLOW
14	4.3	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	34	%pass
15	4.3	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	49	%pass
16	4.3	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	56	%pass
17	4.9	LABSOIL	Particle Size Distribution - Silt (0.06mm)	7	%pass
18	4.9	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	98	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226401 IN BOREHOLE 92264 (Company Name: BH255)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
13	.36	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	40	%pass
14	.36	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	90	%pass
15	.36	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	92	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226404 IN BOREHOLE 92264 (Company Name: BH255)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
19	2.04	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	67	%pass
20	2.04	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	84	%pass
21	2.04	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	88	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226405 IN BOREHOLE 92264 (Company Name: BH255)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	2.8	FIELD	Standard Penetration Test	16	NBLOW
2	2.96	FIELD	Standard Penetration Test	54	NBLOW
22	3.41	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	85	%pass
23	3.41	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	91	%pass
24	3.41	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	92	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226406 IN BOREHOLE 92264 (Company Name: BH255)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	4.18	FIELD	Standard Penetration Test	5	NBLOW
4	4.33	FIELD	Standard Penetration Test	24	NBLOW
5	5.7	FIELD	Standard Penetration Test	3	
6	5.85	FIELD	Standard Penetration Test	19	NBLOW
25	4.18	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	55	%pass
26	4.18	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	84	%pass
27	4.18	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	91	%pass
28	5.52	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	66	%pass
29	5.52	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	90	%pass
30	5.52	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	96	%pass
31	5.7	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	69	%pass
32	5.7	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	91	%pass
33	5.7	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	96	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226410 IN BOREHOLE 92264 (Company Name: BH255)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
34	9.51	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	60	%pass
35	9.51	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	81	%pass
36	9.51	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	84	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226412 IN BOREHOLE 92264 (Company Name: BH255)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
7	11.64	FIELD	Standard Penetration Test	15	NBLOW
8	11.8	FIELD	Standard Penetration Test	35	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226414 IN BOREHOLE 92264 (Company Name: BH255)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
9	12.9	FIELD	Standard Penetration Test	27	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226415 IN BOREHOLE 92264 (Company Name: BH255)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
10	13.04	FIELD	Standard Penetration Test	78	NBLOW
11	13.47	FIELD	Standard Penetration Test	37	NBLOW
12	13.93	FIELD	Standard Penetration Test	7	NBLOW
37	12.56	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	2	%pass
38	12.56	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	20	%pass
39	12.56	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	41	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226501 IN BOREHOLE 92265 (Company Name: BH256)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
13	1.98	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	97	%pass
14	1.98	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	100	%pass
15	2.5	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	82	%pass
16	2.5	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	96	%pass
17	2.5	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	97	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226503 IN BOREHOLE 92265 (Company Name: BH256)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	3.66	FIELD	Standard Penetration Test	12	NBLOW
2	3.66	FIELD	Standard Penetration Test	33	NBLOW
3	5.03	FIELD	Standard Penetration Test	6	NBLOW
4	5.18	FIELD	Standard Penetration Test	32	NBLOW
5	6.55	FIELD	Standard Penetration Test	8	NBLOW
6	6.7	FIELD	Standard Penetration Test	25	NBLOW
18	3.16	LABSOIL	Particle Size Distribution - Silt (0.06mm)	24	%pass
19	3.16	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	99	%pass
20	3.16	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	100	%pass
21	5.18	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	84	%pass
22	5.18	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	99	%pass
23	5.18	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	100	%pass
24	6.7	LABSOIL	Particle Size Distribution - Silt (0.06mm)	15	%pass
25	6.7	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	74	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226504 IN BOREHOLE 92265 (Company Name: BH256)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
7	8.08	FIELD	Standard Penetration Test	12	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226508 IN BOREHOLE 92265 (Company Name: BH256)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
10	13.11	FIELD	Standard Penetration Test	96	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226509 IN BOREHOLE 92265 (Company Name: BH256)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
11	14.33	FIELD	Standard Penetration Test	12	NBLOW
12	14.5	FIELD	Standard Penetration Test	94	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226601 IN BOREHOLE 92266 (Company Name: BH257)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
21	.49	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	95	%pass
22	.49	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	96	%pass
23	.49	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	98	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226602 IN BOREHOLE 92266 (Company Name: BH257)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	1.86	FIELD	Standard Penetration Test	10	NBLOW
2	2.01	FIELD	Standard Penetration Test	26	NBLOW
27	2.47	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	64	%pass
28	2.47	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	80	%pass
29	2.47	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	82	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226603 IN BOREHOLE 92266 (Company Name: BH257)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	3.23	FIELD	Standard Penetration Test	12	NBLOW
4	3.38	FIELD	Standard Penetration Test	31	NBLOW
30	3.23	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	92	%pass
31	3.23	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	98	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226604 IN BOREHOLE 92266 (Company Name: BH257)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
32	4	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	93	%pass
33	4	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	99	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226605 IN BOREHOLE 92266 (Company Name: BH257)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
5	4.76	FIELD	Standard Penetration Test	4	NBLOW
6	4.9	FIELD	Standard Penetration Test	12	NBLOW
34	4.79	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	95	%pass
35	4.79	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	98	%pass
36	4.79	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	99	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226607 IN BOREHOLE 92266 (Company Name: BH257)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
7	6.28	FIELD	Standard Penetration Test	8	NBLOW
8	6.43	FIELD	Standard Penetration Test	20	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226608 IN BOREHOLE 92266 (Company Name: BH257)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
9	7.19	FIELD	Standard Penetration Test	6	NBLOW
10	7.5	FIELD	Standard Penetration Test	18	NBLOW
11	7.65	FIELD	Standard Penetration Test	5	NBLOW
12	7.8	FIELD	Standard Penetration Test	11	NBLOW
13	9.02	FIELD	Standard Penetration Test	8	NBLOW
14	9.18	FIELD	Standard Penetration Test	20	NBLOW
15	11.31	FIELD	Standard Penetration Test	12	NBLOW
16	11.46	FIELD	Standard Penetration Test	23	NBLOW
40	8.26	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	94	%pass
41	8.26	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	98	%pass
42	8.26	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	99	%pass
43	11.16	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	45	%pass
44	11.16	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	72	%pass
45	11.16	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	96	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226609 IN BOREHOLE 92266 (Company Name: BH257)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
17	12.53	FIELD	Standard Penetration Test	20	NBLOW
18	12.68	FIELD	Standard Penetration Test	48	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226610 IN BOREHOLE 92266 (Company Name: BH257)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
19	13.14	FIELD	Standard Penetration Test	28	NBLOW
20	13.29	FIELD	Standard Penetration Test	50	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226701 IN BOREHOLE 92267 (Company Name: BH258)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
7	.82	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	10	%pass
8	.82	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	20	%pass
9	.82	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	32	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226702 IN BOREHOLE 92267 (Company Name: BH258)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
10	1.43	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	21	%pass
11	1.43	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	42	%pass
12	1.43	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	48	%pass
16	2.65	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	55	%pass
17	2.65	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	88	%pass
18	2.65	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	93	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226705 IN BOREHOLE 92267 (Company Name: BH258)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
26	5.09	LABSOIL	Particle Size Distribution - Silt (0.06mm)	38	%pass
27	5.09	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	95	%pass
28	5.09	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	100	%pass
29	5.7	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	85	%pass
30	5.7	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	97	%pass
31	5.7	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	99	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226709 IN BOREHOLE 92267 (Company Name: BH258)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
35	9.97	LABSOIL	Particle Size Distribution - Silt (0.06mm)	65	%pass
36	9.97	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	97	%pass
37	9.97	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	99	%pass

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226711 IN BOREHOLE 92267 (Company Name: BH258)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	11.34	FIELD	Standard Penetration Test	9	
2	11.5	FIELD	Standard Penetration Test	19	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226712 IN BOREHOLE 92267 (Company Name: BH258)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
3	12.86	FIELD	Standard Penetration Test	6	NBLOW
4	13.02	FIELD	Standard Penetration Test	19	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226714 IN BOREHOLE 92267 (Company Name: BH258)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
5	13.78	FIELD	Standard Penetration Test	12	NBLOW
6	13.9	FIELD	Standard Penetration Test	75	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226806 IN BOREHOLE 92268 (Company Name: BH258B)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	10.18	FIELD	Standard Penetration Test	6	NBLOW
2	10.49	FIELD	Standard Penetration Test	13	NBLOW
3	11.25	FIELD	Standard Penetration Test	6	NBLOW
4	11.4	FIELD	Standard Penetration Test	27	NBLOW

GSI REPORT 2816

Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226807 IN BOREHOLE 92268 (Company Name: BH258B)

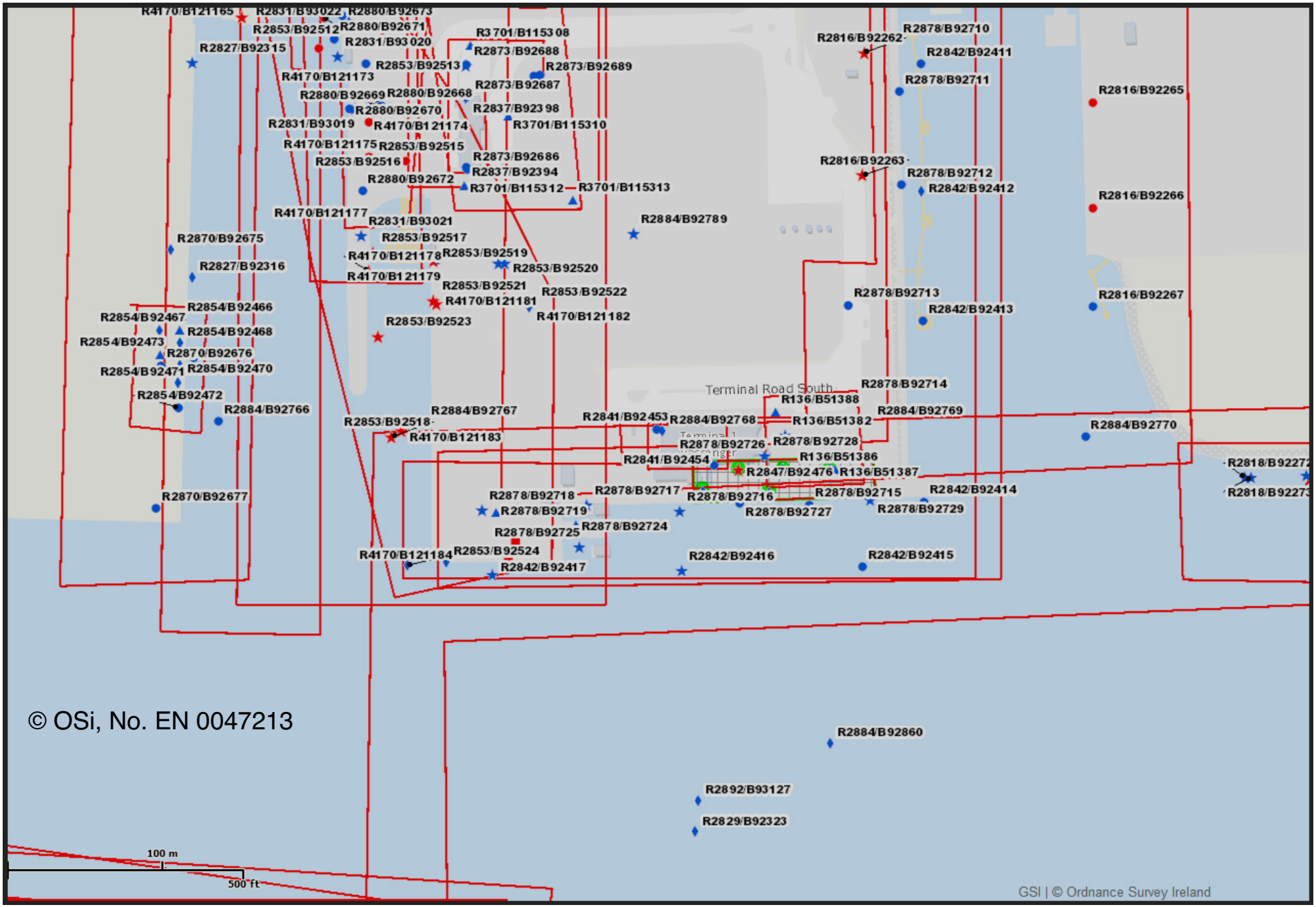
TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
6	15.21	FIELD	Standard Penetration Test	48	NBLOW

GSI REPORT 2816

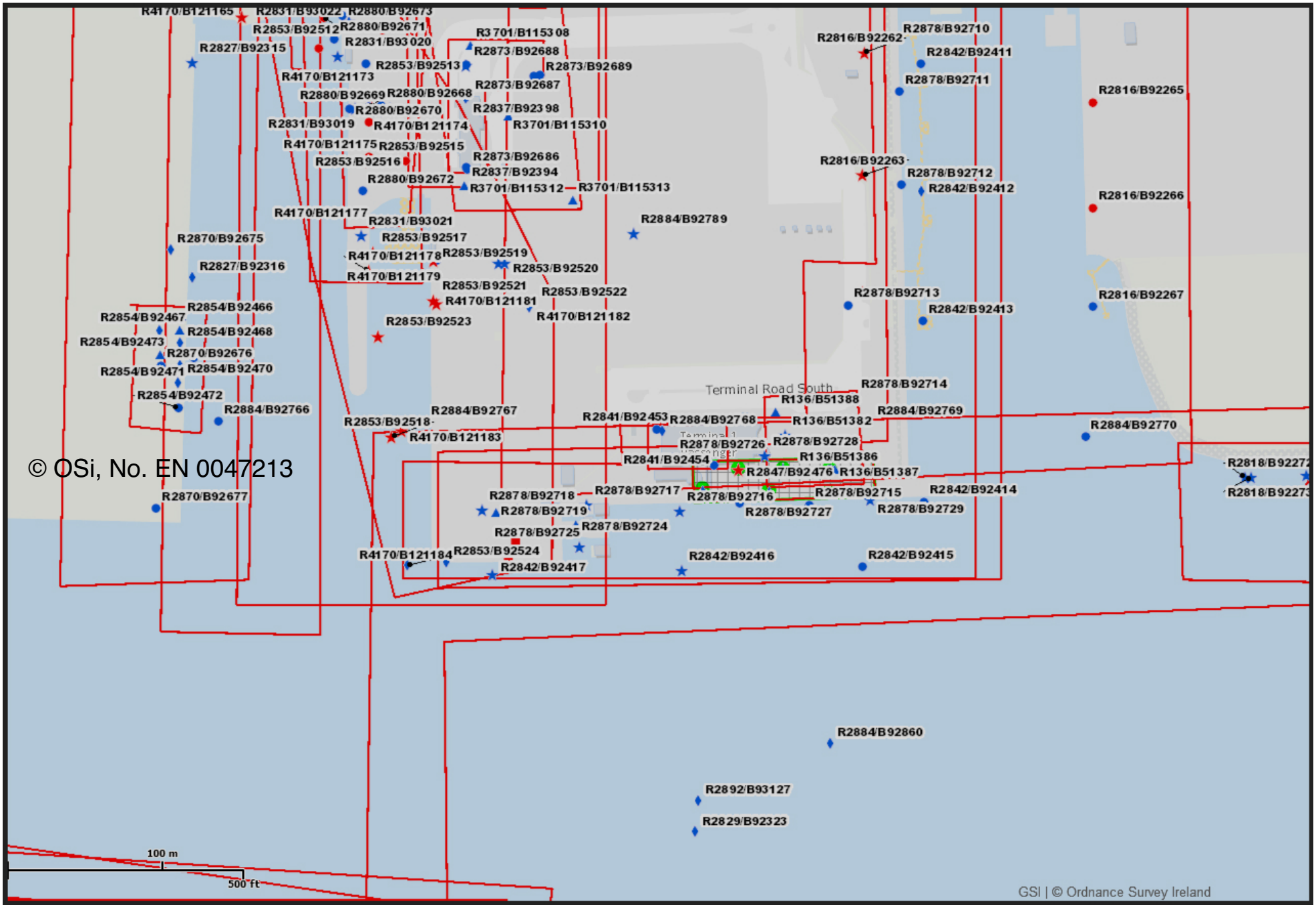
Container Terminal (east of Car Ferry)

TESTS FOR LAYER 9226808 IN BOREHOLE 92268 (Company Name: BH258B)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
8	15.67	FIELD	Standard Penetration Test	37	NBLOW
9	16.28	FIELD	Standard Penetration Test	14	NBLOW
10	16.43	FIELD	Standard Penetration Test	42	NBLOW



Overview Map for GSI Report 2847: Ferry Port Gangway
Dublin Port, Dublin, Co. Dublin
Points Observed: 7



GSI REPORT 2847

Ferry Port Gangway

Dublin Port, Dublin, Co. Dublin

Borehole List:

Borehole	Name	Depth	DTB	ODMALIN	Easting	Northing	Description
92476	BH408	28.5	28.35	6.01	320268	234283	Cable Percussion (Shell and Auger)
92477	BH409	23		6.05	320297	234283	Cable Percussion (Shell and Auger)
92478	BH410	12.5		5.88	320327	234283	Cable Percussion (Shell and Auger)
92479	BH410RB	29.3	29	5.88			Cable Percussion (Shell and Auger)
92480	BH411	3		5.95	320245	234270	Cable Percussion (Shell and Auger)
92481	BH412	3		5.92	320288	234269	Cable Percussion (Shell and Auger)
92482	BH413	3		5.9	320327	234268	Cable Percussion (Shell and Auger)

GSI REPORT 2847

Ferry Port Gangway

LAYERS FOR BOREHOLE 92476 (Company Name: BH408)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9247601	0	5				Fill - Made Ground	Fill - Made Ground
9247602	5	10				Fill - Made Ground	Fill - Made Ground
9247603	10	15.3				Fill - Made Ground	Fill - Made Ground
9247604	15.3	16		Grey	Coarse	Sand	Sand
9247605	16	18.4			Fine to Coarse Sandy	Gravel And Cobbles	Gravel And Cobbles
9247606	18.4	20.5	Very Stiff	Dark Grey	Very Silty	Clay	Clay
9247607	20.5	21.5			Fine Sandy	Gravel	Gravel
9247608	21.5	28.35			Fine to Coarse	Gravel And Cobbles	Gravel And Cobbles
9247609	28.35	28.5				Bedrock	Bedrock

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Ferry Port Gangway

LAYERS FOR BOREHOLE 92477 (Company Name: BH409)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION

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Ferry Port Gangway

LAYERS FOR BOREHOLE 92478 (Company Name: BH410)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9247801	0	4				Fill - Made Ground	Fill - Made Ground
9247802	4	7.5				Fill - Made Ground	Fill - Made Ground
9247803	7.5	11				Fill - Made Ground	Fill - Made Ground
9247804	11	12.5				Boulders	Boulders

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Ferry Port Gangway

LAYERS FOR BOREHOLE 92479 (Company Name: BH410RB)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9247901	0	4				Fill - Made Ground	Fill - Made Ground
9247902	4	7.5				Fill - Made Ground	Fill - Made Ground
9247903	7.5	12.5				Fill - Made Ground	Fill - Made Ground
9247904	12.5	17				Fill - Made Ground	Fill - Made Ground
9247905	17	18	Firm	Grey	Slightly Sandy Gravelly	Silt	Silt
9247906	18	19	Medium Dense	Grey	Gravelly	Sand	Sand
9247907	19	24.5	Stiff	Grey	Very Silty	Clay	Clay
9247908	24.5	25.5	Stiff	Grey	Very Sandy	Silt	Silt
9247909	25.5	26.8	Dense	Brown Grey	Silty	Sand	Sand
9247910	26.8	28			Fine to Coarse Sandy	Gravel And Cobbles	Gravel And Cobbles
9247911	28	28.3				Boulders	Boulders
9247912	28.3	29			Fine to Coarse Sandy	Gravel And Cobbles	Gravel And Cobbles
9247913	29	29.3				Bedrock	Bedrock

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Ferry Port Gangway

LAYERS FOR BOREHOLE 92480 (Company Name: BH411)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9248001	0	.15				Fill - Made Ground	Fill - Made Ground
9248002	.15	.35				Fill - Made Ground	Fill - Made Ground
9248003	.35	.9				Fill - Made Ground	Fill - Made Ground
9248004	.9	1.5				Fill - Made Ground	Fill - Made Ground
9248005	1.5	2.7				Fill - Made Ground	Fill - Made Ground
9248006	2.7	3				Fill - Made Ground	Fill - Made Ground

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Ferry Port Gangway

LAYERS FOR BOREHOLE 92481 (Company Name: BH412)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9248101	0	.15				Fill - Made Ground	Fill - Made Ground
9248102	.15	.4				Fill - Made Ground	Fill - Made Ground
9248103	.4	1.6				Fill - Made Ground	Fill - Made Ground
9248104	1.6	2.6				Fill - Made Ground	Fill - Made Ground
9248105	2.6	3				Fill - Made Ground	Fill - Made Ground

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Ferry Port Gangway

LAYERS FOR BOREHOLE 92482 (Company Name: BH413)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
9248201	0	.25				Fill - Made Ground	Fill - Made Ground
9248202	.25	.4				Fill - Made Ground	Fill - Made Ground
9248203	.4	.8				Fill - Made Ground	Fill - Made Ground
9248204	.8	3				Fill - Made Ground	Fill - Made Ground

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Ferry Port Gangway

TESTS FOR LAYER 9247606 IN BOREHOLE 92476 (Company Name: BH408)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	19	LABSOIL	Unconfined Compressive Strength	465	kN/m(2)
2	19	LABSOIL	Triaxial Compression - Strain at Failure	145	%
2	19	LABSOIL	Triaxial Compression Drained	145	%
3	19	LABSOIL	Triaxial testing involving local strain measurement	123	kN/m(2)
3	19	LABSOIL	Triaxial Compression - Cohesion	123	kN/m(2)
4	19	LABSOIL	Triaxial Compression Undrained	26	?
4	19	LABSOIL	Triaxial Compression - Angle of Friction	26	?
5	19	LABSOIL	Bulk Density	2.21	Mg/m(3)
5	19	LABSOIL	Bulk Density Mg/m(3)	2.21	Mg/m(3)
6	19	LABSOIL	Moisture Content	20.9	%
7	19	LABSOIL	Unconfined Compressive Strength	580	kN/m(2)
8	19	LABSOIL	Triaxial Compression - Strain at Failure	20	%
8	19	LABSOIL	Triaxial Compression Drained	20	%
9	19	LABSOIL	Bulk Density Mg/m(3)	2.12	Mg/m(3)
9	19	LABSOIL	Bulk Density	2.12	Mg/m(3)
10	19	LABSOIL	Moisture Content	22	%
11	19	LABSOIL	Unconfined Compressive Strength	625	kN/m(2)
12	19	LABSOIL	Triaxial Compression Drained	20	%
12	19	LABSOIL	Triaxial Compression - Strain at Failure	20	%
13	19	LABSOIL	Bulk Density Mg/m(3)	2.13	Mg/m(3)
13	19	LABSOIL	Bulk Density	2.13	Mg/m(3)

14	19	LABSOIL	Moisture Content	19.5	%
15	19	LABSOIL	Liquid Limit	45	%
16	19	LABSOIL	Plastic Limit	19	%
17	19	LABSOIL	Plasticity Index	26	%
21	19	LABSOIL	Particle Size Distribution - Silt (0.06mm)	91	%pass
22	19	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	98	%pass
23	19	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	100	%pass

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Ferry Port Gangway

TESTS FOR LAYER 9247608 IN BOREHOLE 92476 (Company Name: BH408)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
24	22	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	7	%pass
25	22	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	12	%pass
26	22	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	29	%pass
27	27	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	2	%pass
28	27	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	6	%pass
29	27	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	17	%pass

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Ferry Port Gangway

TESTS FOR LAYER 9247907 IN BOREHOLE 92479 (Company Name: BH410RB)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
1	21	LABSOIL	Particle Size Distribution - Silt (0.06mm)	83	%pass
2	21	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	98	%pass
3	21	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	99.5	%pass
4	21	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	100	%pass
5	21	LABSOIL	Particle Size Distribution - Clay (0.002mm)	31	%pass

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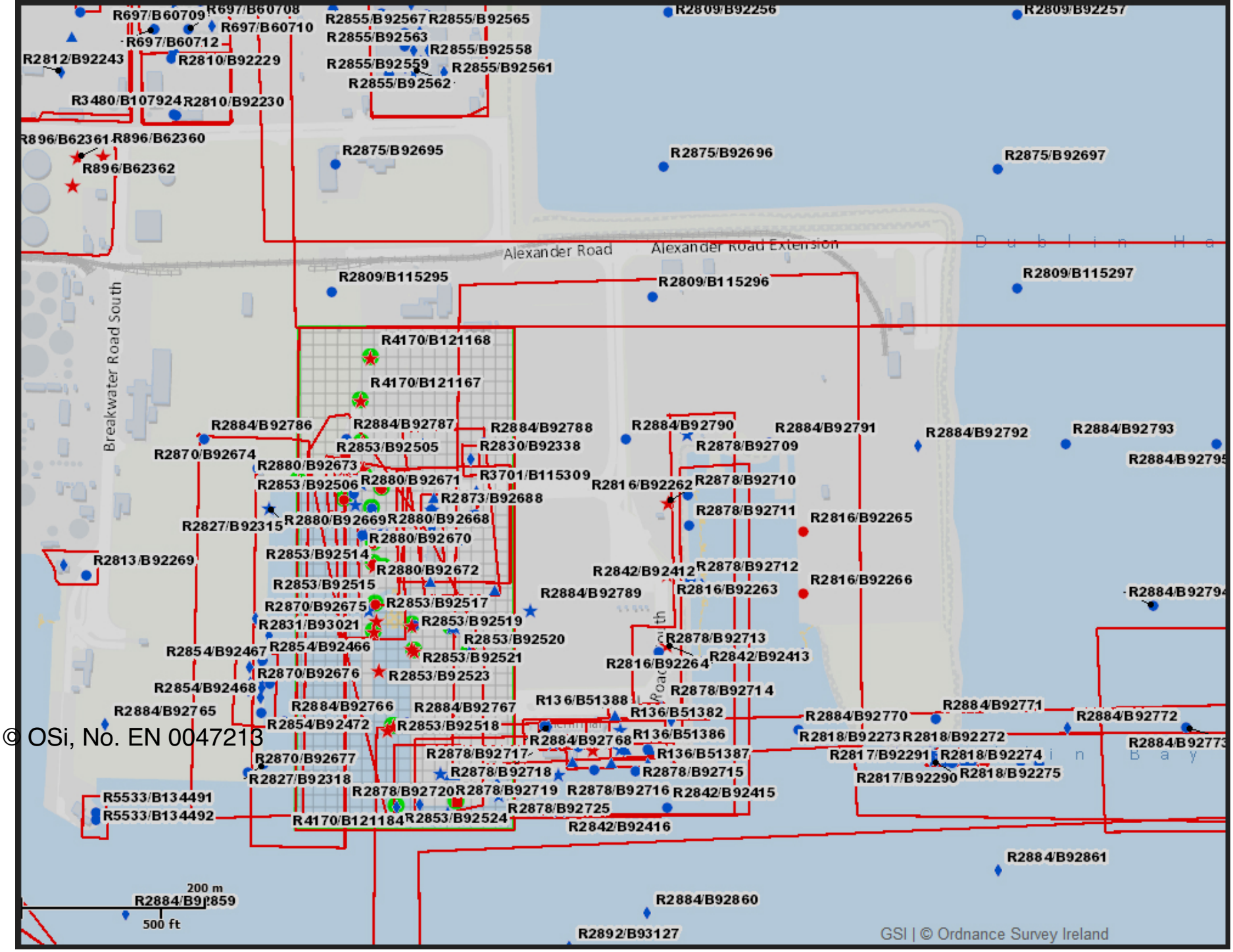
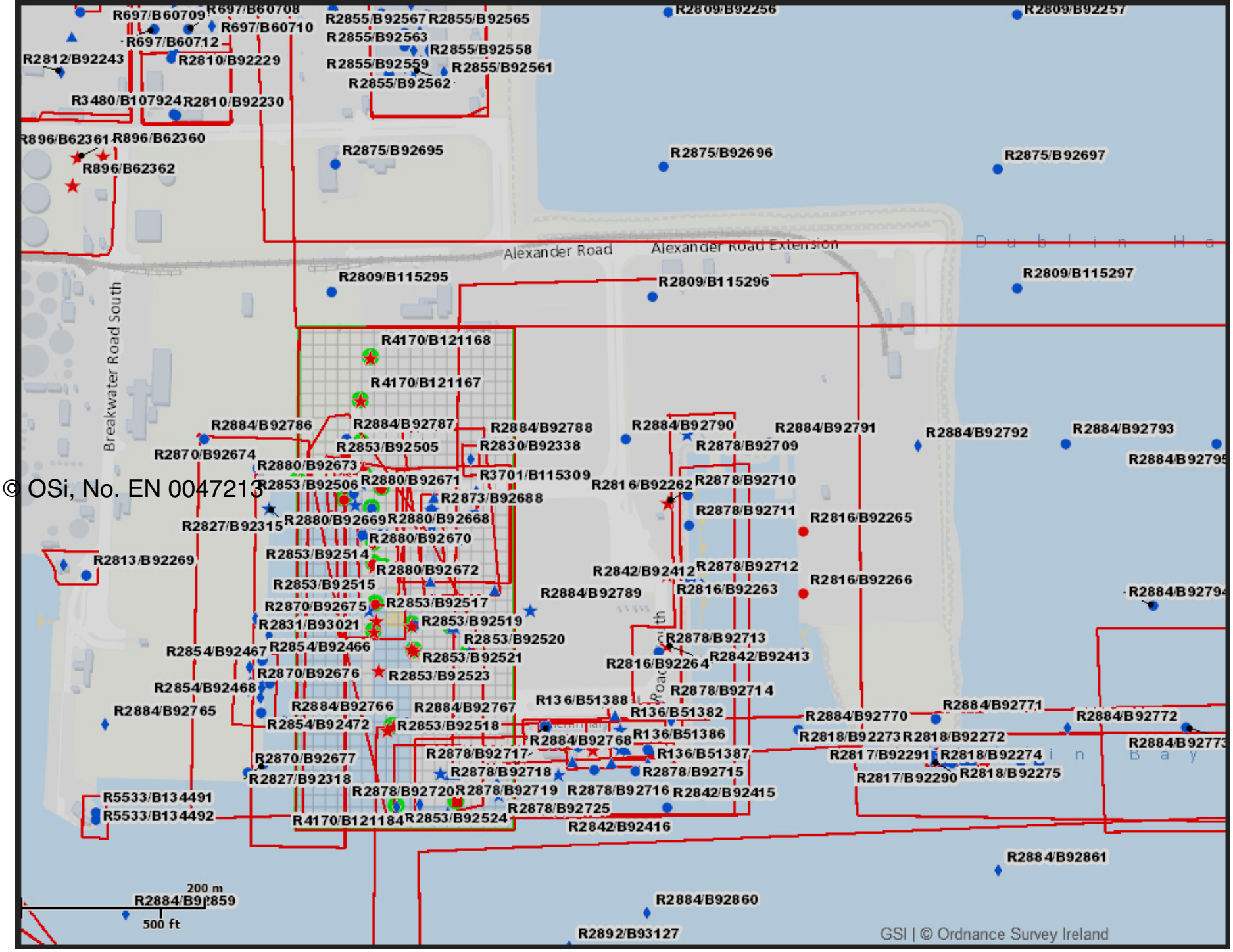
Ferry Port Gangway

TESTS FOR LAYER 9247909 IN BOREHOLE 92479 (Company Name: BH410RB)

TEST	TOP	CLASS	DESCRIPTION	RESULT	UNITS
6	26.5	LABSOIL	Particle Size Distribution - Fine Sand (0.20mm)	55	%pass
7	26.5	LABSOIL	Particle Size Distribution - Medium Sand (0.60mm)	82	%pass
8	26.5	LABSOIL	Particle Size Distribution - Coarse Sand (2.00mm)	95	%pass



Overview Map for GSI Report 4170: Reconstruction of Berth 51
Berth 51, Dublin Port, Dublin
Points Observed: 21



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Reconstruction of Berth 51

Berth 51, Dublin Port, Dublin

Borehole List:

Borehole	Name	Depth	DTB	ODMALIN	Easting	Northing	Description
121165	101	25.3	25	5.7	319947	234575	Cable Percussion (Shell and Auger)
121166	102	20	19.3	5.49	319992	234591	Cable Percussion (Shell and Auger)
121167	103	22.8	22.6	5.87	320015	234662	Cable Percussion (Shell and Auger)
121168	104	25.5	23.5	6.03	320026	234709	Cable Percussion (Shell and Auger)
121169	105	23.4	23	6.28	320016	234616	Cable Percussion (Shell and Auger)
121170	106A	18.1	17.85	6.14	320019	234581	Cable Percussion (Shell and Auger)
121171	107	12	11.7	-2.26	320038	234567	Cable Percussion (Shell and Auger)
121172	108	11.9	11.7	-2.66	319997	234555	Cable Percussion (Shell and Auger)
121173	109	12		-2.56	320027	234545	Cable Percussion (Shell and Auger)
121174	111	14.6	14.5	-2.67	320029	234507	Cable Percussion (Shell and Auger)
121175	112	18.2	18	-1.26	320029	234485	Cable Percussion (Shell and Auger)
121176	113	18.6	18.4	-.06	320040	234481	Cable Percussion (Shell and Auger)
121177	114	19.1	18.8	-3.46	320031	234441	Cable Percussion (Shell and Auger)
121178	115	21.5	21.4	-3.66	320029	234411	Cable Percussion (Shell and Auger)
121179	116A	27	26.8	6.2	320071	234418	Cable Percussion (Shell and Auger)
121180	117	22.5		6.3	320113	234416	Cable Percussion (Shell and Auger)
121181	118	26.6	25.5	5.8	320073	234390	Cable Percussion (Shell and Auger)
121182	119B	5.5		6.2	320133	234388	Cable Percussion (Shell and Auger)
121183	120	21.5	20.8	2.76	320050	234308	Cable Percussion (Shell and Auger)
121184	121/A	8.2		7.66	320054	234221	Cable Percussion (Shell and Auger)
121185	122	33	32.5	6.3	320119	234226	Cable Percussion (Shell and Auger)

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121165 (Company Name: 101)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12116501	0	.2				Fill - Made Ground	Fill - Made Ground
12116502	.2	5.4				Fill - Made Ground	Fill - Made Ground
12116503	5.4	8.6	Soft to Firm	Grey		Silt	Silt
12116504	8.6	11	Soft	Grey		Silt	Silt
12116505	11	12.5	Soft	Grey		Silt	Silt
12116506	12.5	14.5	Soft	Grey		Silt	Silt
12116507	14.5	15.9	Soft	Brown		Peat	Peat
12116508	15.9	17			Fine to Coarse Sandy	Gravel	Gravel
12116509	17	19	Dense		Fine to Coarse	Gravel	Gravel
12116510	19	22	Stiff	Grey	Silty	Clay	Clay
12116511	22	23.5	Dense		Fine to Coarse Sandy	Gravel	Gravel
12116512	23.5	24.5	Dense		Fine to Coarse Sandy	Gravel	Gravel
12116513	24.5	25	Dense			Gravel, Cobbles And Boulders	Gravel, Cobbles And Boulders
12116514	25	25.3				Weathered Rock	Weathered Rock

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LAYERS FOR BOREHOLE 121166 (Company Name: 102)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12116601	0	.6				Fill - Made Ground	Fill - Made Ground
12116602	.6	6				Fill - Made Ground	Fill - Made Ground
12116603	6	10.5	Soft to Firm	Grey Blue		Silt	Silt
12116604	10.5	17.4	Soft to Firm	Grey Blue		Silt	Silt
12116605	17.4	18	Dense		Fine to Coarse Sandy	Gravel	Gravel
12116606	18	18.6	Dense		Fine to Coarse	Gravel	Gravel
12116607	18.6	19.3	Stiff	Grey	Silty	Clay	Clay
12116608	19.3	20		Grey		Weathered Rock	Weathered Rock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121167 (Company Name: 103)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12116701	0	5.6				Fill - Made Ground	Fill - Made Ground
12116702	5.6	6.2	Soft	Black	Silty	Clay	Clay
12116703	6.2	6.3			Fine Sandy	Gravel	Gravel
12116704	6.3	8	Firm	Grey Blue	Silty	Clay	Clay
12116705	8	12.5	Firm	Grey Blue	Silty	Clay	Clay
12116706	12.5	13			Fine to Coarse	Sand	Sand
12116707	13	14.4			Fine to Coarse	Sand	Sand
12116708	14.4	17.4	Firm	Grey	Silty	Clay	Clay
12116709	17.4	18.7	Dense		Fine to Coarse Sandy	Gravel	Gravel
12116710	18.7	22.3	Firm	Grey	Silty	Clay	Clay
12116711	22.3	22.6	Dense			Gravel	Gravel
12116712	22.6	22.8				Weathered Rock	Weathered Rock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121168 (Company Name: 104)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12116801	0	.3				Fill - Made Ground	Fill - Made Ground
12116802	.3	5.8				Fill - Made Ground	Fill - Made Ground
12116803	5.8	6.2	Soft	Grey		Silt	Silt
12116804	6.2	8	Medium Dense		Silty	Sand	Sand
12116805	8	15.5	Firm	Grey Blue		Silt	Silt
12116806	15.5	16.8		Brown	Fine	Sand	Sand
12116807	16.8	17.5			Sandy	Gravel	Gravel
12116808	17.5	19.4	Dense		Fine to Coarse	Gravel	Gravel
12116809	19.4	22.9	Stiff	Grey	Silty	Clay	Clay
12116810	22.9	23.5	Dense	Grey		Gravel	Gravel
12116811	23.5	25.5		Grey		Weathered Rock	Weathered Rock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121169 (Company Name: 105)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12116901	0	5.8				Fill - Made Ground	Fill - Made Ground
12116902	5.8	15.5	Firm	Blue		Silt	Silt
12116903	15.5	17	Dense	Grey	Silty	Sand	Sand
12116904	17	18.5	Dense Coarse		Sandy	Gravel	Gravel
12116905	18.5	19.2	Dense Coarse		Sandy	Gravel	Gravel
12116906	19.2	20	Stiff	Grey	Silty	Clay	Clay
12116907	20	23	Compact			Gravel	Gravel
12116908	23	23.4		Grey		Bedrock	Bedrock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121170 (Company Name: 106A)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12117001	0	3.35				Fill - Made Ground	Fill - Made Ground
12117002	3.35	7.05				Fill - Made Ground	Fill - Made Ground
12117003	7.05	11.2	Soft	Grey	Silty	Clay	Clay
12117004	11.2	11.7	Loose	Grey	Fine to Medium	Sand	Sand
12117005	11.7	14.5	Soft	Grey	Silty	Clay	Clay
12117006	14.5	17.3	Firm	Grey Brown	Silty	Clay	Clay
12117007	17.3	17.85	Medium Dense	Grey	Fine to Coarse Sandy	Gravel	Gravel
12117008	17.85	18.1		Grey		Weathered Rock	Weathered Rock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121171 (Company Name: 107)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12117101	0	3.2	Very Soft	Grey Black	Clayey	Silt	Silt
12117102	3.2	5			Fine to Coarse Sandy	Gravel	Gravel
12117103	5	8.3	Soft to Firm	Grey Brown	Silty	Clay	Clay
12117104	8.3	11.7			Fine to Coarse	Gravel	Gravel
12117105	11.7	12				Weathered Rock	Weathered Rock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121172 (Company Name: 108)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12117201	0	1.9				Fill - Made Ground	Fill - Made Ground
12117202	1.9	3.4	Loose		Fine to Coarse Sandy	Gravel	Gravel
12117203	3.4	5.2	Soft	Grey	Silty	Clay	Clay
12117204	5.2	7.8	Soft to Firm	Brown	Silty	Clay	Clay
12117205	7.8	10	Dense		Fine to Coarse Sandy	Gravel	Gravel
12117206	10	11.7	Stiff	Grey	Silty	Clay	Clay
12117207	11.7	11.9	Hard	Grey		Bedrock	Bedrock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121173 (Company Name: 109)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12117301	0	3.3				Top Soil	Top Soil
12117302	3.3	4.8			Fine Sandy	Gravel	Gravel
12117303	4.8	8.4	Soft to Firm	Grey Brown	Organic	Clay	Clay
12117304	8.4	10.8			Fine to Coarse Sandy	Gravel	Gravel
12117305	10.8	12	Firm	Grey	Silty	Clay	Clay

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121174 (Company Name: 111)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12117401	0	3.2	Very Soft	Grey Black	Organic	Silt	Silt
12117402	3.2	4.8	Loose		Fine to Medium	Gravel	Gravel
12117403	4.8	7.5	Soft	Light Grey	Silty	Clay	Clay
12117404	7.5	8.7	Dense		Fine to Coarse Sandy	Gravel	Gravel
12117405	8.7	12.8	Stiff	Grey	Silty	Clay	Clay
12117406	12.8	14.5	Stiff	Grey	Silty	Clay	Clay
12117407	14.5	14.6		Black		Weathered Rock	Weathered Rock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121175 (Company Name: 112)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12117501	0	3.4	Soft	Black	Clayey	Silt	Silt
12117502	3.4	6.8			Fine to Coarse Sandy	Gravel	Gravel
12117503	6.8	8.1	Soft	Light Brownish Grey	Silty	Clay	Clay
12117504	8.1	16	Dense		Fine to Coarse Sandy	Gravel	Gravel
12117505	16	16.8	Dense	Grey	Medium to Coarse	Sand	Sand
12117506	16.8	18	Dense		Fine to Coarse Sandy	Gravel	Gravel
12117507	18	18.2				Presumed Rock	Presumed Rock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121176 (Company Name: 113)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12117601	0	2.2	Soft	Grey Black	Clayey	Silt	Silt
12117602	2.2	10.9			Fine to Coarse Sandy	Gravel	Gravel
12117603	10.9	11.9				Cobbles And Boulders	Cobbles And Boulders
12117604	11.9	18.4	Firm to Stiff	Grey	Silty	Clay	Clay
12117605	18.4	18.6				Presumed Rock	Presumed Rock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121177 (Company Name: 114)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12117701	0	2.6	Very Soft	Black	Organic	Silt	Silt
12117702	2.6	6	Medium Dense		Fine to Coarse	Gravel	Gravel
12117703	6	10	Dense		Fine to Coarse	Gravel	Gravel
12117704	10	10.2				Boulders	Boulders
12117705	10.2	18.8	Firm to Stiff	Grey	Silty	Clay	Clay
12117706	18.8	19.1		Grey		Weathered Rock	Weathered Rock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121178 (Company Name: 115)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12117801	0	3.6	Very Soft	Black	Organic	Silt	Silt
12117802	3.6	4.2				Fill - Made Ground	Fill - Made Ground
12117803	4.2	9.3			Fine to Coarse Sandy	Gravel	Gravel
12117804	9.3	10.2	Dense	Grey	Fine	Sand	Sand
12117805	10.2	21.4	Firm to Stiff	Grey	Silty	Clay	Clay
12117806	21.4	21.5		Grey Black		Weathered Rock	Weathered Rock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121179 (Company Name: 116A)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12117901	0	.3				Fill - Made Ground	Fill - Made Ground
12117902	.3	3.3				Fill - Made Ground	Fill - Made Ground
12117903	3.3	5.7				Fill - Made Ground	Fill - Made Ground
12117904	5.7	6.2	Firm	Black	Silty	Clay	Clay
12117905	6.2	16.5			Sandy	Gravel	Gravel
12117906	16.5	17.8	Dense		Fine to Coarse Sandy	Gravel	Gravel
12117907	17.8	26.2	Stiff	Grey	Silty	Clay	Clay
12117908	26.2	26.8	Dense		Fine to Coarse	Gravel	Gravel
12117909	26.8	27		Grey		Weathered Rock	Weathered Rock

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121180 (Company Name: 117)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12118001	0	6				Fill - Made Ground	Fill - Made Ground
12118002	6	7.3	Soft	Grey Black		Silt	Silt
12118003	7.3	9.5			Fine to Coarse Sandy	Gravel	Gravel
12118004	9.5	15.4	Dense		Fine to Coarse Sandy	Gravel	Gravel
12118005	15.4	16.5	Soft	Grey	Clayey	Silt	Silt
12118006	16.5	17.4	Dense		Fine to Coarse Sandy	Gravel	Gravel
12118007	17.4	18	Dense		Fine to Coarse	Gravel	Gravel
12118008	18	22.5	Stiff	Grey	Silty	Clay	Clay

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Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121181 (Company Name: 118)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12118101	0	6.6				Fill - Made Ground	Fill - Made Ground
12118102	6.6	8.5	Soft	Grey Black	Organic	Silt	Silt
12118103	8.5	17.5			Sandy	Gravel	Gravel
12118104	17.5	25.5	Stiff	Grey	Silty	Clay	Clay
12118105	25.5	26.6		Black		Weathered Rock	Weathered Rock

GSI REPORT 4170

Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121182 (Company Name: 119B)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12118201	0	5.5				Fill - Made Ground	Fill - Made Ground

GSI REPORT 4170

Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121183 (Company Name: 120)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12118301	0	3.5	Very Soft	Black	Organic	Silt	Silt
12118302	3.5	9.9			Fine to Coarse	Gravel	Gravel
12118303	9.9	20.8	Firm to Stiff	Grey	Silty	Clay	Clay
12118304	20.8	21.2		Grey		Weathered Rock	Weathered Rock
12118305	21.2	21.5		Grey		Bedrock	Bedrock

GSI REPORT 4170

Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121184 (Company Name: 121/A)

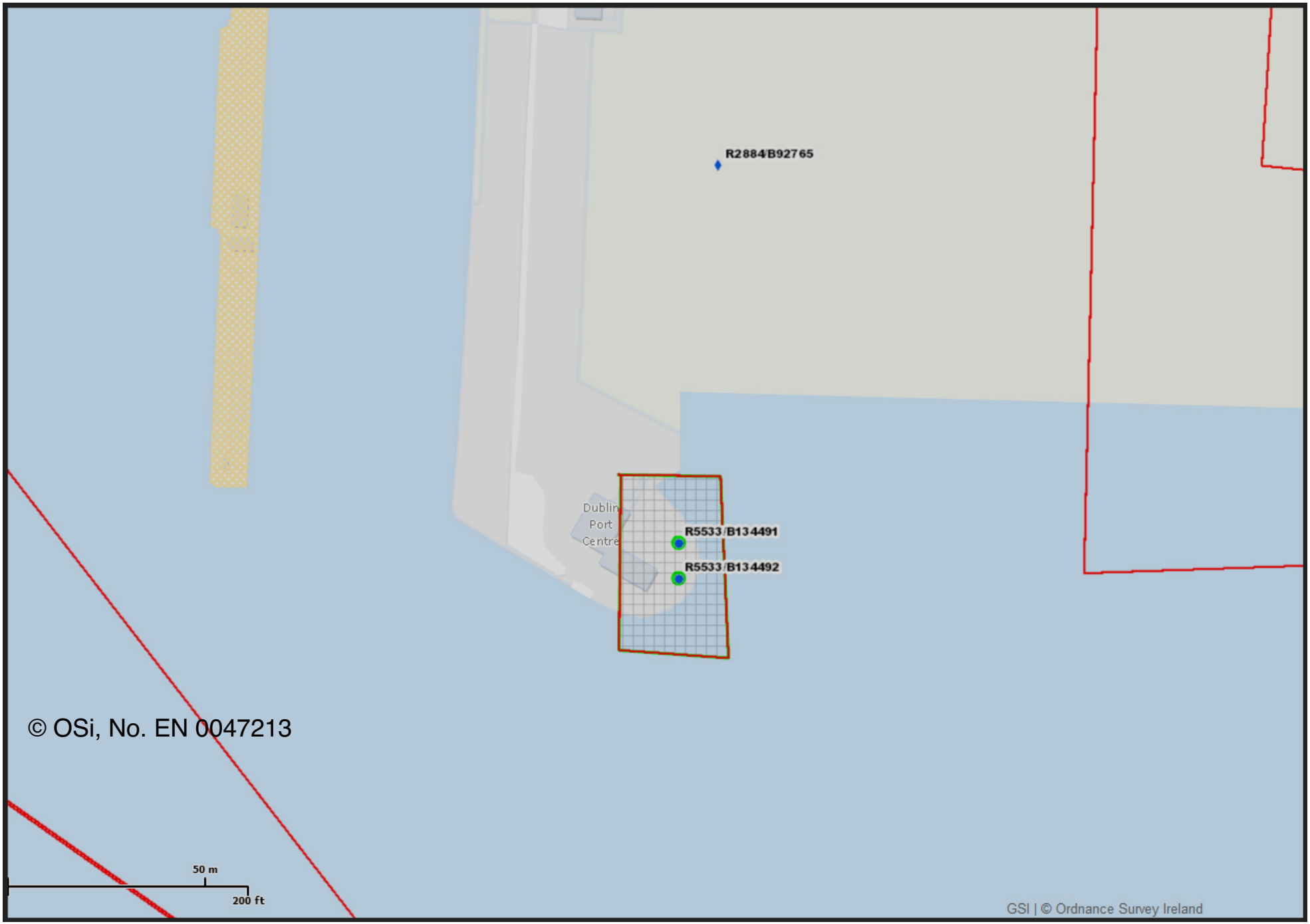
LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12118401	0	3.7	Very Soft	Grey Black	Clayey	Silt	Silt
12118402	3.7	8.2			Fine to Coarse	Gravel	Gravel

GSI REPORT 4170

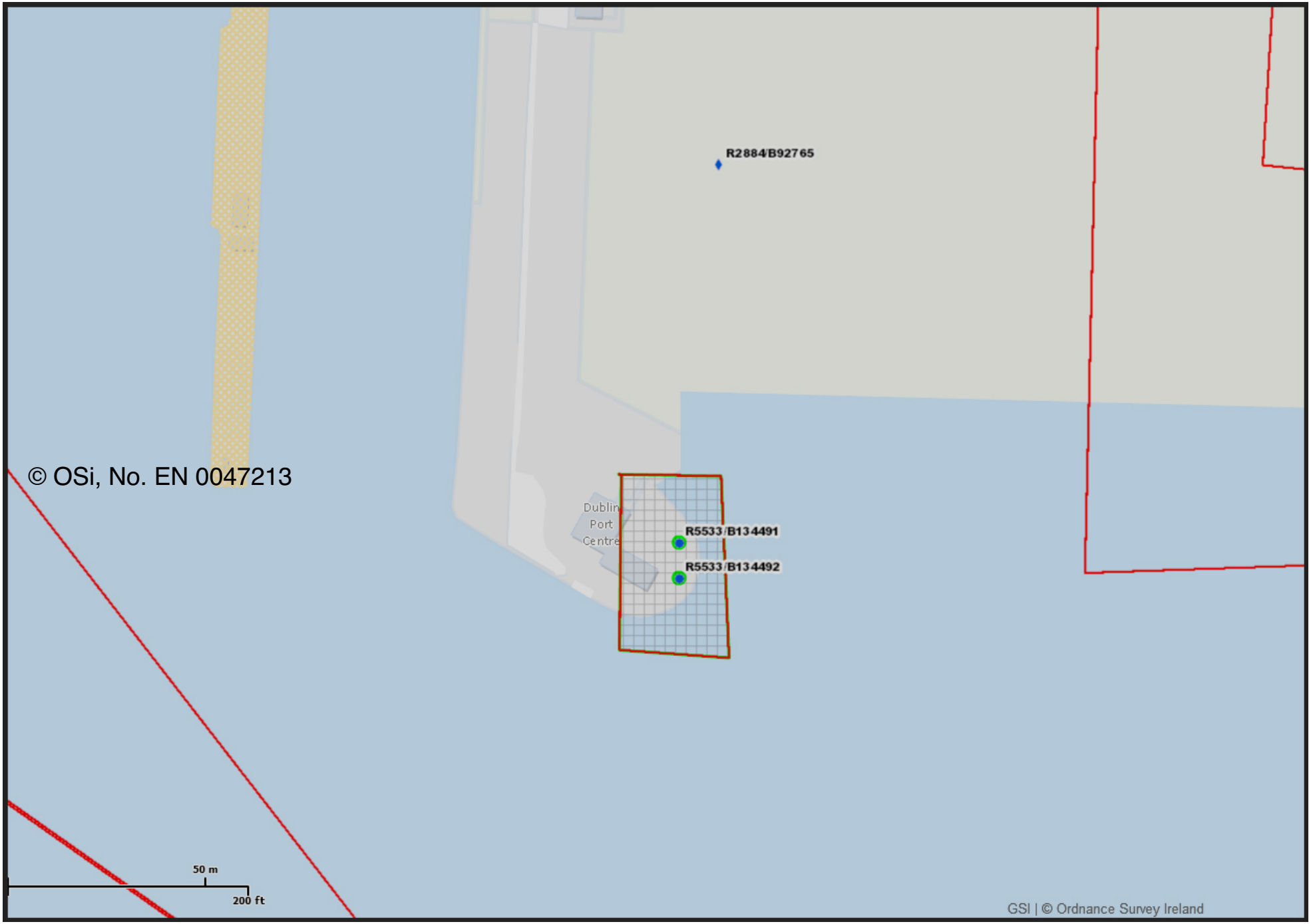
Reconstruction of Berth 51

LAYERS FOR BOREHOLE 121185 (Company Name: 122)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
12118501	0	4.9				Fill - Made Ground	Fill - Made Ground
12118502	4.9	10.6				Fill - Made Ground	Fill - Made Ground
12118503	10.6	11.5		Grey Brown	Sandy	Gravel	Gravel
12118504	11.5	12.1	Medium Dense	Dark Grey	Sandy	Gravel	Gravel
12118505	12.1	12.35	Soft	Grey	Silty	Clay	Clay
12118506	12.35	15.95	Medium Dense	Grey	Fine to Coarse Sandy	Gravel	Gravel
12118507	15.95	17.6	Medium Dense	Grey Brown	Fine to Medium	Sand	Sand
12118508	17.6	17.9	Firm	Grey	Silty	Clay	Clay
12118509	17.9	19.1	Medium Dense	Grey Brown	Fine to Medium	Sand	Sand
12118510	19.1	20.5	Firm	Grey	Silty	Clay	Clay
12118511	20.5	20.85	Firm	Grey	Silty	Clay	Clay
12118512	20.85	25.6	Firm to Stiff	Grey	Silty	Clay	Clay
12118513	25.6	30.5	Stiff	Grey	Silty	Clay	Clay
12118514	30.5	32.5	Dense Coarse			Gravel	Gravel
12118515	32.5	33				Weathered Rock	Weathered Rock



Overview Map for GSI Report 5533: Slipway
Berth 50-A, Dublin Port, Dublin 1, Co. Dublin
Points Observed: 2


R2884/B92765
© OSi, No. EN 0047213
Dublin
Port
Centre
R5533/B134491
R5533/B134492
50 m
200 ft
GSI | © Ordnance Survey Ireland

GSI REPORT 5533

Slipway

Berth 50-A, Dublin Port, Dublin 1, Co. Dublin

Borehole List:

Borehole	Name	Depth	DTB	ODMALIN	Easting	Northing	Description
134491	RC1	16		5.8	319727	234215	Rotary Core Drilling
134492	RC2	15		5.8	319727	234206	Rotary Core Drilling

GSI REPORT 5533

Slipway

LAYERS FOR BOREHOLE 134491 (Company Name: RC1)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
13449101	0	13.6				Fill - Made Ground	Fill - Made Ground
13449102	13.6	15				Gravel	Gravel
13449103	15	16				Gravel And Silt	Gravel And Silt

GSI REPORT 5533

Slipway

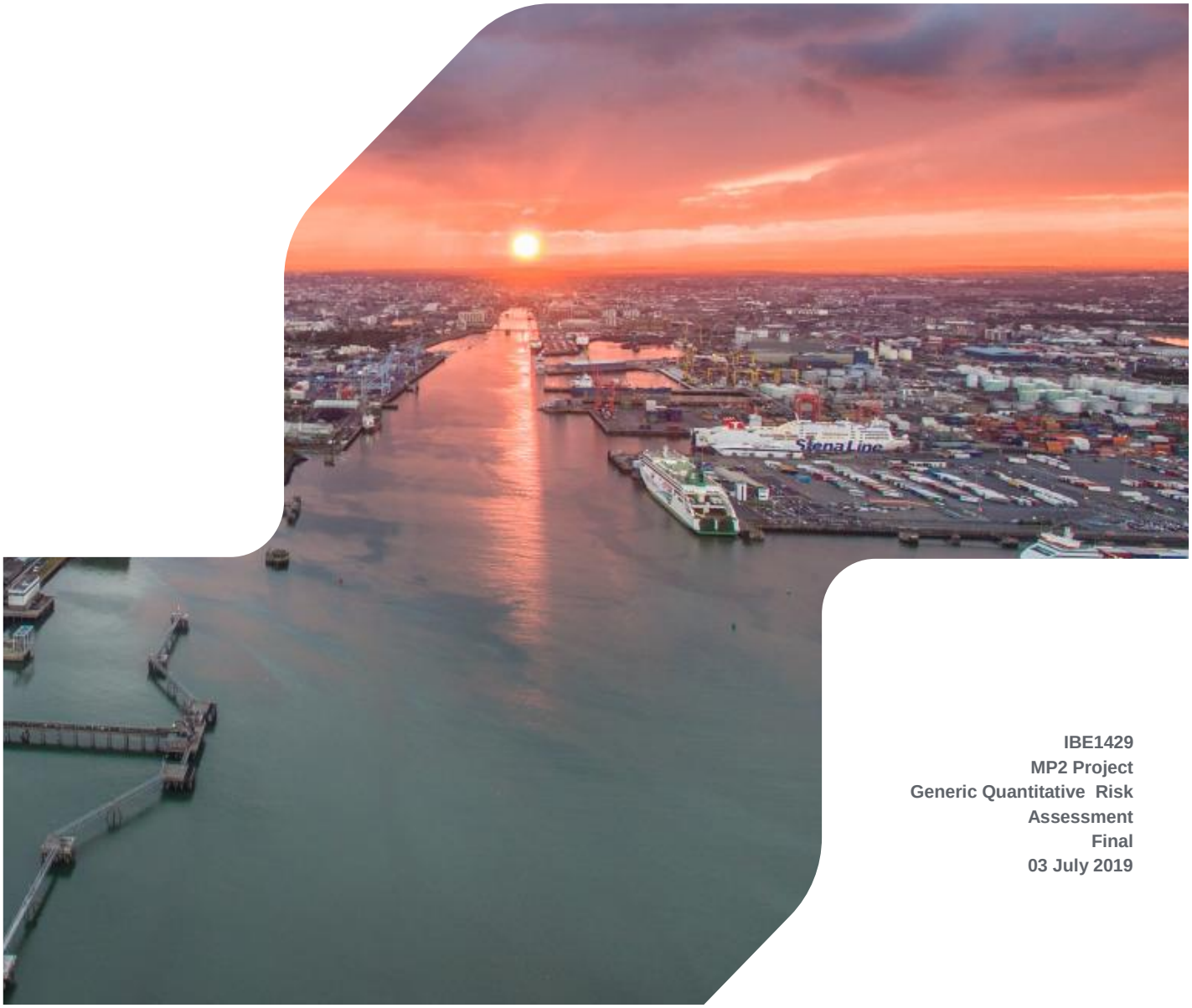
LAYERS FOR BOREHOLE 134492 (Company Name: RC2)

LAYER	TOP	BASE	STRENGTH	COLOUR	MINORLITH	MAJORLITH	INTERPRETATION
13449201	0	13.8				Fill - Made Ground	Fill - Made Ground
13449202	13.8	15				Gravel And Silt	Gravel And Silt

APPENDIX 8 SOILS, GEOLOGY & HYDROGEOLOGY

Appendix 8-2

MP2 PROJECT
GENERIC QUANTITATIVE RISK ASSESSMENT REPORT



IBE1429
MP2 Project
Generic Quantitative Risk Assessment
Final
03 July 2019

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	Quantitative Generic Risk Assessment Report (Contamination Assessment)	JMcG	DH	AGB	03-06-2019

Approval for issue

AGB		3 July 2019

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Dublin Port Company

Port Centre, Alexandra Road

North Dock, Dublin 1.

Co. Dublin

Contents

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1 INTRODUCTION

RPS was appointed by Dublin Port Company to undertake an environmental ground investigation and associated testing in support of the proposed MP2 Project. The MP2 Project will include the amalgamation of three existing ferry terminals into one, infilling to the east of oil berth 4, demolition of a number of existing buildings and the end of the old eastern breakwater, and extension of a number of berths.

This facilitated the production of a Generic Quantitative Risk Assessment (GQRA) to quantify potential contamination risks for the redevelopment.

1.1 Report objectives and scope

This report describes the investigations undertaken to characterise the ground conditions beneath the site, and to quantify the potential risks to any development from sub-soil contamination and groundwater. This information will also form the basis of any further assessments and remedial measures, if deemed necessary.

1.2 Planning History & Previous Reports

A Preliminary Risk Assessment (PRA) was completed by RPS for the site in April 2018:

'Dublin Port Company, MP2 Project, Preliminary Risk Assessment (Desk Study) Report, IBR1085'. RPS, April 2018.

The PRA report highlighted the potential contamination sources, pathways and receptors which were likely to be present on the site. The principal source of contamination is likely to be the presence of fuel storage, boilers, substations and a garage area on site. In addition, made ground is known to underlie the site and has the potential to effect groundwater and contaminants in shallow soils.

Therefore, as per the guidance provided in CLR 11; a supplementary intrusive site investigation followed by an updated generic quantitative risk assessment was undertaken.

1.3 Limitations

This report is for the use of Dublin Port Company only and should not be relied upon by other parties unless specifically advised by RPS in writing. Furthermore, new information, design changes, changed practices or new legislation may necessitate revised interpretation of the report after its date of submission.

This report has been prepared by RPS on the basis of the available information received during the study period. Although every reasonable effort has been made to obtain all relevant information, all potential contaminants, environmental constraints or liabilities associated with the site may not necessarily have been revealed.

1.4 Site Description

As shown on Figure 1, the proposed MP2 Project is located at the eastern end of Dublin Port, approximately 4km east of Dublin city centre.

A site walkover was completed by RPS personnel on 1st May 2018; a photographic record of the site walkover is included in the PRA. The application boundary for the MP2 Project is shown on Figure 2.

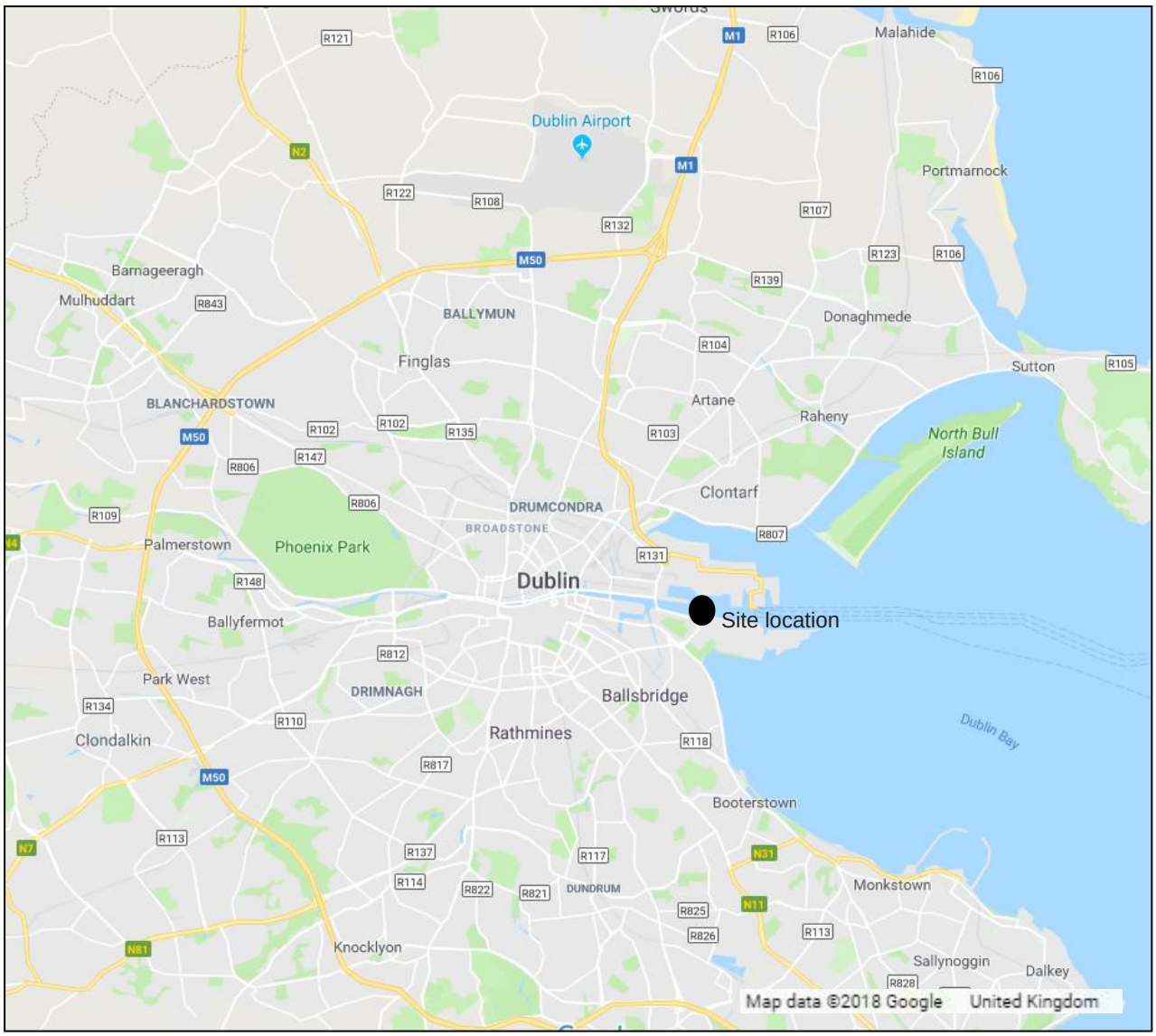

Figure 1 Site location

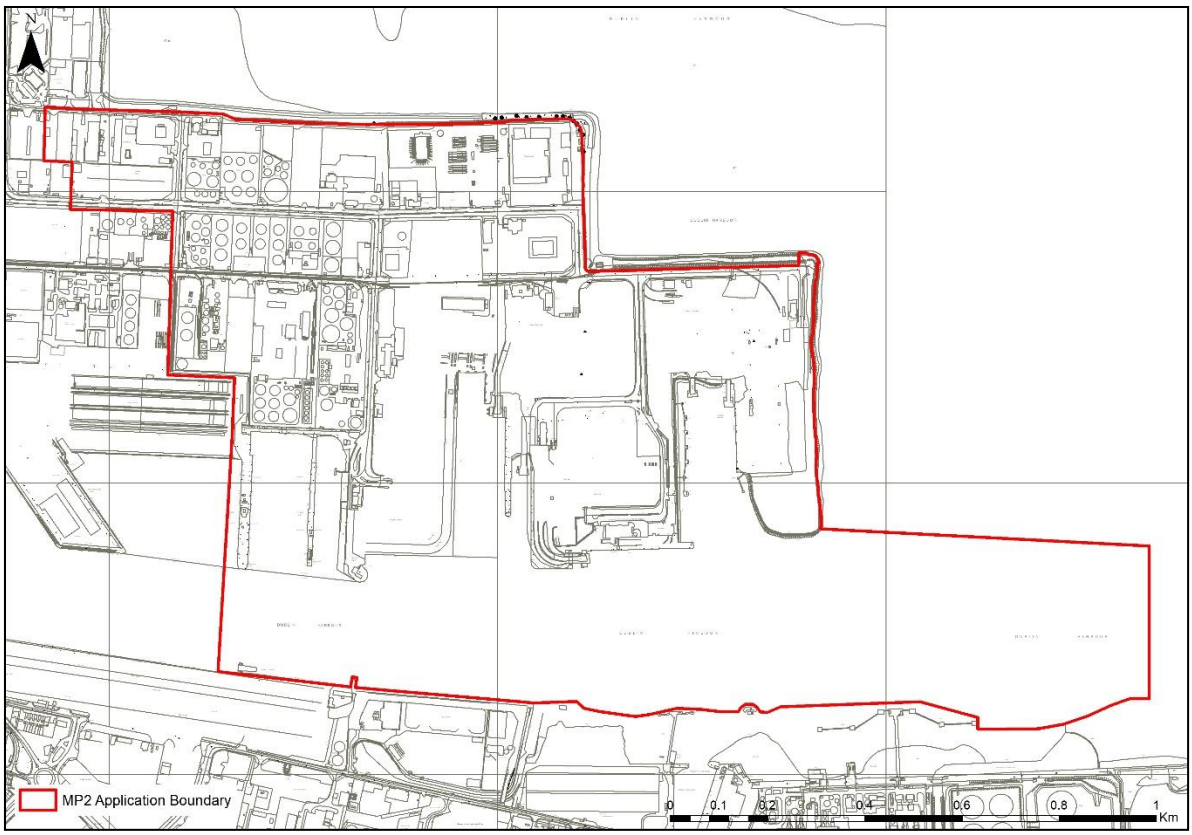

Figure 2 Site layout plan

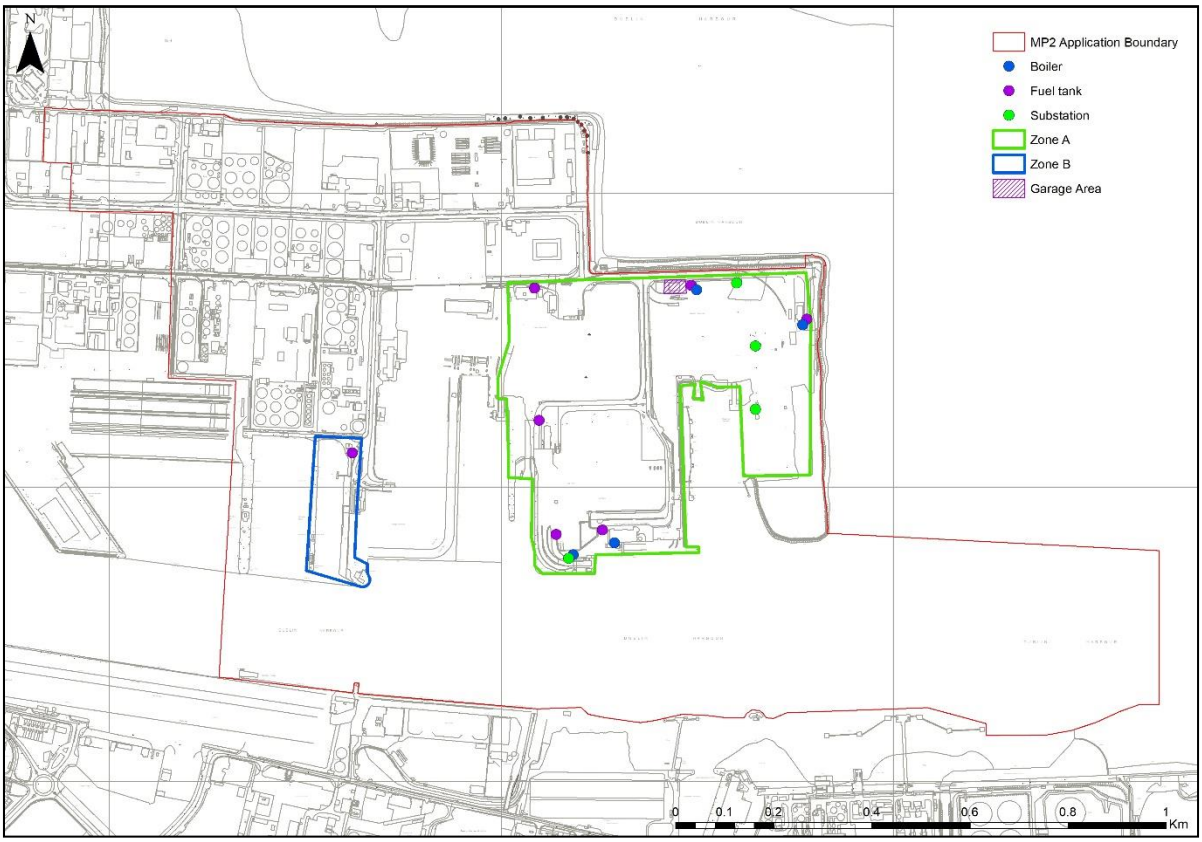

Figure 3 Potential sources of contamination

As shown in Figure 3, a number of potential sources have been identified within the land based area of the MP2 Project. It should be noted that a number of structures are to be demolished in advance of the MP2 Project as part of other permissions. This includes the warehouses present in the north of the site, which are used by a number of businesses including Ecocem. Ecocem use part of the building for storing and distributing their cement products.

Zone A represents the existing ferry terminals while Zone B represents the area to the east of Oil Berth 4 to be infilled and the end of the old eastern breakwater (to be demolished).

Zone A currently consists of three separate ferry terminals; Terminal 1 Irish Ferries, Terminal 2 Stena Line and Terminal 5 Seatruck. The identified fuel tanks, substations and generators/boilers within Zone A are demonstrated on Figure 3. The existing Terminal 5 has a number of substations present on site; the age of these substations in unknown. A maintenance and refuelling area is present to the north of Terminal 5 with a fuel tank and generator present. Oil staining of the ground surrounding the existing fuel tank is obvious. Three fuel tanks were identified on the Terminal 1 site. A fuel tank is present to the west of the freight office present in the north west of Terminal 1. Another fuel tank is present to the west of the passenger office in the south of Terminal 1, with boilers present in the south of that building. Another fuel tank is present in the south west of Terminal 1; significant oil staining of the ground surrounds this fuel tank. Oil drums, with a small amount of oil remaining in them, are present surrounding this oil tank. A generator and substation are present to the south east of this oil tank.

A single oil tank was identified to the north of the Stena Line building on Terminal 2. This oil tank appeared to be relatively new and as such in very good condition.

A single oil tank is present to the north east of Oil Berth 4 in Zone B. A large area of bitumen and tar storage is present directly north of Zone B. This area is managed by Hugh Munro & Company Ltd and contains storage for Irish Bitumen Storage Ltd, Dublin Joint Fuels Terminal and Irish Tar & Bitumen Suppliers.

Table 1 Application site details

Site address	Tolka Quay Road, Dublin Port, Dublin, Ireland
Grid reference	320277E 234742N

1.4.1 Surrounding land-use

The pertinent surrounding land uses of the site are given in Table 2.

Table 2 Surrounding land use

Boundary	Surrounding land use
North	South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) is present to the north of the site.
East	South Dublin Bay and River Tolka Estuary SPA is present to the east of the site.
South	The River Liffey is present to the south of the site. Poolbeg Peninsula is present to the south of the River Liffey.
West	Various industrial activities of Dublin Port are present to the west of the site.

1.5 Proposed development

The proposed land works involve the provision of a Unified Ferry Terminal at the eastern end of the port to facilitate Irish Ferries, Stena Line and P&O with Seatruck relocated to the western end of the port. The demolitions to be undertaken as part of MP2 Project include: Terminal 2 Building, Terminal 5 Building, Terminal 5 Check in, Terminal 5 Sheds (3 no.), Terminal 1 Car Check in booths.

2 PRELIMINARY RISK ASSESSMENT (DESK STUDY)

The PRA was completed by RPS in April 2018 and is summarised below.

2.1 Ordnance Survey Maps & Historical development of the site

Two historical maps of the area are provided on the Ordnance Survey Ireland mapviewer; a six inch map from c. 1830s and a twenty-five inch map from c. 1890s. Table 3 provides a summary of potentially contaminating activities during the history of both the site and its surrounding area.

Table 3 Historical site and surrounding area development

Date	Site history	Surrounding land use history
c. 1830s	The site is undeveloped; it consists of mud flats that have not been reclaimed for development.	A Harbour, barracks and Pigeon House Fort was developed to the south of the site, on the opposite bank of the River Liffey. A number of potentially contaminating land uses are present a significant distance to the west of the site where the land extends to, including a glass works and a vitriol works.
c. 1890s	A breakwater has been developed where the modern day Breakwater Road is present.	Increased development is present in the area to the west of the site. Dublin Port has extended closer to the site with a number of quay extensions, a shipbuilding yard, railway line, timber yard, coal yard, chemical manure works and a number of oil tanks present. Increased development is also present on the opposite bank of the River Liffey with electricity works and outfall works present surrounding Pigeon House Fort.

By 1907, many of the principal features of the deepwater port in Dublin were established, including the shipbuilding yard, the North Wall graving dock and the North Quay Extension, which formed the south side of the deepwater facility. Alexandra Quay was built in the 1920s (placed along the north side of Alexandra Basin) and Alexandra Quay East, Ocean Pier, and a number of Oil Jetties were completed by 1955. A new phase of reclamation works was initiated at this time and pushed the boundaries of the port northwards, along the East Wall, towards the Clontarf shoreline. Further reclamation works to the east define the current extent of Dublin Port; most of the area relevant to the MP2 Project is within the most recently reclaimed area.

2.2 Consultation

Significant consultation regarding the overall Dublin Port Masterplan 2040, reviewed 2018, and the MP2 Project has been completed with the local community, An Bord Pleanála, Dublin City Council and various other Statutory Bodies. No concerns with regard to contaminated land were raised.

2.3 Ground Conditions

Information held online by Geological Survey Ireland at their Spatial Resources Map Viewer was used to identify the geological and hydrogeological conditions of the site. The following describes the findings of this preliminary research.

2.3.1 Solid geology

The bedrock geology anticipated in the vicinity of the site is shown on Figure 4. The entire Dublin area is underlain by the Lucan Formation. The formation comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are also rare, dark, coarser grained, calcarenitic limestones, which are sometimes graded, present. The formation ranges from 300m to 800m in thickness and is Carboniferous

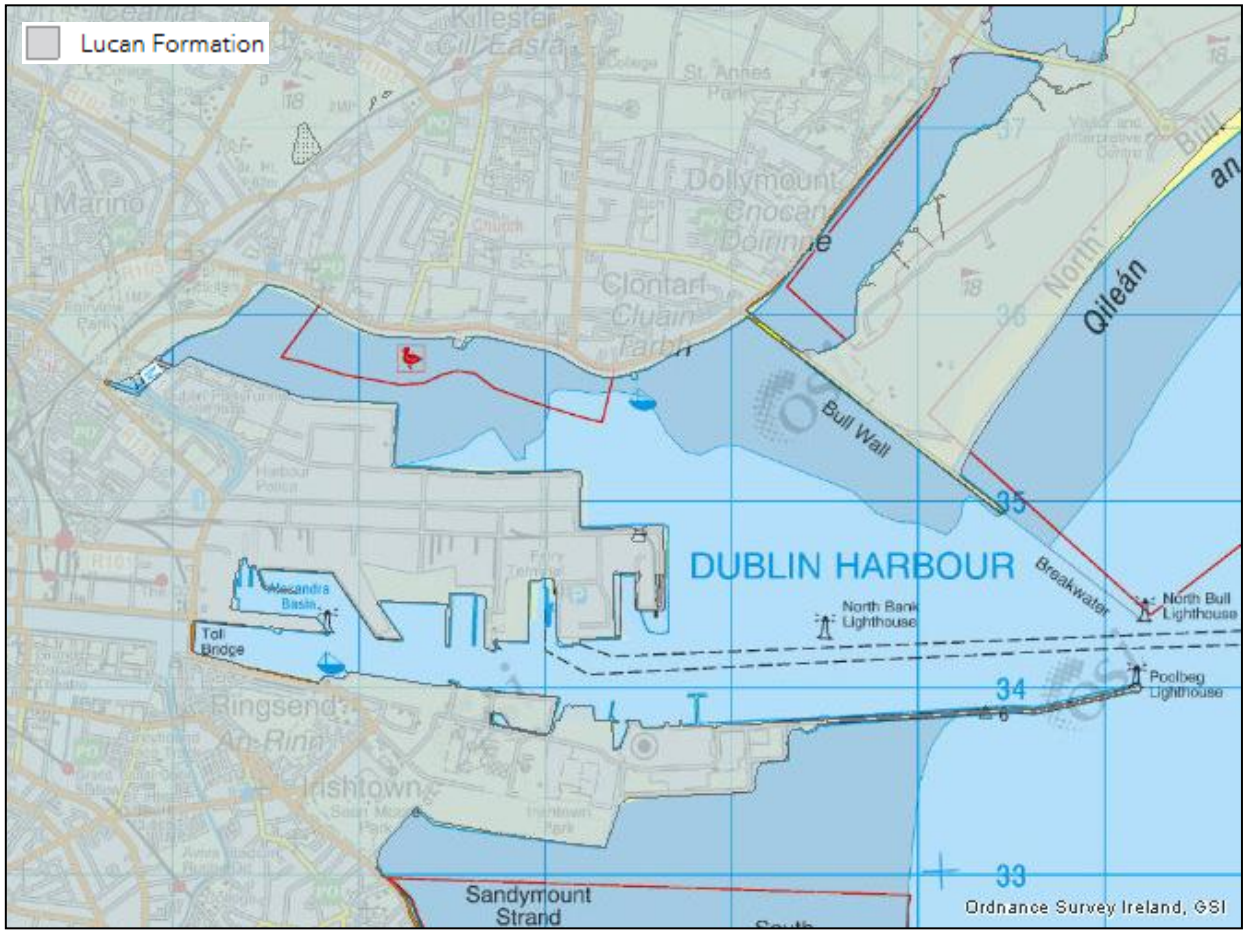

Figure 4 Solid geology (taken from GSI's Spatial Resources portal)

2.3.2 Drift geology

Drift is a general term applied to all mineral material (clay, sand, silt, boulders) transported by a glacier and deposited directly by or from the ice, or by running water emanating from the glacier. It generally applies to Pleistocene glacial deposits.

The drift geology of the area is expected to principally reflect the depositional process of the last glaciation when an extensive ice sheet that extended into the Irish Sea covered the region. Typically

during the ice advance boulder clays were deposited sub-glacially as lodgement till over the eroded rock head surface, whilst moraine deposits were laid down at the glacier margins. Subsequently, with the progressive retreat of the ice sheet from the region, fluvio-glacial deposits (sand, gravel and silt) were laid down by melt waters discharging from the front of the glacier. Recent deposition prior to reclamation of the site principally reflects marine erosional and depositional processes, which have modified the glacial deposits.

As shown on Figure 5, the site is anticipated to be underlain by made ground. Dublin Port is located entirely on made ground (fill deposits).

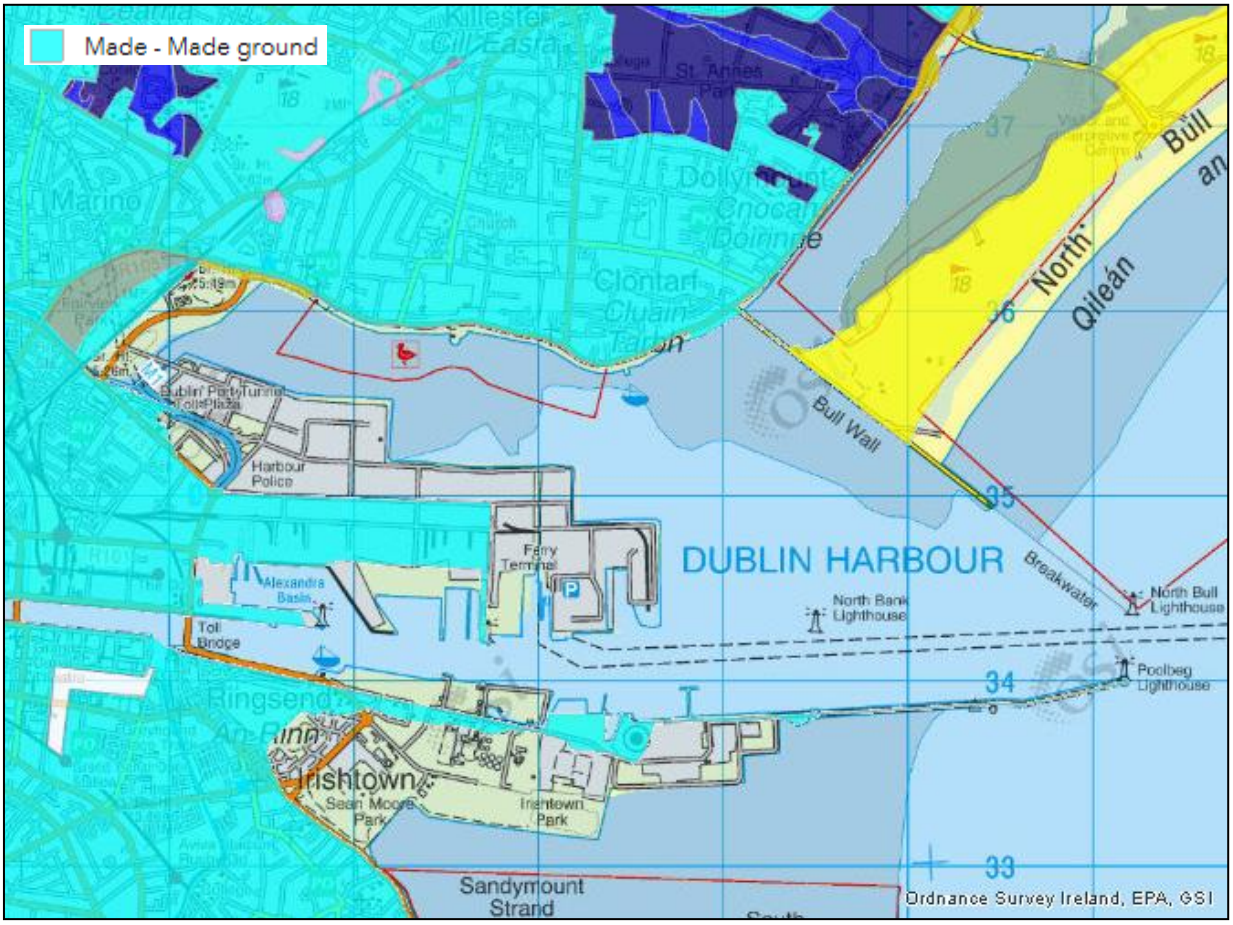

Figure 5 Sub soils (taken from GSI's Spatial Resources portal)

2.3.3 Hydrogeology

The hydrogeology of the area has been described by the Geological Survey of Ireland as complex and very variable. The Limestone bedrock is generally considered to be indurated and hence dominated by fissure permeability (e.g. joints and faults). Such permeability is likely to be low except where coarse, clean Limestones where present, have been karstified, dolomitised or are highly fractured.

The Lower Carboniferous rocks that underlie the region have been classified by the Geological Survey of Ireland as "Locally Important Aquifer, bedrock which is moderately productive only in local zones" (Figure 6). These locally productive zones are due to the presence of more permeable strata that are encountered in different parts of the outcrop area due to substantial faults, fractures or fissures. The limited groundwater movement within the rock tends to be restricted to the weathered horizons or to

non-extensive fractured zones. These zones tend to have a limited hydraulic continuity, low storage capacity and low potential yield.

The Quaternary drift is considered the principal medium for groundwater movement in the area. The infiltration capacity of the clay deposits would be limited due to their low permeability and hence groundwater movement is likely to be confined to the fluvio-glacial sand and gravel deposits that overlie the clays. The potential importance of the Quaternary drift deposits as a groundwater resource is a function of their permeability, thickness and extent. The low permeable fine grained glacial clays represent aquitards that limit infiltration and restrict recharge to bedrock aquifers when sufficiently thick. The overlying fluvio-glacial sand and gravel deposits represent material with a significantly higher permeability. Consequently these deposits have a high potential recharge and storage capacity.

It is generally expected that groundwater levels beneath the site will remain close to sea level and may exhibit tidal variation. Groundwater at the site is expected to be brackish / saline and unsuitable for potable supply.

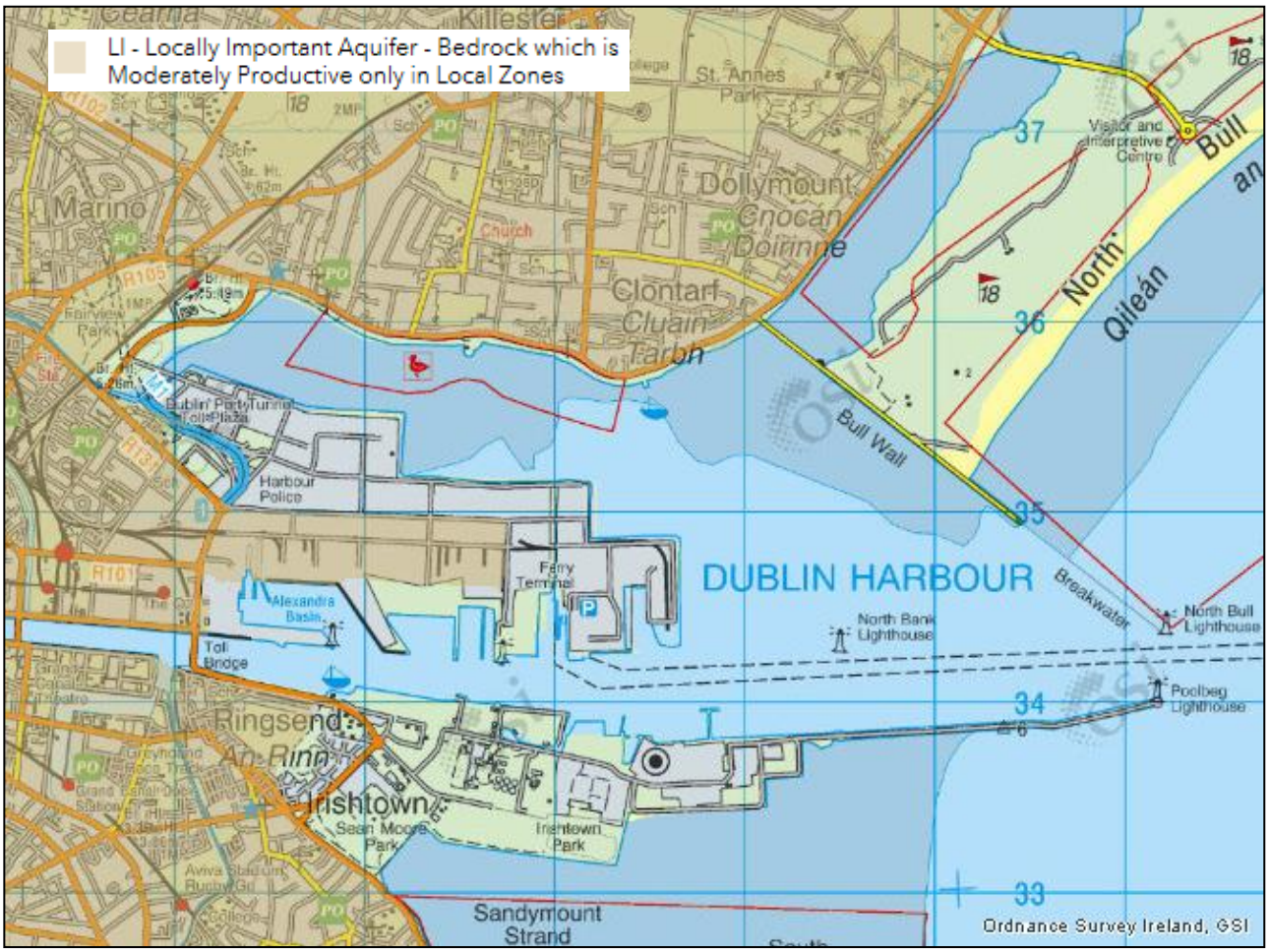

Figure 6 Groundwater aquifer (taken from GSI's Spatial Resources portal)

2.3.4 Groundwater vulnerability

In accordance with the Water Framework Directive (2000/60/EC) it is necessary to understand the groundwater vulnerability of the site, which is defined as the tendency and likelihood for general contaminants to reach the water table after introduction at the ground surface.

The site falls within an area of low groundwater vulnerability. A groundwater borehole of unknown use is present to the north west of the site.

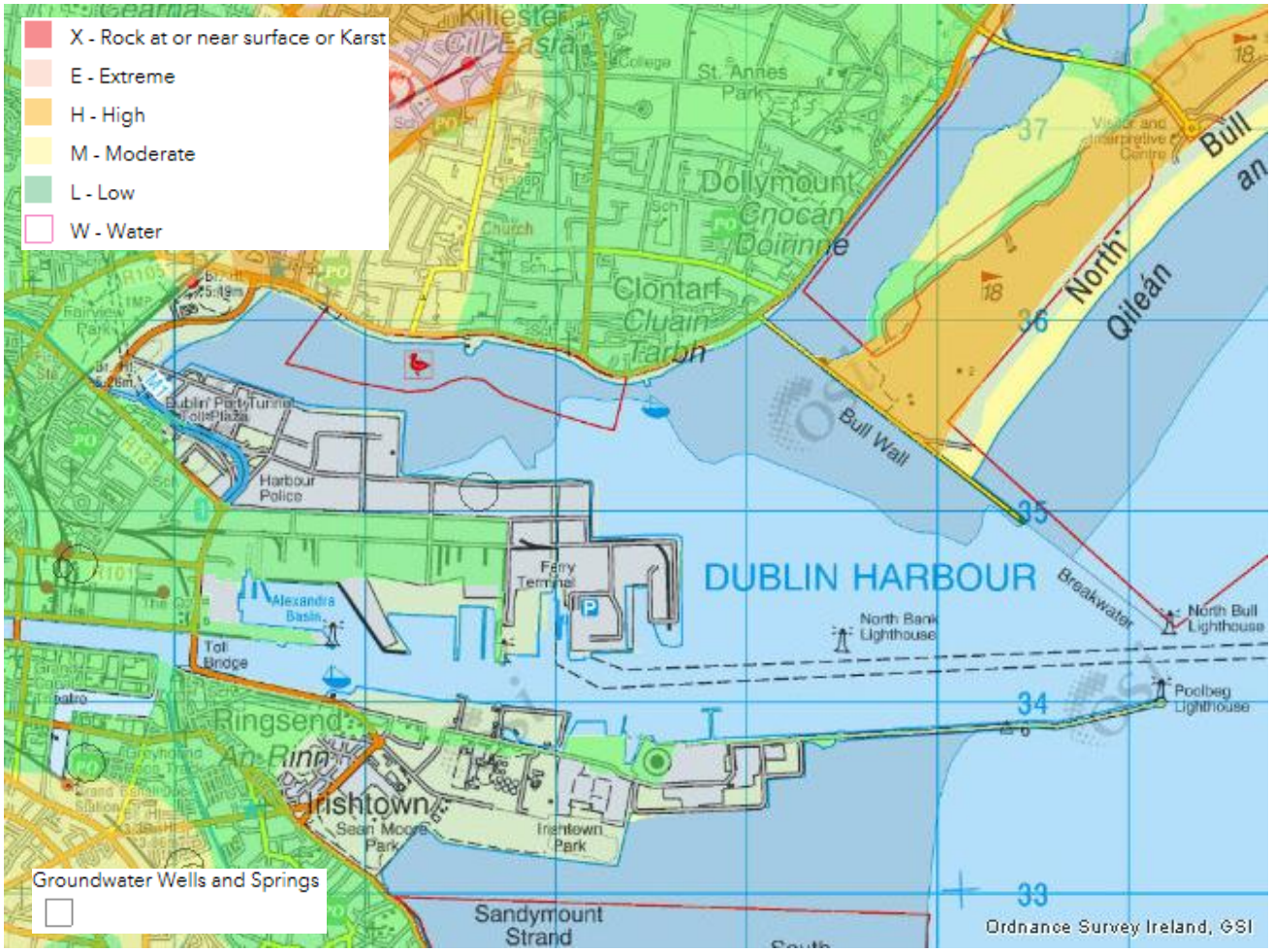

Figure 7 Groundwater vulnerability (taken from GSI's Spatial Resources portal)

2.3.5 Surface water hydrology

The South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) is present directly north and west of the site. The River Liffey is present directly south of the site. The Dodder River flows into the River Liffey just west of Tom Clarke Bridge.

2.3.6 Licenses and permits

Dublin Port Company have an Industrial Emission licence (IEL) (licence number P1022-01) on the existing Sea Truck terminal site. The existing Seatruck terminal area is also identified as an Integrated Pollution Prevention and Control facility. In addition, Indaver Ireland Limited are registered as having a

hazardous waste facility (ref. W0036-02) to the north of Tolka Quay Road (just north west of its junction with Breakwater Road South).

2.3.7 Designated Sites

The South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) is present directly north and west of the site. Tolka Estuary and the Liffey Estuary are classified as nutrient sensitive estuaries under the Urban Waste Water Treatment Directive Sensitive Area. North Dublin Bay and South Dublin Bay are proposed Natural Heritage Areas.

2.4 Previous site investigation

2.4.1 Dublin Port IED application

A number of boreholes were sunk across the wider Dublin Port site as part of the site investigation prior to the Industrial Emissions Directive (IED) licence application. As part of this site investigation, completed by Geotechnical Environmental Services in January-February 2015, four boreholes were sunk within the MP2 Project area; BH6, BH7, BH8 and BH10 (as shown on Figure 8). The logs for these boreholes are included in Appendix B; the boreholes are summarised in Tables 4-7.

Figure 8 IED Licence Monitoring Locations

Table 4 Dublin Port IED application BH6 – February 2015

Depth (m)	Strata
0.00-0.35	Topsoil
0.35-3.60	MADE GROUND: Firm brown with grey and dark brown mottling slightly sandy silty CLAY containing red brick, slate and glass remnants.
3.60-3.90	MADE GROUND: Soft grey slightly sandy slightly gravelly clayey SILT. Gravel is fine to medium, sub-angular to sub-rounded. Steady groundwater strike was recorded at 3.60m, rising to 3.40m in 20 minutes
3.90-7.30	MADE GROUND: Brown and dark brown silty gravelly fine to coarse SAND containing red brick and concrete remnants. Gravel is fine to coarse, sub-angular to sub-rounded.
7.30-9.00	MADE GROUND: Black silty sandy fine to coarse GRAVEL containing red brick, concrete and cinder remnants. Gravel is sub-angular to sub-rounded.
9.00-10.00	Firm dark grey slightly sandy clayey thinly laminated organic SILT containing occasional thinly interbedded grey silty fine SAND layers.
10.00-15.00	Firm dark grey slightly sandy clayey thinly laminated organic SILT containing occasional thinly interbedded grey silty fine SAND layers.

Table 5 Dublin Port IED application BH7 – February 2015

Depth (m)	Strata
0.00-0.40	Topsoil
0.40-3.40	MADE GROUND: Firm dark brown and grey gravelly sandy CLAY containing red brick, mortar, slate, timber and tarmac remnants. Gravel is fine to coarse, sub-angular to sub-rounded.
3.40-11.70	Dark grey and black silty sandy fine to coarse GRAVEL with cobble and boulder content. Gravel is sub-angular to sub-rounded. Steady groundwater strike was recorded at 3.40m
11.70-15.45	Medium dense grey silty fine SAND.

Table 6 Dublin Port IED Application BH8 – February 2015

Depth (m)	Strata
0.00-0.10	Pavlor brick
0.10-0.20	Fill: Quarry dust
0.20-0.70	Concrete
0.70-3.80	MADE GROUND: Firm brown and dark brown slightly sandy slightly gravelly CLAY containing red brick, concrete and timber remnants. Gravel is fine coarse, sub-angular to sub-rounded. Steady groundwater strike was recorded at 3.20m.
3.80-5.60	MADE GROUND: Soft to firm dark grey and black slightly sandy slightly gravelly CLAY containing red brick, concrete and timber remnants. Gravel is fine coarse, sub-angular to sub-rounded.
5.60-7.50	Soft to firm grey slightly sandy silty CLAY.
7.50-15.45	Grey silty fine to medium SAND containing occasional bands of sandy fine to coarse GRAVEL. Gravel is fine to medium, sub-angular to sub-rounded.

Table 7 Dublin Port IED Application BH10 – February 2015

Depth (m)	Strata
0.00-0.15	Tarmac
0.15-0.30	Fill: Hardcore
0.30-0.60	Concrete
0.60-0.90	Fill: Hardcore
0.90-1.40	MADE GROUND: Grey silty slightly gravelly fine to coarse SAND containing shell remnants. Gravel is fine to medium, sub-angular to sub-rounded.
1.40-2.90	MADE GROUND: Soft to fiem brown and dark brown slightly sandy slightly gravelly CLAY with cobble content. Gravel is fine to coarse, sub-angular rto sub-rounded.
2.90-3.50	MADE GROUND: Brown and grey sandy fine to coarse GRAVEL with cobble content. Gravel is sub-angular to sub-rounded. Steady groundwater strike was recorded at 2.90m.
3.50-4.20	MADE GROUND: Soft black slightly sandy slightly gravelly CLAY. Gravel is fine to medium, sub-angular to sub-rounded.
4.20-5.90	Black silty gravelly fine to coarse SAND. Gravel is fine to medium, sub-angular to sub-rounded.
5.90-11.70	Firm dark grey slightly sandy clayey SILT with occasional interbedded silty gravelly fine to coarse SAND. Gravel is fine to medium, sub-angular to sub-rounded.
11.70-15.45	Medium dense grey and grey brown silty gravelly fine to coarse SAND. Gravel is fine to coarse, sub-angular to sub-rounded.

2.4.2 GSI Geotechnical viewer

The GSI Geotechnical viewer was consulted to gain an understanding of historical site investigations undertaken on or in proximity to the site. The full downloaded reports including location plans are included in Appendix C; the relevant boreholes are summarised in the sections below.

2.4.2.1 Port Operations Centre

Two boreholes were historically drilled in proximity to the existing Port Operations Centre. The boreholes were drilled via the rotary core method to a maximum depth of 16m and are summarised in Tables 8 and 9.

Table 8 Borehole 134491 – GSI Report 5533 (March 2003)

Depth (m)	Strata
0.00-13.60	Fill – Made ground
13.60-15.00	Gravel
15.00-16.00	Gravel and silt

Table 9 Borehole 134492 – GSI Report 5533 (March 2003)

Depth (m)	Strata
0.00-13.80	Fill – Made ground
13.80-15.00	Gravel and silt

2.4.2.2 North east of Oil Berth 4

Two boreholes were formerly drilled, via cable percussion (shell and auger), to a maximum depth of 16.77m to the north east of Oil Berth 4 (Tables 10 and 11). As no made ground is denoted on the logs it is assumed that these boreholes were drilled prior to the land being reclaimed.

Table 10 Borehole 92269 – GSI Report 2813 (March 1971)

Depth (m)	Strata
0.00-3.66	Clayey sandy gravel
3.66-6.71	Sand
6.71-7.32	Soft grey organic silt
7.32-8.54	Sandy gravel
8.54-12.80	Sand
12.80-13.72	Soft grey silt
13.72-14.94	Sandy gravel
14.94-16.11	Soft grey silty clay
16.11-16.77	Clayey gravel

Table 11 Borehole 92270 – GSI Report 2813 (March 1971)

Depth (m)	Strata
0.00-2.44	Clayey sandy gravel
2.44-6.09	Sand

2.4.2.3 Terminal 5

Boreholes 92262 and 92265 were drilled in the west and east of terminal 5 respectively. As no made ground is denoted on the logs it is assumed that these boreholes were drilled prior to the land being reclaimed. Both boreholes were drilled via cable percussion (shell and auger) and are summarised in Tables 12 and 13.

Table 12 Borehole 92262 – GSI Report 2816 (June 1969)

Depth (m)	Strata
0.00-1.55	Organic clay
1.55-2.93	Organic clay and gravel
2.93-3.07	Gravelly sand
3.07-4.60	Sand
4.60-10.55	Sandy gravel
10.55-11.77	Organic sand and clay
11.77-12.38	Slightly clayey sand
12.38-13.29	Coarse sand and gravel
13.29-14.82	Gravel
14.82-15.42	Sand and gravel
15.42-15.73	Boulder clay
15.73-16.95	Boulders
16.95-19.08	Boulder clay
19.08-22.74	Bedrock

Table 13 Borehole 92265 – GSI Report 2816 (June 1969)

Depth (m)	Strata
0.00-2.74	Organic silt
2.74-3.50	Fine to medium sand
3.50-7.93	Fine sand
7.93-8.23	Fine to medium sand
8.23-8.54	Fine to medium sand
8.54-10.67	Fine to medium sand
10.67-12.96	Silty clay
12.96-13.57	Clayey silt
13.57-15.10	Gravel
15.10-17.83	Bedrock
17.83-19.60	Bedrock

2.4.2.4 Terminal 1

Borehole 92476 was drilled just south of the existing passenger terminal building at Terminal 1. It was drilled to a depth of 28.5m via cable percussion (shell and auger) and is summarised in Table 14.

Table 14 Borehole 92476 – GSI Report 2847 (December 1997)

Depth (m)	Strata
0.00-5.00	Fill – Made ground
5.00-10.00	Fill – Made ground
10.00-15.30	Fill – Made ground
15.30-16.00	Grey coarse sand
16.00-18.40	Fine to coarse, sandy gravel and cobbles
18.40-20.50	Very stiff, dark grey, very silty clay
20.50-21.50	Fine, sandy gravel
21.50-28.35	Fine to coarse gravel and cobbles
28.35-28.50	Bedrock

2.4.2.5 Terminal 2

Borehole 121168 was drilled just south of the existing freight terminal building at Terminal 2. It was drilled to a depth of 25.5m via cable percussion (shell and auger) and is summarised in Table 15.

Table 15 Borehole 121168 – GSI Report 4170 (November 1999)

Depth (m)	Strata
0.00-0.30	Fill – Made ground
0.30-5.80	Fill – Made ground
5.80-6.20	Soft grey silt
6.20-8.00	Medium dense silty sand
8.00-15.50	Firm grey blue silt
15.50-16.80	Brown fine sand
16.80-17.50	Sandy gravel
17.50-19.40	Dense fine to coarse gravel
19.40-22.90	Stiff grey silty clay
22.90-23.50	Dense grey gravel
23.50-25.50	Grey weathered rock

3 PRELIMINARY RISK ASSESSMENT & OUTLINE CONCEPTUAL MODEL

Risk estimation involves detailed evaluation of source – pathway – receptor scenarios to determine whether a linkage exists between any sources of contaminants and potential receptors. A risk exists where a receptor is exposed to a contaminant, via a pathway. If any element of the source-pathway-receptor linkage is absent, then no risk is present.

The preliminary conceptual site model and Preliminary Risk Assessment are presented in Table 16.

Table 16 Conceptual model for the site

POTENTIAL SOURCES
Potential on-site sources: • Areas of fuel storage, boilers, substations and a garage area • Unknown nature of made ground underlying the site; it may have the potential to contain contamination (including asbestos) **Potential off-site sources:** • Historical development in the area surrounding the site has included a shipbuilding yard, railway line, timber yard, coal yard, chemical manure works and a number of oil tanks.
POTENTIAL PATHWAYS
Humans: • Dermal (skin) contact with contaminated soil, fugitive dust or waters and the absorption of any contaminants through the skin into the body • Inhalation of fugitive soil dust or vapour • Ingestion of soil by hand to mouth activity **Environment:** • Sub-surface infiltration • Leaching from sub-soils • Groundwater flow • Surface run-off
POTENTIAL RECEPTORS
• Humans in form of future site users (commercial, site workers), landscaping and maintenance workers • Perched groundwater, bedrock aquifer, South Dublin Bay and River Tolka Estuary SPA, River Liffey

3.1 Preliminary Risk Assessment Conclusions

The desk study highlighted the potential contamination sources, pathways and receptors which are likely to be present on the current site. The principal source of contamination is likely to be the presence of fuel storage, boilers, substations and a garage area on site. In addition, made ground is known to underlie the site and has the potential to effect groundwater and contaminants in shallow soils.

Therefore, as per the guidance provided in CLR 11; a supplementary intrusive site investigation followed by an updated generic quantitative risk assessment was undertaken.

4 INTRUSIVE GROUND INVESTIGATION

4.1 Methodology

The contamination assessment comprised six main elements, carried out on a phased basis as described below:

- Phase I PRA - Desk Study (carried out by RPS)
- Phase I PRA - Site walkover (carried out by RPS)
- Phase II GQRA - Ground investigation
- Phase II GQRA - Chemical testing of soil samples
- Phase II GQRA - Chemical testing of groundwater samples
- Phase II GQRA - Contamination risk assessment

The information gathered during the PRA (as detailed in the previous sections) was used to plan and focus the Phase II investigation.

4.2 Objectives for Investigation

- To assess sub-soil and groundwater contamination to enable a generic quantitative risk assessment (GQRA) to be undertaken to assess the potential risks to human health and from future development proposals.
- To summarise the findings of the chemical testing and based on the results; revise the Conceptual Model for the site and risk rating proposed by RPS in the Preliminary Risk Assessment report.
- To provide sufficient evidence with regards to the sites suitability for the proposed end use.

4.3 Sampling strategy

An intrusive site investigation was undertaken by Causeway Geotech Ltd during August 2018 under the supervision of RPS personnel. The site investigation report is included in Appendix A. It comprised:

- Five (5) light cable percussion boreholes to a maximum depth of 12.0m bgl (BH01, BH02, BH04, BH06D and BH07)
- Thirteen (13) boreholes by dynamic (windowless) sampling methods to a maximum depth of 6.0m bgl

A total of eighteen boreholes were put down in a minimum diameter of 150mm through soil strata by a combination of methods, including light percussion boring using a Dando Terrier rig, light cable percussion boring by a Dando 2000 rig.

Figure 9 Site investigation locations (taken from Causeway Geotech Report 18-0795)

The boreholes were used to provide information on ground conditions and soil and groundwater quality. They were positioned (as shown on Figure 9) for the following reasons:

- MP2BH01-MP2BH02 – boreholes taken to 8.8m bgl and 4.8m bgl respectively which provides information on the ground conditions and soil and groundwater quality within the area surrounding Dublin Port Operations Centre. This area is to be removed as part of the MP2 Project.
- MP2BH04 – deep borehole to 12m bgl which provides information on ground conditions and soil and groundwater quality (dual installation) in proximity to the existing fuel storage area within the Irish Ferries terminal.
- MP2BH05 – borehole refusal at 0.3m bgl due to presence of thick concrete.
- MP2BH06D – deep borehole to 12m bgl which provides information on ground conditions and soil and groundwater quality (dual installation) in the general site area.
- MP2BH06S – borehole taken to 1.8m bgl which provide information on ground conditions and soil quality.
- MP2BH06SA – redrill of BH06S taken to 1.4m bgl.

- MP2BH07 – borehole taken to 2m bgl which provides information on ground conditions and soil and groundwater quality adjacent to an existing substation within the Seatruck terminal.
- MP2BH08 - borehole taken to 5m bgl which provides information on ground conditions and soil and groundwater quality adjacent to an existing substation within the Irish Ferries terminal.
- MP2BH09 – borehole taken to 1m bgl which provides information on ground conditions and soil and groundwater quality adjacent to existing fuel storage within the Irish Ferries terminal.
- MP2BH10 – terminated at 0.5m bgl on a concrete obstruction – was originally located to target oil tank within the Irish Ferries terminal.
- MP2BH10A – terminated at 0.5m bgl on a concrete obstruction – redrill of BH10.
- MP2BH11 - borehole taken to 2.1m bgl which provides information on ground conditions and soil and groundwater quality in proximity to existing fuel storage adjacent to the Irish Ferries passenger terminal.
- MP2BH12 - borehole taken to 6.0m bgl which provides information on ground conditions and soil and groundwater quality adjacent to existing fuel storage adjacent to the Stenaline passenger terminal.
- MP2BH13 – borehole taken to 6.0m bgl which provides information on ground conditions and soil and groundwater quality in proximity to the garage located on the Seatruck terminal.
- MP2BH14 – borehole taken to 4.75m bgl which provides information on ground conditions and soil and groundwater quality in proximity to existing fuel storage located on the Seatruck terminal.
- MP2BH15 – borehole taken to 5.2m bgl which provides information on ground conditions and soil and groundwater quality in proximity to an existing substation located within the Seatruck terminal.
- MP2BH16 – borehole taken to 5.0m bgl which provides information on ground conditions and soil and groundwater quality in proximity to existing fuel storage adjacent to the Seatruck main office building.
- MP2BH17 – terminated at 1.1m bgl on a concrete obstruction.

An additional borehole was originally scheduled in proximity to the fuel tank present to the north of the Dublin Port Operations Centre (as shown on Figure 3). However, a high voltage electricity cable is present in this area and as such it was not safe to drill a borehole anywhere in this area. Both this fuel tank, and the fuel tank which BH10 and BH10A had aimed to target, are contained within concrete bunds which appear to be sound. The potential for contamination to be associated with these fuel tanks is therefore considered to be minimal.

Environmental soil samples were taken at regular intervals throughout the length of the excavation of each borehole. The protocol observed during the recovery of samples followed the guidance set out in BS 10175:2011 the Code of Practice for the Investigation of Potentially Contaminated Sites.

A single 50mm HDPE groundwater monitoring standpipe was installed in boreholes MP2BH01, MP2BH02, MP2BH07, MP2BH09 and MP2BH11-MP2BH17. Dual installations; one targeting the shallow groundwater body and other the deeper groundwater body, were installed in boreholes MP2BH04 and MP2BH06D. Details of the installations, including the depth range of the response zone, are provided in Appendix A on the individual borehole logs. Groundwater samples were collected from all the installed boreholes except BH07 and BH09 (boreholes dry) and BH11 (no access) in August 2018, following development and purging of at least three well volumes, to ensure a representative sample of groundwater was taken from each well.

Surface water samples were also taken; as shown on Figure 9 SW1 was taken in proximity to the Port Operations Centre, SW2 at Irish Ferries and SW3 at Seatruck.

4.4 Analytical strategy

Twenty-four (24) soil samples were sent to Chemtest for analysis. Samples were analysed for a mixture of; pH, Sulphate (2:1 water soluble as SO4), Sulphur (elemental), Sulphur (total), Cyanide (total), Asbestos identification, ACM type, Arsenic, Barium, Beryllium, Boron (hot water soluble), Iron (total), Cadmium, Chromium (total), Copper, Mercury, Nickel, Lead, Selenium, Vanadium, Zinc, Chromium (hexavalent), Organic matter, Total Petroleum Hydrocarbons (TPH-CWG C5 – C35 aromatic-aliphatic split), speciated Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), speciated Poly Chlorinated Biphenyls (PCBs) and Phenols (speciated HPLC).

Seven soil samples were also analysed via leachate analysis. As per the EA Remedial Targets Methodology, the Level 1 screen examines the potential for contaminants to leach from soil to soil pore water. The compliance point utilised is the soil pore space and as such, is the most conservative compliance point as it does not take into account attenuation and dilution within the aquifer.

Speciated TPH analysis was undertaken to provide a better understanding of the ‘make up’ of the hydrocarbon contamination in relation to the specific carbon banding, as suggested within the ‘Total Petroleum Hydrocarbon Criteria Working Group’ (TPH-CWG) literature and recommended by the Environment Agency document P5-080/TR3 ‘The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbon in Soil’.

Fifteen groundwater samples for environmental analysis were taken and analysed for a similar range of contaminants as listed above for the soil samples. The soil and groundwater laboratory analytical results are included within Appendix A.

4.5 IED licence monitoring

Ongoing groundwater monitoring is being completed as part of the Industrial Emissions Directive (IED) licence in place for the upgrade of Alexandra Basin. As shown on Figure 8, groundwater samples taken from GW6 (shallow and deep), GW7 (deep), GW8 (deep) and GW10 (shallow and deep) are contained with the MP2 Project area. In addition, surface water samples taken as part of the IED licence are relevant to the MP2 Project area with SW1 upstream, SW2 downstream and SW3 within Dublin Bay.

Recent rounds of surface water or groundwater monitoring completed at these locations have therefore been included within the groundwater assessment. Groundwater and surface water samples were taken at the majority of these IED licence monitoring locations on 2nd May 2018, 6th June 2018 and 3rd July 2018.

5 RISK ASSESSMENT

5.1 Soils Contamination Risk Assessment

5.1.1 Assessment Methodology

In the absence of government guidance on contaminated land risk assessment within the Republic of Ireland, current guidance provided by the UK Environment Agency (EA) has been utilised to form the basis of this assessment.

5.1.1.1 Human health risk assessment framework

The Environment Agency has published guidance in relation to assessing the potential risk from contaminated land to human health. Science Report SR2 'Human Health Toxicological Assessment of Contaminants in Soil' and Science Report SR3 'Updated Technical Background to the CLEA Model' are intended to replace CLR 9 and 10 respectively and together with CLR 11 'Model Procedures for the Management of Land Contamination' provide the most up to date framework for human health risk assessment within the UK.

CLR10 previously stated that '*the contamination is assumed to be at or within 1m of the surface*' (CLR10 pg 10). SR3 contains a brief discussion of contamination depth on p13 and although it does not specifically mention a depth of 1.0m it states that '*it is assumed that the pollution is at the surface or close to it*' and '*whether or not soil contamination at greater depth or beneath hard standing poses a risk to health depends on the importance of the contact pathways (primarily ingestion and dermal contact) and the likelihood that such soils may be brought to the surface through activities such as gardening or building works*'. For the purpose of this assessment therefore, it is considered that at depths greater than 1m, the probability of human exposure via the direct contact pathways are significantly reduced.

5.1.1.2 Published generic site assessment criteria

In order to assess the human health and environmental risks posed by potential contaminants within the underlying soils, RPS undertook an initial screen of the laboratory results using the 2015 LQM/CIEH Suitable 4 Use Levels (S4ULs) (Copyright Land Quality management Limited reproduced with permission; Publication Number S4UL3474. All Rights Reserved) as trigger values. Where contamination results are recorded above these S4ULs, further assessment of the risks or remedial action may be needed.

These new LQM/CIEH S4ULs replace the second edition of the LQM/CIEH Generic Assessment Criteria (GAC) published in 2009. Differences in modelling assumptions and added land uses and substances create the difference between these S4ULs and the previous GAC. These values are provided for 6 land use classifications:

- Residential with homegrown produce
- Residential without homegrown produce
- Allotments

- Commercial
- Public open space near residential housing
- Public park

The provisional Category 4 Screening Levels (pC4SLs) developed by Defra provide the same added land uses as the S4ULs but are based on a different toxicological benchmark. The pC4SLs are based on a 'low level of toxicological concern' (LLTC) whereas the S4ULs remain based on the 'minimal' or 'tolerable' risk level outlined in SR2 to ensure a fully conservative approach is being taken.

These new values have been adopted within this investigation as they provide the most up to date trigger values that are based on appropriate and rationale assumptions. Similarly to the previous GAC, the S4ULs are provided for 1%, 2.5% and 6% soil organic matter (SOM). In the absence of complete analysis of SOM at the site, generic values derived for a SOM value of 1% have been utilised in the risk assessment where possible to ensure the most conservative approach is taken.

For pollutants with no relevant S4ULs, assessment criteria were provided by the following publications:

- Soil Guideline Values (SGVs)
- The Soil Generic Assessment Criteria (GAC) for Human Health Risk Assessment – CL:AIRE December 2009

In light of the publication of SR2 and SR3 the Environment Agency published SGVs for Benzene, Toluene, Ethylbenzene, Xylene, Selenium, Mercury, Arsenic, Cadmium, Phenol, Nickel and Sum of PCDDs, PCDFs and dioxin-like PCBs for the following standard land use scenarios assuming a Sandy Loam soil and Soil Organic Matter (SOM) content of 6%:

- Residential
- Allotments
- Commercial

CL:AIRE in association with The Environmental Industries Commission (EIC) and Association of Geotechnical and Geo-environmental Specialists (AGS) published a set of Generic Assessment Criteria in 2009 for previously unpublished contaminants which are intended to complement the SGVs derived by the Environment Agency. The GACs have been derived predominantly for VOCs and SVOCs using CLEA v1.06 for a number of different Soil Organic Matter contents (1%, 2.5% and 6%).

As the planned development of the site incorporates redevelopment of the existing port, all soil samples have been screened against generic values derived for a commercial end use.

5.2 Groundwater Contamination Risk Assessment

A summary of the geochemical test results are presented in Appendix B. Within these tables, those cells with no value recorded indicate that the samples were not scheduled for that particular suite of analysis. All samples were screened against the generic site assessment criteria discussed in Section 5.1.1.2.

The ground contamination assessment for the site is discussed in Section 7 of this report.

5.2.1 Assessment Methodology

5.2.1.1 Published generic site assessment criteria

The groundwater chemical analysis results were initially screened against threshold values listed by:

1. Guidelines for Drinking-water Quality, World Health Organization, 4th edition, 2011 (WHO).
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016 (S.I. No. 366 of 2016)
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (S.I. No. 386 of 2015)
4. Interim Guideline Values provided by 'Towards setting guideline values for the protection of groundwater in Ireland', Environmental Protection Agency, January 2003
5. European Communities (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014)
6. Atkins ATRISK Water Screening Values derived using CLEA for a Commercial land use, 2011 (WSV).

Use of the Drinking Water Standards (1 and 5) provides a very conservative risk assessment as groundwater is not utilised for drinking water in the area of the site. Groundwater chemistry results used as part of the site assessment are included in Appendix C and the detailed discussion of the groundwater contamination assessment is presented in Section 7 of this report.

6 ACTUAL GROUND CONDITIONS

6.1 Ground conditions

The ground conditions indicated by the exploratory investigations are described in the exploratory hole logs presented in Appendix A and are briefly summarised below.

The site investigation logs indicate that the site is underlain by the following general sequence:

- Topsoil/concrete
- Made ground
- Gravel
- Sand
- Clay
- Gravel

Made ground

Made ground was identified at all borehole locations to a maximum depth of 6.00m bgl. The made ground was not consistent in nature across the site; it was identified as a sand, silt, clay and gravel at different locations and depths. In places the made ground was noted to contain pieces of red brick and concrete.

Gravel

Deposits of dense grey sandy silty subangular to subrounded fine to coarse GRAVEL with low cobble and boulder content were encountered at BH01 between 4.9m and 7.9m bgl.

Sand

Deposits of loose to dense greyish black gravelly silty fine to coarse SAND, gravel is subangular to subrounded fine to coarse were encountered at BH06 between 4.8m and 7.1m bgl, BH04 between 6m and 9.2m bgl and BH01 between 7.9m and 8.8m bgl..

Clay

Deposits of clay in the form of soft grey sandy organic CLAY, sand is fine to coarse were encountered at BH06 between 7.1m and 11.5m bgl.

Gravel

Deposits of greyish black slightly silty subangular to subrounded fine to coarse GRAVEL were encountered at BH04 between 9.2m and 12m bgl.

6.2 Groundwater conditions

6.2.1 Groundwater strikes during drilling

During the site investigation, groundwater was encountered during excavation of 8 of the exploratory locations, at depths between 3.0 and 5.30m bgl. Groundwater strikes are summarised in Table 17.

Table 17 Summary of water strikes during drilling

Exploratory hole	Depth of water strikes (m bgl)	Summary of ground conditions
BH04	Strike at 4.2m bgl	MADE GROUND: Black slightly silty subangular to subrounded fine to coarse GRAVEL with fragments of brick and concrete.
BH06D	Strike at 3.2m bgl	MADE GROUND: Dense brownish black sandy silty subangular to subrounded fine to coarse GRAVEL with fragments of red brick and concrete. Sand is fine to coarse.
BH08	Strike at 3.8m bgl, rose to 3.4m after 20 minutes	MADE GROUND: Very soft grey sandy slightly gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular
	Strike at 4.8m bgl, rose to 4.6m after 20 minutes	MADE GROUND: Very soft greyish brown sandy slightly gravelly SILT with fragments of concrete and low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular
BH12	Strike at 4.0m bgl, rose to 3.6m after 20 minutes	MADE GROUND: Dark grey gravelly fine to medium SAND with low cobble content. Sand is fine to medium. Gravel is subangular fine. Cobbles are subrounded
	Strike at 5.3m bgl, rose to 5.0m after 20 minutes	MADE GROUND: Grey gravelly fine to coarse SAND with low cobble content. Gravel is subrounded fine to medium. Cobbles are subrounded.
BH13	Strike at 3.0m bgl, rose to 2.9m after 20 minutes	MADE GROUND: Very soft brownish grey sandy slightly gravelly SILT with low cobble content. Sand is fine to medium. Gravel is subangular fine to medium. Cobbles are subrounded.
	Strike at 5.0m bgl, rose to 4.3m after 20 minutes	MADE GROUND: Very soft greyish brown sandy slightly gravelly SILT with fragments of timber with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium.
BH14	Strike at 4.0m bgl, rose to 3.8m after 20 minutes	MADE GROUND: Brownish blue sandy slightly silty subangular fine to medium GRAVEL with low cobble content and fragments of timber. Sand is fine to coarse.

Exploratory hole	Depth of water strikes (m bgl)	Summary of ground conditions
	Strike at 5.0m bgl, rose to 3.8m after 20 minutes	MADE GROUND: Brownish blue sandy slightly silty subangular fine to medium GRAVEL with low cobble content and fragments of timber. Sand is fine to coarse.
BH15	Strike at 4.4m bgl	MADE GROUND: Firm to stiff brownish blue slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is subangular fine to medium.
BH16	Strike at 4.0m bgl, rose to 3.8m after 20 minutes	MADE GROUND: Blueish brown sandy silty angular fine to medium GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subrounded.
	Strike at 5.0m bgl, rose to 4.6m after 20 minutes	MADE GROUND: Blueish brown sandy silty angular fine to medium GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subrounded.

6.2.2 Standing groundwater

Standing groundwater levels within installed boreholes were monitored on one occasion (22nd August 2018-23rd August 2018), using an acoustic dip-meter. The results of the monitoring are presented in Table 18.

Table 18 Groundwater monitoring levels

Borehole ID	Surface level (mOD)	Depth to water (m bgl)	Water level (m OD)
		22/08/2018-23/08/2018	
BH01	3.52	2.77	0.75
BH02	3.47	3.23	0.24
BH04S	3.11	2.85	0.26
BH04D	3.11	1.77	1.34
BH06S	3.68	3.10	0.58
BH06D	3.68	3.35	0.33
BH07	3.29	Dry	
BH08	3.24	2.35	0.89
BH09	3.17	Dry	
BH11	3.65	No access	
BH12	3.56	3.15	0.41
BH13	3.60	2.82	0.78
BH14	3.45	2.90	0.55
BH15	3.65	2.10	1.55
BH16	3.35	3.15	0.20

6.2.3 Hydrogeological units & groundwater flow

The two deeper installations were screened across BH04D and BH06D; these were screened across the deeper deposits of sand and gravel. All the other boreholes were screened across the made ground and therefore represent the shallow groundwater within the made ground.

No discernible direction of groundwater flow could be interpreted from the one monitoring round completed. It is likely that the shallow groundwater within the made ground is in hydraulic conductivity with the deeper deposits as the made ground has been shown to directly overlie deposits of sands and gravels.

It is also possible that groundwater is in hydraulic conductivity with the surrounding water bodies; River Liffey and Dublin Bay.

6.3 Observation of potential soil and groundwater contamination

One visual observation of contamination was identified during the site investigation, as summarised in Table 19. All environmental soil samples were screened using the PID meter, the highest PID reading of 12.70ppm was from the sample taken at BH16 at 3m bgl.

Table 19 Visual and olfactory observation of contaminants during excavation

Borehole ID	Depth (m bgl)	Olfactory and visual evidence	Stratum
BH14	3.00-4.00	Possible oil contamination	MADE GROUND: Blueish brown sandy slightly silty subangular fine to medium GRAVEL with possible oil contamination. Sand is fine to medium.

6.3.1 Underground structures and services

No obvious underground structures or services were encountered during the site investigation, however in a number of locations boreholes had to be terminated at shallow depth due to the presence of obstructions. These obstructions are outlined in Table 20.

Table 20 Underground obstructions identified during site investigation

Borehole ID	Depth (m bgl)	Olfactory and visual evidence
BH02	4.80	Terminated on large boulder
BH06S	1.80	Terminated on large boulder or cobble
BH06SA	1.40	Terminated on concrete obstruction
BH07	2.00	Terminated on obstruction
BH08	5.00	Terminated on obstruction
BH09	1.00	Terminated on large obstruction
BH10	0.50	Terminated on concrete obstruction
BH10A	0.50	Terminated on concrete obstruction
BH11	2.10	Terminated on large cobble or boulder

Borehole ID	Depth (m bgl)	Olfactory and visual evidence
BH14	4.75	Terminated on obstruction
BH15	5.20	Terminated on obstruction
BH16	5.00	Terminated on very dense gravel
BH17	1.10	Terminated on obstruction

7 SOIL CONTAMINATION

The results of the laboratory analysis were used to carry out a generic quantitative risk assessment (GQRA) using the methodology outlined in Section 5.1. The soil results have been screened against the latest available LQM/CIEH S4ULs for a commercial end use.

A summary of the geochemical test results are presented in Appendix B. Within these tables, those cells with no recorded values indicate that the samples were not scheduled for that particular suite of analysis.

7.1 Soil Chemical Analysis

7.1.1 Contaminants below laboratory detection limits

The following soil contaminant concentrations were at or below the method detection limit and have therefore not been considered further within this report;

Chromium (hexavalent), Coronene, Aliphatics EC C5-C6, Aliphatics EC C6-C8, Aromatics EC C5-C7, Aromatics EC C7-C8, Aromatics EC C8-C10, Benzene, Toluene, Ethylbenzene, m&p Xylene, o Xylene, Methyl Tert-Butyl Ether, all PCBs, all Phenols, all SVOCs except Dibenzofuran, Carbazole, Bis(2-ethylhexyl) phthalate, 2-Methylnaphthalene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Benzo[g,h,i]perylene, Chrysene, Fluoranthene, Fluorene, Indeno(1,2,3-c,d)Pyrene, Phenanthrene, Pyrene, Dibenz(a,h)Anthracene, 2-Methyl-4,6-Dinitrophenol and Di-N-Butyl Phthalate and all VOCs except Tribromomethane.

7.1.2 Contamination above detection limits but below S4UL, SGV or GAC

The following soil contaminants were recorded at concentrations above the method detection limit but below their S4UL, SGV or GAC value;

Arsenic, Beryllium, Boron (hot water soluble), Cadmium, Copper, Chromium (total), Mercury, Nickel, Selenium, Vanadium, Zinc, all PAHs except Coronene and Total 17 PAHs, all TPH-CWG except Aliphatics EC C5-C6, Aliphatics EC C6-C8, Total Aliphatic Hydrocarbons, Aromatics EC C5-C7, Aromatics EC C7-C8, Aromatics EC C8-C10, Total Aromatic Hydrocarbons and TPH (Aliphatics and Aromatics) and Bis(2-ethylhexyl) phthalate.

The above contaminants were recorded at concentrations which do not pose an unacceptable risk to human health and are not considered further in the risk assessment.

7.1.3 Contamination above detection limits with no S4UL, SGV or GAC

Concentrations of a number of contaminants, for which no S4UL, SGV or GAC is currently available, recorded concentrations above the laboratory method detection limit:

Sulphate (2:1 Water Soluble) as SO4, Sulphur (elemental), Sulphur (total), Cyanide (total), Barium, Iron, Lead, Coronene, Total 17 PAHs, Total Aliphatic Hydrocarbons, Total Aromatic Hydrocarbons, Total Petroleum Hydrocarbons (Aliphatic and Aromatic), Dibenzofuran, Carbazole, 2-Methylnaphthalene, 2-Methyl-4,6-Dinitrophenol, Di-N-Butyl Phthalate and Tribromomethane.

Although no screening value is currently available for Lead, particularly elevated concentrations of 1100 mg/kg and 1600 mg/kg were identified at BH16 (1m bgl) and BH01 (2m bgl) respectively.

7.1.4 Contaminants exceeding commercial S4UL, SGV or GAC

None of the contaminants exceeded the commercial screening values.

7.1.5 Asbestos in soils

All of the soil samples were screened for the presence of asbestos. As summarised in Table 21, asbestos was identified in 2 of the 24 samples.

Table 21 Presence of asbestos in soil samples

Borehole ID	Depth (m bgl)	Asbestos type	ACM type
BH04D	1.00	Amosite Chrysotile	Fibres/clumps
BH16	1.00	Chrysotile	Fibres/clumps

7.2 Groundwater Chemical Analysis

A groundwater screening table for the thirty-nine groundwater samples is presented in Appendix C. These have been screened against the generic site assessment criteria discussed in Section 5.2.1.1.

7.2.1 Results

Upon completion of the intrusive site investigation, groundwater samples were taken from MP2-BH01, MP2-BH02, MP2-BH04S, MP2-BH04D, MP2-BH06S, MP2-BH06D, MP2-BH08, MP2-BH12, MP2-BH13, MP2-BH14, MP2-BH15 and MP2-BH16. Surface water samples were taken from MP2-SW1, MP2-SW2 and MP2-SW3 (Figure 9). All water samples were taken in August 2018 and were analysed for a range of potential contaminants including:

- Metals
- Phenols
- TPH-CWG
- PAHs (16 USEPA Speciated)
- PCBs
- SVOCs
- VOCs

A similar range of contaminants have been recorded for the IED licence samples taken in three rounds (May 2018, June 2018 and July 2018). As discussed in Section 4.5, these samples consist of groundwater and surface water samples located in the vicinity of the MP2 Project (Figure 8). As shown in Table 22, the samples show a number of exceedances of the screening values.

Table 22 Groundwater contaminant concentrations exceeding screening values

Contaminant	Screening value	Exceeding concentrations	Locations exceeding
Nitrate as N	0.375 mg/l (Groundwater Regs 2016)	2.1 mg/l	MP2-BH12
Orthophosphate as PO4	0.03 mg/l (EPA IGV 2003)	0.071-3.8 mg/l	All MP2 locations
Electrical Conductivity at 20°C	800-1875 µS/cm (Groundwater Regs 2016)	22000 - 64000 µS/cm	GW6S, GW6D, GW7D, GW8D, GW10S, GW10D
Chloride	24-187.5 mg/l (Groundwater Regs 2016)	660-20000 mg/l	GW6S, GW6D, GW7D, GW8D, GW10S, GW10D
Dibutyltin	0.0002 µg/l (Surface water Regs 2016)	0.6-0.8 µg/l	SW1, SW2, SW3

Contaminant	Screening value	Exceeding concentrations	Locations exceeding
Tributyltin	0.0002 µg/l (Surface water Regs 2016)	0.3-0.9 µg/l	SW1, SW2, SW3
Arsenic	7.5 µg/l (Groundwater Regs 2016)	9.6-55 µg/l	MP2-BH01, MP2-BH02, MP2-BH04S, MP2-BH04D, MP2-BH06S, MP2-BH06D, MP2-BH08, MP2-BH13, MP2-BH15, MP2-BH16, MP2-SW1, MP2-SW2, MP2-SW3
Barium	100 µg/l (EPA IGV 2003)	160-340 µg/l	MP2-BH04D, MP2-BH06S, MP2-BH06D, MP2-BH13, BH14
Boron	1000 µg/l (EPA IGV 2003)	1700-2000 µg/l	MP2-BH06S, MP2-BH06D
	2400 µg/l (WHO 2011)	2500-3500 µg/l	MP2-BH01, MP2-BH02, MP2-BH04S, MP2-BH04D, MP2-BH08, MP2-BH15, MP2-BH16, MP2-SW1, MP2-SW2, MP2-SW3
Copper	30 µg/l (EPA IGV 2003)	37-510 µg/l	MP2-BH01, MP2-BH02, MP2-BH04S, MP2-BH04D, MP2-BH06S, MP2-BH06D, MP2-BH08, MP2-BH15, MP2-BH16, MP2-SW1, MP2-SW2, MP2-SW3
Chromium (total)	37.5 µg/l (Groundwater Regs 2016)	42-150 µg/l	MP2-BH01, MP2-BH02, MP2-BH04S, MP2-BH08, MP2-BH16, MP2-SW1, MP2-SW2, MP2-SW3
Iron	200 µg/l (EPA IGV 2003)	210-1500 µg/l	All MP2 locations
Lead	1.3 µg/l (Surface water Regs 2016)	6 µg/l	MP2-BH06D, MP2-BH15
Manganese	50 µg/l (EPA IGV 2003)	150-1500 µg/l	MP2-BH04D, MP2-BH06S, MP2-BH06D, MP2-BH12, MP2-BH13, MP2-BH14, MP2-BH15
Nickel	8.6 µg/l (Surface water Regs 2016)	12-15 µg/l	MP2-BH04D, MP2-BH06S, MP2-BH15
Selenium	40 µg/l (WHO 2011)	75-160 µg/l	MP2-BH04S, MP2-BH04D, MP2-BH06S, MP2-BH06D, MP2-BH08, MP2-BH15, MP2-SW2, MP2-SW3
Zinc	75 µg/l (Groundwater Regs 2016)	80-210 µg/l	MP2-BH04S, MP2-BH04D, MP2-BH08, MP2-BH15, MP2-SW2

Drinking Water Standards	Groundwater/Surface water Regulations	EPA Interim Guideline Values (2003)

The EPA Interim Guideline Values were produced in 2003 and are guideline values only. The interim guideline value chosen was the GSI Trigger Value (background concentration) where it applied, and where it did not apply the most stringent value of the:

- The Drinking Water Standard, or
- The EQS for the Aquatic Environment/ Dangerous Substances, where appropriate.

In many cases these IGVs are therefore potentially outdated or based on Drinking Water Standards. It is therefore considered that exceedances of the groundwater or surface water regulations are more pertinent to this assessment. The exceedances of the IGVs for Orthophosphate as PO4, Barium, Boron, Copper, Iron and Manganese are therefore not considered in any more detail in this report.

Exceedances of the Drinking Water Standards are not considered relevant as groundwater in the vicinity of the site is not used as a potable water supply. No risk to human health exists from Boron or Selenium and as such they are not considered in any more detail in this report.

Exceedances of the groundwater/surface water regulations represent a potential risk to groundwater and/or surface waters. Exceedances of these screening values are shown for Nitrate as N, Electrical conductivity, Chloride, Dibutyltin, Tributyltin, Arsenic, Chromium (total), Lead, Nickel and Zinc.

7.2.2 Remedial Targets Methodology – Level 1 leachability soil screening

Soil samples taken from BH01, BH02, BH08, BH09, BH12, BH14 and BH15 were sent for leachate analysis. The laboratory certificates are included in Appendix A with a screening table demonstrating the results in Appendix D. The results were screened against the same screening values as those employed to screen the groundwater samples. They are screened against the groundwater and surface water regulations values in the first instance. As groundwater in the area is not used as a drinking water supply, the groundwater and surface water regulations values are more relevant than the WHO Health 2011 or Drinking Water Regulations 2014. However, these other values have been used where the groundwater and surface water regulations values are not available.

As per the EA Remedial Targets Methodology, the Level 1 screen examines the potential for contaminants to leach from soil to soil pore water. The compliance point utilised is the soil pore space and as such, is the most conservative compliance point as it does not take into account attenuation and dilution within the aquifer. The results indicate that leachate contamination is low; very minor exceedances of the screening values are shown in Table 23.

Table 23 Exceedances of screening values within leachate tests

Contaminant	Screening value	Exceeding concentrations	Locations exceeding
Aluminium	150 µg/l (Groundwater Regs 2016)	200 ug/l	BH02 at 2.0m bgl
Manganese	50 ug/l (EPA IGV 2003)	52 ug/l	BH14 at 3.0m bgl
Groundwater/Surface water Regulations		EPA Interim Guideline Values (2003)	

8 RISK ASSESSMENT

Using the methodology outlined in the previous sections, the laboratory analytical results were used to carry out a generic quantitative risk assessment (GQRA).

8.1 Overview of contaminant sources, pathways and receptors

8.1.1 Sources – Ground contamination

No exceedances of the commercial screening values used were noted within the soil samples. Elevated concentrations of Lead, for which there is currently no relevant screening value, were noted at BH16 at 1m bgl (1100mg/kg) and BH01 at 2m bgl (1600 mg/kg). In addition, asbestos was identified in 2 soil samples; BH16 at 1m bgl and BH04 at 1m bgl (as summarised in Table 21).

8.1.2 Sources – Groundwater contamination

Exceedances of the groundwater/surface water regulations represent a potential risk to groundwater and/or surface waters. Exceedances of these screening values are shown for Nitrate as N, Electrical conductivity, Chloride, Dibutyltin, Tributyltin, Arsenic, Chromium (total), Lead, Nickel and Zinc.

Exceedances of the Drinking Water Standards are not considered relevant as groundwater in the vicinity of the site is not used as a potable water supply. No risk to human health exists from Boron or Selenium and as such they are not considered in any more detail in this report. In addition, in certain instances the EPA IGVs are outdated or are based on Drinking Water Standards. The exceedances of the IGVs for Orthophosphate as PO4, Barium, Boron, Copper, Iron and Manganese are therefore not considered in any more detail in this report.

8.1.3 Off site sources

Although some potential off-site sources (current and historical) were identified, none are considered likely to be the cause of on-site contamination of soils and/or groundwater.

8.1.4 Pathways

- Pathways associated with impacts to human health through inhalation of soil and/or dusts are unlikely to exist on the site. As noted in Section 8.1.1, elevated concentrations of Lead were noted at BH16 at 1m bgl and BH01 at 2m bgl. Asbestos was identified in 2 soil samples; BH16 at 1m bgl and BH04 at 1m bgl. As the proposed development incorporates a hardstanding barrier across the site, the risk posed by Asbestos and Lead is considered to be relevant to construction workers only.

- Groundwater within the site will not be used as a potable source of water, therefore, the ingestion pathway for contamination to human health from groundwater is not deemed to be active.

- A pathway for the leaching of contaminants from the made ground into the shallow groundwater is active on the site.

- It is likely the groundwater within the shallow made ground deposits is in hydraulic conductivity with the groundwater within the deeper deposits of sands and gravels.

- A pathway for the migration of contaminants from the deeper sands and gravels waterbody into the deeper bedrock aquifer may be active on the site. Bedrock was not encountered within this most recent site investigation however historical boreholes on the site have demonstrated sands and gravels directly overlying bedrock.

- A pathway is likely to exist whereby groundwater on site can migrate into the River Liffey and Dublin Bay.

8.1.5 Receptors

End-users

Development proposals include the amalgamation of three existing ferry terminals into one, infilling to the east of oil berth 4, demolition of a number of existing buildings and the end of the old eastern breakwater, and extension of a number of berths. This will result in hard-standing covering the site. Therefore, exposure via ingestion, inhalation and direct contact to long term end users is deemed to be minimal as a result of the redevelopment.

Construction workers

A potential risk may exist to construction workers from the identified Asbestos and Lead in shallow soils. However, as the redevelopment only involves demolition of buildings, minimal disturbance of the underlying soils is anticipated during construction These risks can be managed by the implementation of stringent site management practices, the wearing of appropriate PPE, the adoption of good hygiene and dampening down of construction activities which will minimise dust generation.

Shallow groundwater

The shallow groundwater has been impacted by elevated levels of Nitrate as N, Electrical conductivity, Chloride, Dibutyltin, Tributyltin, Arsenic, Chromium (total), Lead, Nickel and Zinc. As explained in Section 7.2.1, Orthophosphate as PO4, Barium, Boron, Copper, Iron, Manganese and Selenium are not considered to pose a risk on the site. Shallow groundwater on site is not considered to be a controlled water and does not represent an exploitable source of groundwater.

Deep groundwater

Two groundwater samples from the deeper sands and gravels were taken at BH04D and BH06D. Similar exceedances to those demonstrated within the shallow groundwater were determined in the deeper groundwater, reinforcing that these groundwater bodies are likely to be in hydraulic conductivity. This bedrock aquifer is considered to be locally important and of moderate productivity.

Surface water – River Liffey and Dublin Bay

Surface water samples were taken at three locations during the MP2 Project site investigation (Figure 9) and at three different locations during the IED licence monitoring (Figure 8). Exceedances of the screening values for a variety of metals as well as Tributyltin and Dibutyltin within the surface water samples demonstrates that 1) the groundwater within is likely to be in hydraulic conductivity with the River Liffey and Dublin Bay and 2) contamination of these parameters is widespread across the wider water environment.

8.2 Risk assessment and revised conceptual model

A review of the CSM based on the above information indicates that potential contaminant linkages still exist, for the proposed site end-use. The revised site conceptual model is illustrated in Table 24 and the risks to receptors are summarised below.

Risk to human health

The risk to site end users from identified sub-soil contamination (Asbestos and Lead) will be minimal due to the emplacement of hard-standing across the site. A potential risk may exist to construction workers during the construction process.

Risk to shallow groundwater

The shallow groundwater has been impacted by elevated levels of Nitrate as N, Arsenic, Chromium (total), Lead, Nickel and Zinc. Shallow groundwater on site is not considered to be a controlled water and does not represent an exploitable source of groundwater. The works proposed as part of MP2 Project will not disturb groundwater on site.

Risk to deep groundwater

Shallow groundwater is considered likely to be in hydraulic conductivity with deep groundwater due to the permeable nature of the strata encountered across the site. Similar exceedances to those demonstrated within the shallow groundwater were determined in the deeper groundwater, reinforcing that these groundwater bodies are likely to be in hydraulic conductivity. This bedrock aquifer is considered to be locally important and of moderate productivity. The works proposed as part of MP2 Project will not disturb groundwater on site.

Risk to surface water

The works proposed as part of MP2 Project will not disturb groundwater on site and as such no significant impacts to the surrounding surface water is anticipated.

Table 24 Risk Assessment & Site Conceptual Model

Source	Pathway(s)	Receptors(s)	Relevant Source – Pathway – Receptor linkage (SPR)	Mitigation measures
On-site sources				
Lead in soil BH01 at 2m bgl BH16 at 1m bgl	Dermal contact, inhalation and/or ingestion of soil or dust	Humans in form of construction workers, maintenance workers and site end users	A hardstanding barrier across the site will negate any impact to site end users. A potential risk to construction workers during site redevelopment may exist.	The risks to construction workers can be managed by the implementation of stringent site management practices, the wearing of appropriate PPE, the adoption of good hygiene and dampening down of construction activities to minimise dust generation
Asbestos in soil BH04D at 1m bgl BH16 at 1m bgl	Inhalation of soil or dust	Humans in form of construction workers, maintenance workers and site end users	A hardstanding barrier across the site will negate any impact to site end users. A potential risk to construction workers during site redevelopment may exist.	
Contaminants in groundwater (Nitrate as N, Electrical conductivity, Chloride, Dibutyltin, Tributyltin, Arsenic, Chromium (total), Lead, Nickel and Zinc)	Horizontal migration	River Liffey and Dublin Bay	The works proposed as part of MP2 Project will not disturb groundwater on site.	None required.
	Vertical migration	Deeper groundwater and bedrock aquifer	The works proposed as part of MP2 Project will not disturb groundwater on site.	

9 OUTLINE REMEDIAL STRATEGY

9.1 Summary of contamination distribution

9.1.1 Soils

Elevated concentrations of Lead, for which there is currently no relevant screening value, were noted at BH16 at 1m bgl (1100mg/kg) and BH01 at 2m bgl (1600 mg/kg). In addition, asbestos was identified in 2 soil samples; BH16 at 1m bgl and BH04 at 1m bgl.

9.1.2 Groundwater

Shallow groundwater has been impacted by Nitrate as N, Electrical conductivity, Chloride, Dibutyltin, Tributyltin, Arsenic, Chromium (total), Lead, Nickel and Zinc. Shallow groundwater, deep groundwater and the surrounding surface waters are considered likely to be in hydraulic conductivity and these elevated concentrations are considered likely to be representative of the water quality in the wider area.

9.1.3 Remedial objectives

This outline strategy addresses the remediation which is to be undertaken at the site.

It is intended that the strategy will be agreed with the Environmental Protection Agency prior to the commencement of works on site, which will then be undertaken in accordance with the agreed strategy. Throughout the works, consultations with regulatory bodies will be maintained at an appropriate level. In particular, agreement will be sought regarding aspects relating to this strategy, environmental monitoring, control and validation of the works.

- To reduce long term risks to human health receptors to an acceptable level
- To provide a sustainable and economically viable remedial solution
- To leave the site with no future statutory liability with respect to ground contamination

9.2 Overview of outline remedial strategy

9.2.1 Soils

The only contaminants considered to be an issue within the soils are Lead and Asbestos. The following information can be used as a guideline for construction workers on the site for working with soils contaminated with Asbestos; these measures will also reduce the risk associated with elevated Lead concentrations.

a. Access should be restricted to essential site users/employees, all of whom should have the relevant asbestos training/awareness training, as provided by their employer(s). All site users/employees should be made aware of the asbestos materials identified on site, and all relevant reports should be made available to all site users/employees.

b. All site users should be provided with, and use the relevant PPE & RPE whilst on site. This should include the following:

- Type 5/6 Disposable overalls – these should be disposed of after a single use, and disposed of as asbestos waste in the site asbestos waste container.
- Disposable respirator to standards EN149 (type FFP3) or EN1827 (type FMP3); half mask respirator (to standard EN140) with P3 filter; or semi-disposable respirator (to EN405) with P3 filter.
- Boots without laces, which can easily be decontaminated if required (eg: rigger boots, wellington boots with steel toes).
- Single use only disposable gloves. As above, all disposable PPE & RPE must be disposed of as asbestos waste.

c. All site users must follow the correct decontamination procedures once finished on site. Site operatives should be familiar with the decontamination procedures from the relevant asbestos awareness/site training, however the following should be used as guidance:

- Clean boots with damp rags.
- Where available, clean overalls with the brush attachment on a Class H vacuum cleaner, vacuum off the brush.
- Otherwise, use damp rags by a 'patting' action. Rubbing can disturb fibres. Where there are two workers, they can help to clean each other.
- Peel off disposable overalls. They should be inside out. Put them in a suitable asbestos waste container.
- Bag up re-usable overalls for a specialist laundry.
- Finally, remove disposable respirator and place it in the asbestos waste container. Tape the container closed.

d. A suitable dust suppressant method should be used to accompany any works which may disturb the ground materials. Similarly, all vehicles/plant leaving site should have a wheel wash/decontamination before leaving as an added precaution. Where possible, site traffic should be limited to essential vehicles only, using designated areas where there are no known asbestos materials.

9.2.2 Groundwater

No remedial actions with regard to groundwater are proposed on the site. The works proposed as part of the MP2 Project will not disturb groundwater on site.

9.3 Unidentified contamination

During construction works should unexpected contamination be encountered in soils or groundwater with visual or olfactory signs of contamination, samples of the potentially contaminated material should be obtained and sent for chemical analysis. An updated risk assessment should be completed to assess risks to human health and environmental receptors. Should unacceptable risks be identified then appropriate remedial works will be conducted and agreement sought from the relevant regulatory bodies.

9.4 Additional works/other considerations

9.4.1 Waste management

Prior to commencement of site redevelopment the Principle Contractor shall develop a site waste management plan which will incorporate details of off-site disposal of any waste soils for approval by the statutory authority.

It is recommended that the Principal Contractor should satisfy themselves as to the classification and characterisation of any waste soils to be removed from the site in accordance with Irish waste legislation

9.4.2 Disposal of unsuitable material

Any material which is categorised as contaminated and unsuitable for re-use will be disposed off-site to a suitably licensed landfill.

All waste generated on site will be dealt with in accordance with the appropriate current legislation. Waste classification will be undertaken in accordance with the 'Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-hazardous' guidance produced by the Environmental Protection Agency (valid from 1st June 2015).

Waste characterisation (Waste Acceptance Criteria) testing will be carried out as per BS 12457/2. A sample will be collected for every 500m3 of material.

A full record of waste transfer consignment notes will be kept on site of all material that is removed off-site for disposal to a licensed landfill. Should a Verification Report be required for the site, a copy of the consignment notes will be included within the Report.

All those responsible for producing or handling wastes have legal requirements placed upon them for the safe keeping, transport and subsequent recovery or disposal. Consequently, at the basic minimum, the Contractor shall ensure that all waste leaving site must have a Waste Transfer Note.

The Waste Transfer Note as a minimum shall include detail on:

- Type of Waste and its 6 digit European Waste Code;
- What sort of container it is in;
- Time, date, and place the waste was transferred to;
- The names and addresses of both persons involved in the transfer;
- Details of which category of authorised person each one is (i.e. producer, waste license holder, registered waste carrier);
- Certificate number of registered waste carrier;
- Waste management license number of waste facility;
- The name and addresses of any broker involved in the transfer; and
- Signatures of both parties.

All Waste Transfer Notes will be kept for a minimum of three years.

Appendix A

Causeway Geotech Ground Investigation Report

Dublin Port MP2 – Ground Investigation

Client:	Dublin Port
Client's Representative:	RPS
Report No.:	18-0795
Date:	September 2018
Status:	Final for Issue

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CONTENTS

APPENDICES

Document Control Sheet

Report No.:		18-0795			
Project Title:		Dublin Port MP2			
Client:		Dublin Port			
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Revision:	A01	**Status:**	Final for Issue	**Issue Date:**	14 September 2018
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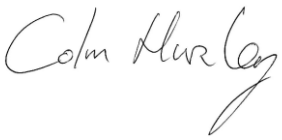
 Sean Ross BSc MSc		 Colm Hurley BSc		 Darren O'Mahony BSc MSc MIEI	

The works were conducted in accordance with:

UK Specification for Ground Investigation 2nd Edition, published by ICE Publishing (2012)

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

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

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

METHODS OF DESCRIBING SOILS AND ROCKS

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

Abbreviations used on exploratory hole logs	
U	Nominal 100mm diameter undisturbed open tube sample (thick walled sampler)
UT	Nominal 100mm diameter undisturbed open tube sample (thin walled sampler)
P	Nominal 100mm diameter undisturbed piston sample
B	Bulk disturbed sample
LB	Large bulk disturbed sample
D	Small disturbed sample
C	Core sub-sample (displayed in the Field Records column on the logs)
L	Liner sample from dynamic sampled borehole
W	Water sample
ES / EW	Soil sample for environmental testing / Water sample for environmental testing
SPT (s)	Standard penetration test using a split spoon sampler (small disturbed sample obtained)
SPT (c)	Standard penetration test using 60 degree solid cone
x,x/x,x,x,x	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length. The length achieved is stated (mm) for any test increment less than 75mm
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm)
N=X/Z	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given test length 'Z' (mm)
V VR	Shear vane test (borehole) Hand vane test (trial pit) Shear strength stated in kPa V: undisturbed vane shear strength VR: remoulded vane shear strength
dd/mm/yy: 1.0 dd/mm/yy: dry	Date & water level at the borehole depth at the end of shift and the start of the following shift
Abbreviations relating to rock core – reference Clause 36.4.4 of BS 5930: 2015	
TCR (%)	Total Core Recovery: Ratio of rock/soil core recovered (both solid and non-intact) to the total length of core run.
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, uninterrupted by natural discontinuities, but not necessarily a full circumference and is measured along the core axis between natural fractures.
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run.
FI	Fracture Index: Number of natural discontinuities per metre over an indicated length of core of similar intensity of fracturing.
NI	Non Intact: Used where the rock material was recovered fragmented, for example as fine to coarse gravel size particles.
AZCL	Assessed zone of core loss: The estimated depth range where core was not recovered.
DIF	Drilling induced fracture: A fracture of non-geological origin brought about by the rock coring.
(xxx/xxx/xxx)	Spacing between discontinuities (minimum/average/maximum).

Dublin Port MP2

1 AUTHORITY

On the instructions of RPS Consulting Engineers, ("the Client's Representative"), acting on the behalf of Dublin Port ("the Client"), a ground investigation was undertaken at the above location to provide environmental information for input to a risk assessment for potential contamination as part of the MP2 project.

This report details the work carried out both on site and in the chemical testing laboratories; it contains a description of the site and the works undertaken, the exploratory hole logs and the laboratory test results.

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

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

2 SCOPE

The extent of the investigation, as instructed by the Client's Representative, included boreholes, soil sampling and laboratory testing, and the preparation of a factual report on the findings.

3 DESCRIPTION OF SITE

As shown on the site location plan in Appendix A, the works were conducted on several sites within Dublin Port including the Port Operations Centre, the Stena Line terminal, the Irish Ferries terminal and the Seatruck terminal.

4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between 2nd and 16th August 2018, comprised:

- five light cable percussion boreholes;
- thirteen boreholes by dynamic (windowless) sampling methods; and
- a standpipe installation in thirteen boreholes

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

4.2 Boreholes

A total of sixteen boreholes were put down in a minimum diameter of 150mm through soil strata to their completion depths by a combination of methods, including light percussion boring using a Dando Terrier rig, light cable percussion boring by a Dando 2000 rig.

The borehole logs state the methodology and plant used for each location, as well as the appropriate depth ranges.

A summary of the boreholes, subdivided by category in accordance with the methods employed for their completion, is presented in the following sub-sections.

Appendix B presents the borehole logs.

4.2.1 Light cable percussion boreholes

Five boreholes (MP2BH01, MP2BH02, MP2BH04D, MP2BH06D and MP2BH07D) were put down to completion in minimum 200mm diameter using a light cable percussion boring rig. All boreholes were terminated either at their scheduled completion depths, or else on encountering virtual refusal on obstructions.

Hand dug inspection pits were carried out between ground level and 1.20m depth to ensure boreholes were put down at locations clear of services or subsurface obstructions.

Environmental samples were taken at standard intervals, as directed by the Client's Representative.

Any water strikes encountered during boring were recorded along with any changes in their levels as the borehole proceeded.

Where water was added to assist with boring, a note has been added to the log to account for same.

Appendix B presents the borehole logs.

4.2.2 Dynamic sampled boreholes

Thirteen boreholes (MP2BH06S, MP2BH08-MP2BH17) were put down to completion by light percussion boring techniques using a Dando Terrier dynamic sampling rig. The boreholes were put down initially in 150mm diameter, reducing in diameter with depth as required, down to 50mm by use of the smallest sampler.

Hand dug inspection pits were carried out between ground level and 1.20m depth to ensure boreholes were put down clear of services or subsurface obstructions. The boreholes were taken to depths ranging between 1.0m and 6.0m where they were terminated at their scheduled depths, or else they were terminated on encountering virtual refusal on obstructions above this depth.

Environmental samples were taken at standard intervals, as directed by the Client's Representative.

Any water strikes encountered during boring were recorded along with any changes in their levels as the borehole proceeded. Details of the water strikes are presented on the individual borehole logs.

Appendix B presents the borehole logs.

4.3 Standpipe installations

A single groundwater monitoring standpipe was installed in boreholes MP2BH01, MP2BH02, MP2BH07-MP2BH09, and MP2BH11-MP2BH17.

Two groundwater monitoring standpipes were installed in boreholes MP2BH04 and MP2BH06D.

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

4.4 Surveying

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

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

4.5 Groundwater

Following completion of site works, groundwater monitoring was conducted on one round. Ground water monitoring was carried out using a water interface probe.

The monitoring records are presented in Table 2 of Section 6.3.

5 LABORATORY WORK

5.1 Environmental laboratory testing of soils

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

Testing was carried out according to the specification provided by the Client's Representative and included the following suites of testing:

- Dublin Port RPS Leachate Suite
- Dublin Port RPS Soil Suite A
- Dublin Port RPS Soil Suite B
- Dublin Port RPS Soil Suite C
- Dublin Port RPS Soil Suite D
- Waste Acceptance Criteria Full 2 Stage (Combined)
- Dublin Port RPS Water Suite

Results of environmental laboratory testing are presented in Appendix C.

6 GROUND CONDITIONS

6.1 General geology of the area

Published geological mapping indicate the superficial deposits underlying the site comprise Made Ground over marine deposits. These deposits are underlain by limestone and shales of the Lucan Formation.

6.2 Ground types encountered during investigation of the site

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

- **Paved surface:** MP2BH04, MP2BH05, MP2BH09, MP2BH13 and MP2BH15 encountered paving bricks of varying thickness. In addition, concrete surfacing was encountered in all boreholes apart from MP2BH01, MP2BH02 and MP2BH07. It was encountered at its greatest extent in MP2BH13 to a depth of 330mm. MP2BH07 and MP2BH09 encountered bitmac varying in thickness.

- **Topsoil:** encountered in BH01 and BH02 up to 200mm in thickness.

- **Made Ground (sub-base):** typically, sandy gravel encountered in majority of boreholes, with a maximum extent of 1.0m in MP2BH06D.

- **Made Ground (fill):** reworked sandy gravelly clay/sandy gravel/gravelly and fill with fragments of concrete and brick extending to a depth of 6.0m in MP2BH04, MP2BH12 and MP2BH13.

- **Marine deposits:** typically, gravelly sands/sandy gravel/sandy clays extending to a maximum depth of 12.0m in MP2BH04.

6.3 Groundwater

Groundwater was encountered during percussion boring through soil as water strikes as shown in Table 1 below.

Table 1 Groundwater strikes encountered during ground investigation

GI Ref	Water Strike (mbgl)	Comments
MP2BH04	4.20	
MP2BH06D	3.20	
MP2BH08	3.8	Rose to 3.4 after 20mins
MP2BH08	4.8	Rose to 4.6 after 20mins
MP2BH12	4.0	Rose to 3.6 after 20mins
MP2BH12	5.3	Rose to 5.0 after 20mins
MP2BH13	3.0	Rose to 2.9 after 20mins
MP2BH13	5.0	Rose to 4.3 after 20mins
MP2BH14	4.0	Rose to 3.8 after 20mins
MP2BH14	5.0	Rose to 4.3 after 20mins
MP2BH15	4.4	
MP2BH16	4.0	Rose to 3.8 after 20mins
MP2BH16	5.0	Rose to 4.6 after 20mins

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

Groundwater was not noted during drilling at any of the other borehole locations. However, it should be noted that the casing used in supporting the borehole walls during drilling may have sealed out any/additional groundwater strikes and the possibility of encountering groundwater during excavation works should not be ruled out. Seasonal variation in groundwater levels should also be factored into design considerations.

Continued monitoring of the installed standpipes will give an indication of the seasonal variation in groundwater level.

Groundwater monitoring levels conducted on 22nd and 23rd August 2018 are shown in Table 2 below.

Table 2 Groundwater monitoring results

GI Ref	Depth of install (mbgl)	Depth to water (mbgl)	Comments
MP2BH01	8.87	2.77	
MP2BH02	4.75	3.23	
MP2BH04	5.41	2.85	Shallow Install
MP2BH04	11.94	1.77	Deep Install
MP2BH06D	5.11	3.1	Shallow Install
MP2BH06D	12.18	3.35	Deep Install
MP2BH07	2.24	-	Borehole was dry
MP2BH08	4.6	2.35	
MP2BH09	0.97	-	Borehole was dry
MP2BH11			No access to borehole.
MP2BH12	3.33	3.15	
MP2BH13	3.84	2.82	
MP2BH14	3.87	2.9	
MP2BH15	5.17	2.1	
MP2BH16	4.5	3.15	

7 REFERENCES

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

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

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

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

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

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

BS EN ISO 14688-2:2004+A1:2013: Geotechnical investigation and testing. Identification and classification of soil. Part 2 Principles for a classification.

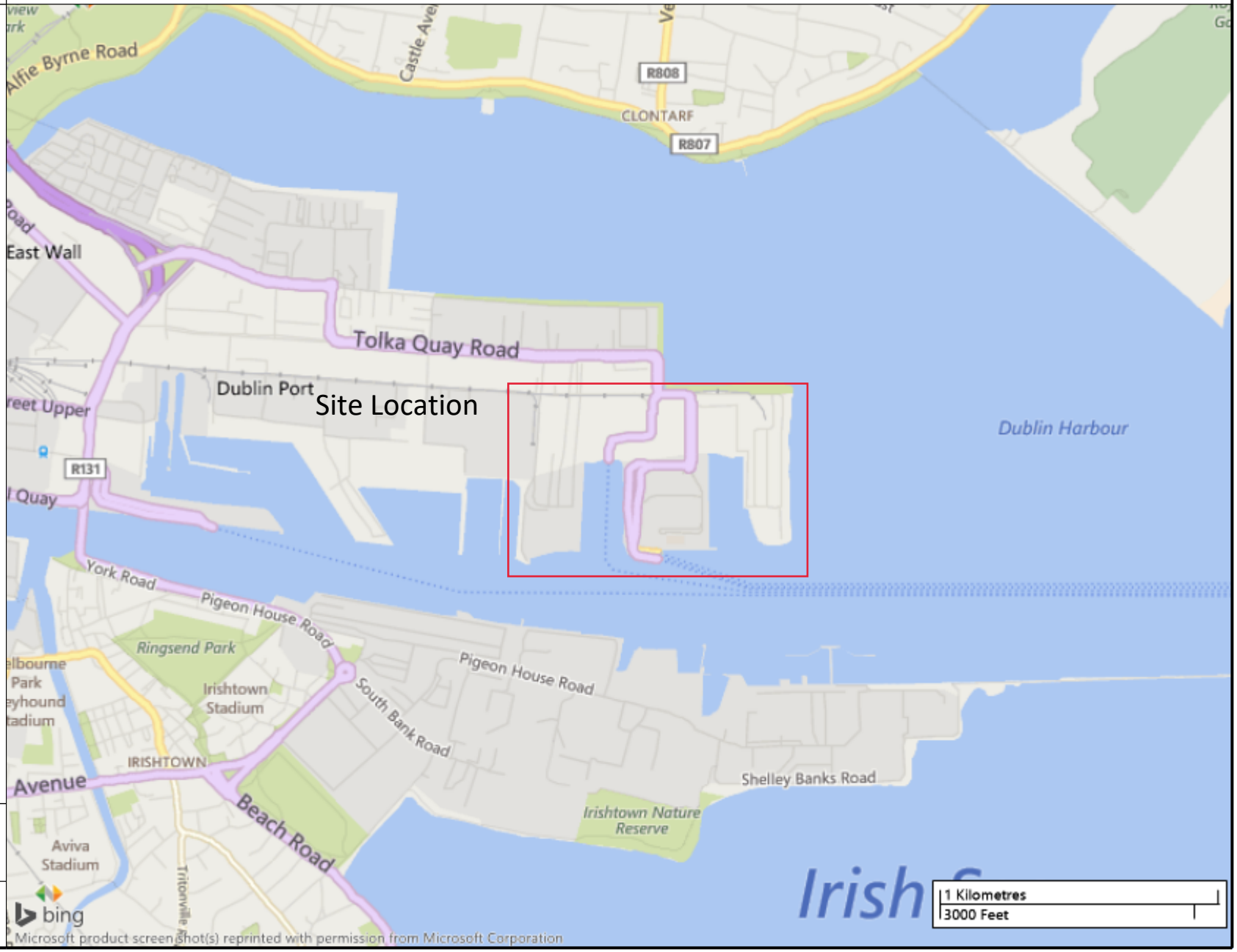
CAUSEWAY GEOTECH

APPENDIX A

SITE AND EXPLORATORY HOLE LOCATION PLANS

Project No.:	18-0795	**Client:**	Dublin Port Company
Project Name:	Dublin Port MP2	**Client's Representative:**	RPS Consulting Engineers

Legend Key



Title:
Site Location Plan

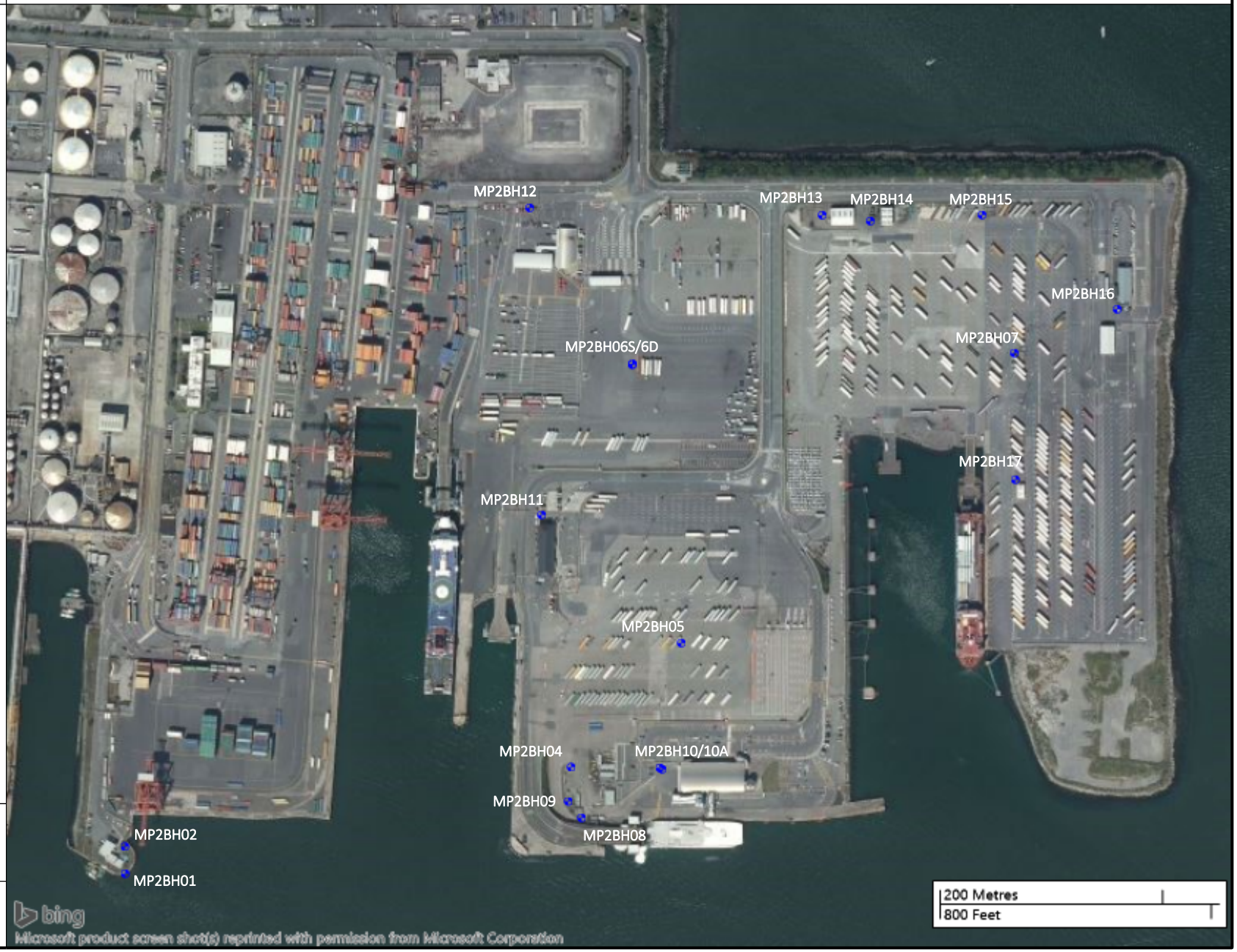
Last Revised:	**Scale:**
05/09/2018	1:20000

CAUSEWAY GEOTECH

Project No.:	18-0795	**Client:**	Dublin Port Company
Project Name:	Dublin Port MP2	**Client's Representative:**	RPS Consulting Engineers

Legend Key

Locations By Type - CP



Title:
Exploratory Hole Location Plan

Last Revised:	**Scale:**
05/09/2018	1:5000

CAUSEWAY GEOTECH

APPENDIX B

BOREHOLE LOGS

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Cable Percussion	Dando 2000	0.00	8.80

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH01

Coordinates: 319721.48 E, 234200.85 N

Client: Dublin Port Company

Client's Representative: RPS Consulting Engineers

Ground Level: 3.52 mOD

Dates: 14/08/2018 - 15/08/2018

Sheet 1 of 1

Scale: 1:50

Driller: MK

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
					3.42	(0.10)		TOPSOIL		
					3.32	(0.20)		MADE GROUND: Loose brown gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.		
0.50	D8							MADE GROUND: Loose grey sandy subangular to subrounded fine to coarse GRAVEL with low cobble and boulder content. . Sand is fine to coarse. Cobbles and boulders are subrounded.		
	ES1			PID = 0.20ppm						
1.00	D9									
	ES2			PID = 0.30ppm						
2.00	D10									
	ES3			PID = 0.50ppm						
						(4.50)				
3.00	D11									
	ES4			PID = 1.20ppm						
4.00	D12									
	ES5			PID = 1.90ppm						
					-1.18	4.70				
						(0.20)		CONCRETE		
					-1.38	4.90				
5.00	D13							Dense grey sandy silty subangular to subrounded fine to coarse GRAVEL with low cobble and boulder content. Sand is fine to coarse.		
	ES6			PID = 0.40ppm						
6.00	D14									
	ES7			PID = 0.50ppm						
						(3.00)				
7.50	D17									
	ES15	7.50	1.50	15-08-2018						
		7.50	5.00	14-08-2018						
				PID = 0.00ppm	-4.38	7.90		Dense greyish black gravelly silty fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.		
						(0.90)				
8.80	D18				-5.28	8.80		End of Borehole at 8.80m		
	ES16			PID = 0.00ppm						

Remarks

Hand dug starter pit excavated from 0m to 1.20m.

No groundwater encountered

Terminated on instruction of engineer

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Water Added

From (m)	To (m)
1.20	7.50

Casing Details

To (m)	Diam (mm)
7.50	200

Chiselling Details

From (m)	To (m)	Time (hh:mm)
8.80	8.80	01:00

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Cable Percussion	Dando 2000	0.00	4.80

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH02

Coordinates: 319721.10 E 234225.26 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Driller: MK

Ground Level: 3.47 mOD

Dates: 10/08/2018 - 13/08/2018

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description
					3.27	(0.20) 0.20		TOPSOIL
0.50	D4 ES1			PID = 5.10ppm		(1.00)		MADE GROUND: Grey sandy subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse.
1.00	D5 ES2			PID = 0.20ppm	2.27	1.20		
					1.97	(0.30) 1.50		MADE GROUND: Light brown silty gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.
2.00	D10 D6 ES3 ES7			PID = 0.00ppm				MADE GROUND: Brownish grey silty sandy subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse.
3.00	D11 ES8			PID = 0.80ppm		(3.30)		
4.00	D12 ES9			PID = 3.60ppm				
					-1.33	4.80		End of Borehole at 4.80m

Water | Backfill

Remarks

Hand dug starter pit excavated from 0m to 1.20m.

No groundwater encountered

Terminated on large boulder

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Water Added

From (m)	To (m)
1.20	1.40

Casing Details

To (m)	Diam (mm)
4.80	200

Chiselling Details

From (m)	To (m)	Time (hh:mm)
3.00	3.50	01:30
4.70	4.80	01:00

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Cable Percussion	Dando 2000	0.00	12.00

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH04

Coordinates: 320120.40 E, 234306.82 N

Client: Dublin Port Company

Sheet 1 of 2

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Driller: MK

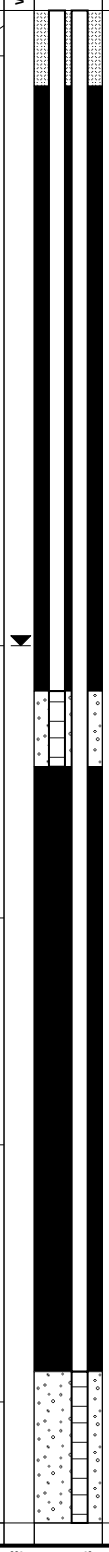
Ground Level: 3.11 mOD

Dates: 02/08/2018 - 03/08/2018

Logger: SR

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description
					3.01	(0.10) 0.10		MADE GROUND: Black PAVOUR
						(0.20)		CONCRETE
					2.81	0.30		MADE GROUND: Firm brownish black sandy slightly gravelly CLAY with fragments of brick and concrete. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse
0.50	D1 ES12			PID = 0.00ppm				
1.00	D2 ES13			PID = 0.00ppm				
2.00	D3 ES14			PID = 0.00ppm		(3.90)		
3.00	D4 ES15			PID = 0.00ppm				
4.00	D5 ES16			PID = 0.00ppm Water Strike at 4.20m	-1.09	4.20		MADE GROUND: Black slightly silty subangular to subrounded fine to coarse GRAVEL with fragments of brick and concrete.
5.00	D6 ES17			PID = 0.00ppm		(1.80)		
6.00	D7 ES18			PID = 0.00ppm	-2.89	6.00		Grey silty fine to coarse SAND
						(1.50)		
7.50	D8 ES19	7.50	3.00	03-08-2018	-4.39	7.50		Greyish black silty fine to coarse SAND.
		7.50	4.00	02-08-2018 PID = 0.00ppm				
						(1.70)		
9.00	D9 ES20			PID = 0.00ppm	-6.09	9.20		Greyish black slightly silty subangular to subrounded fine to coarse GRAVEL.

Backfill



Remarks

Hand dug starter pit excavated from 0m to 1.20m.

Terminated at scheduled depth

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
4.20	4.20		

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)
12.00	200

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.60	5.70	01:00

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Cable Percussion	Dando 2000	0.00	12.00

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH04

Coordinates: 320120.40 E, 234306.82 N

Client: Dublin Port Company

Sheet 2 of 2

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Driller: MK

Ground Level: 3.11 mOD

Dates: 02/08/2018 - 03/08/2018

Logger: SR

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
								Greyish black slightly silty subangular to subrounded fine to coarse GRAVEL.		
10.50	D10 ES21			PID = 0.00ppm		(2.80)				
12.00	D11 ES22	12.00		03-08-2018 PID = 0.00ppm	-8.89	12.00		End of Borehole at 12.00m		

Remarks

Hand dug starter pit excavated from 0m to 1.20m.

Terminated at scheduled depth

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)
12.00	200

Chiselling Details

From (m)	To (m)	Time (hh:mm)
4.60	5.70	01:00

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Cable Percussion	Dando 2000	0.00	0.30

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH05

Coordinates: 320217.10 E, 234421.20 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Driller: MK

Ground Level: 3.33 mOD

Dates: 06/08/2018 - 06/08/2018

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
					3.23	(0.10) 0.10		MADE GROUND: Paving BRICK		
						(0.20)		CONCRETE		
					3.03	0.30		End of Borehole at 0.30m		

Remarks

Concrete encountered to 0.5mbgl.

Terminated on instruction of RPS engineer

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Cable Percussion	Dando 2000	0.00	12.00

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH06D

Coordinates: 320167.34 E 234671.48 N

Client: Dublin Port Company

Client's Representative: RPS Consulting Engineers

Ground Level: 3.68 mOD

Dates: 07/08/2018 - 09/08/2018

Sheet 1 of 2

Scale: 1:50

Driller: MK

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description
					3.43	(0.25) 0.25		CONCRETE
0.50	D1 ES2			PID = 0.10ppm		(0.75)		MADE GROUND: Grey sandy subangular fine to coarse GRAVEL. Sand is fine to coarse.
1.00	D10 ES3			PID = 0.00ppm	2.68	1.00		MADE GROUND: Dense brownish black sandy silty subangular to subrounded fine to coarse GRAVEL with fragments of red brick and concrete. Sand is fine to coarse.
2.00	D11 ES4			PID = 0.70ppm				
3.00	D12 ES5			PID = 0.10ppm Water strike at 3.20m		(3.80)		
4.00	D13 ES6			PID = 0.00ppm				
					-1.12	4.80		Loose greyish black silty fine to coarse SAND.
5.00	D14 ES7			PID = 0.00ppm				
6.00	D15 ES8			PID = 0.00ppm		(2.30)		
					-3.42	7.10		Soft grey sandy organic CLAY. Sand is fine to coarse.
7.50	D16 ES9			PID = 0.00ppm				
						(4.40)		
		9.00	8.00	09-08-2018				
9.00	D20 ES17			PID = 0.30ppm				

Water

Backfill

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5

Remarks

Hand dug inspection pit excavated to 1.20m.

Terminated at scheduled depth

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.20	3.20		

Water Added

From (m)	To (m)
1.20	3.20
7.00	8.00

Casing Details

To (m)	Diam (mm)
12.00	200

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Cable Percussion	Dando 2000	0.00	12.00

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH06D

Coordinates: 320167.34 E 234671.48 N

Client: Dublin Port Company

Sheet 2 of 2

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Ground Level: 3.68 mOD

Dates: 07/08/2018 - 09/08/2018

Driller: MK

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
								Soft grey sandy organic CLAY. Sand is fine to coarse.		
10.50	D21 ES18			PID = 0.10ppm						
					-7.82	11.50				
						(0.50)		Grey silty fine to coarse SAND		
12.00	D22 ES19	12.00	10.00	09-08-2018 PID = 0.00ppm	-8.32	12.00		End of Borehole at 12.00m		

Remarks

Hand dug inspection pit excavated to 1.20m.

Terminated at scheduled depth

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Water Added

From (m)	To (m)
1.20	3.20
7.00	8.00

Casing Details

To (m)	Diam (mm)
12.00	200

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	1.80

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH06S

Coordinates: 320167.47 E, 234670.68 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Driller: PL

Ground Level: 3.47 mOD

Dates: 02/08/2018 - 02/08/2018

Logger: SR

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
					3.27	(0.20) 0.20		CONCRETE CORE		
					2.97	(0.30) 0.50		MADE GROUND: Grey sandy subangular to subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subangular.		
1.00	D2 ES1			PID = 0.00ppm	2.27	(0.70) 1.20		MADE GROUND: Brownish black sandy clayey subangular to subrounded fine to coarse GRAVEL with fragments of red brick. Sand is fine to coarse. Cobbles are subangular.		
					1.87	(0.40) 1.60		MADE GROUND: Soft brownish grey sandy slightly gravelly CLAY with fragments of concrete. Sand is fine to coarse. Gravel is angular fine to coarse		
					1.67	(0.20) 1.80		MADE GROUND: Black sandy clayey subangular fine to coarse GRAVEL with fragments of red brick and concrete with high cobble content. Sand is fine to coarse. Gravel is subangular coarse. Cobbles are subangular		
								End of Borehole at 1.80m		

Remarks

Hand dug inspection pit excavated to 1.20m.

Terminated on large boulder or cobble.
Moved 1m on instruction of RPS engineer

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)
1.00	150

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Project No.:	Project Name:	Borehole No.:
18-0795	Dublin Port MP2	MP2BH06SA
Coordinates:	**Client:**	Sheet 1 of 1
320167.47 E	Dublin Port Company	
234670.68 N	**Client's Representative:** RPS Consulting Engineers	**Scale:** 1:50
Ground Level: 3.47 mOD	**Dates:** 02/08/2018 - 02/08/2018	**Driller:** PL
		Logger: SR

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	1.40

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
					3.28	(0.19) 0.19		CONCRETE CORE		
						(0.81)		MADE GROUND: Blackish brown sandy subangular fine to coarse GRAVEL with medium cobble content and fragments of concrete and hardcore fill. Sand is fine to coarse. Cobbles are subangular		
1.00	D2 ES1			PID = 0.00ppm	2.47	1.00				
					2.07	(0.40) 1.40		MADE GROUND: Stiff orangish brown slightly sandy gravelly CLAY with fragments of concrete and low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular		
								End of Borehole at 1.40m		

Remarks
Hand dug inspection pit excavated to 1.20m.

Terminated on concrete obstruction.

Water Strikes				Chiselling Details		
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)

Water Added		Casing Details	
From (m)	To (m)	To (m)	Diam (mm)
		1.00	150

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Cable Percussion	Dando 2000	0.00	2.00

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH07

Coordinates: 320512.20 E, 234689.92 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Driller: MK

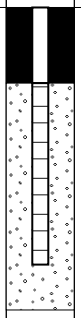
Ground Level: 3.29 mOD

Dates: 16/08/2018 - 16/08/2018

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description
					3.09	(0.20)		BITMAC
						0.20		
					2.89	(0.20) 0.40		MADE GROUND: Subbase
0.50	D4 ES1			PID = 0.10ppm				MADE GROUND: Brownish black slightly sandy subangular fine to coarse GRAVEL with fragments of brick and concrete Sand is fine to coarse.
1.00	D5 ES2			PID = 0.40ppm		(1.60)		
2.00	D6 ES3			PID = 0.70ppm	1.29	2.00		End of Borehole at 2.00m

Water | Backfill



Remarks

Hand dug inspection pit excavated to 1.20m.

Terminated on obstruction

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Water Added

From (m)	To (m)
1.40	2.00

Casing Details

To (m)	Diam (mm)
2.00	200

Chiselling Details

From (m)	To (m)	Time (hh:mm)
1.50	2.00	01:00

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	5.00

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH08

Coordinates: 320130.73 E, 234261.46 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

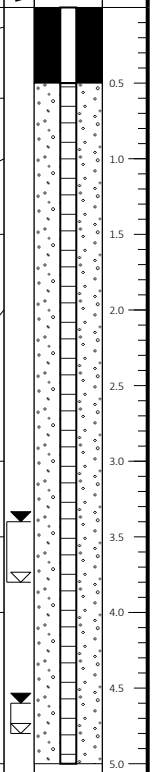
Ground Level: 3.24 mOD

Dates: 06/08/2018 - 06/08/2018

Driller: PL

Logger: SR

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description
					3.10	(0.13) 0.13		CONCRETE CORE
						(0.47)		MADE GROUND: Greyish brown very sandy slightly clayey subangular fine to medium GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular
0.50	D7 ES1			PID = 0.30ppm	2.64	0.60 (0.40)		MADE GROUND: Grey slightly sandy angular to subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular
1.00	D8 ES2			PID = 4.30ppm	2.24	1.00 (0.50)		MADE GROUND: Soft brownish grey slightly sandy gravelly CLAY with fragments of tarmac. Sand is fine to coarse. Gravel is subangular fine to medium.
					1.74	1.50 (0.50)		MADE GROUND: Very soft greyish brown slightly sandy gravelly CLAY with fragments of red brick and low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular.
2.00	D9 ES3			PID = 0.00ppm	1.24	2.00 (1.00)		MADE GROUND: Soft greyish brown sandy slightly gravelly SILT with low cobble content and fragments of red brick. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.
3.00	D10 ES4			PID = 0.00ppm	0.24	3.00 (0.50)		MADE GROUND: Very soft greyish brown mottled orange slightly sandy gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.
				Water Strike at 3.80m	-0.26	3.50 (0.50)		MADE GROUND: Very soft grey sandy slightly gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular
4.00	D11 ES5			PID = 0.10ppm	-0.76	4.00 (1.00)		MADE GROUND: Very soft greyish brown sandy slightly gravelly SILT with fragments of concrete and low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular
				Water Strike at 4.80m				
5.00	D12 ES6			PID = 0.00ppm	-1.76	5.00		End of Borehole at 5.00m



Remarks

Hand dug starter pit excavated.

Terminated on obstruction

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.80	3.80	20	3.40
4.80	4.00	20	4.60

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)
4.00	150

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	1.00

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH09

Coordinates: 320118.45 E, 234276.11 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Ground Level: 3.17 mOD

Dates: 07/08/2018 - 07/08/2018

Driller: PL

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
					3.10	(0.07)		MADE GROUND: Paving BRICK		
					3.07	(0.10)		BITMAC		
0.50	D3 ES1			PID = 0.20ppm		(0.90)		MADE GROUND: Brownish grey sandy slightly clayey subangular fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subrounded.		
1.00	D4 ES2			PID = 0.10ppm	2.17	1.00		End of Borehole at 1.00m		

Remarks

No groundwater encountered

Terminated on large obstruction

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Project No.:	Project Name:	Borehole No.:
18-0795	Dublin Port MP2	MP2BH10
Coordinates:	**Client:**	Sheet 1 of 1
320202.91 E	Dublin Port Company	
234307.11 N	**Client's Representative:** RPS Consulting Engineers	**Scale:** 1:50
Ground Level: 3.47 mOD	**Dates:** 06/08/2018 - 06/08/2018	**Driller:** PL
		Logger: SR

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	0.50

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
					3.38	(0.09) 0.09		CONCRETE CORE		
					3.27	(0.11) 0.20		MADE GROUND: Grey subangular to subrounded fine to coarse GRAVEL with low cobble content. Cobbles are subangular		
						(0.30)				
					2.97	0.50		MADE GROUND: Brownish grey slightly sandy slightly clayey subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular		
								End of Borehole at 0.50m		

Remarks
Hand dug inspection pit excavated to 1.20m.

Terminated on concrete obstruction. Moved to rebore position MP2BH010A

Water Strikes				Chiselling Details		
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)

Water Added		Casing Details	
From (m)	To (m)	To (m)	Diam (mm)

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	0.50

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH10A

Coordinates: 320202.23 E 234308.31 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Driller: PL

Ground Level: 3.48 mOD

Dates: 06/08/2018 - 06/08/2018

Logger: SR

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
					3.40	0.08 (0.08)		CONCRETE CORE		
						(0.42)		MADE GROUND: Brownish grey sandy slightly clayey subangular to subrounded fine to medium GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are angular		
					2.98	0.50		End of Borehole at 0.50m		

Remarks

Hand dug inspection pit excavated to 1.20m.

Terminated on concrete obstruction.

Water Strikes				Chiselling Details		
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)

Water Added		Casing Details	
From (m)	To (m)	To (m)	Diam (mm)

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	2.10

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH11

Coordinates: 320088.26 E, 234533.38 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Ground Level: 3.65 mOD

Dates: 03/08/2018 - 03/08/2018

Driller: PL

Logger: SR

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description
					3.55	(0.10) 0.10		CONCRETE CORE
					3.35	(0.20) 0.30		MADE GROUND: Brownish grey sandy clayey subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse
				PID = 0.00ppm		(0.70)		MADE GROUND: Brownish grey sandy subangular to subrounded fine to medium GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subrounded
1.00	D3 ES1			PID = 0.00ppm	2.65	1.00		MADE GROUND: Brownish grey gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse.
						(1.10)		
2.00	D4 ES2			PID = 0.00ppm	1.55	2.10		End of Borehole at 2.10m

Water | Backfill

Remarks

Hand dug starter pit excavated to 1.20m.

No groundwater encountered

Terminated on large cobble or boulder.

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)
2.00	150

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	6.00

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH12

Coordinates: 320070.88 E, 234809.61 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Driller: PL

Ground Level: 3.56 mOD

Dates: 09/08/2018 - 09/08/2018

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description
					3.31	(0.25) 0.25		CONCRETE
					3.16	(0.15) 0.40		MADE GROUND: Brownish grey sandy slightly clayey subangular fine to medium GRAVEL with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subrounded.
0.50	D8 ES1			PID = 0.30ppm		(0.60)		MADE GROUND: Brownish grey sandy slightly clayey subangular fine to medium GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subrounded.
1.00	D9 ES2			PID = 0.20ppm	2.56	1.00		MADE GROUND: Greyish brown slightly gravelly fine to medium SAND with low cobble content and fragments of red brick. Gravel is subrounded fine to medium. Cobbles are subrounded.
						(1.00)		
2.00	D10 ES3			PID = 0.10ppm	1.56	2.00		MADE GROUND: Grey gravelly fine to medium SAND. Gravel is subangular fine to medium. Cobbles are subrounded.
						(0.80)		
3.00	D11 ES4			PID = 0.00ppm	0.76	2.80 (0.40)		MADE GROUND: Grey gravelly fine to coarse SAND with low cobble content. Gravel is subangular fine to medium. Cobbles are subrounded.
					0.36	3.20		MADE GROUND: Grey slightly gravelly slightly silty fine to coarse SAND with low cobble content. Cobbles are subrounded.
						(0.80)		
4.00	D12 ES5			Water strike at 4.00m PID = 0.10ppm	-0.44	4.00		MADE GROUND: Dark grey gravelly fine to medium SAND with low cobble content. Sand is fine to medium. Gravel is subangular fine. Cobbles are subrounded
						(1.00)		
5.00	D13 ES6			PID = 0.10ppm Water strike at 5.30m	-1.44	5.00		MADE GROUND: Grey gravelly fine to coarse SAND with low cobble content. Gravel is subrounded fine to medium. Cobbles are subrounded.
						(1.00)		
6.00	D14 ES7			PID = 0.10ppm	-2.44	6.00		End of Borehole at 6.00m

Water

Backfill

Remarks

Hand dug inspection pit excavated to 1.20m.

Terminated at scheduled depth

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
4.00	4.00	20	3.60
5.30	5.30	20	5.00

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	6.00

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH13

Coordinates: 320334.94 E, 234809.70 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

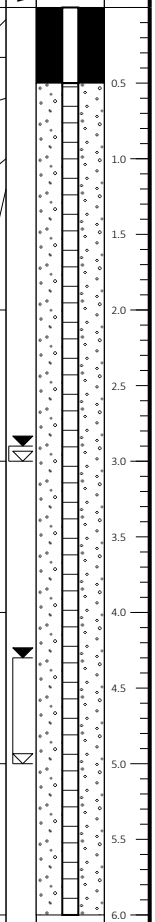
Driller: PL

Ground Level: 3.60 mOD

Dates: 08/08/2018 - 08/08/2018

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description
					3.52	(0.08) 0.08		MADE GROUND: Paving brick
					3.27	(0.25) 0.33		CONCRETE
0.50	D8 ES1			PID = 0.00ppm	3.00	(0.27) 0.60		MADE GROUND: Grey sandy subangular fine to medium GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subrounded.
1.00	D9 ES2			PID = 0.40ppm	2.60	(0.40) 1.00		MADE GROUND: Greyish black sandy clayey angular fine to medium GRAVEL with low cobble content, fragments of yellow brick and timber. Sand is fine to coarse. Cobbles are subrounded.
					2.40	(0.20) 1.20		MADE GROUND: Soft greyish black slightly sandy gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subrounded.
2.00	D10 ES3			PID = 1.90ppm	1.60	(0.80) 2.00		MADE GROUND: Blueish grey sandy slightly clayey subangular fine to coarse GRAVEL with low cobble content, fragments of red brick, concrete and plastic. Sand is fine to coarse. Cobbles are subrounded.
3.00	D11 ES4			Water strike at 3.00m PID = 0.00ppm	0.60	(1.00) 3.00		MADE GROUND: Soft brownish grey slightly gravelly sandy SILT with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subrounded.
4.00	D12 ES5			PID = 0.00ppm	-0.40	(1.00) 4.00		MADE GROUND: Very soft brownish grey sandy slightly gravelly SILT with low cobble content. Sand is fine to medium. Gravel is subangular fine to medium. Cobbles are subrounded.
5.00	D13 ES6			Water strike 5.00m PID = 0.20ppm	-1.40	(1.00) 5.00		MADE GROUND: Soft grey sandy slightly gravelly SILT with fragments of timber and plastic. Sand is fine to coarse. Gravel is subangular fine to medium.
6.00	D14 ES7			PID = 0.30ppm	-2.40	6.00		MADE GROUND: Very soft greyish brown sandy slightly gravelly SILT with fragments of timber with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium.
								End of Borehole at 6.00m



Remarks

Hand dug inspection pit excavated to 1.20m.

Terminated at scheduled depth

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.00	3.00	20	2.90
5.00	5.00	20	4.30

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	4.75

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH14

Coordinates: 320379.19 E, 234805.53 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Driller: PL

Ground Level: 3.45 mOD

Dates: 08/08/2018 - 08/08/2018

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description
						(0.28)		CONCRETE
					3.17	0.28		
						(0.22)		MADE GROUND: Grey sandy subangular fine to coarse GRAVEL with low cobble content and fragments of concrete. Sand is fine to coarse. Cobbles are subrounded.
0.50	D7				2.95	0.50		
	ES1			PID = 0.30ppm				
						(0.50)		MADE GROUND: Firm blackish brown sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subrounded.
1.00	D8				2.45	1.00		
	ES2			PID = 0.30ppm				MADE GROUND: Soft to firm greyish brown sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subrounded.
						(1.00)		
2.00	D9				1.45	2.00		MADE GROUND: Very soft orangish brown sandy slightly gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.
	ES3			PID = 0.20ppm				
						(0.80)		
					0.65	2.80		
						(0.20)		MADE GROUND: Very soft brownish black sandy slightly gravelly SILT with low cobble content. Sand is fine to medium. Gravel is subangular fine to medium.
3.00	D10				0.45	3.00		MADE GROUND: Blueish brown sandy slightly silty subangular fine to medium GRAVEL with possible oil contamination. Sand is fine to medium.
	ES4			PID = 0.30ppm				
						(1.00)		
4.00	D11				-0.55	4.00		MADE GROUND: Brownish blue sandy slightly silty subangular fine to medium GRAVEL with low cobble content and fragments of timber. Sand is fine to coarse.
	ES5			Water strike at 4.00 PID = 0.60ppm				
						(0.75)		
4.75	D12				-1.30	4.75		End of Borehole at 4.75m
	ES6			PID = 2.00ppm Water strike at 5.00				

Water

Backfill

Remarks

Hand dug inspection pit excavated to 1.20m.

Terminated on obstruction

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
4.00	4.00	20	3.80
5.00	5.00	20	4.30

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	5.20

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH15

Coordinates: 320479.84 E, 234813.54 N

Client: Dublin Port Company

Sheet 1 of 1

Client's Representative: RPS Consulting Engineers

Scale: 1:50

Ground Level: 3.65 mOD

Dates: 08/08/2018 - 08/08/2018

Driller: PL

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description
					3.57	(0.08)		MADE GROUND: Paving brick
					3.45	(0.12) 0.20		CONCRETE
						(0.30)		MADE GROUND: Grey sandy subangular fine to coarse GRAVEL. Sand is fine to coarse. Gravel is subangular fine to medium.
0.50	D7 ES1			PID = 0.10ppm	3.15	0.50 (0.50)		MADE GROUND: Soft greyish brown sandy slightly gravelly CLAY with low cobble content, fragments of brick and concrete. Sand is fine to coarse. Gravel is subrounded fine to medium. Cobbles are subrounded.
1.00	D8 ES2			PID = 0.01ppm	2.65	1.00 (1.00)		MADE GROUND: Very soft greyish brown sandy slightly gravelly CLAY with fragments of red brick. Sand is fine to coarse. Gravel is subangular fine to medium.
2.00	D9 ES3			PID = 0.10ppm	1.65	2.00 (1.00)		MADE GROUND: Soft orangish brown sandy slightly gravelly CLAY with fragments of red brick and plastic. Sand is fine to coarse. Gravel is subangular fine to medium.
3.00	D10 ES4			PID = 0.00ppm	0.65	3.00 (1.00)		MADE GROUND: Very soft greyish brown sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is angular to subangular fine to coarse.
4.00	D11 ES5			PID = 0.10ppm Water strike at 4.40m	-0.35	4.00 (1.20)		MADE GROUND: Firm to stiff brownish blue slightly sandy gravelly SILT. Sand is fie to coarse. Gravel is subangular fine to medium.
5.00	D12 ES6			PID = 0.40ppm	-1.55	5.20		End of Borehole at 5.20m

Water

Backfill

Remarks

Hand dug inspection pit excavated to 1.20m.

Terminated on obstruction

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
4.40	4.40		

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	5.00

Project No.: 18-0795

Project Name: Dublin Port MP2

Borehole No.: MP2BH16

Coordinates: 320604.08 E 234731.76 N

Client: Dublin Port Company

Client's Representative: RPS Consulting Engineers

Ground Level: 3.35 mOD

Dates: 07/08/2018 - 07/08/2018

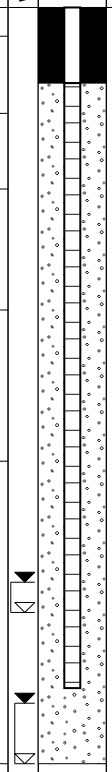
Sheet 1 of 1

Scale: 1:50

Driller: PL

Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description
					3.16	(0.19) 0.19		MADE GROUND: CONCRETE
0.50	D1 ES7			PID = 0.10ppm	2.65	(0.51) 0.70		MADE GROUND: Brownish grey sandy slightly clayey subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subrounded.
1.00	D2 ES8			PID = 0.00ppm	2.15	(0.50) 1.20		MADE GROUND: Greyish dark brown very sandy slightly clayey subrounded fine to medium GRAVEL with low cobble content and fragments of red brick. Sand is fine to coarse. Cobbles are subrounded.
2.00	D3 ES9			PID = 0.10ppm	1.35	(0.80) 2.00		MADE GROUND: Brownish grey sandy silty subangular fine to medium GRAVEL with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to medium.
3.00	D4 ES10			PID = 12.70ppm	0.35	(1.00) 3.00		MADE GROUND: Brownish grey sandy subangular fine to coarse GRAVEL with fragments of red brick and rootlets. Sand is fine to coarse. Gravel is angular fine to medium.
4.00	D5 ES11			Water strike at 4.00m PID = 0.00ppm		(2.00)		MADE GROUND: Blueish brown sandy silty angular fine to medium GRAVEL with high cobble content Sand is fine to coarse. Cobbles are subrounded.
5.00	D6 ES12			Water strike at 5.00m	-1.65	5.00		End of Borehole at 5.00m



Remarks

Hand dug inspection pit excavated to 1.20m.

Terminated on very dense gravel

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
4.00	4.00	20	3.80
5.00	5.00	20	4.60

Water Added

From (m)	To (m)

Casing Details

To (m)	Diam (mm)

Chiselling Details

From (m)	To (m)	Time (hh:mm)

CAUSEWAY GEOTECH

Project No.:	Project Name:	Borehole No.:
18-0795	Dublin Port MP2	MP2BH17
Coordinates:	**Client:**	Sheet 1 of 1
320516.87 E	Dublin Port Company	
234576.00 N	**Client's Representative:** RPS Consulting Engineers	**Scale:** 1:50
Ground Level: 3.24 mOD	**Dates:** 08/08/2018 - 08/08/2018	**Driller:** PL
		Logger: CH

Method	Plant Used	Top	Base
Light Percussion	Dando Terrier	0.00	1.10

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
					3.01	(0.23) 0.23		CONCRETE		
0.50	D1 ES3			PID = 0.10ppm		(0.57)		MADE GROUND: Grey sandy subangular fine to medium GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subrounded.		
1.00	D2 ES4 ES5			PID = 0.10ppm	2.44 2.14	0.80 (0.30) 1.10		MADE GROUND: Brownish grey fine to medium SAND with medium cobble content. Gravel is subangular fine to medium. Cobbles are subrounded. End of Borehole at 1.10m		

Remarks
Hand dug starter pit excavated to 1.20m.
No groundwater encountered

Terminated on obstruction

Water Strikes				Chiselling Details		
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)

Water Added		Casing Details	
From (m)	To (m)	To (m)	Diam (mm)

CAUSEWAY GEOTECH

APPENDIX C

ENVIRONMENTAL LABORATORY TEST RESULTS

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report No.:	18-23293-1
Initial Date of Issue:	14-Aug-2018
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Sean Ross Stephen Franey Stephen Watson Stuart Abraham
Project	18-0795 - Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	06-Aug-2018
Order No.:		**Date Instructed:**	07-Aug-2018
No. of Samples:	2		
Turnaround (Wkdays):	3	**Results Due:**	09-Aug-2018
Date Approved:	14-Aug-2018		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-23293	18-23293
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		665938	665940
Order No.:			Client Location ID.:		MP2-BH-04D	MP2-BH-04D
			Client Sample Ref.:		ES8	ES2
			Sample Type:		SOIL	SOIL
			Top Depth (m):		7.0	1.0
			Date Sampled:		02-Aug-2018	02-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192		N/A	-	Fibres/Clumps
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	Amosite Chrysotile
Moisture	N	2030	%	0.020	15	9.1
Soil Colour	N	2040		N/A	Grey	Brown
Other Material	N	2040		N/A	NONE	Stones
Soil Texture	N	2040		N/A	Sand	Sand
pH	M	2010		N/A	8.6	8.6
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.8	0.65
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.17	0.24
Total Sulphur	M	2175	%	0.010	0.26	0.14
Sulphur (Elemental)	M	2180	mg/kg	1.0	2.1	24
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50
Iron (Total)	N	2430	mg/kg	100	7300	12000
Arsenic	M	2450	mg/kg	1.0	6.0	32
Barium	M	2450	mg/kg	10	19	150
Beryllium	U	2450	mg/kg	1.0	< 1.0	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.11	1.1
Chromium	M	2450	mg/kg	1.0	9.3	18
Copper	M	2450	mg/kg	0.50	10	57
Mercury	M	2450	mg/kg	0.10	< 0.10	0.24
Nickel	M	2450	mg/kg	0.50	9.0	41
Lead	M	2450	mg/kg	0.50	43	260
Selenium	M	2450	mg/kg	0.20	< 0.20	0.20
Vanadium	U	2450	mg/kg	5.0	15	42
Zinc	M	2450	mg/kg	0.50	40	160
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	0.88	4.0
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010	< 0.010

Chemtest
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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-23293	18-23293
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		665938	665940
Order No.:			Client Location ID.:		MP2-BH-04D	MP2-BH-04D
			Client Sample Ref.:		ES8	ES2
			Sample Type:		SOIL	SOIL
			Top Depth (m):		7.0	1.0
			Date Sampled:		02-Aug-2018	02-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	< 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	< 2.0	< 2.0
Naphthalene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Acenaphthylene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Acenaphthene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Fluorene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Phenanthrene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Anthracene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Fluoranthene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Pyrene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Chrysene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Coronene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	2700	mg/kg	0.20	< 0.20	< 0.20
Dichlorodifluoromethane	N	2760	µg/kg	1.0	< 1.0	< 1.0
Chloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Vinyl Chloride	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromomethane	M	2760	µg/kg	20	< 20	< 20
Chloroethane	N	2760	µg/kg	2.0	< 2.0	< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromochloromethane	N	2760	µg/kg	5.0	< 5.0	< 5.0

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd					**Chemtest Job No.:**	18-23293	18-23293
Quotation No.: Q18-13690					**Chemtest Sample ID.:**	665938	665940
Order No.:					Client Location ID.:	MP2-BH-04D	MP2-BH-04D
					Client Sample Ref.:	ES8	ES2
					Sample Type:	SOIL	SOIL
					Top Depth (m):	7.0	1.0
					Date Sampled:	02-Aug-2018	02-Aug-2018
					Asbestos Lab:	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Trichloromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0		< 1.0	< 1.0
Tetrachloromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,1-Dichloropropene	N	2760	µg/kg	1.0		< 1.0	< 1.0
Benzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0		< 2.0	< 2.0
Trichloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1.0		< 1.0	< 1.0
Dibromomethane	M	2760	µg/kg	1.0		< 1.0	< 1.0
Bromodichloromethane	M	2760	µg/kg	5.0		< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10		< 10	< 10
Toluene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10		< 10	< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10		< 10	< 10
Tetrachloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,3-Dichloropropane	N	2760	µg/kg	2.0		< 2.0	< 2.0
Dibromochloromethane	N	2760	µg/kg	10		< 10	< 10
1,2-Dibromoethane	M	2760	µg/kg	5.0		< 5.0	< 5.0
Chlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0		< 2.0	< 2.0
Ethylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0		< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Styrene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Tribromomethane	N	2760	µg/kg	1.0		< 1.0	< 1.0
Isopropylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Bromobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50		< 50	< 50
N-Propylbenzene	N	2760	µg/kg	1.0		< 1.0	< 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
4-Chlorotoluene	N	2760	µg/kg	1.0		< 1.0	< 1.0
Tert-Butylbenzene	N	2760	µg/kg	1.0		< 1.0	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Sec-Butylbenzene	N	2760	µg/kg	1.0		< 1.0	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
4-Isopropyltoluene	N	2760	µg/kg	1.0		< 1.0	< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd					**Chemtest Job No.:**	18-23293	18-23293
Quotation No.: Q18-13690					**Chemtest Sample ID.:**	665938	665940
Order No.:					Client Location ID.:	MP2-BH-04D	MP2-BH-04D
					Client Sample Ref.:	ES8	ES2
					Sample Type:	SOIL	SOIL
					Top Depth (m):	7.0	1.0
					Date Sampled:	02-Aug-2018	02-Aug-2018
					Asbestos Lab:	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
N-Butylbenzene	N	2760	µg/kg	1.0		< 1.0	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	50		< 50	< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0
Hexachlorobutadiene	N	2760	µg/kg	1.0		< 1.0	< 1.0
1,2,3-Trichlorobenzene	N	2760	µg/kg	2.0		< 2.0	< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0		< 1.0	< 1.0
N-Nitrosodimethylamine	N	2790	mg/kg	0.050		< 0.050	< 0.050
Phenol	N	2790	mg/kg	0.050		< 0.050	< 0.050
2-Chlorophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050		< 0.050	< 0.050
1,3-Dichlorobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050
1,4-Dichlorobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050
1,2-Dichlorobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050
2-Methylphenol	N	2790	mg/kg	0.050		< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050		< 0.050	< 0.050
Hexachloroethane	N	2790	mg/kg	0.050		< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050		< 0.050	< 0.050
4-Methylphenol	N	2790	mg/kg	0.050		< 0.050	< 0.050
Nitrobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050
Isophorone	N	2790	mg/kg	0.050		< 0.050	< 0.050
2-Nitrophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050
2,4-Dimethylphenol	N	2790	mg/kg	0.050		< 0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050		< 0.050	< 0.050
2,4-Dichlorophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050
Naphthalene	N	2790	mg/kg	0.050		< 0.050	< 0.050
4-Chloroaniline	N	2790	mg/kg	0.050		< 0.050	< 0.050
Hexachlorobutadiene	N	2790	mg/kg	0.050		< 0.050	< 0.050
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050		< 0.050	< 0.050
2-Methylnaphthalene	N	2790	mg/kg	0.050		< 0.050	< 0.050
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050		< 0.050	< 0.050
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050
2-Chloronaphthalene	N	2790	mg/kg	0.050		< 0.050	< 0.050
2-Nitroaniline	N	2790	mg/kg	0.050		< 0.050	< 0.050
Acenaphthylene	N	2790	mg/kg	0.050		< 0.050	< 0.050
Dimethylphthalate	N	2790	mg/kg	0.050		< 0.050	< 0.050

Chemtest
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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-23293	18-23293
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		665938	665940
Order No.:			Client Location ID.:		MP2-BH-04D	MP2-BH-04D
			Client Sample Ref.:		ES8	ES2
			Sample Type:		SOIL	SOIL
			Top Depth (m):		7.0	1.0
			Date Sampled:		02-Aug-2018	02-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Acenaphthene	N	2790	mg/kg	0.050	< 0.050	< 0.050
3-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
Dibenzofuran	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Chlorophenylphenylether	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Fluorene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Diethyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Azobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050
Hexachlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Pentachlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Phenanthrene	N	2790	mg/kg	0.050	0.13	0.40
Anthracene	N	2790	mg/kg	0.050	< 0.050	0.088
Carbazole	N	2790	mg/kg	0.050	< 0.050	< 0.050
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Fluoranthene	N	2790	mg/kg	0.050	0.22	0.78
Pyrene	N	2790	mg/kg	0.050	0.20	0.66
Butylbenzyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	2790	mg/kg	0.050	0.12	0.41
Chrysene	N	2790	mg/kg	0.050	0.11	0.39
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	0.13	0.78
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	< 0.050	0.63
Benzo[a]pyrene	N	2790	mg/kg	0.050	0.083	0.37
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	< 0.050	0.21
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	< 0.050	0.23
4-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Resorcinol	M	2920	mg/kg	0.050	< 0.050	< 0.050
Phenol	M	2920	mg/kg	0.050	< 0.050	< 0.050
Cresols	M	2920	mg/kg	0.050	< 0.050	< 0.050
Xylenols	M	2920	mg/kg	0.050	< 0.050	< 0.050
1-Naphthol	N	2920	mg/kg	0.050	< 0.050	< 0.050
Trimethylphenols	M	2920	mg/kg	0.050	< 0.050	< 0.050

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-23293	18-23293
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		665938	665940
Order No.:			Client Location ID.:		MP2-BH-04D	MP2-BH-04D
			Client Sample Ref.:		ES8	ES2
			Sample Type:		SOIL	SOIL
			Top Depth (m):		7.0	1.0
			Date Sampled:		02-Aug-2018	02-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest
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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	18-23872-1
Initial Date of Issue:	28-Aug-2018
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Sean Ross Stephen Franey Stephen Watson Stuart Abraham
Project	18-0795 - Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	09-Aug-2018
Order No.:		**Date Instructed:**	21-Aug-2018
No. of Samples:	3		
Turnaround (Wkdays):	3	**Results Due:**	23-Aug-2018
Date Approved:	28-Aug-2018		

Approved By:

Details: Robert Monk, Technical Manager

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-23872	18-23872	18-23872
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		668912	668916	668917
Order No.:			Client Location ID.:		MP2BH08	MP2BH08	MP2BH011
			Client Sample Ref.:		ES2	ES6	ES1
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		1.00	5.00	1.00
			Date Sampled:		06-Aug-2018	06-Aug-2018	03-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	4.1	15	3.8
Soil Colour	N	2040		N/A	Grey	Brown	Grey
Other Material	N	2040		N/A	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand
pH	M	2010		N/A	9.9	8.9	9.1
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.6	4.0	0.62
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.61	0.35	< 0.010
Total Sulphur	M	2175	%	0.010	0.080	0.15	0.029
Sulphur (Elemental)	M	2180	mg/kg	1.0	57	11	2.1
Cyanide (Total)	M	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50
Iron (Total)	N	2430	mg/kg	100	10000	16000	13000
Arsenic	M	2450	mg/kg	1.0	26	26	18
Barium	M	2450	mg/kg	10	89	100	31
Beryllium	U	2450	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.59	0.80	0.45
Chromium	M	2450	mg/kg	1.0	16	24	11
Copper	M	2450	mg/kg	0.50	23	62	8.7
Mercury	M	2450	mg/kg	0.10	0.14	0.63	< 0.10
Nickel	M	2450	mg/kg	0.50	38	45	14
Lead	M	2450	mg/kg	0.50	99	310	17
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20
Vanadium	U	2450	mg/kg	5.0	61	48	22
Zinc	M	2450	mg/kg	0.50	84	170	32
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	3.1	4.0	0.97
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	[B] 2.2	[B] < 0.10	[B] < 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	[B] 22	[B] < 0.10	[B] < 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	[B] 160	[B] < 0.10	[B] < 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	[B] 220	[B] < 0.10	[B] < 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	[B] 79	[B] 17	[B] < 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	[B] 490	[B] 17	[B] < 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-23872	18-23872	18-23872
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		668912	668916	668917
Order No.:			Client Location ID.:		MP2BH08	MP2BH08	MP2BH011
			Client Sample Ref.:		ES2	ES6	ES1
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		1.00	5.00	1.00
			Date Sampled:		06-Aug-2018	06-Aug-2018	03-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	[B] < 0.010	[B] < 0.010	[B] < 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	[B] 1.1	[B] < 0.10	[B] < 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	[B] 26	[B] < 0.10	[B] < 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	[B] 50	[B] 2.6	[B] < 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	[B] 53	[B] 35	[B] < 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	[B] 130	[B] 37	[B] < 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	[B] 620	[B] 55	[B] < 2.0
Naphthalene	N	2700	mg/kg	0.010	0.63	0.79	< 0.010
Acenaphthylene	N	2700	mg/kg	0.010	0.29	0.64	< 0.010
Acenaphthene	N	2700	mg/kg	0.010	1.3	2.3	< 0.010
Fluorene	N	2700	mg/kg	0.010	1.3	2.0	< 0.010
Phenanthrene	N	2700	mg/kg	0.010	3.8	8.7	< 0.010
Anthracene	N	2700	mg/kg	0.010	1.5	3.1	< 0.010
Fluoranthene	N	2700	mg/kg	0.010	2.4	11	< 0.010
Pyrene	N	2700	mg/kg	0.010	3.0	11	< 0.010
Benzo[a]anthracene	N	2700	mg/kg	0.010	1.5	4.9	< 0.010
Chrysene	N	2700	mg/kg	0.010	2.1	5.6	< 0.010
Benzo[b]fluoranthene	N	2700	mg/kg	0.010	1.3	5.6	< 0.010
Benzo[k]fluoranthene	N	2700	mg/kg	0.010	0.51	2.0	< 0.010
Benzo[a]pyrene	N	2700	mg/kg	0.010	0.80	4.4	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010	0.67	3.3	< 0.010
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010	0.16	1.2	< 0.010
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010	0.73	3.2	< 0.010
Coronene	N	2700	mg/kg	0.010	< 0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	2700	mg/kg	0.20	22	70	< 0.20
Dichlorodifluoromethane	N	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Chloromethane	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Vinyl Chloride	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Bromomethane	M	2760	µg/kg	20	[B] < 20	[B] < 20	[B] < 20
Chloroethane	N	2760	µg/kg	2.0	[B] < 2.0	[B] < 2.0	[B] < 2.0
Trichlorofluoromethane	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,1-Dichloroethene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Trans 1,2-Dichloroethene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,1-Dichloroethane	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Bromochloromethane	N	2760	µg/kg	5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-23872	18-23872	18-23872
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	668912	668916	668917
Order No.:				Client Location ID.:	MP2BH08	MP2BH08	MP2BH011
				Client Sample Ref.:	ES2	ES6	ES1
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	1.00	5.00	1.00
				Date Sampled:	06-Aug-2018	06-Aug-2018	03-Aug-2018
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Trichloromethane	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Tetrachloromethane	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,1-Dichloropropene	N	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Benzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0	[B] < 2.0	[B] < 2.0	[B] < 2.0
Trichloroethene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,2-Dichloropropane	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Dibromomethane	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Bromodichloromethane	M	2760	µg/kg	5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	[B] < 10	[B] < 10	[B] < 10
Toluene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	[B] < 10	[B] < 10	[B] < 10
1,1,2-Trichloroethane	M	2760	µg/kg	10	[B] < 10	[B] < 10	[B] < 10
Tetrachloroethene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,3-Dichloropropane	N	2760	µg/kg	2.0	[B] < 2.0	[B] < 2.0	[B] < 2.0
Dibromochloromethane	N	2760	µg/kg	10	[B] < 10	[B] < 10	[B] < 10
1,2-Dibromoethane	M	2760	µg/kg	5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0
Chlorobenzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	[B] < 2.0	[B] < 2.0	[B] < 2.0
Ethylbenzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
m & p-Xylene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
o-Xylene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Styrene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Tribromomethane	N	2760	µg/kg	1.0	[B] < 1.0	[B] 2.6	[B] < 1.0
Isopropylbenzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Bromobenzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	[B] < 50	[B] < 50	[B] < 50
N-Propylbenzene	N	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
4-Chlorotoluene	N	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Tert-Butylbenzene	N	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Sec-Butylbenzene	N	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
4-Isopropyltoluene	N	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0

Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-23872	18-23872	18-23872
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	668912	668916	668917
Order No.:				Client Location ID.:	MP2BH08	MP2BH08	MP2BH011
				Client Sample Ref.:	ES2	ES6	ES1
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	1.00	5.00	1.00
				Date Sampled:	06-Aug-2018	06-Aug-2018	03-Aug-2018
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
N-Butylbenzene	N	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	50	[B] < 50	[B] < 50	[B] < 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
Hexachlorobutadiene	N	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1,2,3-Trichlorobenzene	N	2760	µg/kg	2.0	[B] < 2.0	[B] < 2.0	[B] < 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
N-Nitrosodimethylamine	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Phenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2-Chlorophenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1,3-Dichlorobenzene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1,4-Dichlorobenzene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1,2-Dichlorobenzene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2-Methylphenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Hexachloroethane	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
4-Methylphenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Nitrobenzene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Isophorone	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2-Nitrophenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2,4-Dimethylphenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2,4-Dichlorophenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Naphthalene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
4-Chloroaniline	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Hexachlorobutadiene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2-Methylnaphthalene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2-Chloronaphthalene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2-Nitroaniline	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Acenaphthylene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Dimethylphthalate	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-23872	18-23872	18-23872
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		668912	668916	668917
Order No.:			Client Location ID.:		MP2BH08	MP2BH08	MP2BH011
			Client Sample Ref.:		ES2	ES6	ES1
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		1.00	5.00	1.00
			Date Sampled:		06-Aug-2018	06-Aug-2018	03-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Acenaphthene	N	2790	mg/kg	0.050	[B] < 0.050	[B] 0.24	[B] < 0.050
3-Nitroaniline	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Dibenzofuran	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
4-Chlorophenylphenylether	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2,4-Dinitrotoluene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Fluorene	N	2790	mg/kg	0.050	[B] < 0.050	[B] 0.13	[B] < 0.050
Diethyl Phthalate	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
4-Nitroaniline	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Azobenzene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Hexachlorobenzene	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Pentachlorophenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Phenanthrene	N	2790	mg/kg	0.050	[B] 0.74	[B] 2.0	[B] < 0.050
Anthracene	N	2790	mg/kg	0.050	[B] 0.26	[B] 0.41	[B] < 0.050
Carbazole	N	2790	mg/kg	0.050	[B] < 0.050	[B] 0.12	[B] < 0.050
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Fluoranthene	N	2790	mg/kg	0.050	[B] 0.97	[B] 3.2	[B] < 0.050
Pyrene	N	2790	mg/kg	0.050	[B] 0.98	[B] 2.7	[B] < 0.050
Butylbenzyl Phthalate	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Benzo[a]anthracene	N	2790	mg/kg	0.050	[B] 0.45	[B] 1.7	[B] < 0.050
Chrysene	N	2790	mg/kg	0.050	[B] 0.49	[B] 1.7	[B] < 0.050
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	[B] 0.56	[B] 1.9	[B] < 0.050
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	[B] 0.18	[B] 0.66	[B] < 0.050
Benzo[a]pyrene	N	2790	mg/kg	0.050	[B] 0.40	[B] 1.5	[B] < 0.050
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	[B] 0.19	[B] 0.82	[B] < 0.050
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	[B] < 0.050	[B] 0.30	[B] < 0.050
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	[B] 0.21	[B] 0.95	[B] < 0.050
4-Nitrophenol	N	2790	mg/kg	0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
PCB 81	N	2815	mg/kg	0.0010	< 0.0010		
PCB 77	N	2815	mg/kg	0.0010	< 0.0010		
PCB 105	N	2815	mg/kg	0.0010	< 0.0010		
PCB 114	N	2815	mg/kg	0.0010	< 0.0010		
PCB 118	N	2815	mg/kg	0.0010	< 0.0010		
PCB 123	N	2815	mg/kg	0.0010	< 0.0010		

Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-23872	18-23872	18-23872
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		668912	668916	668917
Order No.:			Client Location ID.:		MP2BH08	MP2BH08	MP2BH011
			Client Sample Ref.:		ES2	ES6	ES1
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		1.00	5.00	1.00
			Date Sampled:		06-Aug-2018	06-Aug-2018	03-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
PCB 126	N	2815	mg/kg	0.0010	< 0.0010		
PCB 156	N	2815	mg/kg	0.0010	< 0.0010		
PCB 157	N	2815	mg/kg	0.0010	< 0.0010		
PCB 167	N	2815	mg/kg	0.0010	< 0.0010		
PCB 169	N	2815	mg/kg	0.0010	< 0.0010		
PCB 189	N	2815	mg/kg	0.0010	< 0.0010		
Total PCBs (12 Congeners)	N	2815	mg/kg	0.0010	< 0.0010		
Resorcinol	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Phenol	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Cresols	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Xylenols	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050
1-Naphthol	N	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Trimethylphenols	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample ID:	Sample Location ID:	Sample Ref:	Sampled Date:	Deviation Code(s):	Containers Received:
668912	MP2BH08	ES2	06-Aug-2018	B	Amber Glass 250ml
668912	MP2BH08	ES2	06-Aug-2018	B	Amber Glass 60ml
668912	MP2BH08	ES2	06-Aug-2018	B	Plastic Tub 500g
668916	MP2BH08	ES6	06-Aug-2018	B	Amber Glass 250ml
668916	MP2BH08	ES6	06-Aug-2018	B	Amber Glass 60ml
668916	MP2BH08	ES6	06-Aug-2018	B	Plastic Tub 500g
668917	MP2BH011	ES1	03-Aug-2018	B	Amber Glass 250ml
668917	MP2BH011	ES1	03-Aug-2018	B	Amber Glass 60ml
668917	MP2BH011	ES1	03-Aug-2018	B	Plastic Tub 500g

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	18-24066-1
Initial Date of Issue:	20-Aug-2018
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Sean Ross Stephen Franey Stephen Watson Stuart Abraham
Project	18-0795 Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	10-Aug-2018
Order No.:		**Date Instructed:**	13-Aug-2018
No. of Samples:	13		
Turnaround (Wkdays):	4	**Results Due:**	16-Aug-2018
Date Approved:	20-Aug-2018		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

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Results - Leachate

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-24066	18-24066	18-24066
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	669860	669871	669878
Order No.:				Client Location ID.:	BH09	BH14	BH15
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.5	3.0	4.0
				Date Sampled:	07-Aug-2018	08-Aug-2018	08-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
pH	U	1010		N/A	8.8	8.2	8.5
Ammonia (Free) as N	U	1220	mg/l	0.050	< 0.050	< 0.050	< 0.050
Nitrite as N	U	1220	mg/l	0.010	< 0.010	< 0.010	< 0.010
Nitrate as N	U	1220	mg/l	0.20	< 0.20	< 0.20	< 0.20
Phosphate as P	U	1220	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Total) Low-Level	N	1300	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Aluminium (Dissolved)	N	1450	µg/l	10	120	15	42
Arsenic (Dissolved)	U	1450	µg/l	1.0	1.2	< 1.0	< 1.0
Boron (Dissolved)	U	1450	µg/l	20	< 20	25	< 20
Barium (Dissolved)	U	1450	µg/l	5.0	9.1	14	< 5.0
Beryllium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080	< 0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Copper (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Manganese (Dissolved)	U	1450	µg/l	1.0	2.0	52	2.2
Nickel (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Vanadium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0
Zinc (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	7.0
Mercury Low Level	U	1460	µg/l	0.010	< 0.010	< 0.010	< 0.010
Iron (Dissolved)	N	1450	µg/l	20	< 20	56	63
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0

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Results - Leachate

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24066	18-24066	18-24066
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		669860	669871	669878
Order No.:			Client Location ID.:		BH09	BH14	BH15
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		0.5	3.0	4.0
			Date Sampled:		07-Aug-2018	08-Aug-2018	08-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10
Dibutyl Tin	N	1730	µg/l	0.050	< 0.050	< 0.050	< 0.050
Tributyl Tin	N	1730	µg/l	0.0500	< 0.050	< 0.050	< 0.050
Dichlorodifluoromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Vinyl Chloride	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Bromomethane	N	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Chloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20
Trichlorofluoromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,1-Dichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dichloromethane	N	1760	µg/l	100	< 100	< 100	< 100
1,1-Dichloroethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
cis 1,2-Dichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Bromochloromethane	N	1760	µg/l	0.50	< 0.50	< 0.50	< 0.50
Trichloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,1,1-Trichloroethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Tetrachloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,1-Dichloropropene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,2-Dichloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20
Trichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,2-Dichloropropane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibromomethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Bromodichloromethane	N	1760	µg/l	0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Toluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Trans-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,3-Dichloropropane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20
Dibromochloromethane	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	N	1760	µg/l	0.50	< 0.50	< 0.50	< 0.50
Chlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,1,1,2-Tetrachloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20
Ethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
m & p-Xylene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
o-Xylene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Styrene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Tribromomethane	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10

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Results - Leachate

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24066	18-24066	18-24066
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		669860	669871	669878
Order No.:			Client Location ID.:		BH09	BH14	BH15
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		0.5	3.0	4.0
			Date Sampled:		07-Aug-2018	08-Aug-2018	08-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Bromobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,2,3-Trichloropropane	N	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0
N-Propylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
2-Chlorotoluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,3,5-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
4-Chlorotoluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Tert-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,2,4-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Sec-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,3-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
4-Isopropyltoluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,4-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
N-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,2-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,2-Dibromo-3-Chloropropane	N	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0
1,2,4-Trichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Hexachlorobutadiene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
1,2,3-Trichlorobenzene	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20
Naphthalene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10
Phenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2-Chlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Hexachloroethane	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
4-Methylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Nitrobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Isophorone	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2-Nitrophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2,4-Dimethylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2,4-Dichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Naphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
4-Chloroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Hexachlorobutadiene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050

Chemtest
The right chemistry to deliver results

Results - Leachate

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24066	18-24066	18-24066
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		669860	669871	669878
Order No.:			Client Location ID.:		BH09	BH14	BH15
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		0.5	3.0	4.0
			Date Sampled:		07-Aug-2018	08-Aug-2018	08-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
4-Chloro-3-Methylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2-Methylnaphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Hexachlorocyclopentadiene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2,4,6-Trichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2-Chloronaphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Acenaphthylene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Dimethylphthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2,6-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Acenaphthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
3-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Dibenzofuran	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
4-Chlorophenylphenylether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Fluorene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Diethyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
4-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Azobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Hexachlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Pentachlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Carbazole	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Di-N-Butyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Butylbenzyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Chrysene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Di-N-Octyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Benzo[k]fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Benzo[a]pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Dibenz(a,h)Anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050
Benzo[g,h,i]perylene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050

Chemtest
The right chemistry to deliver results

Results - Leachate

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-24066	18-24066	18-24066
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	669860	669871	669878
Order No.:				Client Location ID.:	BH09	BH14	BH15
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.5	3.0	4.0
				Date Sampled:	07-Aug-2018	08-Aug-2018	08-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Naphthalene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Coronene	N	1800	µg/l	0.010	< 0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	1800	µg/l	0.20	< 0.20	< 0.20	< 0.20
PCB 81	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
PCB 77	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
PCB 105	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
PCB 114	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
PCB 118	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
PCB 123	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
PCB 126	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
PCB 156	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
PCB 157	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
PCB 167	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
PCB 169	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
PCB 189	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
Total PCBs (12 Congeners)	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010
Resorcinol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Phenol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Cresols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

Chemtest
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Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	669861	669863	669866	669869	669872	669874	669875	669881
Order No.:				Client Location ID.:	BH09	BH16	BH16	BH14	BH14	BH15	BH15	BH17
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.0	1.0	4.0	1.0	4.0	0.5	1.0	1.0
				Date Sampled:	07-Aug-2018	07-Aug-2018	07-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192		N/A	-	Fibres/Clumps	-	-	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	Chrysotile	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	5.1	12	11	7.8	13	5.7	9.6	3.9
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones, Chalk	Stones	Stones,	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
pH	M	2010		N/A	8.9	8.0	8.5	8.5	8.4	9.8	8.7	9.2
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.40	1.3	4.5	0.70	0.67	< 0.40	0.49	0.57
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.10	1.1	0.39	0.074	0.35	0.10	0.014	0.81
Total Sulphur	M	2175	%	0.010	< 0.010	0.28	0.29	0.039	0.23	0.050	0.084	0.24
Sulphur (Elemental)	M	2180	mg/kg	1.0	2.4	26	15	9.9	780	7.6	16	6.3
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Iron (Total)	N	2430	mg/kg	100	7000	22000	11000	13000	16000	3100	14000	11000
Arsenic	M	2450	mg/kg	1.0	43	90	42	28	30	29	28	23
Barium	M	2450	mg/kg	10	87	620	150	140	64	35	150	130
Beryllium	U	2450	mg/kg	1.0	< 1.0	3.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.63	1.1	0.43	1.8	1.3	0.27	0.86	0.58
Chromium	M	2450	mg/kg	1.0	13	35	21	17	30	4.7	24	12
Copper	M	2450	mg/kg	0.50	24	390	53	30	41	27	49	25
Mercury	M	2450	mg/kg	0.10	0.31	1.6	0.45	1.0	0.22	< 0.10	0.72	0.18
Nickel	M	2450	mg/kg	0.50	20	75	51	44	46	9.1	36	27
Lead	M	2450	mg/kg	0.50	99	1100	95	200	310	14	290	74
Selenium	M	2450	mg/kg	0.20	< 0.20	0.93	1.4	0.71	0.95	< 0.20	0.34	0.57
Vanadium	U	2450	mg/kg	5.0	22	64	28	28	40	13	32	18
Zinc	M	2450	mg/kg	0.50	140	560	130	100	150	27	150	95
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	1.9	19	2.8	0.97	0.83	3.1	4.8	2.1
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	2.9	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.7
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	5.8	< 0.10	< 0.10	21	< 0.10	< 0.10	3.2
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	15	< 0.10	< 0.10	90	< 0.10	< 0.10	75
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	46	93	30	45	200	< 0.10	34	94
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	6.8	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	46	120	30	45	310	< 1.0	34	170
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010

Chemtest
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Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd					**Chemtest Job No.:**	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066
Quotation No.: Q18-13690					**Chemtest Sample ID.:**	669861	669863	669866	669869	669872	669874	669875	669881
Order No.:					Client Location ID.:	BH09	BH16	BH16	BH14	BH14	BH15	BH15	BH17
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.0	1.0	4.0	1.0	4.0	0.5	1.0	1.0
					Date Sampled:	07-Aug-2018	07-Aug-2018	07-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018
					Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10		< 0.10	1.6	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10		2.3	53	1.8	1.2	9.0	< 0.10	3.8	30
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10		100	530	88	59	76	< 0.10	74	730
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10		< 0.10	42	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	120
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0		100	630	90	60	85	< 1.0	78	880
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0		150	750	120	110	400	< 2.0	110	1100
Naphthalene	N	2700	mg/kg	0.010		< 0.010	1.3	< 0.010	< 0.010	< 0.010	< 0.010	1.8	< 0.010
Acenaphthylene	N	2700	mg/kg	0.010		< 0.010	0.52	< 0.010	< 0.010	< 0.010	< 0.010	1.0	< 0.010
Acenaphthene	N	2700	mg/kg	0.010		< 0.010	0.45	< 0.010	< 0.010	< 0.010	< 0.010	4.6	< 0.010
Fluorene	N	2700	mg/kg	0.010		< 0.010	0.61	< 0.010	< 0.010	< 0.010	< 0.010	3.7	< 0.010
Phenanthrene	N	2700	mg/kg	0.010		1.3	3.2	1.6	< 0.010	2.1	< 0.010	26	< 0.010
Anthracene	N	2700	mg/kg	0.010		0.36	0.81	0.43	< 0.010	0.40	< 0.010	4.6	< 0.010
Fluoranthene	N	2700	mg/kg	0.010		2.0	4.7	2.4	< 0.010	1.6	< 0.010	30	1.0
Pyrene	N	2700	mg/kg	0.010		3.0	5.3	2.6	< 0.010	1.9	< 0.010	32	1.1
Benzo[a]anthracene	N	2700	mg/kg	0.010		1.0	2.6	1.6	< 0.010	0.58	< 0.010	15	0.45
Chrysene	N	2700	mg/kg	0.010		1.3	3.2	1.4	< 0.010	0.83	< 0.010	19	1.0
Benzo[b]fluoranthene	N	2700	mg/kg	0.010		1.4	3.7	1.2	< 0.010	< 0.010	< 0.010	18	< 0.010
Benzo[k]fluoranthene	N	2700	mg/kg	0.010		0.56	1.3	0.39	< 0.010	< 0.010	< 0.010	6.4	< 0.010
Benzo[a]pyrene	N	2700	mg/kg	0.010		1.2	2.7	0.89	< 0.010	< 0.010	< 0.010	15	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010		0.70	1.8	0.54	< 0.010	< 0.010	< 0.010	9.0	< 0.010
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010		< 0.010	0.61	< 0.010	< 0.010	< 0.010	< 0.010	2.9	< 0.010
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010		0.69	2.2	0.70	< 0.010	< 0.010	< 0.010	9.5	< 0.010
Coronene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	2700	mg/kg	0.20		14	35	14	< 0.20	7.4	< 0.20	200	3.6
Dichlorodifluoromethane	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	M	2760	µg/kg	20		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Chloroethane	N	2760	µg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	N	2760	µg/kg	5.0		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Trichloromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd					**Chemtest Job No.:**	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066
Quotation No.: Q18-13690					**Chemtest Sample ID.:**	669861	669863	669866	669869	669872	669874	669875	669881
Order No.:					Client Location ID.:	BH09	BH16	BH16	BH14	BH14	BH15	BH15	BH17
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.0	1.0	4.0	1.0	4.0	0.5	1.0	1.0
					Date Sampled:	07-Aug-2018	07-Aug-2018	07-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018
					Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Tetrachloromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	M	2760	µg/kg	5.0		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Toluene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	N	2760	µg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	N	2760	µg/kg	10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	M	2760	µg/kg	5.0		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
N-Propylbenzene	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	50		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50

Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	669861	669863	669866	669869	669872	669874	669875	669881
Order No.:				Client Location ID.:	BH09	BH16	BH16	BH14	BH14	BH15	BH15	BH17
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.0	1.0	4.0	1.0	4.0	0.5	1.0	1.0
				Date Sampled:	07-Aug-2018	07-Aug-2018	07-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	N	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodimethylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Chlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachloroethane	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Nitrobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Isophorone	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dimethylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Naphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Chloroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobutadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methylnaphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Chloronaphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthylene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dimethylphthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthene	N	2790	mg/kg	0.050	0.14	0.068	< 0.050	< 0.050	0.25	< 0.050	< 0.050	< 0.050
3-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dibenzofuran	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050

Chemtest
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Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd					**Chemtest Job No.:**	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066
Quotation No.: Q18-13690					**Chemtest Sample ID.:**	669861	669863	669866	669869	669872	669874	669875	669881
Order No.:					Client Location ID.:	BH09	BH16	BH16	BH14	BH14	BH15	BH15	BH17
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.0	1.0	4.0	1.0	4.0	0.5	1.0	1.0
					Date Sampled:	07-Aug-2018	07-Aug-2018	07-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018
					Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
4-Chlorophenylphenylether	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Fluorene	N	2790	mg/kg	0.050		0.084	< 0.050	< 0.050	< 0.050	0.20	< 0.050	< 0.050	< 0.050
Diethyl Phthalate	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Nitroaniline	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	5.4	< 0.050	< 0.050	< 0.050	< 0.050
Azobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Pentachlorophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	N	2790	mg/kg	0.050		1.4	1.1	0.56	0.24	0.48	< 0.050	< 0.050	< 0.050
Anthracene	N	2790	mg/kg	0.050		0.31	0.36	0.15	0.054	0.17	< 0.050	< 0.050	< 0.050
Carbazole	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	0.78	< 0.050	0.42	< 0.050
Fluoranthene	N	2790	mg/kg	0.050		2.0	2.6	0.92	0.58	0.66	< 0.050	0.82	< 0.050
Pyrene	N	2790	mg/kg	0.050		1.9	2.2	0.83	0.53	0.76	< 0.050	0.66	< 0.050
Butylbenzyl Phthalate	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	2790	mg/kg	0.050		1.2	1.7	0.60	0.37	0.31	< 0.050	0.40	< 0.050
Chrysene	N	2790	mg/kg	0.050		1.2	1.7	0.52	0.34	0.39	< 0.050	0.40	< 0.050
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050		0.063	< 0.050	0.16	0.087	0.88	0.14	< 0.050	< 0.050
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	2790	mg/kg	0.050		1.5	3.2	0.77	0.46	0.33	< 0.050	0.60	< 0.050
Benzo[k]fluoranthene	N	2790	mg/kg	0.050		0.43	1.0	< 0.050	0.14	0.11	< 0.050	0.21	< 0.050
Benzo[a]pyrene	N	2790	mg/kg	0.050		0.85	1.5	0.46	0.25	0.20	< 0.050	0.33	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050		0.63	1.1	< 0.050	0.14	< 0.050	< 0.050	0.22	< 0.050
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050		0.20	0.48	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050		0.76	1.5	0.34	0.20	0.11	< 0.050	0.31	< 0.050
4-Nitrophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
PCB 81	N	2815	mg/kg	0.0010									< 0.0010
PCB 77	N	2815	mg/kg	0.0010									< 0.0010
PCB 105	N	2815	mg/kg	0.0010									< 0.0010
PCB 114	N	2815	mg/kg	0.0010									< 0.0010
PCB 118	N	2815	mg/kg	0.0010									< 0.0010
PCB 123	N	2815	mg/kg	0.0010									< 0.0010
PCB 126	N	2815	mg/kg	0.0010									< 0.0010
PCB 156	N	2815	mg/kg	0.0010									< 0.0010
PCB 157	N	2815	mg/kg	0.0010									< 0.0010
PCB 167	N	2815	mg/kg	0.0010									< 0.0010
PCB 169	N	2815	mg/kg	0.0010									< 0.0010

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066	18-24066
Quotation No.: Q18-13690			**Chemtest Sample ID.:**	669861	669863	669866	669869	669872	669874	669875	669881
Order No.:			Client Location ID.:	BH09	BH16	BH16	BH14	BH14	BH15	BH15	BH17
			Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):	1.0	1.0	4.0	1.0	4.0	0.5	1.0	1.0
			Date Sampled:	07-Aug-2018	07-Aug-2018	07-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018	08-Aug-2018
			Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
PCB 189	N	2815	mg/kg	0.0010							< 0.0010
Total PCBs (12 Congeners)	N	2815	mg/kg	0.0010							< 0.0010
Resorcinol	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenol	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cresols	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Xylenols	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1-Naphthol	N	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Trimethylphenols	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24066	18-24066
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		669884	669889
Order No.:			Client Location ID.:		BH06	BH06
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.0	7.5
			Date Sampled:		08-Aug-2018	08-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	16	30
Soil Colour	N	2040		N/A	Brown	Grey
Other Material	N	2040		N/A	Stones	NONE
Soil Texture	N	2040		N/A	Loam	Clay
pH	M	2010		N/A	8.3	8.1
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	3.1	8.0
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.56	0.92
Total Sulphur	M	2175	%	0.010	0.26	1.6
Sulphur (Elemental)	M	2180	mg/kg	1.0	900	28
Cyanide (Total)	M	2300	mg/kg	0.50	1.0	< 0.50
Iron (Total)	N	2430	mg/kg	100	20000	17000
Arsenic	M	2450	mg/kg	1.0	52	24
Barium	M	2450	mg/kg	10	370	33
Beryllium	U	2450	mg/kg	1.0	1.4	< 1.0
Cadmium	M	2450	mg/kg	0.10	4.0	0.43
Chromium	M	2450	mg/kg	1.0	30	33
Copper	M	2450	mg/kg	0.50	140	19
Mercury	M	2450	mg/kg	0.10	2.1	0.11
Nickel	M	2450	mg/kg	0.50	61	37
Lead	M	2450	mg/kg	0.50	810	32
Selenium	M	2450	mg/kg	0.20	0.76	0.42
Vanadium	U	2450	mg/kg	5.0	37	46
Zinc	M	2450	mg/kg	0.50	1100	87
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	10	1.5
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	46	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	46	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010

Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-24066	18-24066
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	669884	669889
Order No.:				Client Location ID.:	BH06	BH06
				Sample Type:	SOIL	SOIL
				Top Depth (m):	2.0	7.5
				Date Sampled:	08-Aug-2018	08-Aug-2018
				Asbestos Lab:	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	1.5	< 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	63	< 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	64	< 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	110	< 2.0
Naphthalene	N	2700	mg/kg	0.010	1.1	< 0.010
Acenaphthylene	N	2700	mg/kg	0.010	0.53	< 0.010
Acenaphthene	N	2700	mg/kg	0.010	1.2	< 0.010
Fluorene	N	2700	mg/kg	0.010	1.1	< 0.010
Phenanthrene	N	2700	mg/kg	0.010	9.6	< 0.010
Anthracene	N	2700	mg/kg	0.010	3.0	< 0.010
Fluoranthene	N	2700	mg/kg	0.010	12	< 0.010
Pyrene	N	2700	mg/kg	0.010	13	< 0.010
Benzo[a]anthracene	N	2700	mg/kg	0.010	6.1	< 0.010
Chrysene	N	2700	mg/kg	0.010	8.1	< 0.010
Benzo[b]fluoranthene	N	2700	mg/kg	0.010	7.8	< 0.010
Benzo[k]fluoranthene	N	2700	mg/kg	0.010	2.7	< 0.010
Benzo[a]pyrene	N	2700	mg/kg	0.010	6.5	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010	3.7	< 0.010
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010	1.5	< 0.010
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010	4.4	< 0.010
Coronene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	2700	mg/kg	0.20	82	< 0.20
Dichlorodifluoromethane	N	2760	µg/kg	1.0	< 1.0	< 1.0
Chloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Vinyl Chloride	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromomethane	M	2760	µg/kg	20	< 20	< 20
Chloroethane	N	2760	µg/kg	2.0	< 2.0	< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromochloromethane	N	2760	µg/kg	5.0	< 5.0	< 5.0
Trichloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	< 1.0	< 1.0

Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24066	18-24066
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		669884	669889
Order No.:			Client Location ID.:		BH06	BH06
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.0	7.5
			Date Sampled:		08-Aug-2018	08-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Tetrachloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloropropene	N	2760	µg/kg	1.0	< 1.0	< 1.0
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0	< 2.0	< 2.0
Trichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Dibromomethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromodichloromethane	M	2760	µg/kg	5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10	< 10	< 10
Tetrachloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,3-Dichloropropane	N	2760	µg/kg	2.0	< 2.0	< 2.0
Dibromochloromethane	N	2760	µg/kg	10	< 10	< 10
1,2-Dibromoethane	M	2760	µg/kg	5.0	< 5.0	< 5.0
Chlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	< 2.0	< 2.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Styrene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Tribromomethane	N	2760	µg/kg	1.0	< 1.0	< 1.0
Isopropylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50	< 50
N-Propylbenzene	N	2760	µg/kg	1.0	< 1.0	< 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
4-Chlorotoluene	N	2760	µg/kg	1.0	< 1.0	< 1.0
Tert-Butylbenzene	N	2760	µg/kg	1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Sec-Butylbenzene	N	2760	µg/kg	1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
4-Isopropyltoluene	N	2760	µg/kg	1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
N-Butylbenzene	N	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	50	< 50	< 50

Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24066	18-24066
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		669884	669889
Order No.:			Client Location ID.:		BH06	BH06
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.0	7.5
			Date Sampled:		08-Aug-2018	08-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Hexachlorobutadiene	N	2760	µg/kg	1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	N	2760	µg/kg	2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0
N-Nitrosodimethylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050
Phenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Chlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050
Hexachloroethane	N	2790	mg/kg	0.050	< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Nitrobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Isophorone	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4-Dimethylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4-Dichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Naphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Chloroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
Hexachlorobutadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Methylnaphthalene	N	2790	mg/kg	0.050	0.12	< 0.050
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Chloronaphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
Acenaphthylene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Dimethylphthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Acenaphthene	N	2790	mg/kg	0.050	0.35	< 0.050
3-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
Dibenzofuran	N	2790	mg/kg	0.050	< 0.050	< 0.050

Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-24066	18-24066
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	669884	669889
Order No.:				Client Location ID.:	BH06	BH06
				Sample Type:	SOIL	SOIL
				Top Depth (m):	2.0	7.5
				Date Sampled:	08-Aug-2018	08-Aug-2018
				Asbestos Lab:	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
4-Chlorophenylphenylether	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Fluorene	N	2790	mg/kg	0.050	0.25	< 0.050
Diethyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Azobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050
Hexachlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Pentachlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Phenanthrene	N	2790	mg/kg	0.050	2.3	< 0.050
Anthracene	N	2790	mg/kg	0.050	0.83	< 0.050
Carbazole	N	2790	mg/kg	0.050	< 0.050	< 0.050
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Fluoranthene	N	2790	mg/kg	0.050	4.0	< 0.050
Pyrene	N	2790	mg/kg	0.050	3.6	< 0.050
Butylbenzyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	2790	mg/kg	0.050	2.5	< 0.050
Chrysene	N	2790	mg/kg	0.050	2.3	< 0.050
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050	0.16	< 0.050
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	2.6	< 0.050
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	1.1	< 0.050
Benzo[a]pyrene	N	2790	mg/kg	0.050	1.7	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	0.39	< 0.050
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	1.3	< 0.050
4-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
PCB 81	N	2815	mg/kg	0.0010		
PCB 77	N	2815	mg/kg	0.0010		
PCB 105	N	2815	mg/kg	0.0010		
PCB 114	N	2815	mg/kg	0.0010		
PCB 118	N	2815	mg/kg	0.0010		
PCB 123	N	2815	mg/kg	0.0010		
PCB 126	N	2815	mg/kg	0.0010		
PCB 156	N	2815	mg/kg	0.0010		
PCB 157	N	2815	mg/kg	0.0010		
PCB 167	N	2815	mg/kg	0.0010		
PCB 169	N	2815	mg/kg	0.0010		

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24066	18-24066
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		669884	669889
Order No.:			Client Location ID.:		BH06	BH06
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.0	7.5
			Date Sampled:		08-Aug-2018	08-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
PCB 189	N	2815	mg/kg	0.0010		
Total PCBs (12 Congeners)	N	2815	mg/kg	0.0010		
Resorcinol	M	2920	mg/kg	0.050	< 0.050	< 0.050
Phenol	M	2920	mg/kg	0.050	< 0.050	< 0.050
Cresols	M	2920	mg/kg	0.050	< 0.050	< 0.050
Xylenols	M	2920	mg/kg	0.050	< 0.050	< 0.050
1-Naphthol	N	2920	mg/kg	0.050	< 0.050	< 0.050
Trimethylphenols	M	2920	mg/kg	0.050	< 0.050	< 0.050
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	18-24514-1
Initial Date of Issue:	21-Aug-2018
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Sean Ross Stephen Franey Stephen Watson Stuart Abraham
Project	18-0795 - Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	15-Aug-2018
Order No.:		**Date Instructed:**	15-Aug-2018
No. of Samples:	8		
Turnaround (Wkdays):	4	**Results Due:**	20-Aug-2018
Date Approved:	21-Aug-2018		

Approved By:

Details: Martin Dyer, Laboratory Manager

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24514	18-24514
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672016	672019
Order No.:			Client Location ID.:		BH02	BH12
			Client Sample Ref.:		ES	ES
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.0	0.5
			Date Sampled:		13-Aug-2018	09-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
pH	U	1010		N/A	9.0	9.0
Ammonia (Free) as N	U	1220	mg/l	0.050	0.056	0.060
Nitrite as N	U	1220	mg/l	0.010	< 0.010	< 0.010
Nitrate as N	U	1220	mg/l	0.20	0.31	0.29
Phosphate as P	U	1220	mg/l	0.050	0.10	< 0.050
Cyanide (Total) Low-Level	N	1300	mg/l	0.0050	< 0.0050	< 0.0050
Aluminium (Dissolved)	N	1450	µg/l	10	200	77
Arsenic (Dissolved)	U	1450	µg/l	1.0	2.4	1.1
Boron (Dissolved)	U	1450	µg/l	20	29	< 20
Barium (Dissolved)	U	1450	µg/l	5.0	5.8	< 5.0
Beryllium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0
Copper (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0
Manganese (Dissolved)	U	1450	µg/l	1.0	< 1.0	1.2
Nickel (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0
Vanadium (Dissolved)	U	1450	µg/l	1.0	3.4	1.8
Zinc (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0
Mercury Low Level	U	1460	µg/l	0.010	0.16	0.14
Iron (Dissolved)	N	1450	µg/l	20	< 20	< 20
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10

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Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24514	18-24514
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672016	672019
Order No.:			Client Location ID.:		BH02	BH12
			Client Sample Ref.:		ES	ES
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.0	0.5
			Date Sampled:		13-Aug-2018	09-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10
Dibutyl Tin	N	1730	µg/l	0.050	< 0.050	< 0.050
Tributyl Tin	N	1730	µg/l	0.0500	< 0.050	< 0.050
Dichlorodifluoromethane	N	1760	µg/l	0.10	< 0.10	< 0.10
Chloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10
Vinyl Chloride	N	1760	µg/l	0.10	< 0.10	< 0.10
Bromomethane	N	1760	µg/l	2.0	< 2.0	< 2.0
Chloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20
Trichlorofluoromethane	N	1760	µg/l	0.10	< 0.10	< 0.10
1,1-Dichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10
Dichloromethane	N	1760	µg/l	100	< 100	< 100
1,1-Dichloroethane	N	1760	µg/l	0.10	< 0.10	< 0.10
cis 1,2-Dichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10
Bromochloromethane	N	1760	µg/l	0.50	< 0.50	< 0.50
Trichloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10
1,1,1-Trichloroethane	N	1760	µg/l	0.10	< 0.10	< 0.10
Tetrachloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10
1,1-Dichloropropene	N	1760	µg/l	0.10	< 0.10	< 0.10
Benzene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,2-Dichloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20
Trichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,2-Dichloropropane	N	1760	µg/l	0.10	< 0.10	< 0.10
Dibromomethane	N	1760	µg/l	0.10	< 0.10	< 0.10
Bromodichloromethane	N	1760	µg/l	0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0	< 1.0
Toluene	N	1760	µg/l	0.10	< 0.10	< 0.10
Trans-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	N	1760	µg/l	1.0	< 1.0	< 1.0
Tetrachloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,3-Dichloropropane	N	1760	µg/l	0.20	< 0.20	< 0.20
Dibromochloromethane	N	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dibromoethane	N	1760	µg/l	0.50	< 0.50	< 0.50
Chlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,1,1,2-Tetrachloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20
Ethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
m & p-Xylene	N	1760	µg/l	0.10	< 0.10	< 0.10

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Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24514	18-24514
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672016	672019
Order No.:			Client Location ID.:		BH02	BH12
			Client Sample Ref.:		ES	ES
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.0	0.5
			Date Sampled:		13-Aug-2018	09-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
o-Xylene	N	1760	µg/l	0.10	< 0.10	< 0.10
Styrene	N	1760	µg/l	0.10	< 0.10	< 0.10
Tribromomethane	N	1760	µg/l	1.0	< 1.0	< 1.0
Isopropylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
Bromobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,2,3-Trichloropropane	N	1760	µg/l	5.0	< 5.0	< 5.0
N-Propylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
2-Chlorotoluene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,3,5-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
4-Chlorotoluene	N	1760	µg/l	0.10	< 0.10	< 0.10
Tert-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,2,4-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
Sec-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,3-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
4-Isopropyltoluene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,4-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
N-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,2-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,2-Dibromo-3-Chloropropane	N	1760	µg/l	5.0	< 5.0	< 5.0
1,2,4-Trichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10
Hexachlorobutadiene	N	1760	µg/l	0.10	< 0.10	< 0.10
1,2,3-Trichlorobenzene	N	1760	µg/l	0.20	< 0.20	< 0.20
Naphthalene	N	1760	µg/l	0.10	< 0.10	< 0.10
Phenol	N	1790	µg/l	0.050	< 0.050	< 0.050
2-Chlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.050	< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.050	< 0.050	< 0.050
Hexachloroethane	N	1790	µg/l	0.050	< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.050	< 0.050	< 0.050
4-Methylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050
Nitrobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050
Isophorone	N	1790	µg/l	0.050	< 0.050	< 0.050
2-Nitrophenol	N	1790	µg/l	0.050	< 0.050	< 0.050
2,4-Dimethylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050

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Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24514	18-24514
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672016	672019
Order No.:			Client Location ID.:		BH02	BH12
			Client Sample Ref.:		ES	ES
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.0	0.5
			Date Sampled:		13-Aug-2018	09-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.050	< 0.050	< 0.050
2,4-Dichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050
Naphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050
4-Chloroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050
Hexachlorobutadiene	N	1790	µg/l	0.050	< 0.050	< 0.050
4-Chloro-3-Methylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050
2-Methylnaphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050
Hexachlorocyclopentadiene	N	1790	µg/l	0.050	< 0.050	< 0.050
2,4,6-Trichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050
2-Chloronaphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050
2-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050
Acenaphthylene	N	1790	µg/l	0.050	< 0.050	< 0.050
Dimethylphthalate	N	1790	µg/l	0.050	< 0.050	< 0.050
2,6-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050	< 0.050
Acenaphthene	N	1790	µg/l	0.050	< 0.050	< 0.050
3-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050
Dibenzofuran	N	1790	µg/l	0.050	< 0.050	< 0.050
4-Chlorophenylphenylether	N	1790	µg/l	0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050	< 0.050
Fluorene	N	1790	µg/l	0.050	< 0.050	< 0.050
Diethyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050
4-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.050	< 0.050	< 0.050
Azobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	1790	µg/l	0.050	< 0.050	< 0.050
Hexachlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050
Pentachlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050
Phenanthrene	N	1790	µg/l	0.050	< 0.050	< 0.050
Anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050
Carbazole	N	1790	µg/l	0.050	< 0.050	< 0.050
Di-N-Butyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050
Fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050
Pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050
Butylbenzyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050
Chrysene	N	1790	µg/l	0.050	< 0.050	< 0.050

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24514	18-24514
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672016	672019
Order No.:			Client Location ID.:		BH02	BH12
			Client Sample Ref.:		ES	ES
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.0	0.5
			Date Sampled:		13-Aug-2018	09-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050
Di-N-Octyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050
Benzo[k]fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050
Benzo[a]pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050
Dibenz(a,h)Anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050
Benzo[g,h,i]perylene	N	1790	µg/l	0.050	< 0.050	< 0.050
Naphthalene	N	1800	µg/l	0.010	< 0.010	< 0.010
Acenaphthylene	N	1800	µg/l	0.010	< 0.010	< 0.010
Acenaphthene	N	1800	µg/l	0.010	< 0.010	< 0.010
Fluorene	N	1800	µg/l	0.010	< 0.010	< 0.010
Phenanthrene	N	1800	µg/l	0.010	< 0.010	< 0.010
Anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010
Fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010
Pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010
Chrysene	N	1800	µg/l	0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1800	µg/l	0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	µg/l	0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	µg/l	0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	µg/l	0.010	< 0.010	< 0.010
Coronene	N	1800	µg/l	0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	1800	µg/l	0.20	< 0.20	< 0.20
PCB 81	N	1815	µg/l	0.010	< 0.010	< 0.010
PCB 77	N	1815	µg/l	0.010	< 0.010	< 0.010
PCB 105	N	1815	µg/l	0.010	< 0.010	< 0.010
PCB 114	N	1815	µg/l	0.010	< 0.010	< 0.010
PCB 118	N	1815	µg/l	0.010	< 0.010	< 0.010
PCB 123	N	1815	µg/l	0.010	< 0.010	< 0.010
PCB 126	N	1815	µg/l	0.010	< 0.010	< 0.010
PCB 156	N	1815	µg/l	0.010	< 0.010	< 0.010
PCB 157	N	1815	µg/l	0.010	< 0.010	< 0.010
PCB 167	N	1815	µg/l	0.010	< 0.010	< 0.010
PCB 169	N	1815	µg/l	0.010	< 0.010	< 0.010
PCB 189	N	1815	µg/l	0.010	< 0.010	< 0.010

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Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24514	18-24514
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672016	672019
Order No.:			Client Location ID.:		BH02	BH12
			Client Sample Ref.:		ES	ES
			Sample Type:		SOIL	SOIL
			Top Depth (m):		2.0	0.5
			Date Sampled:		13-Aug-2018	09-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Total PCBs (12 Congeners)	N	1815	µg/l	0.010	< 0.010	< 0.010
Resorcinol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Phenol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Cresols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.0050	< 0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030

Chemtest
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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-24514	18-24514	18-24514	18-24514	18-24514	18-24514
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	672015	672018	672020	672023	672027	672031
Order No.:				Client Location ID.:	BH02	BH02	BH12	BH12	BH13	BH13
				Client Sample Ref.:	ES	ES	ES	ES	ES	ES
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.0	4.0	1.0	4.0	1.0	5.0
				Date Sampled:	10-Aug-2018	13-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
ACM Type	U	2192		N/A	-	-	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	7.1	9.9	3.7	9.8	12	12
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	NONE	NONE	Stones	Stones, Roots
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand	Loam
pH	M	2010		N/A	8.5	11.0	10.1	9.3	10.1	9.0
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.91	1.8	< 0.40	< 0.40	0.68	1.0
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.11	0.24	0.027	0.044	0.95	0.21
Total Sulphur	M	2175	%	0.010	0.021	0.070	0.028	0.070	0.20	0.12
Sulphur (Elemental)	M	2180	mg/kg	1.0	2.0	1.5	1.4	9.9	490	180
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.1
Iron (Total)	N	2430	mg/kg	100	8900	7900	6900	6300	15000	17000
Arsenic	M	2450	mg/kg	1.0	24	16	8.7	13	36	29
Barium	M	2450	mg/kg	10	40	18	11	11	290	400
Beryllium	U	2450	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.50	0.41	0.17	0.22	1.6	3.5
Chromium	M	2450	mg/kg	1.0	13	9.4	9.4	7.8	20	20
Copper	M	2450	mg/kg	0.50	13	6.2	7.8	4.1	73	40
Mercury	M	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.41	0.22
Nickel	M	2450	mg/kg	0.50	21	13	11	11	40	53
Lead	M	2450	mg/kg	0.50	25	27	11	4.4	360	120
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	2.5
Vanadium	U	2450	mg/kg	5.0	16	12	8.6	10	22	25
Zinc	M	2450	mg/kg	0.50	44	35	28	20	550	260
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	1.1	0.69	2.4	0.93	3.6	1.5
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	4.8	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	6.9	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	25	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	170	35
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	210	36
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010

Chemtest
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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd					**Chemtest Job No.:**	18-24514	18-24514	18-24514	18-24514	18-24514	18-24514
Quotation No.: Q18-13690					**Chemtest Sample ID.:**	672015	672018	672020	672023	672027	672031
Order No.:					Client Location ID.:	BH02	BH02	BH12	BH12	BH13	BH13
					Client Sample Ref.:	ES	ES	ES	ES	ES	ES
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.0	4.0	1.0	4.0	1.0	5.0
					Date Sampled:	10-Aug-2018	13-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018
					Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	1.4	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	7.3	4.6
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	210	59
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	210	64
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0	420	99
Naphthalene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.57
Acenaphthylene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.58
Acenaphthene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.17
Fluorene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.17
Phenanthrene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	1.1
Anthracene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.20
Fluoranthene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	2.1
Pyrene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	2.1
Benzo[a]anthracene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.72
Chrysene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	1.7
Benzo[b]fluoranthene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	1.1
Benzo[k]fluoranthene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.85
Benzo[a]pyrene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.44
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Coronene	N	2700	mg/kg	0.010		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	2700	mg/kg	0.20		< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	12
Dichlorodifluoromethane	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	M	2760	µg/kg	20		< 20	< 20	< 20	< 20	< 20	< 20
Chloroethane	N	2760	µg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	N	2760	µg/kg	5.0		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24514	18-24514	18-24514	18-24514	18-24514	18-24514
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672015	672018	672020	672023	672027	672031
Order No.:			Client Location ID.:		BH02	BH02	BH12	BH12	BH13	BH13
			Client Sample Ref.:		ES	ES	ES	ES	ES	ES
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.0	4.0	1.0	4.0	1.0	5.0
			Date Sampled:		10-Aug-2018	13-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Trichloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	M	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	N	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	N	2760	µg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10
1,2-Dibromoethane	M	2760	µg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50	< 50	< 50	< 50	< 50	< 50
N-Propylbenzene	N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	N	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd					**Chemtest Job No.:**	18-24514	18-24514	18-24514	18-24514	18-24514	18-24514
Quotation No.: Q18-13690					**Chemtest Sample ID.:**	672015	672018	672020	672023	672027	672031
Order No.:					Client Location ID.:	BH02	BH02	BH12	BH12	BH13	BH13
					Client Sample Ref.:	ES	ES	ES	ES	ES	ES
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	1.0	4.0	1.0	4.0	1.0	5.0
					Date Sampled:	10-Aug-2018	13-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018
					Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
N-Butylbenzene	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	50		< 50	< 50	< 50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	N	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	N	2760	µg/kg	2.0		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodimethylamine	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Chlorophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methylphenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachloroethane	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Methylphenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Nitrobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Isophorone	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Nitrophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dimethylphenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dichlorophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Naphthalene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Chloroaniline	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobutadiene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methylnaphthalene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Chloronaphthalene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Nitroaniline	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthylene	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dimethylphthalate	N	2790	mg/kg	0.050		< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24514	18-24514	18-24514	18-24514	18-24514	18-24514
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672015	672018	672020	672023	672027	672031
Order No.:			Client Location ID.:		BH02	BH02	BH12	BH12	BH13	BH13
			Client Sample Ref.:		ES	ES	ES	ES	ES	ES
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.0	4.0	1.0	4.0	1.0	5.0
			Date Sampled:		10-Aug-2018	13-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
3-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dibenzofuran	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Chlorophenylphenylether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Fluorene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Diethyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Azobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Pentachlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	1.9	0.35
Anthracene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.47	< 0.050
Carbazole	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Fluoranthene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	3.5	0.67
Pyrene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	3.0	0.53
Butylbenzyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	2.4	0.29
Chrysene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	2.3	0.27
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	3.5	< 0.050
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	1.6	< 0.050
Benzo[a]pyrene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	2.2	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Resorcinol	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenol	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Cresols	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Xylenols	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1-Naphthol	N	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Trimethylphenols	M	2920	mg/kg	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24514	18-24514	18-24514	18-24514	18-24514	18-24514
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672015	672018	672020	672023	672027	672031
Order No.:			Client Location ID.:		BH02	BH02	BH12	BH12	BH13	BH13
			Client Sample Ref.:		ES	ES	ES	ES	ES	ES
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		1.0	4.0	1.0	4.0	1.0	5.0
			Date Sampled:		10-Aug-2018	13-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018	09-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

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Report Information

Key

U	UKAS accredited
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N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
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T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

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2183

Final Report

Report No.: 18-24570-1

Initial Date of Issue: 28-Aug-2018

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road
Balnamore
Ballymoney
County Antrim
BT53 7QL

Contact(s): Carin Cornwall
Colm Hurley
Darren O'Mahony
Gabriella Horan
John Cameron
Lucy Newland
Matthew Gilbert
Neil Haggan
Paul Dunlop
Paul McNamara
Sean Ross
Stephen Franey
Stephen Watson
Stuart Abraham

Project 18-0795 - Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	15-Aug-2018
Order No.:		**Date Instructed:**	15-Aug-2018
No. of Samples:	1		
Turnaround (Wkdays):	7	**Results Due:**	23-Aug-2018
Date Approved:	28-Aug-2018		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - 2 Stage WAC

Project: 18-0795 - Dublin Port MP2 Ground Investigation

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-24570						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Chemtest Sample ID:	672017								
Sample Location ID:	BH02								
Sample Ref:	ES								
Top Depth(m):	3.0								
Bottom Depth(m):									
Sampling Date:	13-Aug-2018								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			0.87	3	5	6
Loss On Ignition	2610	U	%			1.2	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				9.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.011	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0025	0.0018	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.0087	0.0031	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.0012	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0014	< 0.0010	< 0.050	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0039	< 0.0010	< 0.050	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	0.0014	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0016	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.0010	< 0.50	< 0.50	4	50	200
Chloride	1220	U	260	32	510	670	800	15000	25000
Fluoride	1220	U	0.36	0.17	< 1.0	2.0	10	150	500
Sulphate	1220	U	64	12	130	200	1000	20000	50000
Total Dissolved Solids	1020	N	1800	380	3600	6000	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	17	15	< 50	150	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	10

Leachate Test Information	
Leachant volume 1st extract/l	0.330
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.275

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Report Information

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<	"less than"
>	"greater than"

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All results are expressed on a dry weight basis
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D - Broken Container
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Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

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customerservices@chemtest.co.uk

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Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	18-24646-1
Initial Date of Issue:	22-Aug-2018
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Sean Ross Stephen Franey Stephen Watson Stuart Abraham
Project	18-0795 - Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	16-Aug-2018
Order No.:		**Date Instructed:**	17-Aug-2018
No. of Samples:	1		
Turnaround (Wkdays):	3	**Results Due:**	21-Aug-2018
Date Approved:	22-Aug-2018		

Approved By:

Details: Robert Monk, Technical Manager

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24646
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672719
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		2.0
			Date Sampled:		14-Aug-2018
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected
Moisture	N	2030	%	0.020	8.8
Soil Colour	N	2040		N/A	Brown
Other Material	N	2040		N/A	Stones
Soil Texture	N	2040		N/A	Sand
pH	M	2010		N/A	8.1
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.41
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.20
Total Sulphur	M	2175	%	0.010	0.024
Sulphur (Elemental)	M	2180	mg/kg	1.0	1.5
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50
Iron (Total)	N	2430	mg/kg	100	13000
Arsenic	M	2450	mg/kg	1.0	5.9
Barium	M	2450	mg/kg	10	97
Beryllium	U	2450	mg/kg	1.0	< 1.0
Cadmium	M	2450	mg/kg	0.10	0.20
Chromium	M	2450	mg/kg	1.0	16
Copper	M	2450	mg/kg	0.50	13
Mercury	M	2450	mg/kg	0.10	< 0.10
Nickel	M	2450	mg/kg	0.50	9.3
Lead	M	2450	mg/kg	0.50	1600
Selenium	M	2450	mg/kg	0.20	0.37
Vanadium	U	2450	mg/kg	5.0	24
Zinc	M	2450	mg/kg	0.50	46
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	M	2625	%	0.40	< 0.40
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24646
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672719
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		2.0
			Date Sampled:		14-Aug-2018
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	< 2.0
Naphthalene	N	2700	mg/kg	0.010	< 0.010
Acenaphthylene	N	2700	mg/kg	0.010	< 0.010
Acenaphthene	N	2700	mg/kg	0.010	< 0.010
Fluorene	N	2700	mg/kg	0.010	< 0.010
Phenanthrene	N	2700	mg/kg	0.010	0.36
Anthracene	N	2700	mg/kg	0.010	< 0.010
Fluoranthene	N	2700	mg/kg	0.010	0.38
Pyrene	N	2700	mg/kg	0.010	0.42
Benzo[a]anthracene	N	2700	mg/kg	0.010	< 0.010
Chrysene	N	2700	mg/kg	0.010	< 0.010
Benzo[b]fluoranthene	N	2700	mg/kg	0.010	< 0.010
Benzo[k]fluoranthene	N	2700	mg/kg	0.010	< 0.010
Benzo[a]pyrene	N	2700	mg/kg	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010	< 0.010
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010	< 0.010
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010	< 0.010
Coronene	N	2700	mg/kg	0.010	< 0.010
Total Of 17 PAH's	N	2700	mg/kg	0.20	1.2
Dichlorodifluoromethane	N	2760	µg/kg	1.0	< 1.0
Chloromethane	M	2760	µg/kg	1.0	< 1.0
Vinyl Chloride	M	2760	µg/kg	1.0	< 1.0
Bromomethane	M	2760	µg/kg	20	< 20
Chloroethane	N	2760	µg/kg	2.0	< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1.0	< 1.0
1,1-Dichloroethene	M	2760	µg/kg	1.0	< 1.0
Trans 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1.0	< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0
Bromochloromethane	N	2760	µg/kg	5.0	< 5.0

Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24646
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672719
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		2.0
			Date Sampled:		14-Aug-2018
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Trichloromethane	M	2760	µg/kg	1.0	< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	< 1.0
Tetrachloromethane	M	2760	µg/kg	1.0	< 1.0
1,1-Dichloropropene	N	2760	µg/kg	1.0	< 1.0
Benzene	M	2760	µg/kg	1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0	< 2.0
Trichloroethene	M	2760	µg/kg	1.0	< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1.0	< 1.0
Dibromomethane	M	2760	µg/kg	1.0	< 1.0
Bromodichloromethane	M	2760	µg/kg	5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10
Toluene	M	2760	µg/kg	1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10	< 10
Tetrachloroethene	M	2760	µg/kg	1.0	< 1.0
1,3-Dichloropropane	N	2760	µg/kg	2.0	< 2.0
Dibromochloromethane	N	2760	µg/kg	10	< 10
1,2-Dibromoethane	M	2760	µg/kg	5.0	< 5.0
Chlorobenzene	M	2760	µg/kg	1.0	< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	< 2.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0
Styrene	M	2760	µg/kg	1.0	< 1.0
Tribromomethane	N	2760	µg/kg	1.0	< 1.0
Isopropylbenzene	M	2760	µg/kg	1.0	< 1.0
Bromobenzene	M	2760	µg/kg	1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50
N-Propylbenzene	N	2760	µg/kg	1.0	< 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0
4-Chlorotoluene	N	2760	µg/kg	1.0	< 1.0
Tert-Butylbenzene	N	2760	µg/kg	1.0	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0
Sec-Butylbenzene	N	2760	µg/kg	1.0	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0
4-Isopropyltoluene	N	2760	µg/kg	1.0	< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0

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Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24646
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672719
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		2.0
			Date Sampled:		14-Aug-2018
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
N-Butylbenzene	N	2760	µg/kg	1.0	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	50	< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	< 1.0
Hexachlorobutadiene	N	2760	µg/kg	1.0	< 1.0
1,2,3-Trichlorobenzene	N	2760	µg/kg	2.0	< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0
N-Nitrosodimethylamine	N	2790	mg/kg	0.050	< 0.050
Phenol	N	2790	mg/kg	0.050	< 0.050
2-Chlorophenol	N	2790	mg/kg	0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050	< 0.050
1,3-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050
1,4-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050
1,2-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050
2-Methylphenol	N	2790	mg/kg	0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050	< 0.050
Hexachloroethane	N	2790	mg/kg	0.050	< 0.050
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050	< 0.050
4-Methylphenol	N	2790	mg/kg	0.050	< 0.050
Nitrobenzene	N	2790	mg/kg	0.050	< 0.050
Isophorone	N	2790	mg/kg	0.050	< 0.050
2-Nitrophenol	N	2790	mg/kg	0.050	< 0.050
2,4-Dimethylphenol	N	2790	mg/kg	0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050	< 0.050
2,4-Dichlorophenol	N	2790	mg/kg	0.050	< 0.050
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050	< 0.050
Naphthalene	N	2790	mg/kg	0.050	< 0.050
4-Chloroaniline	N	2790	mg/kg	0.050	< 0.050
Hexachlorobutadiene	N	2790	mg/kg	0.050	< 0.050
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050	< 0.050
2-Methylnaphthalene	N	2790	mg/kg	0.050	< 0.050
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050	< 0.050
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050
2-Chloronaphthalene	N	2790	mg/kg	0.050	< 0.050
2-Nitroaniline	N	2790	mg/kg	0.050	< 0.050
Acenaphthylene	N	2790	mg/kg	0.050	< 0.050
Dimethylphthalate	N	2790	mg/kg	0.050	< 0.050

Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24646
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672719
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		2.0
			Date Sampled:		14-Aug-2018
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050
Acenaphthene	N	2790	mg/kg	0.050	< 0.050
3-Nitroaniline	N	2790	mg/kg	0.050	< 0.050
Dibenzofuran	N	2790	mg/kg	0.050	< 0.050
4-Chlorophenylphenylether	N	2790	mg/kg	0.050	< 0.050
2,4-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050
Fluorene	N	2790	mg/kg	0.050	< 0.050
Diethyl Phthalate	N	2790	mg/kg	0.050	< 0.050
4-Nitroaniline	N	2790	mg/kg	0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050	< 0.050
Azobenzene	N	2790	mg/kg	0.050	< 0.050
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050	< 0.050
Hexachlorobenzene	N	2790	mg/kg	0.050	< 0.050
Pentachlorophenol	N	2790	mg/kg	0.050	< 0.050
Phenanthrene	N	2790	mg/kg	0.050	< 0.050
Anthracene	N	2790	mg/kg	0.050	< 0.050
Carbazole	N	2790	mg/kg	0.050	< 0.050
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050	< 0.050
Fluoranthene	N	2790	mg/kg	0.050	< 0.050
Pyrene	N	2790	mg/kg	0.050	< 0.050
Butylbenzyl Phthalate	N	2790	mg/kg	0.050	< 0.050
Benzo[a]anthracene	N	2790	mg/kg	0.050	< 0.050
Chrysene	N	2790	mg/kg	0.050	< 0.050
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050	< 0.050
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	< 0.050
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	< 0.050
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	< 0.050
Benzo[a]pyrene	N	2790	mg/kg	0.050	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	< 0.050
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	< 0.050
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	< 0.050
4-Nitrophenol	N	2790	mg/kg	0.050	< 0.050
Resorcinol	M	2920	mg/kg	0.050	< 0.050
Phenol	M	2920	mg/kg	0.050	< 0.050
Cresols	M	2920	mg/kg	0.050	< 0.050
Xylenols	M	2920	mg/kg	0.050	< 0.050
1-Naphthol	N	2920	mg/kg	0.050	< 0.050
Trimethylphenols	M	2920	mg/kg	0.050	< 0.050

Results - Soil

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24646
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672719
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		2.0
			Date Sampled:		14-Aug-2018
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Total Phenols	M	2920	mg/kg	0.30	< 0.30

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest
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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

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Final Report

Report No.:	18-24716-1
Initial Date of Issue:	28-Aug-2018
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Sean Ross Stephen Franey Stephen Watson Stuart Abraham
Project	18-0795 - Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	16-Aug-2018
Order No.:		**Date Instructed:**	17-Aug-2018
No. of Samples:	1		
Turnaround (Wkdays):	7	**Results Due:**	28-Aug-2018
Date Approved:	28-Aug-2018		

Approved By:

Details: Robert Monk, Technical Manager

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - 2 Stage WAC

Project: 18-0795 - Dublin Port MP2 Ground Investigation

							Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	18-24716						**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Chemtest Sample ID:	672723								
Sample Location ID:	MP2BH01								
Sample Ref:	ES								
Top Depth(m):	6.0								
Bottom Depth(m):									
Sampling Date:	14-Aug-2018								
Determinand	**SOP**	**Accred.**	**Units**						
Total Organic Carbon	2625	U	%			0.23	3	5	6
Loss On Ignition	2610	U	%			0.79	--	--	10
Total BTEX	2760	U	mg/kg			< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg			< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg			< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg			< 2.0	100	--	--
pH	2010	U				9.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg			0.12	--	To evaluate	To evaluate
Eluate Analysis			**2:1 mg/l**	**8:1 mg/l**	**2:1 mg/kg**	**Cumulative mg/kg 10:1**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1450	U	0.0017	< 0.0010	< 0.050	< 0.050	0.5	2	25
Barium	1450	U	0.015	0.0029	< 0.50	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04	1	5
Chromium	1450	U	0.0029	< 0.0010	< 0.050	< 0.050	0.5	10	70
Copper	1450	U	0.0016	< 0.0010	< 0.050	< 0.050	2	50	100
Mercury	1450	U	0.00077	< 0.00050	0.0015	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0025	< 0.0010	< 0.050	< 0.050	0.5	10	30
Nickel	1450	U	0.0013	< 0.0010	< 0.050	< 0.050	0.4	10	40
Lead	1450	U	0.0020	< 0.0010	< 0.010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.06	0.7	5
Selenium	1450	U	0.0021	< 0.0010	< 0.010	< 0.010	0.1	0.5	7
Zinc	1450	U	0.0026	< 0.0010	< 0.50	< 0.50	4	50	200
Chloride	1220	U	360	20	720	770	800	15000	25000
Fluoride	1220	U	2.7	0.16	5.4	5.9	10	150	500
Sulphate	1220	U	64	4.4	130	140	1000	20000	50000
Total Dissolved Solids	1020	N	760	52	1500	1700	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1	-	-
Dissolved Organic Carbon	1610	U	5.4	3.7	< 50	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	3.3

Leachate Test Information	
Leachant volume 1st extract/l	0.344
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.294

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Report Information

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I/S	Insufficient Sample
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N/E	not evaluated
<	"less than"
>	"greater than"

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Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

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Final Report

Report No.:	18-24738-1
Initial Date of Issue:	22-Aug-2018
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Sean Ross Stephen Franey Stephen Watson Stuart Abraham
Project	18-0795 - Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	16-Aug-2018
Order No.:		**Date Instructed:**	17-Aug-2018
No. of Samples:	1		
Turnaround (Wkdays):	4	**Results Due:**	22-Aug-2018
Date Approved:	22-Aug-2018		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24738
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672721
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		4.0
			Date Sampled:		14-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
pH	U	1010		N/A	8.5
Ammonia (Free) as N	U	1220	mg/l	0.050	< 0.050
Nitrite as N	U	1220	mg/l	0.010	< 0.010
Nitrate as N	U	1220	mg/l	0.20	< 0.20
Phosphate as P	U	1220	mg/l	0.050	< 0.050
Cyanide (Total) Low-Level	N	1300	mg/l	0.0050	< 0.0050
Aluminium (Dissolved)	N	1450	µg/l	10	13
Arsenic (Dissolved)	U	1450	µg/l	1.0	< 1.0
Boron (Dissolved)	U	1450	µg/l	20	< 20
Barium (Dissolved)	U	1450	µg/l	5.0	< 5.0
Beryllium (Dissolved)	U	1450	µg/l	1.0	< 1.0
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	< 1.0
Copper (Dissolved)	U	1450	µg/l	1.0	< 1.0
Manganese (Dissolved)	U	1450	µg/l	1.0	< 1.0
Nickel (Dissolved)	U	1450	µg/l	1.0	< 1.0
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	< 1.0
Vanadium (Dissolved)	U	1450	µg/l	1.0	< 1.0
Zinc (Dissolved)	U	1450	µg/l	1.0	< 1.0
Mercury Low Level	U	1460	µg/l	0.010	< 0.010
Iron (Dissolved)	N	1450	µg/l	20	< 20
Chromium (Hexavalent)	U	1490	µg/l	20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10

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The right chemistry to deliver results

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24738
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672721
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		4.0
			Date Sampled:		14-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10
Dibutyl Tin	N	1730	µg/l	0.050	< 0.050
Tributyl Tin	N	1730	µg/l	0.0500	< 0.050
Dichlorodifluoromethane	N	1760	µg/l	0.10	< 0.10
Chloromethane	N	1760	µg/l	0.10	< 0.10
Vinyl Chloride	N	1760	µg/l	0.10	< 0.10
Bromomethane	N	1760	µg/l	2.0	< 2.0
Chloroethane	N	1760	µg/l	0.20	< 0.20
Trichlorofluoromethane	N	1760	µg/l	0.10	< 0.10
1,1-Dichloroethene	N	1760	µg/l	0.10	< 0.10
Dichloromethane	N	1760	µg/l	100	< 100
1,1-Dichloroethane	N	1760	µg/l	0.10	< 0.10
cis 1,2-Dichloroethene	N	1760	µg/l	0.10	< 0.10
Bromochloromethane	N	1760	µg/l	0.50	< 0.50
Trichloromethane	N	1760	µg/l	0.10	< 0.10
1,1,1-Trichloroethane	N	1760	µg/l	0.10	< 0.10
Tetrachloromethane	N	1760	µg/l	0.10	< 0.10
1,1-Dichloropropene	N	1760	µg/l	0.10	< 0.10
Benzene	N	1760	µg/l	0.10	< 0.10
1,2-Dichloroethane	N	1760	µg/l	0.20	< 0.20
Trichloroethene	N	1760	µg/l	0.10	< 0.10
1,2-Dichloropropane	N	1760	µg/l	0.10	< 0.10
Dibromomethane	N	1760	µg/l	0.10	< 0.10
Bromodichloromethane	N	1760	µg/l	0.50	< 0.50
cis-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0
Toluene	N	1760	µg/l	0.10	< 0.10
Trans-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0
1,1,2-Trichloroethane	N	1760	µg/l	1.0	< 1.0
Tetrachloroethene	N	1760	µg/l	0.10	< 0.10
1,3-Dichloropropane	N	1760	µg/l	0.20	< 0.20
Dibromochloromethane	N	1760	µg/l	1.0	< 1.0
1,2-Dibromoethane	N	1760	µg/l	0.50	< 0.50
Chlorobenzene	N	1760	µg/l	0.10	< 0.10
1,1,1,2-Tetrachloroethane	N	1760	µg/l	0.20	< 0.20
Ethylbenzene	N	1760	µg/l	0.10	< 0.10
m & p-Xylene	N	1760	µg/l	0.10	< 0.10

Chemtest
The right chemistry to deliver results

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24738
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672721
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		4.0
			Date Sampled:		14-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
o-Xylene	N	1760	µg/l	0.10	< 0.10
Styrene	N	1760	µg/l	0.10	< 0.10
Tribromomethane	N	1760	µg/l	1.0	< 1.0
Isopropylbenzene	N	1760	µg/l	0.10	< 0.10
Bromobenzene	N	1760	µg/l	0.10	< 0.10
1,2,3-Trichloropropane	N	1760	µg/l	5.0	< 5.0
N-Propylbenzene	N	1760	µg/l	0.10	< 0.10
2-Chlorotoluene	N	1760	µg/l	0.10	< 0.10
1,3,5-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10
4-Chlorotoluene	N	1760	µg/l	0.10	< 0.10
Tert-Butylbenzene	N	1760	µg/l	0.10	< 0.10
1,2,4-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10
Sec-Butylbenzene	N	1760	µg/l	0.10	< 0.10
1,3-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10
4-Isopropyltoluene	N	1760	µg/l	0.10	< 0.10
1,4-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10
N-Butylbenzene	N	1760	µg/l	0.10	< 0.10
1,2-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10
1,2-Dibromo-3-Chloropropane	N	1760	µg/l	5.0	< 5.0
1,2,4-Trichlorobenzene	N	1760	µg/l	0.10	< 0.10
Hexachlorobutadiene	N	1760	µg/l	0.10	< 0.10
1,2,3-Trichlorobenzene	N	1760	µg/l	0.20	< 0.20
Naphthalene	N	1760	µg/l	0.10	< 0.10
Phenol	N	1790	µg/l	0.050	< 0.050
2-Chlorophenol	N	1790	µg/l	0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.050	< 0.050
1,3-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050
1,4-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050
1,2-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.050	< 0.050
Hexachloroethane	N	1790	µg/l	0.050	< 0.050
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.050	< 0.050
4-Methylphenol	N	1790	µg/l	0.050	< 0.050
Nitrobenzene	N	1790	µg/l	0.050	< 0.050
Isophorone	N	1790	µg/l	0.050	< 0.050
2-Nitrophenol	N	1790	µg/l	0.050	< 0.050
2,4-Dimethylphenol	N	1790	µg/l	0.050	< 0.050

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24738
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672721
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		4.0
			Date Sampled:		14-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.050	< 0.050
2,4-Dichlorophenol	N	1790	µg/l	0.050	< 0.050
1,2,4-Trichlorobenzene	N	1790	µg/l	0.050	< 0.050
Naphthalene	N	1790	µg/l	0.050	< 0.050
4-Chloroaniline	N	1790	µg/l	0.050	< 0.050
Hexachlorobutadiene	N	1790	µg/l	0.050	< 0.050
4-Chloro-3-Methylphenol	N	1790	µg/l	0.050	< 0.050
2-Methylnaphthalene	N	1790	µg/l	0.050	< 0.050
Hexachlorocyclopentadiene	N	1790	µg/l	0.050	< 0.050
2,4,6-Trichlorophenol	N	1790	µg/l	0.050	< 0.050
2,4,5-Trichlorophenol	N	1790	µg/l	0.050	< 0.050
2-Chloronaphthalene	N	1790	µg/l	0.050	< 0.050
2-Nitroaniline	N	1790	µg/l	0.050	< 0.050
Acenaphthylene	N	1790	µg/l	0.050	< 0.050
Dimethylphthalate	N	1790	µg/l	0.050	< 0.050
2,6-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050
Acenaphthene	N	1790	µg/l	0.050	< 0.050
3-Nitroaniline	N	1790	µg/l	0.050	< 0.050
Dibenzofuran	N	1790	µg/l	0.050	< 0.050
4-Chlorophenylphenylether	N	1790	µg/l	0.050	< 0.050
2,4-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050
Fluorene	N	1790	µg/l	0.050	< 0.050
Diethyl Phthalate	N	1790	µg/l	0.050	< 0.050
4-Nitroaniline	N	1790	µg/l	0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.050	< 0.050
Azobenzene	N	1790	µg/l	0.050	< 0.050
4-Bromophenylphenyl Ether	N	1790	µg/l	0.050	< 0.050
Hexachlorobenzene	N	1790	µg/l	0.050	< 0.050
Pentachlorophenol	N	1790	µg/l	0.050	< 0.050
Phenanthrene	N	1790	µg/l	0.050	< 0.050
Anthracene	N	1790	µg/l	0.050	< 0.050
Carbazole	N	1790	µg/l	0.050	< 0.050
Di-N-Butyl Phthalate	N	1790	µg/l	0.050	< 0.050
Fluoranthene	N	1790	µg/l	0.050	< 0.050
Pyrene	N	1790	µg/l	0.050	< 0.050
Butylbenzyl Phthalate	N	1790	µg/l	0.050	< 0.050
Benzo[a]anthracene	N	1790	µg/l	0.050	< 0.050
Chrysene	N	1790	µg/l	0.050	< 0.050

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24738
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672721
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		4.0
			Date Sampled:		14-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.050	< 0.050
Di-N-Octyl Phthalate	N	1790	µg/l	0.050	< 0.050
Benzo[b]fluoranthene	N	1790	µg/l	0.050	< 0.050
Benzo[k]fluoranthene	N	1790	µg/l	0.050	< 0.050
Benzo[a]pyrene	N	1790	µg/l	0.050	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.050	< 0.050
Dibenz(a,h)Anthracene	N	1790	µg/l	0.050	< 0.050
Benzo[g,h,i]perylene	N	1790	µg/l	0.050	< 0.050
Naphthalene	N	1800	µg/l	0.010	< 0.010
Acenaphthylene	N	1800	µg/l	0.010	< 0.010
Acenaphthene	N	1800	µg/l	0.010	< 0.010
Fluorene	N	1800	µg/l	0.010	< 0.010
Phenanthrene	N	1800	µg/l	0.010	< 0.010
Anthracene	N	1800	µg/l	0.010	< 0.010
Fluoranthene	N	1800	µg/l	0.010	< 0.010
Pyrene	N	1800	µg/l	0.010	< 0.010
Benzo[a]anthracene	N	1800	µg/l	0.010	< 0.010
Chrysene	N	1800	µg/l	0.010	< 0.010
Benzo[b]fluoranthene	N	1800	µg/l	0.010	< 0.010
Benzo[k]fluoranthene	N	1800	µg/l	0.010	< 0.010
Benzo[a]pyrene	N	1800	µg/l	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	µg/l	0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	µg/l	0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	µg/l	0.010	< 0.010
Coronene	N	1800	µg/l	0.010	< 0.010
Total Of 17 PAH's	N	1800	µg/l	0.20	< 0.20
PCB 81	N	1815	µg/l	0.010	< 0.010
PCB 77	N	1815	µg/l	0.010	< 0.010
PCB 105	N	1815	µg/l	0.010	< 0.010
PCB 114	N	1815	µg/l	0.010	< 0.010
PCB 118	N	1815	µg/l	0.010	< 0.010
PCB 123	N	1815	µg/l	0.010	< 0.010
PCB 126	N	1815	µg/l	0.010	< 0.010
PCB 156	N	1815	µg/l	0.010	< 0.010
PCB 157	N	1815	µg/l	0.010	< 0.010
PCB 167	N	1815	µg/l	0.010	< 0.010
PCB 169	N	1815	µg/l	0.010	< 0.010
PCB 189	N	1815	µg/l	0.010	< 0.010

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-24738
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		672721
Order No.:			Client Location ID.:		MP2BH01
			Client Sample Ref.:		ES
			Sample Type:		SOIL
			Top Depth (m):		4.0
			Date Sampled:		14-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Total PCBs (12 Congeners)	N	1815	µg/l	0.010	< 0.010
Resorcinol	U	1920	mg/l	0.0050	< 0.0050
Phenol	U	1920	mg/l	0.0050	< 0.0050
Cresols	U	1920	mg/l	0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.030	< 0.030

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

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Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	18-25001-1
Initial Date of Issue:	28-Aug-2018
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Sean Ross Stephen Franey Stephen Watson Stuart Abraham
Project	18-0795 Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	20-Aug-2018
Order No.:		**Date Instructed:**	21-Aug-2018
No. of Samples:	2		
Turnaround (Wkdays):	3	**Results Due:**	23-Aug-2018
Date Approved:	28-Aug-2018		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

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Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25001	18-25001
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		674303	674305
Order No.:			Client Location ID.:		BH01	BH07
			Client Sample Ref.:		ES	ES
			Sample Type:		SOIL	SOIL
			Top Depth (m):		8.8	1.0
			Date Sampled:		15-Aug-2018	16-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192		N/A	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	16	15
Soil Colour	N	2040		N/A	Black	Brown
Other Material	N	2040		N/A	Stones	Stones, Brick
Soil Texture	N	2040		N/A	Sand	Sand
pH	M	2010		N/A	8.9	8.4
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	2.7	1.4
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.27	0.12
Total Sulphur	M	2175	%	0.010	0.20	0.14
Sulphur (Elemental)	M	2180	mg/kg	1.0	550	22
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	0.60
Iron (Total)	N	2430	mg/kg	100	8500	17000
Arsenic	M	2450	mg/kg	1.0	11	39
Barium	M	2450	mg/kg	10	23	240
Beryllium	U	2450	mg/kg	1.0	< 1.0	1.5
Cadmium	M	2450	mg/kg	0.10	0.22	1.4
Chromium	M	2450	mg/kg	1.0	13	28
Copper	M	2450	mg/kg	0.50	9.8	190
Mercury	M	2450	mg/kg	0.10	< 0.10	1.2
Nickel	M	2450	mg/kg	0.50	17	61
Lead	M	2450	mg/kg	0.50	20	390
Selenium	M	2450	mg/kg	0.20	< 0.20	0.35
Vanadium	U	2450	mg/kg	5.0	23	43
Zinc	M	2450	mg/kg	0.50	25	680
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	0.45	4.7
Aliphatic TPH >C5-C6	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aliphatic TPH >C6-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aliphatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	13
Aliphatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	14
Aromatic TPH >C5-C7	N	2680	mg/kg	0.010	< 0.010	< 0.010

Chemtest
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Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-25001	18-25001
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	674303	674305
Order No.:				Client Location ID.:	BH01	BH07
				Client Sample Ref.:	ES	ES
				Sample Type:	SOIL	SOIL
				Top Depth (m):	8.8	1.0
				Date Sampled:	15-Aug-2018	16-Aug-2018
				Asbestos Lab:	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aromatic TPH >C7-C8	N	2680	mg/kg	0.010	< 0.010	< 0.010
Aromatic TPH >C8-C10	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	2680	mg/kg	0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	2680	mg/kg	0.10	< 0.10	8.7
Aromatic TPH >C21-C35	N	2680	mg/kg	0.10	< 0.10	62
Aromatic TPH >C35-C44	N	2680	mg/kg	0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	2680	mg/kg	1.0	< 1.0	71
Total Petroleum Hydrocarbons	N	2680	mg/kg	2.0	< 2.0	85
Naphthalene	N	2700	mg/kg	0.010	< 0.010	0.88
Acenaphthylene	N	2700	mg/kg	0.010	< 0.010	0.50
Acenaphthene	N	2700	mg/kg	0.010	< 0.010	0.61
Fluorene	N	2700	mg/kg	0.010	< 0.010	0.46
Phenanthrene	N	2700	mg/kg	0.010	< 0.010	5.9
Anthracene	N	2700	mg/kg	0.010	< 0.010	1.8
Fluoranthene	N	2700	mg/kg	0.010	< 0.010	11
Pyrene	N	2700	mg/kg	0.010	< 0.010	12
Benzo[a]anthracene	N	2700	mg/kg	0.010	< 0.010	7.6
Chrysene	N	2700	mg/kg	0.010	< 0.010	11
Benzo[b]fluoranthene	N	2700	mg/kg	0.010	< 0.010	11
Benzo[k]fluoranthene	N	2700	mg/kg	0.010	< 0.010	5.2
Benzo[a]pyrene	N	2700	mg/kg	0.010	< 0.010	9.2
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.010	< 0.010	6.1
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.010	< 0.010	2.2
Benzo[g,h,i]perylene	N	2700	mg/kg	0.010	< 0.010	6.6
Coronene	N	2700	mg/kg	0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	2700	mg/kg	0.20	< 0.20	92
Dichlorodifluoromethane	N	2760	µg/kg	1.0	< 1.0	< 1.0
Chloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Vinyl Chloride	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromomethane	M	2760	µg/kg	20	< 20	< 20
Chloroethane	N	2760	µg/kg	2.0	< 2.0	< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromochloromethane	N	2760	µg/kg	5.0	< 5.0	< 5.0

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Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-25001	18-25001
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	674303	674305
Order No.:				Client Location ID.:	BH01	BH07
				Client Sample Ref.:	ES	ES
				Sample Type:	SOIL	SOIL
				Top Depth (m):	8.8	1.0
				Date Sampled:	15-Aug-2018	16-Aug-2018
				Asbestos Lab:	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Trichloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Tetrachloromethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1-Dichloropropene	N	2760	µg/kg	1.0	< 1.0	< 1.0
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2.0	< 2.0	< 2.0
Trichloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Dibromomethane	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromodichloromethane	M	2760	µg/kg	5.0	< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10	< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10	< 10	< 10
Tetrachloroethene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,3-Dichloropropane	N	2760	µg/kg	2.0	< 2.0	< 2.0
Dibromochloromethane	N	2760	µg/kg	10	< 10	< 10
1,2-Dibromoethane	M	2760	µg/kg	5.0	< 5.0	< 5.0
Chlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2.0	< 2.0	< 2.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Styrene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Tribromomethane	N	2760	µg/kg	1.0	< 1.0	< 1.0
Isopropylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Bromobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50	< 50
N-Propylbenzene	N	2760	µg/kg	1.0	< 1.0	< 1.0
2-Chlorotoluene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
4-Chlorotoluene	N	2760	µg/kg	1.0	< 1.0	< 1.0
Tert-Butylbenzene	N	2760	µg/kg	1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Sec-Butylbenzene	N	2760	µg/kg	1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
4-Isopropyltoluene	N	2760	µg/kg	1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0

Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25001	18-25001
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		674303	674305
Order No.:			Client Location ID.:		BH01	BH07
			Client Sample Ref.:		ES	ES
			Sample Type:		SOIL	SOIL
			Top Depth (m):		8.8	1.0
			Date Sampled:		15-Aug-2018	16-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
N-Butylbenzene	N	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	N	2760	µg/kg	50	< 50	< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0
Hexachlorobutadiene	N	2760	µg/kg	1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	N	2760	µg/kg	2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0
N-Nitrosodimethylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050
Phenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Chlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,4-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050
Hexachloroethane	N	2790	mg/kg	0.050	< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Nitrobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Isophorone	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4-Dimethylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4-Dichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Naphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Chloroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
Hexachlorobutadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Methylnaphthalene	N	2790	mg/kg	0.050	< 0.050	0.19
Hexachlorocyclopentadiene	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4,6-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Chloronaphthalene	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
Acenaphthylene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Dimethylphthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050

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Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25001	18-25001
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		674303	674305
Order No.:			Client Location ID.:		BH01	BH07
			Client Sample Ref.:		ES	ES
			Sample Type:		SOIL	SOIL
			Top Depth (m):		8.8	1.0
			Date Sampled:		15-Aug-2018	16-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
2,6-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Acenaphthene	N	2790	mg/kg	0.050	< 0.050	0.39
3-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
Dibenzofuran	N	2790	mg/kg	0.050	< 0.050	0.22
4-Chlorophenylphenylether	N	2790	mg/kg	0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Fluorene	N	2790	mg/kg	0.050	< 0.050	0.36
Diethyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Nitroaniline	N	2790	mg/kg	0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Azobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.050	< 0.050	< 0.050
Hexachlorobenzene	N	2790	mg/kg	0.050	< 0.050	< 0.050
Pentachlorophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
Phenanthrene	N	2790	mg/kg	0.050	< 0.050	4.1
Anthracene	N	2790	mg/kg	0.050	< 0.050	1.3
Carbazole	N	2790	mg/kg	0.050	< 0.050	0.36
Di-N-Butyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Fluoranthene	N	2790	mg/kg	0.050	< 0.050	6.8
Pyrene	N	2790	mg/kg	0.050	< 0.050	6.6
Butylbenzyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	2790	mg/kg	0.050	< 0.050	4.6
Chrysene	N	2790	mg/kg	0.050	< 0.050	4.3
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Di-N-Octyl Phthalate	N	2790	mg/kg	0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	2790	mg/kg	0.050	< 0.050	5.6
Benzo[k]fluoranthene	N	2790	mg/kg	0.050	< 0.050	2.0
Benzo[a]pyrene	N	2790	mg/kg	0.050	< 0.050	4.2
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.050	< 0.050	2.3
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.050	< 0.050	1.0
Benzo[g,h,i]perylene	N	2790	mg/kg	0.050	< 0.050	3.0
4-Nitrophenol	N	2790	mg/kg	0.050	< 0.050	< 0.050
PCB 81	N	2815	mg/kg	0.0010		< 0.0010
PCB 77	N	2815	mg/kg	0.0010		< 0.0010
PCB 105	N	2815	mg/kg	0.0010		< 0.0010
PCB 114	N	2815	mg/kg	0.0010		< 0.0010
PCB 118	N	2815	mg/kg	0.0010		< 0.0010
PCB 123	N	2815	mg/kg	0.0010		< 0.0010

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Results - Soil

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25001	18-25001
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		674303	674305
Order No.:			Client Location ID.:		BH01	BH07
			Client Sample Ref.:		ES	ES
			Sample Type:		SOIL	SOIL
			Top Depth (m):		8.8	1.0
			Date Sampled:		15-Aug-2018	16-Aug-2018
			Asbestos Lab:		COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
PCB 126	N	2815	mg/kg	0.0010		< 0.0010
PCB 156	N	2815	mg/kg	0.0010		< 0.0010
PCB 157	N	2815	mg/kg	0.0010		< 0.0010
PCB 167	N	2815	mg/kg	0.0010		< 0.0010
PCB 169	N	2815	mg/kg	0.0010		< 0.0010
PCB 189	N	2815	mg/kg	0.0010		< 0.0010
Total PCBs (12 Congeners)	N	2815	mg/kg	0.0010		< 0.0010
Resorcinol	M	2920	mg/kg	0.050	< 0.050	< 0.050
Phenol	M	2920	mg/kg	0.050	< 0.050	< 0.050
Cresols	M	2920	mg/kg	0.050	< 0.050	< 0.050
Xylenols	M	2920	mg/kg	0.050	< 0.050	< 0.050
1-Naphthol	N	2920	mg/kg	0.050	< 0.050	< 0.050
Trimethylphenols	M	2920	mg/kg	0.050	< 0.050	< 0.050
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest
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Chemtest Ltd.
Depot Road
Newmarket
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Tel: 01638 606070
Email: info@chemtest.com

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2183

Final Report

Report No.:	18-25086-1
Initial Date of Issue:	28-Aug-2018
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Sean Ross Stephen Franey Stephen Watson Stuart Abraham
Project	18-0795 - Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	09-Aug-2018
Order No.:		**Date Instructed:**	21-Aug-2018
No. of Samples:	1		
Turnaround (Wkdays):	4	**Results Due:**	24-Aug-2018
Date Approved:	28-Aug-2018		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25086
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		668911
Order No.:			Client Location ID.:		MP2BH08
			Client Sample Ref.:		ES1
			Sample Type:		SOIL
			Top Depth (m):		0.50
			Date Sampled:		06-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
pH	U	1010		N/A	9.0
Ammonia (Free) as N	U	1220	mg/l	0.050	< 0.050
Nitrite as N	U	1220	mg/l	0.010	< 0.010
Nitrate as N	U	1220	mg/l	0.20	< 0.20
Phosphate as P	U	1220	mg/l	0.050	< 0.050
Cyanide (Total) Low-Level	N	1300	mg/l	0.0050	< 0.0050
Aluminium (Dissolved)	N	1450	µg/l	10	150
Arsenic (Dissolved)	U	1450	µg/l	1.0	1.1
Boron (Dissolved)	U	1450	µg/l	20	< 20
Barium (Dissolved)	U	1450	µg/l	5.0	21
Beryllium (Dissolved)	U	1450	µg/l	1.0	< 1.0
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	< 1.0
Copper (Dissolved)	U	1450	µg/l	1.0	< 1.0
Manganese (Dissolved)	U	1450	µg/l	1.0	1.4
Nickel (Dissolved)	U	1450	µg/l	1.0	< 1.0
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	< 1.0
Vanadium (Dissolved)	U	1450	µg/l	1.0	< 1.0
Zinc (Dissolved)	U	1450	µg/l	1.0	< 1.0
Mercury Low Level	U	1460	µg/l	0.010	< 0.010
Iron (Dissolved)	N	1450	µg/l	20	< 20
Chromium (Hexavalent)	U	1490	µg/l	20	[B] < 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	[B] < 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	[B] < 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	[B] < 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	[B] < 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	[B] < 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	[B] < 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	[B] < 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	[B] < 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	[B] < 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	[B] < 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	[B] < 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	[B] < 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	[B] < 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	[B] < 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	[B] < 0.10

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Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25086
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		668911
Order No.:			Client Location ID.:		MP2BH08
			Client Sample Ref.:		ES1
			Sample Type:		SOIL
			Top Depth (m):		0.50
			Date Sampled:		06-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	[B] < 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	[B] < 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	[B] < 10
Dibutyl Tin	N	1730	µg/l	0.050	< 0.050
Tributyl Tin	N	1730	µg/l	0.0500	< 0.050
Dichlorodifluoromethane	N	1760	µg/l	0.10	[B] < 0.10
Chloromethane	N	1760	µg/l	0.10	[B] < 0.10
Vinyl Chloride	N	1760	µg/l	0.10	[B] < 0.10
Bromomethane	N	1760	µg/l	2.0	[B] < 2.0
Chloroethane	N	1760	µg/l	0.20	[B] < 0.20
Trichlorofluoromethane	N	1760	µg/l	0.10	[B] < 0.10
1,1-Dichloroethene	N	1760	µg/l	0.10	[B] < 0.10
Dichloromethane	N	1760	µg/l	100	[B] < 100
1,1-Dichloroethane	N	1760	µg/l	0.10	[B] < 0.10
cis 1,2-Dichloroethene	N	1760	µg/l	0.10	[B] < 0.10
Bromochloromethane	N	1760	µg/l	0.50	[B] < 0.50
Trichloromethane	N	1760	µg/l	0.10	[B] < 0.10
1,1,1-Trichloroethane	N	1760	µg/l	0.10	[B] < 0.10
Tetrachloromethane	N	1760	µg/l	0.10	[B] < 0.10
1,1-Dichloropropene	N	1760	µg/l	0.10	[B] < 0.10
Benzene	N	1760	µg/l	0.10	[B] < 0.10
1,2-Dichloroethane	N	1760	µg/l	0.20	[B] < 0.20
Trichloroethene	N	1760	µg/l	0.10	[B] < 0.10
1,2-Dichloropropane	N	1760	µg/l	0.10	[B] < 0.10
Dibromomethane	N	1760	µg/l	0.10	[B] < 0.10
Bromodichloromethane	N	1760	µg/l	0.50	[B] < 0.50
cis-1,3-Dichloropropene	N	1760	µg/l	1.0	[B] < 1.0
Toluene	N	1760	µg/l	0.10	[B] < 0.10
Trans-1,3-Dichloropropene	N	1760	µg/l	1.0	[B] < 1.0
1,1,2-Trichloroethane	N	1760	µg/l	1.0	[B] < 1.0
Tetrachloroethene	N	1760	µg/l	0.10	[B] < 0.10
1,3-Dichloropropane	N	1760	µg/l	0.20	[B] < 0.20
Dibromochloromethane	N	1760	µg/l	1.0	[B] < 1.0
1,2-Dibromoethane	N	1760	µg/l	0.50	[B] < 0.50
Chlorobenzene	N	1760	µg/l	0.10	[B] < 0.10
1,1,1,2-Tetrachloroethane	N	1760	µg/l	0.20	[B] < 0.20
Ethylbenzene	N	1760	µg/l	0.10	[B] < 0.10
m & p-Xylene	N	1760	µg/l	0.10	[B] < 0.10

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25086
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		668911
Order No.:			Client Location ID.:		MP2BH08
			Client Sample Ref.:		ES1
			Sample Type:		SOIL
			Top Depth (m):		0.50
			Date Sampled:		06-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
o-Xylene	N	1760	µg/l	0.10	[B] < 0.10
Styrene	N	1760	µg/l	0.10	[B] < 0.10
Tribromomethane	N	1760	µg/l	1.0	[B] < 1.0
Isopropylbenzene	N	1760	µg/l	0.10	[B] < 0.10
Bromobenzene	N	1760	µg/l	0.10	[B] < 0.10
1,2,3-Trichloropropane	N	1760	µg/l	5.0	[B] < 5.0
N-Propylbenzene	N	1760	µg/l	0.10	[B] < 0.10
2-Chlorotoluene	N	1760	µg/l	0.10	[B] < 0.10
1,3,5-Trimethylbenzene	N	1760	µg/l	0.10	[B] < 0.10
4-Chlorotoluene	N	1760	µg/l	0.10	[B] < 0.10
Tert-Butylbenzene	N	1760	µg/l	0.10	[B] < 0.10
1,2,4-Trimethylbenzene	N	1760	µg/l	0.10	[B] < 0.10
Sec-Butylbenzene	N	1760	µg/l	0.10	[B] < 0.10
1,3-Dichlorobenzene	N	1760	µg/l	0.10	[B] < 0.10
4-Isopropyltoluene	N	1760	µg/l	0.10	[B] < 0.10
1,4-Dichlorobenzene	N	1760	µg/l	0.10	[B] < 0.10
N-Butylbenzene	N	1760	µg/l	0.10	[B] < 0.10
1,2-Dichlorobenzene	N	1760	µg/l	0.10	[B] < 0.10
1,2-Dibromo-3-Chloropropane	N	1760	µg/l	5.0	[B] < 5.0
1,2,4-Trichlorobenzene	N	1760	µg/l	0.10	[B] < 0.10
Hexachlorobutadiene	N	1760	µg/l	0.10	[B] < 0.10
1,2,3-Trichlorobenzene	N	1760	µg/l	0.20	[B] < 0.20
Naphthalene	N	1760	µg/l	0.10	[B] < 0.10
Phenol	N	1790	µg/l	0.050	< 0.050
2-Chlorophenol	N	1790	µg/l	0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.050	< 0.050
1,3-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050
1,4-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050
1,2-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.050	< 0.050
Hexachloroethane	N	1790	µg/l	0.050	< 0.050
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.050	< 0.050
4-Methylphenol	N	1790	µg/l	0.050	< 0.050
Nitrobenzene	N	1790	µg/l	0.050	< 0.050
Isophorone	N	1790	µg/l	0.050	< 0.050
2-Nitrophenol	N	1790	µg/l	0.050	< 0.050
2,4-Dimethylphenol	N	1790	µg/l	0.050	< 0.050

Chemtest
The right chemistry to deliver results

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25086
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		668911
Order No.:			Client Location ID.:		MP2BH08
			Client Sample Ref.:		ES1
			Sample Type:		SOIL
			Top Depth (m):		0.50
			Date Sampled:		06-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.050	< 0.050
2,4-Dichlorophenol	N	1790	µg/l	0.050	< 0.050
1,2,4-Trichlorobenzene	N	1790	µg/l	0.050	< 0.050
Naphthalene	N	1790	µg/l	0.050	< 0.050
4-Chloroaniline	N	1790	µg/l	0.050	< 0.050
Hexachlorobutadiene	N	1790	µg/l	0.050	< 0.050
4-Chloro-3-Methylphenol	N	1790	µg/l	0.050	< 0.050
2-Methylnaphthalene	N	1790	µg/l	0.050	< 0.050
Hexachlorocyclopentadiene	N	1790	µg/l	0.050	< 0.050
2,4,6-Trichlorophenol	N	1790	µg/l	0.050	< 0.050
2,4,5-Trichlorophenol	N	1790	µg/l	0.050	< 0.050
2-Chloronaphthalene	N	1790	µg/l	0.050	< 0.050
2-Nitroaniline	N	1790	µg/l	0.050	< 0.050
Acenaphthylene	N	1790	µg/l	0.050	< 0.050
Dimethylphthalate	N	1790	µg/l	0.050	< 0.050
2,6-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050
Acenaphthene	N	1790	µg/l	0.050	< 0.050
3-Nitroaniline	N	1790	µg/l	0.050	< 0.050
Dibenzofuran	N	1790	µg/l	0.050	< 0.050
4-Chlorophenylphenylether	N	1790	µg/l	0.050	< 0.050
2,4-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050
Fluorene	N	1790	µg/l	0.050	< 0.050
Diethyl Phthalate	N	1790	µg/l	0.050	< 0.050
4-Nitroaniline	N	1790	µg/l	0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.050	< 0.050
Azobenzene	N	1790	µg/l	0.050	< 0.050
4-Bromophenylphenyl Ether	N	1790	µg/l	0.050	< 0.050
Hexachlorobenzene	N	1790	µg/l	0.050	< 0.050
Pentachlorophenol	N	1790	µg/l	0.050	< 0.050
Phenanthrene	N	1790	µg/l	0.050	< 0.050
Anthracene	N	1790	µg/l	0.050	< 0.050
Carbazole	N	1790	µg/l	0.050	< 0.050
Di-N-Butyl Phthalate	N	1790	µg/l	0.050	< 0.050
Fluoranthene	N	1790	µg/l	0.050	< 0.050
Pyrene	N	1790	µg/l	0.050	< 0.050
Butylbenzyl Phthalate	N	1790	µg/l	0.050	< 0.050
Benzo[a]anthracene	N	1790	µg/l	0.050	< 0.050
Chrysene	N	1790	µg/l	0.050	< 0.050

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25086
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		668911
Order No.:			Client Location ID.:		MP2BH08
			Client Sample Ref.:		ES1
			Sample Type:		SOIL
			Top Depth (m):		0.50
			Date Sampled:		06-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.050	< 0.050
Di-N-Octyl Phthalate	N	1790	µg/l	0.050	< 0.050
Benzo[b]fluoranthene	N	1790	µg/l	0.050	< 0.050
Benzo[k]fluoranthene	N	1790	µg/l	0.050	< 0.050
Benzo[a]pyrene	N	1790	µg/l	0.050	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.050	< 0.050
Dibenz(a,h)Anthracene	N	1790	µg/l	0.050	< 0.050
Benzo[g,h,i]perylene	N	1790	µg/l	0.050	< 0.050
Naphthalene	N	1800	µg/l	0.010	< 0.010
Acenaphthylene	N	1800	µg/l	0.010	< 0.010
Acenaphthene	N	1800	µg/l	0.010	< 0.010
Fluorene	N	1800	µg/l	0.010	< 0.010
Phenanthrene	N	1800	µg/l	0.010	< 0.010
Anthracene	N	1800	µg/l	0.010	< 0.010
Fluoranthene	N	1800	µg/l	0.010	< 0.010
Pyrene	N	1800	µg/l	0.010	< 0.010
Benzo[a]anthracene	N	1800	µg/l	0.010	< 0.010
Chrysene	N	1800	µg/l	0.010	< 0.010
Benzo[b]fluoranthene	N	1800	µg/l	0.010	< 0.010
Benzo[k]fluoranthene	N	1800	µg/l	0.010	< 0.010
Benzo[a]pyrene	N	1800	µg/l	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1800	µg/l	0.010	< 0.010
Dibenz(a,h)Anthracene	N	1800	µg/l	0.010	< 0.010
Benzo[g,h,i]perylene	N	1800	µg/l	0.010	< 0.010
Coronene	N	1800	µg/l	0.010	< 0.010
Total Of 17 PAH's	N	1800	µg/l	0.20	< 0.20
PCB 81	N	1815	µg/l	0.010	< 0.010
PCB 77	N	1815	µg/l	0.010	< 0.010
PCB 105	N	1815	µg/l	0.010	< 0.010
PCB 114	N	1815	µg/l	0.010	< 0.010
PCB 118	N	1815	µg/l	0.010	< 0.010
PCB 123	N	1815	µg/l	0.010	< 0.010
PCB 126	N	1815	µg/l	0.010	< 0.010
PCB 156	N	1815	µg/l	0.010	< 0.010
PCB 157	N	1815	µg/l	0.010	< 0.010
PCB 167	N	1815	µg/l	0.010	< 0.010
PCB 169	N	1815	µg/l	0.010	< 0.010
PCB 189	N	1815	µg/l	0.010	< 0.010

Results - Leachate

Project: 18-0795 - Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25086
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		668911
Order No.:			Client Location ID.:		MP2BH08
			Client Sample Ref.:		ES1
			Sample Type:		SOIL
			Top Depth (m):		0.50
			Date Sampled:		06-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Total PCBs (12 Congeners)	N	1815	µg/l	0.010	< 0.010
Resorcinol	U	1920	mg/l	0.0050	< 0.0050
Phenol	U	1920	mg/l	0.0050	< 0.0050
Cresols	U	1920	mg/l	0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.030	< 0.030

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample ID:	Sample Location ID:	Sample Ref:	Sampled Date:	Deviation Code(s):	Containers Received:
668911	MP2BH08	ES1	06-Aug-2018	B	Amber Glass 250ml
668911	MP2BH08	ES1	06-Aug-2018	B	Amber Glass 60ml
668911	MP2BH08	ES1	06-Aug-2018	B	Plastic Tub 500g

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	18-25759-1
Initial Date of Issue:	04-Sep-2018
Client	Causeway Geotech Ltd
Client Address:	8 Drumahiskey Road Balnamore Ballymoney County Antrim BT53 7QL
Contact(s):	Carin Cornwall Colm Hurley Darren O'Mahony Gabriella Horan John Cameron Lucy Newland Matthew Gilbert Neil Haggan Paul Dunlop Paul McNamara Stephen Franey Stephen Watson Stuart Abraham
Project	18-0795 Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	28-Aug-2018
Order No.:		**Date Instructed:**	31-Aug-2018
No. of Samples:	5		
Turnaround (Wkdays):	3	**Results Due:**	04-Sep-2018
Date Approved:	04-Sep-2018		

Approved By:

Details: Martin Dyer, Laboratory Manager

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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-25759	18-25759	18-25759	18-25759	18-25759
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	677649	677650	677651	677655	677656
				Sample Location:	MP2BH02	MP2BH12	MP2BH16	MP2BH01	MP2BSW1
				Sample Type:	WATER	WATER	WATER	WATER	WATER
				Date Sampled:	22-Aug-2018	22-Aug-2018	22-Aug-2018	22-Aug-2018	22-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
pH	U	1010		N/A	7.8	8.3	7.8	7.8	7.8
Ammonia (Free) as N	U	1220	mg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.056
Nitrite as N	U	1220	mg/l	0.010	0.015	2.1	0.055	0.015	0.017
Nitrate as N	U	1220	mg/l	0.50	< 0.50	0.64	< 0.50	< 0.50	< 0.50
Orthophosphate as PO4	U	1220	mg/l	0.050	0.17	0.096	0.18	0.12	0.44
Cyanide (Total) Low-Level	N	1300	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Aluminium (Dissolved)	N	1450	µg/l	10	38	12	23	27	10
Arsenic (Dissolved)	U	1450	µg/l	1.0	52	3.3	34	50	54
Boron (Dissolved)	U	1450	µg/l	20	3300	180	2500	3500	3500
Barium (Dissolved)	U	1450	µg/l	5.0	50	24	22	41	6.4
Beryllium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1450	µg/l	0.080	0.13	< 0.080	0.15	0.14	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	150	8.9	95	140	150
Copper (Dissolved)	U	1450	µg/l	1.0	110	6.4	170	390	510
Iron (Dissolved)	N	1450	µg/l	20	1400	250	900	1300	1200
Manganese (Dissolved)	U	1450	µg/l	1.0	11	300	6.1	20	2.9
Nickel (Dissolved)	U	1450	µg/l	1.0	6.7	6.3	5.6	5.4	4.6
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	< 1.0	2.0	< 1.0	< 1.0	< 1.0
Vanadium (Dissolved)	U	1450	µg/l	1.0	42	3.3	29	41	45
Zinc (Dissolved)	U	1450	µg/l	1.0	57	12	48	51	54
Mercury Low Level	U	1460	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chromium (Hexavalent)	U	1490	µg/l	20	[B] < 20	[B] < 20	[B] < 20	[B] < 20	[B] < 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	[D] < 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	[D] < 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	[D] < 5.0	< 5.0	< 5.0

Chemtest
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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-25759	18-25759	18-25759	18-25759	18-25759
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	677649	677650	677651	677655	677656
				Sample Location:	MP2BH02	MP2BH12	MP2BH16	MP2BH01	MP2BSW1
				Sample Type:	WATER	WATER	WATER	WATER	WATER
				Date Sampled:	22-Aug-2018	22-Aug-2018	22-Aug-2018	22-Aug-2018	22-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	[D] < 10	< 10	< 10
Naphthalene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Acenaphthylene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Acenaphthene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Fluorene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Phenanthrene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Anthracene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Fluoranthene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Pyrene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Chrysene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Coronene	N	1700	µg/l	0.010	< 0.010	< 0.010	[D] < 0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	1700	µg/l	0.20	< 0.20	< 0.20	[D] < 0.20	< 0.20	< 0.20
Dibutyl Tin	N	1730	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Tributyl Tin	N	1730	µg/l	0.0500	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dichlorodifluoromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Chloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Vinyl Chloride	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Bromomethane	N	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	[C] < 2.0
Chloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	[C] < 0.20
Trichlorofluoromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,1-Dichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Trans 1,2-Dichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,1-Dichloroethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
cis 1,2-Dichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Bromochloromethane	N	1760	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	[C] < 0.50
Trichloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,1,1-Trichloroethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Tetrachloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,1-Dichloropropene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Benzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,2-Dichloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	[C] < 0.20
Trichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,2-Dichloropropane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Dibromomethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10

Chemtest
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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25759	18-25759	18-25759	18-25759	18-25759
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		677649	677650	677651	677655	677656
			Sample Location:		MP2BH02	MP2BH12	MP2BH16	MP2BH01	MP2BSW1
			Sample Type:		WATER	WATER	WATER	WATER	WATER
			Date Sampled:		22-Aug-2018	22-Aug-2018	22-Aug-2018	22-Aug-2018	22-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Bromodichloromethane	N	1760	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	[C] < 0.50
cis-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	[C] < 1.0
Toluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Trans-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	[C] < 1.0
1,1,2-Trichloroethane	N	1760	µg/l	0.1	< 0.1	< 0.1	< 0.1	< 0.1	[C] < 0.1
Tetrachloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,3-Dichloropropane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	[C] < 0.20
Dibromochloromethane	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	[C] < 1.0
1,2-Dibromoethane	N	1760	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	[C] < 0.50
Chlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,1,1,2-Tetrachloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	[C] < 0.20
Ethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
m & p-Xylene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
o-Xylene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Styrene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Tribromomethane	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	[C] < 1.0
Isopropylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Bromobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,2,3-Trichloropropane	N	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	[C] < 5.0
N-Propylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
2-Chlorotoluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,3,5-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
4-Chlorotoluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Tert-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,2,4-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Sec-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,3-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
4-Isopropyltoluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,4-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
N-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,2-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,2-Dibromo-3-Chloropropane	N	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	[C] < 5.0
1,2,4-Trichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
Hexachlorobutadiene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
1,2,3-Trichlorobenzene	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	[C] < 0.20
Methyl Tert-Butyl Ether	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	[C] < 0.10
N-Nitrosodimethylamine	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Chlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050

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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-25759	18-25759	18-25759	18-25759	18-25759
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	677649	677650	677651	677655	677656
				Sample Location:	MP2BH02	MP2BH12	MP2BH16	MP2BH01	MP2BSW1
				Sample Type:	WATER	WATER	WATER	WATER	WATER
				Date Sampled:	22-Aug-2018	22-Aug-2018	22-Aug-2018	22-Aug-2018	22-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
1,4-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachloroethane	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Methylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Nitrobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Isophorone	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Nitrophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dimethylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Naphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Chloroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobutadiene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Chloro-3-Methylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methylnaphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorocyclopentadiene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4,6-Trichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Chloronaphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthylene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dimethylphthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,6-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
3-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dibenzofuran	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Chlorophenylphenylether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Fluorene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Diethyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Azobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Pentachlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050

Chemtest
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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-25759	18-25759	18-25759	18-25759	18-25759
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	677649	677650	677651	677655	677656
				Sample Location:	MP2BH02	MP2BH12	MP2BH16	MP2BH01	MP2BSW1
				Sample Type:	WATER	WATER	WATER	WATER	WATER
				Date Sampled:	22-Aug-2018	22-Aug-2018	22-Aug-2018	22-Aug-2018	22-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Carbazole	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Di-N-Butyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Butylbenzyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chrysene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Di-N-Octyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[k]fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[a]pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dibenz(a,h)Anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[g,h,i]perylene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Nitrophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
PCB 81	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 77	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 105	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 114	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 118	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 123	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 126	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 156	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 157	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 167	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 169	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 189	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total PCBs (12 Congeners)	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Resorcinol	U	1920	mg/l	0.0050	[B] < 0.0050	[B] < 0.0050	[BD] < 0.0050	[B] < 0.0050	[B] < 0.0050
Phenol	U	1920	mg/l	0.0050	[B] < 0.0050	[B] < 0.0050	[BD] < 0.0050	[B] < 0.0050	[B] < 0.0050
Cresols	U	1920	mg/l	0.0050	[B] < 0.0050	[B] < 0.0050	[BD] < 0.0050	[B] < 0.0050	[B] < 0.0050
Xylenols	U	1920	mg/l	0.0050	[B] < 0.0050	[B] < 0.0050	[BD] < 0.0050	[B] < 0.0050	[B] < 0.0050
1-Naphthol	N	1920	mg/l	0.0050	[B] < 0.0050	[B] < 0.0050	[BD] < 0.0050	[B] < 0.0050	[B] < 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	[B] < 0.0050	[B] < 0.0050	[BD] < 0.0050	[B] < 0.0050	[B] < 0.0050
Total Phenols	U	1920	mg/l	0.030	[B] < 0.030	[B] < 0.030	[BD] < 0.030	[B] < 0.030	[B] < 0.030

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
677649			MP2BH02	22-Aug-2018	B	Coloured Winchester 1000ml
677649			MP2BH02	22-Aug-2018	B	EPA Vial 40ml
677649			MP2BH02	22-Aug-2018	B	Plastic Bottle 1000ml
677650			MP2BH12	22-Aug-2018	B	Coloured Winchester 1000ml
677650			MP2BH12	22-Aug-2018	B	EPA Vial 40ml
677650			MP2BH12	22-Aug-2018	B	Plastic Bottle 1000ml
677651			MP2BH16	22-Aug-2018	BD	Coloured Winchester 1000ml (Broken)
677651			MP2BH16	22-Aug-2018	BD	EPA Vial 40ml
677651			MP2BH16	22-Aug-2018	BD	Plastic Bottle 1000ml
677655			MP2BH01	22-Aug-2018	B	Coloured Winchester 1000ml
677655			MP2BH01	22-Aug-2018	B	EPA Vial 40ml
677655			MP2BH01	22-Aug-2018	B	Plastic Bottle 1000ml
677656			MP2BSW1	22-Aug-2018	BC	Coloured Winchester 1000ml

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Chemtest
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UKAS TESTING
2183

Final Report

Report No.: 18-25969-1

Initial Date of Issue: 03-Sep-2018

Client Causeway Geotech Ltd

Client Address: 8 Drumahiskey Road
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Stuart Abraham

Project 18-0795 Dublin Port MP2 Ground Investigation

Quotation No.:	Q18-13690	**Date Received:**	30-Aug-2018
Order No.:		**Date Instructed:**	30-Aug-2018
No. of Samples:	10		
Turnaround (Wkdays):	3	**Results Due:**	03-Sep-2018
Date Approved:	03-Sep-2018		

Approved By:

Details: Glynn Harvey, Laboratory Manager

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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	679046	679047	679048	679049	679050	679051	679052	679053	679054
				Sample Location:	MP2 BH06S	MP2 BH06D	MP2 BH04S	MP2 BH04D	MP2 BH08	MP2 BH15	MP2 BH13	MP2 BH14	SW3
				Sample Type:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
				Date Sampled:	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
pH	U	1010		N/A	7.5	7.7	7.3	7.5	7.5	7.3	8.2	7.8	7.7
Ammonia (Free) as N	U	1220	mg/l	0.050	< 0.050	0.63	< 0.050	0.71	< 0.050	< 0.050	0.70	0.093	< 0.050
Nitrite as N	U	1220	mg/l	0.010	0.017	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Nitrate as N	U	1220	mg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Orthophosphate as PO4	U	1220	mg/l	0.050	0.30	3.8	0.24	2.3	0.21	0.15	0.28	0.071	0.12
Cyanide (Total) Low-Level	N	1300	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Aluminium (Dissolved)	N	1450	µg/l	10	37	55	< 10	< 10	< 10	< 10	< 10	82	< 10
Arsenic (Dissolved)	U	1450	µg/l	1.0	17	35	49	49	49	42	9.6	3.6	50
Boron (Dissolved)	U	1450	µg/l	20	1700	2000	3400	3000	3200	2700	430	240	3500
Barium (Dissolved)	U	1450	µg/l	5.0	270	340	36	160	37	95	270	330	8.5
Beryllium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	0.092	< 0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	47	30	50	12	< 1.0	4.2	42
Copper (Dissolved)	U	1450	µg/l	1.0	37	120	330	390	490	360	8.2	3.1	210
Iron (Dissolved)	N	1450	µg/l	20	1000	1100	1500	1300	1500	1400	210	560	1400
Manganese (Dissolved)	U	1450	µg/l	1.0	1500	650	10	970	19	350	150	790	11
Nickel (Dissolved)	U	1450	µg/l	1.0	12	8.5	6.2	15	7.5	13	2.6	3.2	< 1.0
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0	6.0	< 1.0	< 1.0	< 1.0	6.0	< 1.0	< 1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	75	130	160	150	150	130	5.4	< 1.0	160
Vanadium (Dissolved)	U	1450	µg/l	1.0	< 1.0	< 1.0	13	6.5	13	7.6	< 1.0	1.3	10
Zinc (Dissolved)	U	1450	µg/l	1.0	55	31	120	110	100	210	12	8.0	75
Mercury Low Level	U	1460	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	679046	679047	679048	679049	679050	679051	679052	679053	679054
				Sample Location:	MP2 BH06S	MP2 BH06D	MP2 BH04S	MP2 BH04D	MP2 BH08	MP2 BH15	MP2 BH13	MP2 BH14	SW3
				Sample Type:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
				Date Sampled:	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenanthrene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluoranthene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Pyrene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]anthracene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[b]fluoranthene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[k]fluoranthene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[a]pyrene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)Anthracene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo[g,h,i]perylene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Coronene	N	1700	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Of 17 PAH's	N	1700	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Dibutyl Tin	N	1730	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Tributyl Tin	N	1730	µg/l	0.0500	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dichlorodifluoromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Vinyl Chloride	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Bromomethane	N	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Chloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Trichlorofluoromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,1-Dichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trans 1,2-Dichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,1-Dichloroethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
cis 1,2-Dichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Bromochloromethane	N	1760	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,1,1-Trichloroethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Tetrachloromethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,1-Dichloropropene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,2-Dichloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Trichloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,2-Dichloropropane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibromomethane	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	679046	679047	679048	679049	679050	679051	679052	679053	679054
				Sample Location:	MP2 BH06S	MP2 BH06D	MP2 BH04S	MP2 BH04D	MP2 BH08	MP2 BH15	MP2 BH13	MP2 BH14	SW3
				Sample Type:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
				Date Sampled:	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Bromodichloromethane	N	1760	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trans-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	N	1760	µg/l	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tetrachloroethene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,3-Dichloropropane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Dibromochloromethane	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	N	1760	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,1,1,2-Tetrachloroethane	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Ethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
m & p-Xylene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.14	< 0.10
o-Xylene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Styrene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Tribromomethane	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Bromobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,2,3-Trichloropropane	N	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
N-Propylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2-Chlorotoluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,3,5-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
4-Chlorotoluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Tert-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,2,4-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sec-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,3-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
4-Isopropyltoluene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,4-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
N-Butylbenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,2-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,2-Dibromo-3-Chloropropane	N	1760	µg/l	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,2,4-Trichlorobenzene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Hexachlorobutadiene	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,2,3-Trichlorobenzene	N	1760	µg/l	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Methyl Tert-Butyl Ether	N	1760	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
N-Nitrosodimethylamine	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Chlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,3-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050

Chemtest
The right chemistry to deliver results

Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	679046	679047	679048	679049	679050	679051	679052	679053	679054
				Sample Location:	MP2 BH06S	MP2 BH06D	MP2 BH04S	MP2 BH04D	MP2 BH08	MP2 BH15	MP2 BH13	MP2 BH14	SW3
				Sample Type:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
				Date Sampled:	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
1,4-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachloroethane	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Methylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Nitrobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Isophorone	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Nitrophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dimethylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Naphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Chloroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobutadiene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Chloro-3-Methylphenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methylnaphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorocyclopentadiene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4,6-Trichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4,5-Trichlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Chloronaphthalene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthylene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dimethylphthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,6-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Acenaphthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
3-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dibenzofuran	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Chlorophenylphenylether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2,4-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Fluorene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Diethyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Nitroaniline	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Azobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Bromophenylphenyl Ether	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Hexachlorobenzene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Pentachlorophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050

Chemtest
The right chemistry to deliver results

Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd				**Chemtest Job No.:**	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969	18-25969
Quotation No.: Q18-13690				**Chemtest Sample ID.:**	679046	679047	679048	679049	679050	679051	679052	679053	679054
				Sample Location:	MP2 BH06S	MP2 BH06D	MP2 BH04S	MP2 BH04D	MP2 BH08	MP2 BH15	MP2 BH13	MP2 BH14	SW3
				Sample Type:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
				Date Sampled:	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018	30-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Carbazole	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Di-N-Butyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Butylbenzyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[a]anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chrysene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Di-N-Octyl Phthalate	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[b]fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[k]fluoranthene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[a]pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dibenz(a,h)Anthracene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Benzo[g,h,i]perylene	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4-Nitrophenol	N	1790	µg/l	0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
PCB 81	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 77	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 105	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 114	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 118	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 123	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 126	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 156	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 157	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 167	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 169	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 189	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total PCBs (12 Congeners)	N	1815	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Resorcinol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Phenol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Cresols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030

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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25969
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		679055
			Sample Location:		SW2
			Sample Type:		WATER
			Date Sampled:		30-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
pH	U	1010		N/A	7.6
Ammonia (Free) as N	U	1220	mg/l	0.050	< 0.050
Nitrite as N	U	1220	mg/l	0.010	< 0.010
Nitrate as N	U	1220	mg/l	0.50	< 0.50
Orthophosphate as PO4	U	1220	mg/l	0.050	0.13
Cyanide (Total) Low-Level	N	1300	mg/l	0.0050	< 0.0050
Aluminium (Dissolved)	N	1450	µg/l	10	< 10
Arsenic (Dissolved)	U	1450	µg/l	1.0	55
Boron (Dissolved)	U	1450	µg/l	20	3500
Barium (Dissolved)	U	1450	µg/l	5.0	7.5
Beryllium (Dissolved)	U	1450	µg/l	1.0	< 1.0
Cadmium (Dissolved)	U	1450	µg/l	0.080	< 0.080
Chromium (Dissolved)	U	1450	µg/l	1.0	65
Copper (Dissolved)	U	1450	µg/l	1.0	380
Iron (Dissolved)	N	1450	µg/l	20	1500
Manganese (Dissolved)	U	1450	µg/l	1.0	< 1.0
Nickel (Dissolved)	U	1450	µg/l	1.0	< 1.0
Lead (Dissolved)	U	1450	µg/l	1.0	< 1.0
Selenium (Dissolved)	U	1450	µg/l	1.0	160
Vanadium (Dissolved)	U	1450	µg/l	1.0	15
Zinc (Dissolved)	U	1450	µg/l	1.0	80
Mercury Low Level	U	1460	µg/l	0.010	< 0.010
Chromium (Hexavalent)	U	1490	µg/l	20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0

Chemtest
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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25969
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		679055
			Sample Location:		SW2
			Sample Type:		WATER
			Date Sampled:		30-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10
Naphthalene	N	1700	µg/l	0.010	< 0.010
Acenaphthylene	N	1700	µg/l	0.010	< 0.010
Acenaphthene	N	1700	µg/l	0.010	< 0.010
Fluorene	N	1700	µg/l	0.010	< 0.010
Phenanthrene	N	1700	µg/l	0.010	< 0.010
Anthracene	N	1700	µg/l	0.010	< 0.010
Fluoranthene	N	1700	µg/l	0.010	< 0.010
Pyrene	N	1700	µg/l	0.010	< 0.010
Benzo[a]anthracene	N	1700	µg/l	0.010	< 0.010
Chrysene	N	1700	µg/l	0.010	< 0.010
Benzo[b]fluoranthene	N	1700	µg/l	0.010	< 0.010
Benzo[k]fluoranthene	N	1700	µg/l	0.010	< 0.010
Benzo[a]pyrene	N	1700	µg/l	0.010	< 0.010
Indeno(1,2,3-c,d)Pyrene	N	1700	µg/l	0.010	< 0.010
Dibenz(a,h)Anthracene	N	1700	µg/l	0.010	< 0.010
Benzo[g,h,i]perylene	N	1700	µg/l	0.010	< 0.010
Coronene	N	1700	µg/l	0.010	< 0.010
Total Of 17 PAH's	N	1700	µg/l	0.20	< 0.20
Dibutyl Tin	N	1730	µg/l	0.050	< 0.050
Tributyl Tin	N	1730	µg/l	0.0500	< 0.050
Dichlorodifluoromethane	N	1760	µg/l	0.10	< 0.10
Chloromethane	N	1760	µg/l	0.10	< 0.10
Vinyl Chloride	N	1760	µg/l	0.10	< 0.10
Bromomethane	N	1760	µg/l	2.0	< 2.0
Chloroethane	N	1760	µg/l	0.20	< 0.20
Trichlorofluoromethane	N	1760	µg/l	0.10	< 0.10
1,1-Dichloroethene	N	1760	µg/l	0.10	< 0.10
Trans 1,2-Dichloroethene	N	1760	µg/l	0.10	< 0.10
1,1-Dichloroethane	N	1760	µg/l	0.10	< 0.10
cis 1,2-Dichloroethene	N	1760	µg/l	0.10	< 0.10
Bromochloromethane	N	1760	µg/l	0.50	< 0.50
Trichloromethane	N	1760	µg/l	0.10	< 0.10
1,1,1-Trichloroethane	N	1760	µg/l	0.10	< 0.10
Tetrachloromethane	N	1760	µg/l	0.10	< 0.10
1,1-Dichloropropene	N	1760	µg/l	0.10	< 0.10
Benzene	N	1760	µg/l	0.10	< 0.10
1,2-Dichloroethane	N	1760	µg/l	0.20	< 0.20
Trichloroethene	N	1760	µg/l	0.10	< 0.10
1,2-Dichloropropane	N	1760	µg/l	0.10	< 0.10
Dibromomethane	N	1760	µg/l	0.10	< 0.10

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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25969
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		679055
			Sample Location:		SW2
			Sample Type:		WATER
			Date Sampled:		30-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Bromodichloromethane	N	1760	µg/l	0.50	< 0.50
cis-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0
Toluene	N	1760	µg/l	0.10	< 0.10
Trans-1,3-Dichloropropene	N	1760	µg/l	1.0	< 1.0
1,1,2-Trichloroethane	N	1760	µg/l	0.1	< 0.1
Tetrachloroethene	N	1760	µg/l	0.10	< 0.10
1,3-Dichloropropane	N	1760	µg/l	0.20	< 0.20
Dibromochloromethane	N	1760	µg/l	1.0	< 1.0
1,2-Dibromoethane	N	1760	µg/l	0.50	< 0.50
Chlorobenzene	N	1760	µg/l	0.10	< 0.10
1,1,1,2-Tetrachloroethane	N	1760	µg/l	0.20	< 0.20
Ethylbenzene	N	1760	µg/l	0.10	< 0.10
m & p-Xylene	N	1760	µg/l	0.10	< 0.10
o-Xylene	N	1760	µg/l	0.10	< 0.10
Styrene	N	1760	µg/l	0.10	< 0.10
Tribromomethane	N	1760	µg/l	1.0	< 1.0
Isopropylbenzene	N	1760	µg/l	0.10	< 0.10
Bromobenzene	N	1760	µg/l	0.10	< 0.10
1,2,3-Trichloropropane	N	1760	µg/l	5.0	< 5.0
N-Propylbenzene	N	1760	µg/l	0.10	< 0.10
2-Chlorotoluene	N	1760	µg/l	0.10	< 0.10
1,3,5-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10
4-Chlorotoluene	N	1760	µg/l	0.10	< 0.10
Tert-Butylbenzene	N	1760	µg/l	0.10	< 0.10
1,2,4-Trimethylbenzene	N	1760	µg/l	0.10	< 0.10
Sec-Butylbenzene	N	1760	µg/l	0.10	< 0.10
1,3-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10
4-Isopropyltoluene	N	1760	µg/l	0.10	< 0.10
1,4-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10
N-Butylbenzene	N	1760	µg/l	0.10	< 0.10
1,2-Dichlorobenzene	N	1760	µg/l	0.10	< 0.10
1,2-Dibromo-3-Chloropropane	N	1760	µg/l	5.0	< 5.0
1,2,4-Trichlorobenzene	N	1760	µg/l	0.10	< 0.10
Hexachlorobutadiene	N	1760	µg/l	0.10	< 0.10
1,2,3-Trichlorobenzene	N	1760	µg/l	0.20	< 0.20
Methyl Tert-Butyl Ether	N	1760	µg/l	0.10	< 0.10
N-Nitrosodimethylamine	N	1790	µg/l	0.050	< 0.050
Phenol	N	1790	µg/l	0.050	< 0.050
2-Chlorophenol	N	1790	µg/l	0.050	< 0.050
Bis-(2-Chloroethyl)Ether	N	1790	µg/l	0.050	< 0.050
1,3-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050

Chemtest
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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25969
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		679055
			Sample Location:		SW2
			Sample Type:		WATER
			Date Sampled:		30-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
1,4-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050
1,2-Dichlorobenzene	N	1790	µg/l	0.050	< 0.050
2-Methylphenol (o-Cresol)	N	1790	µg/l	0.050	< 0.050
Bis(2-Chloroisopropyl)Ether	N	1790	µg/l	0.050	< 0.050
Hexachloroethane	N	1790	µg/l	0.050	< 0.050
N-Nitrosodi-n-propylamine	N	1790	µg/l	0.050	< 0.050
4-Methylphenol	N	1790	µg/l	0.050	< 0.050
Nitrobenzene	N	1790	µg/l	0.050	< 0.050
Isophorone	N	1790	µg/l	0.050	< 0.050
2-Nitrophenol	N	1790	µg/l	0.050	< 0.050
2,4-Dimethylphenol	N	1790	µg/l	0.050	< 0.050
Bis(2-Chloroethoxy)Methane	N	1790	µg/l	0.050	< 0.050
2,4-Dichlorophenol	N	1790	µg/l	0.050	< 0.050
1,2,4-Trichlorobenzene	N	1790	µg/l	0.050	< 0.050
Naphthalene	N	1790	µg/l	0.050	< 0.050
4-Chloroaniline	N	1790	µg/l	0.050	< 0.050
Hexachlorobutadiene	N	1790	µg/l	0.050	< 0.050
4-Chloro-3-Methylphenol	N	1790	µg/l	0.050	< 0.050
2-Methylnaphthalene	N	1790	µg/l	0.050	< 0.050
Hexachlorocyclopentadiene	N	1790	µg/l	0.050	< 0.050
2,4,6-Trichlorophenol	N	1790	µg/l	0.050	< 0.050
2,4,5-Trichlorophenol	N	1790	µg/l	0.050	< 0.050
2-Chloronaphthalene	N	1790	µg/l	0.050	< 0.050
2-Nitroaniline	N	1790	µg/l	0.050	< 0.050
Acenaphthylene	N	1790	µg/l	0.050	< 0.050
Dimethylphthalate	N	1790	µg/l	0.050	< 0.050
2,6-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050
Acenaphthene	N	1790	µg/l	0.050	< 0.050
3-Nitroaniline	N	1790	µg/l	0.050	< 0.050
Dibenzofuran	N	1790	µg/l	0.050	< 0.050
4-Chlorophenylphenylether	N	1790	µg/l	0.050	< 0.050
2,4-Dinitrotoluene	N	1790	µg/l	0.050	< 0.050
Fluorene	N	1790	µg/l	0.050	< 0.050
Diethyl Phthalate	N	1790	µg/l	0.050	< 0.050
4-Nitroaniline	N	1790	µg/l	0.050	< 0.050
2-Methyl-4,6-Dinitrophenol	N	1790	µg/l	0.050	< 0.050
Azobenzene	N	1790	µg/l	0.050	< 0.050
4-Bromophenylphenyl Ether	N	1790	µg/l	0.050	< 0.050
Hexachlorobenzene	N	1790	µg/l	0.050	< 0.050
Pentachlorophenol	N	1790	µg/l	0.050	< 0.050
Phenanthrene	N	1790	µg/l	0.050	< 0.050

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Results - Water

Project: 18-0795 Dublin Port MP2 Ground Investigation

Client: Causeway Geotech Ltd			**Chemtest Job No.:**		18-25969
Quotation No.: Q18-13690			**Chemtest Sample ID.:**		679055
			Sample Location:		SW2
			Sample Type:		WATER
			Date Sampled:		30-Aug-2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Anthracene	N	1790	µg/l	0.050	< 0.050
Carbazole	N	1790	µg/l	0.050	< 0.050
Di-N-Butyl Phthalate	N	1790	µg/l	0.050	< 0.050
Fluoranthene	N	1790	µg/l	0.050	< 0.050
Pyrene	N	1790	µg/l	0.050	< 0.050
Butylbenzyl Phthalate	N	1790	µg/l	0.050	< 0.050
Benzo[a]anthracene	N	1790	µg/l	0.050	< 0.050
Chrysene	N	1790	µg/l	0.050	< 0.050
Bis(2-Ethylhexyl)Phthalate	N	1790	µg/l	0.050	< 0.050
Di-N-Octyl Phthalate	N	1790	µg/l	0.050	< 0.050
Benzo[b]fluoranthene	N	1790	µg/l	0.050	< 0.050
Benzo[k]fluoranthene	N	1790	µg/l	0.050	< 0.050
Benzo[a]pyrene	N	1790	µg/l	0.050	< 0.050
Indeno(1,2,3-c,d)Pyrene	N	1790	µg/l	0.050	< 0.050
Dibenz(a,h)Anthracene	N	1790	µg/l	0.050	< 0.050
Benzo[g,h,i]perylene	N	1790	µg/l	0.050	< 0.050
4-Nitrophenol	N	1790	µg/l	0.050	< 0.050
PCB 81	N	1815	µg/l	0.010	< 0.010
PCB 77	N	1815	µg/l	0.010	< 0.010
PCB 105	N	1815	µg/l	0.010	< 0.010
PCB 114	N	1815	µg/l	0.010	< 0.010
PCB 118	N	1815	µg/l	0.010	< 0.010
PCB 123	N	1815	µg/l	0.010	< 0.010
PCB 126	N	1815	µg/l	0.010	< 0.010
PCB 156	N	1815	µg/l	0.010	< 0.010
PCB 157	N	1815	µg/l	0.010	< 0.010
PCB 167	N	1815	µg/l	0.010	< 0.010
PCB 169	N	1815	µg/l	0.010	< 0.010
PCB 189	N	1815	µg/l	0.010	< 0.010
Total PCBs (12 Congeners)	N	1815	µg/l	0.010	< 0.010
Resorcinol	U	1920	mg/l	0.0050	< 0.0050
Phenol	U	1920	mg/l	0.0050	< 0.0050
Cresols	U	1920	mg/l	0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.030	< 0.030

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix B

Summary of Soil Analysis

Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	INORGANICS	pH	Moisture	Soil colour	Other material	Soil texture	Sulphate (2:1 Water Soluble) as SO4	Sulphur (Elemental)	Sulphur (total)	Cyanide (total)
						pH Units	%				g/l	mg/kg	%	mg/kg
2.0	BH01	14-Aug-2018	672719	1		8.1	8.8	Brown	Stones	Sand	0.20	1.5	0.024	< 0.50
8.8	BH01	15-Aug-2018	674303	2		8.9	16	Black	Stones	Sand	0.27	550	0.20	< 0.50
1.0	BH02	10-Aug-2018	672015	3		8.5	7.1	Brown	Stones	Sand	0.11	2.0	0.021	< 0.50
4.0	BH02	13-Aug-2018	672018	4		11.0	9.9	Brown	Stones	Sand	0.24	1.5	0.070	< 0.50
1.0	BH04D	02-Aug-2018	665940	5		8.6	9.1	Brown	Stones	Sand	0.24	24	0.14	< 0.50
7.0	BH04D	02-Aug-2018	665938	6		8.6	15	Grey	NONE	Sand	0.17	2.1	0.26	< 0.50
2.0	BH06	08-Aug-2018	669884	7		8.3	16	Brown	Stones	Loam	0.56	900	0.26	1.0
7.5	BH06	08-Aug-2018	669889	8		8.1	30	Grey	NONE	Clay	0.92	28	1.6	< 0.50
1.0	BH07	16-Aug-2018	674305	9		8.4	15	Brown	Stones, Brick	Sand	0.12	22	0.14	0.60
1.0	BH08	06-Aug-2018	668912	10		9.9	4.1	Grey	Stones	Sand	0.61	57	0.080	[B] < 0.50
5.0	BH08	06-Aug-2018	668916	11		8.9	15	Brown	Stones	Sand	0.35	11	0.15	[B] < 0.50
1.0	BH09	07-Aug-2018	669861	12		8.9	5.1	Brown	Stones	Sand	0.10	2.4	< 0.010	< 0.50
1.0	BH11	03-Aug-2018	668917	13		9.1	3.8	Grey	Stones	Sand	< 0.010	2.1	0.029	[B] < 0.50
1.0	BH12	09-Aug-2018	672020	14		10.1	3.7	Brown	NONE	Sand	0.027	1.4	0.028	< 0.50
4.0	BH12	09-Aug-2018	672023	15		9.3	9.8	Brown	NONE	Sand	0.044	9.9	0.070	< 0.50
1.0	BH13	09-Aug-2018	672027	16		10.1	12	Brown	Stones	Sand	0.95	490	0.20	< 0.50
5.0	BH13	09-Aug-2018	672031	17		9.0	12	Brown	Stones, Roots	Loam	0.21	180	0.12	1.1
1.0	BH14	08-Aug-2018	669869	18		8.5	7.8	Brown	Stones,	Sand	0.074	9.9	0.039	< 0.50
4.0	BH14	08-Aug-2018	669872	19		8.4	13	Brown	Stones	Sand	0.35	780	0.23	< 0.50
0.5	BH15	08-Aug-2018	669874	20		9.8	5.7	Brown	Stones	Sand	0.10	7.6	0.050	< 0.50
1.0	BH15	08-Aug-2018	669875	21		8.7	9.6	Brown	Stones	Sand	0.014	16	0.084	< 0.50
1.0	BH16	07-Aug-2018	669863	22		8.0	12	Brown	Stones, Chalk	Sand	1.1	26	0.28	< 0.50
4.0	BH16	07-Aug-2018	669866	23		8.5	11	Brown	Stones	Sand	0.39	15	0.29	< 0.50
1.0	BH17	08-Aug-2018	669881	24		9.2	3.9	Brown	Stones	Sand	0.81	6.3	0.24	< 0.50
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)														
CL:AIRE GAC commercial (SOM 2.5%)														
CL:AIRE GAC commercial (SOM 6%)														
S4UL commercial (SOM 1%)														
S4UL commercial (SOM 2.5%)														
S4UL commercial (SOM 6%)														
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Organic matter	Asbestos Identification	ACM Type	METALS	Arsenic	Barium	Beryllium	Boron (Hot water soluble)	Cadmium
					% w/w				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1	< 0.40	No Asbestos Detected	-		5.9	97	< 1.0	0.41	0.20
8.8	BH01	15-Aug-2018	674303	2	0.45	No Asbestos Detected	-		11	23	< 1.0	2.7	0.22
1.0	BH02	10-Aug-2018	672015	3	1.1	No Asbestos Detected	-		24	40	< 1.0	0.91	0.50
4.0	BH02	13-Aug-2018	672018	4	0.69	No Asbestos Detected	-		16	18	< 1.0	1.8	0.41
1.0	BH04D	02-Aug-2018	665940	5	4.0	Amosite Chrysotile	Fibres/Clumps		32	150	< 1.0	0.65	1.1
7.0	BH04D	02-Aug-2018	665938	6	0.88	No Asbestos Detected	-		6.0	19	< 1.0	1.8	0.11
2.0	BH06	08-Aug-2018	669884	7	10	No Asbestos Detected	-		52	370	1.4	3.1	4.0
7.5	BH06	08-Aug-2018	669889	8	1.5	No Asbestos Detected	-		24	33	< 1.0	8.0	0.43
1.0	BH07	16-Aug-2018	674305	9	4.7	No Asbestos Detected	-		39	240	1.5	1.4	1.4
1.0	BH08	06-Aug-2018	668912	10	3.1	No Asbestos Detected	-		26	89	< 1.0	1.6	0.59
5.0	BH08	06-Aug-2018	668916	11	4.0	No Asbestos Detected	-		26	100	< 1.0	4.0	0.80
1.0	BH09	07-Aug-2018	669861	12	1.9	No Asbestos Detected	-		43	87	< 1.0	0.40	0.63
1.0	BH11	03-Aug-2018	668917	13	0.97	No Asbestos Detected	-		18	31	< 1.0	0.62	0.45
1.0	BH12	09-Aug-2018	672020	14	2.4	No Asbestos Detected	-		8.7	11	< 1.0	< 0.40	0.17
4.0	BH12	09-Aug-2018	672023	15	0.93	No Asbestos Detected	-		13	11	< 1.0	< 0.40	0.22
1.0	BH13	09-Aug-2018	672027	16	3.6	No Asbestos Detected	-		36	290	< 1.0	0.68	1.6
5.0	BH13	09-Aug-2018	672031	17	1.5	No Asbestos Detected	-		29	400	< 1.0	1.0	3.5
1.0	BH14	08-Aug-2018	669869	18	0.97	No Asbestos Detected	-		28	140	< 1.0	0.70	1.8
4.0	BH14	08-Aug-2018	669872	19	0.83	No Asbestos Detected	-		30	64	< 1.0	0.67	1.3
0.5	BH15	08-Aug-2018	669874	20	3.1	No Asbestos Detected	-		29	35	< 1.0	< 0.40	0.27
1.0	BH15	08-Aug-2018	669875	21	4.8	No Asbestos Detected	-		28	150	< 1.0	0.49	0.86
1.0	BH16	07-Aug-2018	669863	22	19	Chrysotile	Fibres/Clumps		90	620	3.1	1.3	1.1
4.0	BH16	07-Aug-2018	669866	23	2.8	No Asbestos Detected	-		42	150	< 1.0	4.5	0.43
1.0	BH17	08-Aug-2018	669881	24	2.1	No Asbestos Detected	-		23	130	< 1.0	0.57	0.58
SGV commercial (SOM 6%)									640				230
CL:AIRE GAC commercial (SOM 1%)													
CL:AIRE GAC commercial (SOM 2.5%)													
CL:AIRE GAC commercial (SOM 6%)													
S4UL commercial (SOM 1%)													
S4UL commercial (SOM 2.5%)													
S4UL commercial (SOM 6%)									640		12	240000	190
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Copper	Total Chromium	Chromium VI	Iron	Lead	Mercury	Nickel	Selenium	Vanadium	Zinc
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1	16	16	< 0.50	13000	1600	< 0.10	9.3	0.37	24	46
8.8	BH01	15-Aug-2018	674303	2	13	13	< 0.50	8500	20	< 0.10	17	< 0.20	23	25
1.0	BH02	10-Aug-2018	672015	3	13	13	< 0.50	8900	25	< 0.10	21	< 0.20	16	44
4.0	BH02	13-Aug-2018	672018	4	9.4	9.4	< 0.50	7900	27	< 0.10	13	< 0.20	12	35
1.0	BH04D	02-Aug-2018	665940	5	18	18	< 0.50	12000	260	0.24	41	0.20	42	160
7.0	BH04D	02-Aug-2018	665938	6	9.3	9.3	< 0.50	7300	43	< 0.10	9.0	< 0.20	15	40
2.0	BH06	08-Aug-2018	669884	7	30	30	< 0.50	20000	810	2.1	61	0.76	37	1100
7.5	BH06	08-Aug-2018	669889	8	33	33	< 0.50	17000	32	0.11	37	0.42	46	87
1.0	BH07	16-Aug-2018	674305	9	28	28	< 0.50	17000	390	1.2	61	0.35	43	680
1.0	BH08	06-Aug-2018	668912	10	16	16	< 0.50	10000	99	0.14	38	< 0.20	61	84
5.0	BH08	06-Aug-2018	668916	11	24	24	< 0.50	16000	310	0.63	45	< 0.20	48	170
1.0	BH09	07-Aug-2018	669861	12	13	13	< 0.50	7000	99	0.31	20	< 0.20	22	140
1.0	BH11	03-Aug-2018	668917	13	11	11	< 0.50	13000	17	< 0.10	14	< 0.20	22	32
1.0	BH12	09-Aug-2018	672020	14	9.4	9.4	< 0.50	6900	11	< 0.10	11	< 0.20	8.6	28
4.0	BH12	09-Aug-2018	672023	15	7.8	7.8	< 0.50	6300	4.4	< 0.10	11	< 0.20	10	20
1.0	BH13	09-Aug-2018	672027	16	20	20	< 0.50	15000	360	0.41	40	< 0.20	22	550
5.0	BH13	09-Aug-2018	672031	17	20	20	< 0.50	17000	120	0.22	53	2.5	25	260
1.0	BH14	08-Aug-2018	669869	18	17	17	< 0.50	13000	200	1.0	44	0.71	28	100
4.0	BH14	08-Aug-2018	669872	19	30	30	< 0.50	16000	310	0.22	46	0.95	40	150
0.5	BH15	08-Aug-2018	669874	20	4.7	4.7	< 0.50	3100	14	< 0.10	9.1	< 0.20	13	27
1.0	BH15	08-Aug-2018	669875	21	24	24	< 0.50	14000	290	0.72	36	0.34	32	150
1.0	BH16	07-Aug-2018	669863	22	35	35	< 0.50	22000	1100	1.6	75	0.93	64	560
4.0	BH16	07-Aug-2018	669866	23	21	21	< 0.50	11000	95	0.45	51	1.4	28	130
1.0	BH17	08-Aug-2018	669881	24	12	12	< 0.50	11000	74	0.18	27	0.57	18	95
SGV commercial (SOM 6%)										26		13000		
CL:AIRE GAC commercial (SOM 1%)														
CL:AIRE GAC commercial (SOM 2.5%)														
CL:AIRE GAC commercial (SOM 6%)														
S4UL commercial (SOM 1%)														
S4UL commercial (SOM 2.5%)														
S4UL commercial (SOM 6%)					68000	8600 (CrIII)	33			58	980	12000	9000	730000
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	POLYCYCLIC AROMATIC HYDROCARBONS	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)Anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)Fluoranthene	Chrysene
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
8.8	BH01	15-Aug-2018	674303	2		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1.0	BH02	10-Aug-2018	672015	3		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
4.0	BH02	13-Aug-2018	672018	4		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1.0	BH04D	02-Aug-2018	665940	5		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
7.0	BH04D	02-Aug-2018	665938	6		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
2.0	BH06	08-Aug-2018	669884	7		1.2	0.53	3.0	6.1	6.5	7.8	4.4	2.7	8.1
7.5	BH06	08-Aug-2018	669889	8		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1.0	BH07	16-Aug-2018	674305	9		0.61	0.50	1.8	7.6	9.2	11	6.6	5.2	11
1.0	BH08	06-Aug-2018	668912	10		1.3	0.29	1.5	1.5	0.80	1.3	0.73	0.51	2.1
5.0	BH08	06-Aug-2018	668916	11		2.3	0.64	3.1	4.9	4.4	5.6	3.2	2.0	5.6
1.0	BH09	07-Aug-2018	669861	12		< 0.010	< 0.010	0.36	1.0	1.2	1.4	0.69	0.56	1.3
1.0	BH11	03-Aug-2018	668917	13		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1.0	BH12	09-Aug-2018	672020	14		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
4.0	BH12	09-Aug-2018	672023	15		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1.0	BH13	09-Aug-2018	672027	16		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
5.0	BH13	09-Aug-2018	672031	17		0.17	0.58	0.20	0.72	0.44	1.1	< 0.010	0.85	1.7
1.0	BH14	08-Aug-2018	669869	18		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
4.0	BH14	08-Aug-2018	669872	19		< 0.010	< 0.010	0.40	0.58	< 0.010	< 0.010	< 0.010	< 0.010	0.83
0.5	BH15	08-Aug-2018	669874	20		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1.0	BH15	08-Aug-2018	669875	21		4.6	1.0	4.6	15	15	18	9.5	6.4	19
1.0	BH16	07-Aug-2018	669863	22		0.45	0.52	0.81	2.6	2.7	3.7	2.2	1.3	3.2
4.0	BH16	07-Aug-2018	669866	23		< 0.010	< 0.010	0.43	1.6	0.89	1.2	0.70	0.39	1.4
1.0	BH17	08-Aug-2018	669881	24		< 0.010	< 0.010	< 0.010	0.45	< 0.010	< 0.010	< 0.010	< 0.010	1.0
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)														
CL:AIRE GAC commercial (SOM 2.5%)														
CL:AIRE GAC commercial (SOM 6%)														
S4UL commercial (SOM 1%)						84000	83000	520000	170	35	44	3900	1200	350
S4UL commercial (SOM 2.5%)						97000	97000	540000	170	35	44	4000	1200	350
S4UL commercial (SOM 6%)						100000	100000	540000	180	36	45	4000	1200	350
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Dibenz(a,h)Anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)Pyrene	Naphthalene	Phenanthrene	Pyrene	Coronene	Total 17 PAHs	HYDROCARBONS TPH-CWG
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
2.0	BH01	14-Aug-2018	672719	1	< 0.010	0.38	< 0.010	< 0.010	< 0.010	0.36	0.42	< 0.010	1.2	
8.8	BH01	15-Aug-2018	674303	2	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
1.0	BH02	10-Aug-2018	672015	3	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
4.0	BH02	13-Aug-2018	672018	4	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
1.0	BH04D	02-Aug-2018	665940	5	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
7.0	BH04D	02-Aug-2018	665938	6	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
2.0	BH06	08-Aug-2018	669884	7	1.5	12	1.1	3.7	1.1	9.6	13	< 0.010	82	
7.5	BH06	08-Aug-2018	669889	8	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
1.0	BH07	16-Aug-2018	674305	9	2.2	11	0.46	6.1	0.88	5.9	12	< 0.010	92	
1.0	BH08	06-Aug-2018	668912	10	0.16	2.4	1.3	0.67	0.63	3.8	3.0	< 0.010	22	
5.0	BH08	06-Aug-2018	668916	11	1.2	11	2.0	3.3	0.79	8.7	11	< 0.010	70	
1.0	BH09	07-Aug-2018	669861	12	< 0.010	2.0	< 0.010	0.70	< 0.010	1.3	3.0	< 0.010	14	
1.0	BH11	03-Aug-2018	668917	13	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
1.0	BH12	09-Aug-2018	672020	14	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
4.0	BH12	09-Aug-2018	672023	15	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
1.0	BH13	09-Aug-2018	672027	16	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
5.0	BH13	09-Aug-2018	672031	17	< 0.010	2.1	0.17	< 0.010	0.57	1.1	2.1	< 0.010	12	
1.0	BH14	08-Aug-2018	669869	18	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
4.0	BH14	08-Aug-2018	669872	19	< 0.010	1.6	< 0.010	< 0.010	< 0.010	2.1	1.9	< 0.010	7.4	
0.5	BH15	08-Aug-2018	669874	20	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.20	
1.0	BH15	08-Aug-2018	669875	21	2.9	30	3.7	9.0	1.8	26	32	< 0.010	200	
1.0	BH16	07-Aug-2018	669863	22	0.61	4.7	0.61	1.8	1.3	3.2	5.3	< 0.010	35	
4.0	BH16	07-Aug-2018	669866	23	< 0.010	2.4	< 0.010	0.54	< 0.010	1.6	2.6	< 0.010	14	
1.0	BH17	08-Aug-2018	669881	24	< 0.010	1.0	< 0.010	< 0.010	< 0.010	< 0.010	1.1	< 0.010	3.6	
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)														
CL:AIRE GAC commercial (SOM 2.5%)														
CL:AIRE GAC commercial (SOM 6%)														
S4UL commercial (SOM 1%)					3.5	23000	63000	500	190	22000	54000			
S4UL commercial (SOM 2.5%)					3.6	23000	68000	510	460	22000	54000			
S4UL commercial (SOM 6%)					3.6	23000	71000	510	1100	23000	54000			
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Aliphatics EC C5-C6	Aliphatics EC>C6-C8	Aliphatics EC>C8-C10	Aliphatics EC>C10-C12	Aliphatics EC>C12-C16	Aliphatics EC>C16-C21	Aliphatics EC>C21-C35	Aliphatics EC>C35-C44	Total Aliphatic Hydrocarbons	Aromatics EC C5-C7
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.010
8.8	BH01	15-Aug-2018	674303	2	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.010
1.0	BH02	10-Aug-2018	672015	3	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.010
4.0	BH02	13-Aug-2018	672018	4	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.010
1.0	BH04D	02-Aug-2018	665940	5	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.010
7.0	BH04D	02-Aug-2018	665938	6	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.010
2.0	BH06	08-Aug-2018	669884	7	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	46	< 0.10	46	< 0.010
7.5	BH06	08-Aug-2018	669889	8	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.010
1.0	BH07	16-Aug-2018	674305	9	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	13	< 0.10	14	< 0.010
1.0	BH08	06-Aug-2018	668912	10	[B] < 0.010	[B] < 0.010	[B] 2.2	[B] 22	[B] 160	[B] 220	[B] 79	[B] < 0.10	[B] 490	[B] < 0.010
5.0	BH08	06-Aug-2018	668916	11	[B] < 0.010	[B] < 0.010	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] 17	[B] < 0.10	[B] 17	[B] < 0.010
1.0	BH09	07-Aug-2018	669861	12	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	46	< 0.10	46	< 0.010
1.0	BH11	03-Aug-2018	668917	13	[B] < 0.010	[B] < 0.010	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 1.0	[B] < 0.010
1.0	BH12	09-Aug-2018	672020	14	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.010
4.0	BH12	09-Aug-2018	672023	15	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.010
1.0	BH13	09-Aug-2018	672027	16	< 0.010	< 0.010	< 0.10	4.8	6.9	25	170	< 0.10	210	< 0.010
5.0	BH13	09-Aug-2018	672031	17	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	35	< 0.10	36	< 0.010
1.0	BH14	08-Aug-2018	669869	18	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	45	< 0.10	45	< 0.010
4.0	BH14	08-Aug-2018	669872	19	< 0.010	< 0.010	< 0.10	< 0.10	21	90	200	< 0.10	310	< 0.010
0.5	BH15	08-Aug-2018	669874	20	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.010
1.0	BH15	08-Aug-2018	669875	21	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	34	< 0.10	34	< 0.010
1.0	BH16	07-Aug-2018	669863	22	< 0.010	< 0.010	< 0.10	2.9	5.8	15	93	6.8	120	< 0.010
4.0	BH16	07-Aug-2018	669866	23	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	30	< 0.10	30	< 0.010
1.0	BH17	08-Aug-2018	669881	24	< 0.010	< 0.010	< 0.10	2.7	3.2	75	94	< 0.10	170	< 0.010
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)														
CL:AIRE GAC commercial (SOM 2.5%)														
CL:AIRE GAC commercial (SOM 6%)														
S4UL commercial (SOM 1%)					3200	7800	2000	9700	59000	1600000		1600000		26000
S4UL commercial (SOM 2.5%)					5900	17000	4800	23000	82000	1700000		1700000		46000
S4UL commercial (SOM 6%)					12000	40000	11000	47000	90000	1800000		1800000		86000
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Aromatics EC>C7-C8	Aromatics EC>C8-C10	Aromatics EC>C10-C12	Aromatics EC>C12-C16	Aromatics EC>C16-C21	Aromatics EC>C21-C35	Aromatics EC>C35-C44	Total Aromatic Hydrocarbons	TPH (Aliphatic and Aromatic)	BTEX - Benzene
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg
2.0	BH01	14-Aug-2018	672719	1	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 2.0	< 1.0
8.8	BH01	15-Aug-2018	674303	2	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 2.0	< 1.0
1.0	BH02	10-Aug-2018	672015	3	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 2.0	< 1.0
4.0	BH02	13-Aug-2018	672018	4	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 2.0	< 1.0
1.0	BH04D	02-Aug-2018	665940	5	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 2.0	< 1.0
7.0	BH04D	02-Aug-2018	665938	6	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 2.0	< 1.0
2.0	BH06	08-Aug-2018	669884	7	< 0.010	< 0.10	< 0.10	< 0.10	1.5	63	< 0.10	64	110	< 1.0
7.5	BH06	08-Aug-2018	669889	8	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 2.0	< 1.0
1.0	BH07	16-Aug-2018	674305	9	< 0.010	< 0.10	< 0.10	< 0.10	8.7	62	< 0.10	71	85	< 1.0
1.0	BH08	06-Aug-2018	668912	10	[B] < 0.010	[B] < 0.10	[B] 1.1	[B] 26	[B] 50	[B] 53	[B] < 0.10	[B] 130	[B] 620	[B] < 1.0
5.0	BH08	06-Aug-2018	668916	11	[B] < 0.010	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] 2.6	[B] 35	[B] < 0.10	[B] 37	[B] 55	[B] < 1.0
1.0	BH09	07-Aug-2018	669861	12	< 0.010	< 0.10	< 0.10	< 0.10	2.3	100	< 0.10	100	150	< 1.0
1.0	BH11	03-Aug-2018	668917	13	[B] < 0.010	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 1.0	[B] < 2.0	[B] < 1.0
1.0	BH12	09-Aug-2018	672020	14	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 2.0	< 1.0
4.0	BH12	09-Aug-2018	672023	15	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 2.0	< 1.0
1.0	BH13	09-Aug-2018	672027	16	< 0.010	< 0.10	< 0.10	1.4	7.3	210	< 0.10	210	420	< 1.0
5.0	BH13	09-Aug-2018	672031	17	< 0.010	< 0.10	< 0.10	< 0.10	4.6	59	< 0.10	64	99	< 1.0
1.0	BH14	08-Aug-2018	669869	18	< 0.010	< 0.10	< 0.10	< 0.10	1.2	59	< 0.10	60	110	< 1.0
4.0	BH14	08-Aug-2018	669872	19	< 0.010	< 0.10	< 0.10	< 0.10	9.0	76	< 0.10	85	400	< 1.0
0.5	BH15	08-Aug-2018	669874	20	< 0.010	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 2.0	< 1.0
1.0	BH15	08-Aug-2018	669875	21	< 0.010	< 0.10	< 0.10	< 0.10	3.8	74	< 0.10	78	110	< 1.0
1.0	BH16	07-Aug-2018	669863	22	< 0.010	< 0.10	< 0.10	1.6	53	530	42	630	750	< 1.0
4.0	BH16	07-Aug-2018	669866	23	< 0.010	< 0.10	< 0.10	< 0.10	1.8	88	< 0.10	90	120	< 1.0
1.0	BH17	08-Aug-2018	669881	24	< 0.010	< 0.10	< 0.10	< 0.10	30	730	120	880	1100	< 1.0
SGV commercial (SOM 6%)														95000
CL:AIRE GAC commercial (SOM 1%)														
CL:AIRE GAC commercial (SOM 2.5%)														
CL:AIRE GAC commercial (SOM 6%)														
S4UL commercial (SOM 1%)					56000	3500	16000	36000	28000	28000	28000			27000
S4UL commercial (SOM 2.5%)					110000	8100	28000	37000	28000	28000	28000			47000
S4UL commercial (SOM 6%)					180000	17000	34000	38000	28000	28000	28000			90000
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	BTEX - Toluene	BTEX - Ethylbenzene	BTEX - m & p-Xylene	BTEX - o-Xylene	Methyl Tert-Butyl Ether (MTBE)	PCBs	PCB 77	PCB 81	PCB 105	PCB 114
					µg/kg	µg/kg	µg/kg	µg/kg	µg/kg		mg/kg	mg/kg	mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
8.8	BH01	15-Aug-2018	674303	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
1.0	BH02	10-Aug-2018	672015	3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
4.0	BH02	13-Aug-2018	672018	4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
1.0	BH04D	02-Aug-2018	665940	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
7.0	BH04D	02-Aug-2018	665938	6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
2.0	BH06	08-Aug-2018	669884	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
7.5	BH06	08-Aug-2018	669889	8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
1.0	BH07	16-Aug-2018	674305	9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 0.0010	< 0.0010	< 0.0010	< 0.0010
1.0	BH08	06-Aug-2018	668912	10	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0		< 0.0010	< 0.0010	< 0.0010	< 0.0010
5.0	BH08	06-Aug-2018	668916	11	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0		-	-	-	-
1.0	BH09	07-Aug-2018	669861	12	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
1.0	BH11	03-Aug-2018	668917	13	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0		-	-	-	-
1.0	BH12	09-Aug-2018	672020	14	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
4.0	BH12	09-Aug-2018	672023	15	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
1.0	BH13	09-Aug-2018	672027	16	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
5.0	BH13	09-Aug-2018	672031	17	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
1.0	BH14	08-Aug-2018	669869	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
4.0	BH14	08-Aug-2018	669872	19	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
0.5	BH15	08-Aug-2018	669874	20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
1.0	BH15	08-Aug-2018	669875	21	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
1.0	BH16	07-Aug-2018	669863	22	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
4.0	BH16	07-Aug-2018	669866	23	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		-	-	-	-
1.0	BH17	08-Aug-2018	669881	24	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 0.0010	< 0.0010	< 0.0010	< 0.0010
SGV commercial (SOM 6%)					4400000	2800000	3200000	2600000						
CL:AIRE GAC commercial (SOM 1%)									7900000					
CL:AIRE GAC commercial (SOM 2.5%)									13000000					
CL:AIRE GAC commercial (SOM 6%)									24000000					
S4UL commercial (SOM 1%)					56000000	5700000	5900000	6600000						
S4UL commercial (SOM 2.5%)					110000000	13000000	14000000	15000000						
S4UL commercial (SOM 6%)					180000000	27000000	30000000	33000000						
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	PCB 118	PCB 123	PCB 126	PCB 156	PCB 157	PCB 167	PCB 169	PCB 189	Total PCBs (12 Congeners)	PHENOLS
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
2.0	BH01	14-Aug-2018	672719	1	-	-	-	-	-	-	-	-	-	
8.8	BH01	15-Aug-2018	674303	2	-	-	-	-	-	-	-	-	-	
1.0	BH02	10-Aug-2018	672015	3	-	-	-	-	-	-	-	-	-	
4.0	BH02	13-Aug-2018	672018	4	-	-	-	-	-	-	-	-	-	
1.0	BH04D	02-Aug-2018	665940	5	-	-	-	-	-	-	-	-	-	
7.0	BH04D	02-Aug-2018	665938	6	-	-	-	-	-	-	-	-	-	
2.0	BH06	08-Aug-2018	669884	7	-	-	-	-	-	-	-	-	-	
7.5	BH06	08-Aug-2018	669889	8	-	-	-	-	-	-	-	-	-	
1.0	BH07	16-Aug-2018	674305	9	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	
1.0	BH08	06-Aug-2018	668912	10	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	
5.0	BH08	06-Aug-2018	668916	11	-	-	-	-	-	-	-	-	-	
1.0	BH09	07-Aug-2018	669861	12	-	-	-	-	-	-	-	-	-	
1.0	BH11	03-Aug-2018	668917	13	-	-	-	-	-	-	-	-	-	
1.0	BH12	09-Aug-2018	672020	14	-	-	-	-	-	-	-	-	-	
4.0	BH12	09-Aug-2018	672023	15	-	-	-	-	-	-	-	-	-	
1.0	BH13	09-Aug-2018	672027	16	-	-	-	-	-	-	-	-	-	
5.0	BH13	09-Aug-2018	672031	17	-	-	-	-	-	-	-	-	-	
1.0	BH14	08-Aug-2018	669869	18	-	-	-	-	-	-	-	-	-	
4.0	BH14	08-Aug-2018	669872	19	-	-	-	-	-	-	-	-	-	
0.5	BH15	08-Aug-2018	669874	20	-	-	-	-	-	-	-	-	-	
1.0	BH15	08-Aug-2018	669875	21	-	-	-	-	-	-	-	-	-	
1.0	BH16	07-Aug-2018	669863	22	-	-	-	-	-	-	-	-	-	
4.0	BH16	07-Aug-2018	669866	23	-	-	-	-	-	-	-	-	-	
1.0	BH17	08-Aug-2018	669881	24	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)														
CL:AIRE GAC commercial (SOM 2.5%)														
CL:AIRE GAC commercial (SOM 6%)														
S4UL commercial (SOM 1%)														
S4UL commercial (SOM 2.5%)														
S4UL commercial (SOM 6%)														
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Phenol	Cresols	Xylenols	Resorcinol	1-Naphthol	Trimethylphenols	Total Phenols	SEMI VOLATILE ORGANIC COMPOUNDS	Hexachlorobenzene	Diethyl phthalate
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
8.8	BH01	15-Aug-2018	674303	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
1.0	BH02	10-Aug-2018	672015	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
4.0	BH02	13-Aug-2018	672018	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
1.0	BH04D	02-Aug-2018	665940	5	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
7.0	BH04D	02-Aug-2018	665938	6	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
2.0	BH06	08-Aug-2018	669884	7	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
7.5	BH06	08-Aug-2018	669889	8	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
1.0	BH07	16-Aug-2018	674305	9	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
1.0	BH08	06-Aug-2018	668912	10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		[B] < 0.050	[B] < 0.050
5.0	BH08	06-Aug-2018	668916	11	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		[B] < 0.050	[B] < 0.050
1.0	BH09	07-Aug-2018	669861	12	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
1.0	BH11	03-Aug-2018	668917	13	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		[B] < 0.050	[B] < 0.050
1.0	BH12	09-Aug-2018	672020	14	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
4.0	BH12	09-Aug-2018	672023	15	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
1.0	BH13	09-Aug-2018	672027	16	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
5.0	BH13	09-Aug-2018	672031	17	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
1.0	BH14	08-Aug-2018	669869	18	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
4.0	BH14	08-Aug-2018	669872	19	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
0.5	BH15	08-Aug-2018	669874	20	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
1.0	BH15	08-Aug-2018	669875	21	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
1.0	BH16	07-Aug-2018	669863	22	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
4.0	BH16	07-Aug-2018	669866	23	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
1.0	BH17	08-Aug-2018	669881	24	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.30		< 0.050	< 0.050
SGV commercial (SOM 6%)					3200						3200			
CL:AIRE GAC commercial (SOM 1%)						160000								150000
CL:AIRE GAC commercial (SOM 2.5%)						180000								220000
CL:AIRE GAC commercial (SOM 6%)						180000								290000
S4UL commercial (SOM 1%)					440						440		110	
S4UL commercial (SOM 2.5%)					690						690		120	
S4UL commercial (SOM 6%)					1300						1300		120	
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Dimethyl phthalate	Dibenzofuran	Carbazole	Butylbenzyl phthalate	Bis(2-ethylhexyl) phthalate	Bis(2-chloroethoxy)methane	Bis(2-chloroethyl)ether	4-Nitrophenol	4-Methylphenol	4-Chloro-3-methylphenol
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
8.8	BH01	15-Aug-2018	674303	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH02	10-Aug-2018	672015	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH02	13-Aug-2018	672018	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH04D	02-Aug-2018	665940	5	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
7.0	BH04D	02-Aug-2018	665938	6	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2.0	BH06	08-Aug-2018	669884	7	< 0.050	< 0.050	< 0.050	< 0.050	0.16	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
7.5	BH06	08-Aug-2018	669889	8	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH07	16-Aug-2018	674305	9	< 0.050	0.22	0.36	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH08	06-Aug-2018	668912	10	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
5.0	BH08	06-Aug-2018	668916	11	[B] < 0.050	[B] < 0.050	[B] 0.12	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1.0	BH09	07-Aug-2018	669861	12	< 0.050	< 0.050	< 0.050	< 0.050	0.063	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH11	03-Aug-2018	668917	13	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1.0	BH12	09-Aug-2018	672020	14	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH12	09-Aug-2018	672023	15	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH13	09-Aug-2018	672027	16	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
5.0	BH13	09-Aug-2018	672031	17	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH14	08-Aug-2018	669869	18	< 0.050	< 0.050	< 0.050	< 0.050	0.087	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH14	08-Aug-2018	669872	19	< 0.050	< 0.050	< 0.050	< 0.050	0.88	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
0.5	BH15	08-Aug-2018	669874	20	< 0.050	< 0.050	< 0.050	< 0.050	0.14	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH15	08-Aug-2018	669875	21	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH16	07-Aug-2018	669863	22	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH16	07-Aug-2018	669866	23	< 0.050	< 0.050	< 0.050	< 0.050	0.16	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH17	08-Aug-2018	669881	24	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)								940000	85000				160000*	
CL:AIRE GAC commercial (SOM 2.5%)								940000	86000				180000*	
CL:AIRE GAC commercial (SOM 6%)								950000	86000				180000*	
S4UL commercial (SOM 1%)														
S4UL commercial (SOM 2.5%)														
S4UL commercial (SOM 6%)														
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	2-Nitrophenol	2-Methylphenol	2-Chlorophenol	2,6-Dinitrotoluene	2,4-Dinitrotoluene	2,4-Dimethylphenol	2,4-Dichlorophenol	2,4,6-Trichlorophenol	2,4,5-Trichlorophenol	2-Chloronaphthalene
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
8.8	BH01	15-Aug-2018	674303	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH02	10-Aug-2018	672015	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH02	13-Aug-2018	672018	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH04D	02-Aug-2018	665940	5	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
7.0	BH04D	02-Aug-2018	665938	6	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2.0	BH06	08-Aug-2018	669884	7	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
7.5	BH06	08-Aug-2018	669889	8	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH07	16-Aug-2018	674305	9	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH08	06-Aug-2018	668912	10	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
5.0	BH08	06-Aug-2018	668916	11	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1.0	BH09	07-Aug-2018	669861	12	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH11	03-Aug-2018	668917	13	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1.0	BH12	09-Aug-2018	672020	14	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH12	09-Aug-2018	672023	15	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH13	09-Aug-2018	672027	16	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
5.0	BH13	09-Aug-2018	672031	17	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH14	08-Aug-2018	669869	18	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH14	08-Aug-2018	669872	19	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
0.5	BH15	08-Aug-2018	669874	20	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH15	08-Aug-2018	669875	21	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH16	07-Aug-2018	669863	22	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH16	07-Aug-2018	669866	23	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH17	08-Aug-2018	669881	24	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)						160000*		1900	3700	16000				390
CL:AIRE GAC commercial (SOM 2.5%)						180000*		1900	3700	24000				960
CL:AIRE GAC commercial (SOM 6%)						180000*		1900	3800	30000				2200
S4UL commercial (SOM 1%)							3500				3500	3500		
S4UL commercial (SOM 2.5%)							4000				4000	4000		
S4UL commercial (SOM 6%)							4300				4300	4300		

henol total

Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	2-Methylnaphthalene	Acenaphthylene	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Benzo[g,h,i]perylene	Chrysene
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
8.8	BH01	15-Aug-2018	674303	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH02	10-Aug-2018	672015	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH02	13-Aug-2018	672018	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH04D	02-Aug-2018	665940	5	< 0.050	< 0.050	< 0.050	0.088	0.41	0.78	0.63	0.37	0.23	0.39
7.0	BH04D	02-Aug-2018	665938	6	< 0.050	< 0.050	< 0.050	< 0.050	0.12	0.13	< 0.050	0.083	< 0.050	0.11
2.0	BH06	08-Aug-2018	669884	7	0.12	< 0.050	0.35	0.83	2.5	2.6	1.1	1.7	1.3	2.3
7.5	BH06	08-Aug-2018	669889	8	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH07	16-Aug-2018	674305	9	0.19	< 0.050	0.39	1.3	4.6	5.6	2.0	4.2	3.0	4.3
1.0	BH08	06-Aug-2018	668912	10	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] 0.26	[B] 0.45	[B] 0.56	[B] 0.18	[B] 0.40	[B] 0.21	[B] 0.49
5.0	BH08	06-Aug-2018	668916	11	[B] < 0.050	[B] < 0.050	[B] 0.24	[B] 0.41	[B] 1.7	[B] 1.9	[B] 0.66	[B] 1.5	[B] 0.95	[B] 1.7
1.0	BH09	07-Aug-2018	669861	12	< 0.050	< 0.050	0.14	0.31	1.2	1.5	0.43	0.85	0.76	1.2
1.0	BH11	03-Aug-2018	668917	13	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1.0	BH12	09-Aug-2018	672020	14	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH12	09-Aug-2018	672023	15	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH13	09-Aug-2018	672027	16	< 0.050	< 0.050	< 0.050	0.47	2.4	3.5	1.6	2.2	< 0.050	2.3
5.0	BH13	09-Aug-2018	672031	17	< 0.050	< 0.050	< 0.050	< 0.050	0.29	< 0.050	< 0.050	< 0.050	< 0.050	0.27
1.0	BH14	08-Aug-2018	669869	18	< 0.050	< 0.050	< 0.050	0.054	0.37	0.46	0.14	0.25	0.20	0.34
4.0	BH14	08-Aug-2018	669872	19	< 0.050	< 0.050	0.25	0.17	0.31	0.33	0.11	0.20	0.11	0.39
0.5	BH15	08-Aug-2018	669874	20	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH15	08-Aug-2018	669875	21	< 0.050	< 0.050	< 0.050	< 0.050	0.40	0.60	0.21	0.33	0.31	0.40
1.0	BH16	07-Aug-2018	669863	22	< 0.050	< 0.050	0.068	0.36	1.7	3.2	1.0	1.5	1.5	1.7
4.0	BH16	07-Aug-2018	669866	23	< 0.050	< 0.050	< 0.050	0.15	0.60	0.77	< 0.050	0.46	0.34	0.52
1.0	BH17	08-Aug-2018	669881	24	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)														
CL:AIRE GAC commercial (SOM 2.5%)														
CL:AIRE GAC commercial (SOM 6%)														
S4UL commercial (SOM 1%)						83000	84000	520000	170	44	1200	35	3900	350
S4UL commercial (SOM 2.5%)						97000	97000	540000	170	44	1200	35	4000	350
S4UL commercial (SOM 6%)						100000	100000	540000	180	45	1200	36	4000	350
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)Pyrene	Phenanthrene	Pyrene	1,2,4-Trichlorobenzene	Naphthalene	4-Chloroaniline	Hexachlorobutadiene	Dibenz(a,h)Anthracene
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
8.8	BH01	15-Aug-2018	674303	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH02	10-Aug-2018	672015	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH02	13-Aug-2018	672018	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH04D	02-Aug-2018	665940	5	0.78	< 0.050	0.21	0.40	0.66	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
7.0	BH04D	02-Aug-2018	665938	6	0.22	< 0.050	< 0.050	0.13	0.20	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2.0	BH06	08-Aug-2018	669884	7	4.0	0.25	< 0.050	2.3	3.6	< 0.050	< 0.050	< 0.050	< 0.050	0.39
7.5	BH06	08-Aug-2018	669889	8	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH07	16-Aug-2018	674305	9	6.8	0.36	2.3	4.1	6.6	< 0.050	< 0.050	< 0.050	< 0.050	1.0
1.0	BH08	06-Aug-2018	668912	10	[B] 0.97	[B] < 0.050	[B] 0.19	[B] 0.74	[B] 0.98	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
5.0	BH08	06-Aug-2018	668916	11	[B] 3.2	[B] 0.13	[B] 0.82	[B] 2.0	[B] 2.7	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] 0.30
1.0	BH09	07-Aug-2018	669861	12	2.0	0.084	0.63	1.4	1.9	< 0.050	< 0.050	< 0.050	< 0.050	0.20
1.0	BH11	03-Aug-2018	668917	13	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1.0	BH12	09-Aug-2018	672020	14	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH12	09-Aug-2018	672023	15	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH13	09-Aug-2018	672027	16	3.5	< 0.050	< 0.050	1.9	3.0	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
5.0	BH13	09-Aug-2018	672031	17	0.67	< 0.050	< 0.050	0.35	0.53	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH14	08-Aug-2018	669869	18	0.58	< 0.050	0.14	0.24	0.53	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH14	08-Aug-2018	669872	19	0.66	0.20	< 0.050	0.48	0.76	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
0.5	BH15	08-Aug-2018	669874	20	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH15	08-Aug-2018	669875	21	0.82	< 0.050	0.22	< 0.050	0.66	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH16	07-Aug-2018	669863	22	2.6	< 0.050	1.1	1.1	2.2	< 0.050	< 0.050	< 0.050	< 0.050	0.48
4.0	BH16	07-Aug-2018	669866	23	0.92	< 0.050	< 0.050	0.56	0.83	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH17	08-Aug-2018	669881	24	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)														
CL:AIRE GAC commercial (SOM 2.5%)														
CL:AIRE GAC commercial (SOM 6%)														
S4UL commercial (SOM 1%)					23000	63000	500	22000	54000		190			3.5
S4UL commercial (SOM 2.5%)					23000	68000	510	22000	54000		460			3.6
S4UL commercial (SOM 6%)					23000	71000	510	23000	54000		1100			3.6
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Bis(2-Chloroisopropyl)Ether	Phenol	Pentachlorophenol	N-Nitrosodi-n-propylamine	N-Nitrosodimethylamine	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Nitrobenzene	Isophorone
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
8.8	BH01	15-Aug-2018	674303	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH02	10-Aug-2018	672015	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH02	13-Aug-2018	672018	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH04D	02-Aug-2018	665940	5	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
7.0	BH04D	02-Aug-2018	665938	6	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2.0	BH06	08-Aug-2018	669884	7	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
7.5	BH06	08-Aug-2018	669889	8	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH07	16-Aug-2018	674305	9	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH08	06-Aug-2018	668912	10	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
5.0	BH08	06-Aug-2018	668916	11	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1.0	BH09	07-Aug-2018	669861	12	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH11	03-Aug-2018	668917	13	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1.0	BH12	09-Aug-2018	672020	14	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH12	09-Aug-2018	672023	15	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH13	09-Aug-2018	672027	16	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
5.0	BH13	09-Aug-2018	672031	17	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH14	08-Aug-2018	669869	18	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH14	08-Aug-2018	669872	19	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
0.5	BH15	08-Aug-2018	669874	20	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH15	08-Aug-2018	669875	21	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH16	07-Aug-2018	669863	22	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH16	07-Aug-2018	669866	23	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH17	08-Aug-2018	669881	24	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
SGV commercial (SOM 6%)						3200								
CL:AIRE GAC commercial (SOM 1%)									89000	15000				
CL:AIRE GAC commercial (SOM 2.5%)									89000	15000				
CL:AIRE GAC commercial (SOM 6%)									89000	15000				
S4UL commercial (SOM 1%)						440	400							
S4UL commercial (SOM 2.5%)						690	400							
S4UL commercial (SOM 6%)						1300	400							
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Hexachloroethane	Hexachlorocyclopentadiene	2-Nitroaniline	3-Nitroaniline	4-Nitroaniline	4-Chlorophenylphenylether	2-Methyl-4,6-Dinitrophenol	Azobenzene	4-Bromophenylphenyl Ether	Di-N-Butyl Phthalate
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
2.0	BH01	14-Aug-2018	672719	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
8.8	BH01	15-Aug-2018	674303	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH02	10-Aug-2018	672015	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH02	13-Aug-2018	672018	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH04D	02-Aug-2018	665940	5	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
7.0	BH04D	02-Aug-2018	665938	6	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
2.0	BH06	08-Aug-2018	669884	7	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
7.5	BH06	08-Aug-2018	669889	8	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH07	16-Aug-2018	674305	9	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH08	06-Aug-2018	668912	10	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
5.0	BH08	06-Aug-2018	668916	11	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1.0	BH09	07-Aug-2018	669861	12	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH11	03-Aug-2018	668917	13	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050	[B] < 0.050
1.0	BH12	09-Aug-2018	672020	14	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH12	09-Aug-2018	672023	15	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH13	09-Aug-2018	672027	16	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
5.0	BH13	09-Aug-2018	672031	17	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH14	08-Aug-2018	669869	18	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	5.4	< 0.050	< 0.050	< 0.050
4.0	BH14	08-Aug-2018	669872	19	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.78
0.5	BH15	08-Aug-2018	669874	20	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH15	08-Aug-2018	669875	21	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.42
1.0	BH16	07-Aug-2018	669863	22	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4.0	BH16	07-Aug-2018	669866	23	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1.0	BH17	08-Aug-2018	669881	24	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)					22									
CL:AIRE GAC commercial (SOM 2.5%)					53									
CL:AIRE GAC commercial (SOM 6%)					120									
S4UL commercial (SOM 1%)														
S4UL commercial (SOM 2.5%)														
S4UL commercial (SOM 6%)														
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Di-N-Octyl Phthalate	VOLATILE ORGANIC COMPOUNDS	Dichlorodifluoromethane	Chloromethane	Vinyl Chloride	Bromomethane	Chloroethane	Trichlorofluoromethane	1,1-Dichloroethene	Trans 1,2-Dichloroethene
					mg/kg		µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg
2.0	BH01	14-Aug-2018	672719	1	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
8.8	BH01	15-Aug-2018	674303	2	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
1.0	BH02	10-Aug-2018	672015	3	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
4.0	BH02	13-Aug-2018	672018	4	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
1.0	BH04D	02-Aug-2018	665940	5	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
7.0	BH04D	02-Aug-2018	665938	6	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
2.0	BH06	08-Aug-2018	669884	7	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
7.5	BH06	08-Aug-2018	669889	8	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
1.0	BH07	16-Aug-2018	674305	9	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
1.0	BH08	06-Aug-2018	668912	10	[B] < 0.050		[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 20	[B] < 2.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
5.0	BH08	06-Aug-2018	668916	11	[B] < 0.050		[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 20	[B] < 2.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1.0	BH09	07-Aug-2018	669861	12	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
1.0	BH11	03-Aug-2018	668917	13	[B] < 0.050		[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 20	[B] < 2.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1.0	BH12	09-Aug-2018	672020	14	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
4.0	BH12	09-Aug-2018	672023	15	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
1.0	BH13	09-Aug-2018	672027	16	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
5.0	BH13	09-Aug-2018	672031	17	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
1.0	BH14	08-Aug-2018	669869	18	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
4.0	BH14	08-Aug-2018	669872	19	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
0.5	BH15	08-Aug-2018	669874	20	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
1.0	BH15	08-Aug-2018	669875	21	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
1.0	BH16	07-Aug-2018	669863	22	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
4.0	BH16	07-Aug-2018	669866	23	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
1.0	BH17	08-Aug-2018	669881	24	< 0.050		< 1.0	< 1.0	< 1.0	< 20	< 2.0	< 1.0	< 1.0	< 1.0
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)								1000			960000		26000	22000
CL:AIRE GAC commercial (SOM 2.5%)								1200			1300000		46000	40000
CL:AIRE GAC commercial (SOM 6%)								1600			2100000		92000	81000
S4UL commercial (SOM 1%)									59					
S4UL commercial (SOM 2.5%)									77					
S4UL commercial (SOM 6%)									120					
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	1,1-Dichloroethane	cis 1,2-Dichloroethene	Bromochloromethane	Trichloromethane	1,1,1-Trichloroethane	1,1-Dichloropropene	Tetrachloromethane	1,2-Dichloroethane	Trichloroethene	1,2-Dichloropropane
					µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg
2.0	BH01	14-Aug-2018	672719	1	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
8.8	BH01	15-Aug-2018	674303	2	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
1.0	BH02	10-Aug-2018	672015	3	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
4.0	BH02	13-Aug-2018	672018	4	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
1.0	BH04D	02-Aug-2018	665940	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
7.0	BH04D	02-Aug-2018	665938	6	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
2.0	BH06	08-Aug-2018	669884	7	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
7.5	BH06	08-Aug-2018	669889	8	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
1.0	BH07	16-Aug-2018	674305	9	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
1.0	BH08	06-Aug-2018	668912	10	[B] < 1.0	[B] < 1.0	[B] < 5.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 2.0	[B] < 1.0	[B] < 1.0
5.0	BH08	06-Aug-2018	668916	11	[B] < 1.0	[B] < 1.0	[B] < 5.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 2.0	[B] < 1.0	[B] < 1.0
1.0	BH09	07-Aug-2018	669861	12	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
1.0	BH11	03-Aug-2018	668917	13	[B] < 1.0	[B] < 1.0	[B] < 5.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 2.0	[B] < 1.0	[B] < 1.0
1.0	BH12	09-Aug-2018	672020	14	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
4.0	BH12	09-Aug-2018	672023	15	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
1.0	BH13	09-Aug-2018	672027	16	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
5.0	BH13	09-Aug-2018	672031	17	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
1.0	BH14	08-Aug-2018	669869	18	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
4.0	BH14	08-Aug-2018	669872	19	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
0.5	BH15	08-Aug-2018	669874	20	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
1.0	BH15	08-Aug-2018	669875	21	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
1.0	BH16	07-Aug-2018	669863	22	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
4.0	BH16	07-Aug-2018	669866	23	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
1.0	BH17	08-Aug-2018	669881	24	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)					280000	14000								3300
CL:AIRE GAC commercial (SOM 2.5%)					450000	24000								5900
CL:AIRE GAC commercial (SOM 6%)					850000	47000								12000
S4UL commercial (SOM 1%)								99000	660000		2900	670	1200	
S4UL commercial (SOM 2.5%)								170000	1300000		6300	970	2600	
S4UL commercial (SOM 6%)								350000	3000000		14000	1700	5700	
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Dibromomethane	Bromodichloromethane	cis-1,3-Dichloropropene	Trans-1,3-Dichloropropene	1,1,2-Trichloroethane	1,3-Dichloropropane	Tetrachloroethene	Dibromochloromethane	1,2-Dibromoethane	Chlorobenzene
					µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg
2.0	BH01	14-Aug-2018	672719	1	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
8.8	BH01	15-Aug-2018	674303	2	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
1.0	BH02	10-Aug-2018	672015	3	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
4.0	BH02	13-Aug-2018	672018	4	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
1.0	BH04D	02-Aug-2018	665940	5	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
7.0	BH04D	02-Aug-2018	665938	6	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
2.0	BH06	08-Aug-2018	669884	7	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
7.5	BH06	08-Aug-2018	669889	8	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
1.0	BH07	16-Aug-2018	674305	9	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
1.0	BH08	06-Aug-2018	668912	10	[B] < 1.0	[B] < 5.0	[B] < 10	[B] < 10	[B] < 10	[B] < 2.0	[B] < 1.0	[B] < 10	[B] < 5.0	[B] < 1.0
5.0	BH08	06-Aug-2018	668916	11	[B] < 1.0	[B] < 5.0	[B] < 10	[B] < 10	[B] < 10	[B] < 2.0	[B] < 1.0	[B] < 10	[B] < 5.0	[B] < 1.0
1.0	BH09	07-Aug-2018	669861	12	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
1.0	BH11	03-Aug-2018	668917	13	[B] < 1.0	[B] < 5.0	[B] < 10	[B] < 10	[B] < 10	[B] < 2.0	[B] < 1.0	[B] < 10	[B] < 5.0	[B] < 1.0
1.0	BH12	09-Aug-2018	672020	14	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
4.0	BH12	09-Aug-2018	672023	15	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
1.0	BH13	09-Aug-2018	672027	16	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
5.0	BH13	09-Aug-2018	672031	17	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
1.0	BH14	08-Aug-2018	669869	18	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
4.0	BH14	08-Aug-2018	669872	19	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
0.5	BH15	08-Aug-2018	669874	20	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
1.0	BH15	08-Aug-2018	669875	21	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
1.0	BH16	07-Aug-2018	669863	22	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
4.0	BH16	07-Aug-2018	669866	23	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
1.0	BH17	08-Aug-2018	669881	24	< 1.0	< 5.0	< 10	< 10	< 10	< 2.0	< 1.0	< 10	< 5.0	< 1.0
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)						2100			94000					
CL:AIRE GAC commercial (SOM 2.5%)						3700			190000					
CL:AIRE GAC commercial (SOM 6%)						7600			400000					
S4UL commercial (SOM 1%)											19000			56000
S4UL commercial (SOM 2.5%)											42000			130000
S4UL commercial (SOM 6%)											95000			290000
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	1,1,1,2-Tetrachloroethane	Styrene	Tribromomethane	Isopropylbenzene	1,2,3-Trichloropropane	Bromobenzene	N-Propylbenzene	2-Chlorotoluene	1.3.5-Trimethylbenzene	4-Chlorotoluene
					µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg
2.0	BH01	14-Aug-2018	672719	1	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
8.8	BH01	15-Aug-2018	674303	2	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1.0	BH02	10-Aug-2018	672015	3	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4.0	BH02	13-Aug-2018	672018	4	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1.0	BH04D	02-Aug-2018	665940	5	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
7.0	BH04D	02-Aug-2018	665938	6	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2.0	BH06	08-Aug-2018	669884	7	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
7.5	BH06	08-Aug-2018	669889	8	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1.0	BH07	16-Aug-2018	674305	9	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1.0	BH08	06-Aug-2018	668912	10	[B] < 2.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 50	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
5.0	BH08	06-Aug-2018	668916	11	[B] < 2.0	[B] < 1.0	[B] 2.6	[B] < 1.0	[B] < 50	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1.0	BH09	07-Aug-2018	669861	12	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1.0	BH11	03-Aug-2018	668917	13	[B] < 2.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 50	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0
1.0	BH12	09-Aug-2018	672020	14	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4.0	BH12	09-Aug-2018	672023	15	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1.0	BH13	09-Aug-2018	672027	16	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
5.0	BH13	09-Aug-2018	672031	17	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1.0	BH14	08-Aug-2018	669869	18	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4.0	BH14	08-Aug-2018	669872	19	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
0.5	BH15	08-Aug-2018	669874	20	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1.0	BH15	08-Aug-2018	669875	21	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1.0	BH16	07-Aug-2018	669863	22	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4.0	BH16	07-Aug-2018	669866	23	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1.0	BH17	08-Aug-2018	669881	24	< 2.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)						3300000		1400000		97000	4100000			
CL:AIRE GAC commercial (SOM 2.5%)						6500000		3300000		220000	9700000			
CL:AIRE GAC commercial (SOM 6%)						11000000		7700000		520000	21000000			
S4UL commercial (SOM 1%)					110000									
S4UL commercial (SOM 2.5%)					250000									
S4UL commercial (SOM 6%)					560000									
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Tert-Butylbenzene	1,2,4-Trimethylbenzene	Sec-Butylbenzene	4-Isopropyltoluene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	N-Butylbenzene	1,2-Dichlorobenzene	1,2-Dibromo-3-Chloropropane	1,2,4-Trichlorobenzene
					µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg	µg/ kg
2.0	BH01	14-Aug-2018	672719	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
8.8	BH01	15-Aug-2018	674303	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
1.0	BH02	10-Aug-2018	672015	3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
4.0	BH02	13-Aug-2018	672018	4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
1.0	BH04D	02-Aug-2018	665940	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
7.0	BH04D	02-Aug-2018	665938	6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
2.0	BH06	08-Aug-2018	669884	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
7.5	BH06	08-Aug-2018	669889	8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
1.0	BH07	16-Aug-2018	674305	9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
1.0	BH08	06-Aug-2018	668912	10	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 50	[B] < 1.0
5.0	BH08	06-Aug-2018	668916	11	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 50	[B] < 1.0
1.0	BH09	07-Aug-2018	669861	12	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
1.0	BH11	03-Aug-2018	668917	13	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 1.0	[B] < 50	[B] < 1.0
1.0	BH12	09-Aug-2018	672020	14	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
4.0	BH12	09-Aug-2018	672023	15	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
1.0	BH13	09-Aug-2018	672027	16	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
5.0	BH13	09-Aug-2018	672031	17	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
1.0	BH14	08-Aug-2018	669869	18	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
4.0	BH14	08-Aug-2018	669872	19	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
0.5	BH15	08-Aug-2018	669874	20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
1.0	BH15	08-Aug-2018	669875	21	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
1.0	BH16	07-Aug-2018	669863	22	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
4.0	BH16	07-Aug-2018	669866	23	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
1.0	BH17	08-Aug-2018	669881	24	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 50	< 1.0
SGV commercial (SOM 6%)														
CL:AIRE GAC commercial (SOM 1%)						42000								
CL:AIRE GAC commercial (SOM 2.5%)						99000								
CL:AIRE GAC commercial (SOM 6%)						220000								
S4UL commercial (SOM 1%)									30000	4400000		2000000		220000
S4UL commercial (SOM 2.5%)									73000	10000000		4800000		530000
S4UL commercial (SOM 6%)									170000	25000000		11000000		1300000
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Depth (m bgl)	Sample identity	Sample date	Chemtest sample ID	Sample number	Hexachlorobutadiene	1,2,3-Trichlorobenzene
					µg/ kg	µg/ kg
2.0	BH01	14-Aug-2018	672719	1	< 1.0	< 2.0
8.8	BH01	15-Aug-2018	674303	2	< 1.0	< 2.0
1.0	BH02	10-Aug-2018	672015	3	< 1.0	< 2.0
4.0	BH02	13-Aug-2018	672018	4	< 1.0	< 2.0
1.0	BH04D	02-Aug-2018	665940	5	< 1.0	< 2.0
7.0	BH04D	02-Aug-2018	665938	6	< 1.0	< 2.0
2.0	BH06	08-Aug-2018	669884	7	< 1.0	< 2.0
7.5	BH06	08-Aug-2018	669889	8	< 1.0	< 2.0
1.0	BH07	16-Aug-2018	674305	9	< 1.0	< 2.0
1.0	BH08	06-Aug-2018	668912	10	[B] < 1.0	[B] < 2.0
5.0	BH08	06-Aug-2018	668916	11	[B] < 1.0	[B] < 2.0
1.0	BH09	07-Aug-2018	669861	12	< 1.0	< 2.0
1.0	BH11	03-Aug-2018	668917	13	[B] < 1.0	[B] < 2.0
1.0	BH12	09-Aug-2018	672020	14	< 1.0	< 2.0
4.0	BH12	09-Aug-2018	672023	15	< 1.0	< 2.0
1.0	BH13	09-Aug-2018	672027	16	< 1.0	< 2.0
5.0	BH13	09-Aug-2018	672031	17	< 1.0	< 2.0
1.0	BH14	08-Aug-2018	669869	18	< 1.0	< 2.0
4.0	BH14	08-Aug-2018	669872	19	< 1.0	< 2.0
0.5	BH15	08-Aug-2018	669874	20	< 1.0	< 2.0
1.0	BH15	08-Aug-2018	669875	21	< 1.0	< 2.0
1.0	BH16	07-Aug-2018	669863	22	< 1.0	< 2.0
4.0	BH16	07-Aug-2018	669866	23	< 1.0	< 2.0
1.0	BH17	08-Aug-2018	669881	24	< 1.0	< 2.0
SGV commercial (SOM 6%)						
CL:AIRE GAC commercial (SOM 1%)						
CL:AIRE GAC commercial (SOM 2.5%)						
CL:AIRE GAC commercial (SOM 6%)						
S4UL commercial (SOM 1%)					31000	102000
S4UL commercial (SOM 2.5%)					66000	250000
S4UL commercial (SOM 6%)					120000	590000
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Appendix C

Summary of Groundwater Analysis

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	GENERAL INORGANICS	Nitrate as N	Nitrite as N	Orthophosphate as PO4	Total Cyanide	Ammonia (Free) as N	pH	Chemical Oxygen Demand (Tot	Total Suspended Solids	Dissolved Oxygen	Electrical Conductivity at 20 °C	Chloride	Fluoride	Total Nitrogen (Kjeldahl)	ORGANOTINS	Triphenyl tin	Dibutyltin	Tributyltin	METALS
					mg/l	mg/l	mg/l	ug/l	mg/l	pH Units	mg/l	mg/l	mg/l	µS/cm	mg/l	ug/l	mg/l		ug/l	ug/l	ug/l	
Dublin Port groundwater monitoring May 2018																						
SW1	02-May-2018	955493	1		-	-	-	-	-	-	-	36	9.3	-	-	-	-		< 0.2	0.8	0.3	
SW2	02-May-2018	955494	2		-	-	-	-	-	-	-	6.0	10	-	-	-	-		< 0.2	0.7	0.3	
SW3	02-May-2018	955495	3		-	-	-	-	-	-	-	17	11	-	-	-	-		< 0.2	0.6	0.4	
GW6S	02-May-2018	955488	4		0.14	-	-	-	2.4	7.7	350	-	-	29000	19000	750	3.3		-	-	-	
GW6D	02-May-2018	955489	5		0.04	-	-	-	26	7.4	340	-	-	32000	19000	910	27		-	-	-	
GW7D	02-May-2018	955550	6		0.04	-	-	-	7.4	7.5	490	-	-	28000	20000	970	9.4		-	-	-	
GW8D	02-May-2018	955490	7		0.01	-	-	-	6.6	7.7	610	-	-	22000	14000	1100	9.4		-	-	-	
GW10S	02-May-2018	955491	8		0.05	-	-	-	< 15	7.6	690	-	-	33000	20000	850	2.7		-	-	-	
GW10D	02-May-2018	955492	9		0.06	-	-	-	4.8	7.5	610	-	-	30000	20000	940	7.9		-	-	-	
Dublin Port groundwater monitoring June 2018																						
SW1	06-Jun-18	978740	10		-	-	-	-	-	-	-	28	8.5	-	-	-	-		-	< 0.2	0.3	
SW2	06-Jun-18	978741	11		-	-	-	-	-	-	-	26	9.5	-	-	-	-		-	< 0.2	0.3	
SW3	06-Jun-18	978742	12		-	-	-	-	-	-	-	32	9.1	-	-	-	-		-	< 0.2	< 0.2	
GW6S	06-Jun-18	978745	13		0.20	-	-	-	0.72	7.7	410	-	-	50000	13000	840	1.9		-	< 0.2	< 0.2	
GW6D	06-Jun-18	978744	14		0.20	-	-	-	22	7.3	530	-	-	49000	20000	1100	19		-	< 0.2	< 0.2	
GW8D	06-Jun-18	978746	15		0.14	-	-	-	7.3	7.5	340	-	-	34000	15000	1200	6.3		-	< 0.2	< 0.2	
GW10D	06-Jun-18	978747	16		0.17	-	-	-	7.6	7.6	310	-	-	48000	20000	1000	6.3		-	< 0.2	< 0.2	
Dublin Port groundwater monitoring July 2018																						
SW1	03-Jul-18	995184	17		-	-	-	-	-	-	-	26	9.1	-	-	-	-		< 0.2	< 0.2	0.4	
SW2	03-Jul-18	995185	18		-	-	-	-	-	-	-	33	9.2	-	-	-	-		< 0.2	< 0.2	0.9	
SW3	03-Jul-18	995186	19		-	-	-	-	-	-	-	50	9.4	-	-	-	-		< 0.2	< 0.2	0.3	
GW6S	03-Jul-18	995190	20		0.04	-	-	-	1.5	7.9	84	-	-	64000	15000	980	2.5		< 0.2	< 0.2	< 0.2	
GW6D	03-Jul-18	995191	21		0.05	-	-	-	21	7.4	80	-	-	63000	660	1000	18		< 0.2	< 0.2	< 0.2	
GW7D	03-Jul-18	995189	22		0.02	-	-	-	6.1	7.6	85	-	-	55000	10000	990	5.1		< 0.2	< 0.2	< 0.2	
GW8D	03-Jul-18	995188	23		0.05	-	-	-	7.4	7.6	50	-	-	43000	9200	1300	6.2		< 0.2	< 0.2	< 0.2	
GW10D	03-Jul-18	995187	24		0.08	-	-	-	7.7	7.6	84	-	-	55000	11000	1000	6.5		< 0.2	< 0.2	< 0.2	
MP2 Ground Investigation August 2018																						
MP2 BH01	22-Aug-2018	677655	25		< 0.50	0.015	0.12	<5	< 0.050	7.8	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 BH02	22-Aug-2018	677649	26		< 0.50	0.015	0.17	<5	< 0.050	7.8	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 BH04S	30-Aug-2018	679048	27		< 0.50	< 0.010	0.24	<5	< 0.050	7.3	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 BH04D	30-Aug-2018	679049	28		< 0.50	< 0.010	2.3	<5	0.71	7.5	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 BH06S	30-Aug-2018	679046	29		< 0.50	0.017	0.30	<5	< 0.050	7.5	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 BH06D	30-Aug-2018	679047	30		< 0.50	0.010	3.8	<5	0.63	7.7	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 BH08	30-Aug-2018	679050	31		< 0.50	< 0.010	0.21	<5	< 0.050	7.5	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 BH12	22-Aug-2018	677650	32		0.64	2.1	0.096	<5	< 0.050	8.3	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 BH13	30-Aug-2018	679052	33		< 0.50	< 0.010	0.28	<5	0.70	8.2	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 BH14	30-Aug-2018	679053	34		< 0.50	< 0.010	0.071	<5	0.093	7.8	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 BH15	30-Aug-2018	679051	35		< 0.50	< 0.010	0.15	<5	< 0.050	7.3	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 BH16	22-Aug-2018	677651	36		< 0.50	0.055	0.18	<5	< 0.050	7.8	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 SW1	22-Aug-2018	677656	37		< 0.50	0.017	0.44	<5	0.056	7.8	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 SW2	30-Aug-2018	679055	38		< 0.50	< 0.010	0.13	<5	< 0.050	7.6	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
MP2 SW3	30-Aug-2018	679054	39		< 0.50	< 0.010	0.12	<5	< 0.050	7.7	-	-	-	-	-	-	-		-	< 0.050	< 0.050	
1. WHO Health 2011						3										1500						
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016					37.5	0.375								800-1875	24-187.5							
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																				0.0002	0.0002	
4. Environmental Protection Agency Interim Guideline Values 2003					25	0.1	0.03	10		≥6.5 and ≤9.5				1000	30							
5. European Communities (Drinking Water) Regulations 2014 Ireland					50	0.5		50								1500						
6. Atkins WSV Commercial																						

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1

*, =, +, - sum of values

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	Aluminium	Arsenic	Barium	Beryllium	Boron	Cadmium	Copper	Chromium	Chromium (hexavalent)	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Vanadium	Zinc	Sodium	PETROLEUM HYDROCARBONS
				µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	
Dublin Port groundwater monitoring May 2018																						
SW1	02-May-2018	955493	1	-	0.70	-	-	-	< 0.02	< 0.5	3.3	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	1.8	-	
SW2	02-May-2018	955494	2	-	0.53	-	-	-	< 0.02	< 0.5	0.5	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	0.8	-	
SW3	02-May-2018	955495	3	-	0.49	-	-	-	< 0.02	< 0.5	2.1	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	< 0.5	-	
GW6S	02-May-2018	955488	4	-	1.12	-	-	-	< 0.02	< 0.5	0.3	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	1.4	-	
GW6D	02-May-2018	955489	5	-	0.71	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	0.5	-	-	< 0.5	-	
GW7D	02-May-2018	955550	6	-	0.62	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	< 0.5	-	
GW8D	02-May-2018	955490	7	-	2.48	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	1.1	-	-	< 0.5	-	
GW10S	02-May-2018	955491	8	-	1.10	-	-	-	0.08	< 0.5	1.2	< 5.0	-	0.3	-	< 0.05	< 0.5	-	-	0.6	-	
GW10D	02-May-2018	955492	9	-	0.98	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	< 0.5	-	
Dublin Port groundwater monitoring June 2018																						
SW1	06-Jun-18	978740	10	-	0.73	-	-	-	< 0.02	1.2	< 0.2	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	1.6	3600	
SW2	06-Jun-18	978741	11	-	0.39	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	< 0.5	7600	
SW3	06-Jun-18	978742	12	-	0.33	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	< 0.5	8600	
GW6S	06-Jun-18	978745	13	-	0.55	-	-	-	0.04	< 0.5	< 0.2	< 5.0		0.3	-	< 0.05	< 0.5	-	-	0.9	7600	
GW6D	06-Jun-18	978744	14	-	0.29	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	< 0.5	7500	
GW8D	06-Jun-18	978746	15	-	1.71	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	0.5	-	-	< 0.5	7100	
GW10D	06-Jun-18	978747	16	-	1.04	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	< 0.5	7000	
Dublin Port groundwater monitoring July 2018																						
SW1	03-Jul-18	995184	17	-	0.63	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	0.7	4900	
SW2	03-Jul-18	995185	18	-	0.56	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	< 0.5	6700	
SW3	03-Jul-18	995186	19	-	0.35	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	< 0.5	8000	
GW6S	03-Jul-18	995190	20	-	0.57	-	-	-	0.06	< 0.5	< 0.2	< 5.0	-	0.4	-	< 0.05	< 0.5	-	-	1.0	8300	
GW6D	03-Jul-18	995191	21	-	0.62	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2		< 0.05	< 0.5	-	-	< 0.5	9700	
GW7D	03-Jul-18	995189	22	-	0.71	-	-	-	0.03	< 0.5	< 0.2	< 5.0	-	0.2	-	< 0.05	< 0.5	-	-	< 0.5	8300	
GW8D	03-Jul-18	995188	23	-	1.50	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	0.3	-	< 0.05	0.6	-	-	1.6	6000	
GW10D	03-Jul-18	995187	24	-	0.85	-	-	-	< 0.02	< 0.5	< 0.2	< 5.0	-	< 0.2	-	< 0.05	< 0.5	-	-	< 0.5	8400	
MP2 Ground Investigation August 2018																						
MP2 BH01	22-Aug-2018	677655	25	27	50	41	< 1.0	3500	0.14	390	140	[B] < 20	1300	< 1.0	20	< 0.010	5.4	< 1.0	41	51	-	
MP2 BH02	22-Aug-2018	677649	26	38	52	50	< 1.0	3300	0.13	110	150	[B] < 20	1400	< 1.0	11	< 0.010	6.7	< 1.0	42	57	-	
MP2 BH04S	30-Aug-2018	679048	27	< 10	49	36	< 1.0	3400	< 0.080	330	47	< 20	1500	< 1.0	10	< 0.010	6.2	160	13	120	-	
MP2 BH04D	30-Aug-2018	679049	28	< 10	49	160	< 1.0	3000	< 0.080	390	30	< 20	1300	< 1.0	970	< 0.010	15	150	6.5	110	-	
MP2 BH06S	30-Aug-2018	679046	29	37	17	270	< 1.0	1700	< 0.080	37	< 1.0	< 20	1000	< 1.0	1500	< 0.010	12	75	< 1.0	55	-	
MP2 BH06D	30-Aug-2018	679047	30	55	35	340	< 1.0	2000	< 0.080	120	< 1.0	< 20	1100	6.0	650	< 0.010	8.5	130	< 1.0	31	-	
MP2 BH08	30-Aug-2018	679050	31	< 10	49	37	< 1.0	3200	< 0.080	490	50	< 20	1500	< 1.0	19	< 0.010	7.5	150	13	100	-	
MP2 BH12	22-Aug-2018	677650	32	12	3.3	24	< 1.0	180	< 0.080	6.4	8.9	[B] < 20	250	< 1.0	300	< 0.010	6.3	2.0	3.3	12	-	
MP2 BH13	30-Aug-2018	679052	33	< 10	9.6	270	< 1.0	430	0.092	8.2	< 1.0	< 20	210	< 1.0	150	< 0.010	2.6	5.4	< 1.0	12	-	
MP2 BH14	30-Aug-2018	679053	34	82	3.6	330	< 1.0	240	< 0.080	3.1	4.2	< 20	560	< 1.0	790	< 0.010	3.2	< 1.0	1.3	8.0	-	
MP2 BH15	30-Aug-2018	679051	35	< 10	42	95	< 1.0	2700	< 0.080	360	12	< 20	1400	6.0	350	< 0.010	13	130	7.6	210	-	
MP2 BH16	22-Aug-2018	677651	36	23	34	22	< 1.0	2500	0.15	170	95	[B] < 20	900	< 1.0	6.1	< 0.010	5.6	< 1.0	29	48	-	
MP2 SW1	22-Aug-2018	677656	37	10	54	6.4	< 1.0	3500	< 0.080	510	150	[B] < 20	1200	< 1.0	2.9	< 0.010	4.6	< 1.0	45	54	-	
MP2 SW2	30-Aug-2018	679055	38	< 10	55	7.5	< 1.0	3500	< 0.080	380	65	< 20	1500	< 1.0	< 1.0	< 0.010	< 1.0	160	15	80	-	
MP2 SW3	30-Aug-2018	679054	39	< 10	50	8.5	< 1.0	3500	< 0.080	210	42	< 20	1400	< 1.0	11	< 0.010	< 1.0	160	10	75	-	
1. WHO Health 2011					10	700		2400	3	2000	50			10		6	70	40				
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016				150	7.5						37.5	7.5		7.5		0.75				75		
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)									0.2					1.3			8.6					
4. Environmental Protection Agency Interim Guideline Values 2003				200	10	100		1000	5	30	30		200	10	50	1	20			100	150000	
5. European Communities (Drinking Water) Regulations 2014 Ireland								1000	5	2000	50			10		1	20	10				
6. Atkins WSV Commercial																428						

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1

*, =, +, - sum of values

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	TPH1 (C10 - C40)	Aliphatics >C5-C6	Aliphatics >C6-C8	Aliphatics >C8-C10	Aliphatics >C10-C12	Aliphatics >C12-C16	Aliphatics >C16-C21	Aliphatics >C21-C35	Aliphatics >C35-C44	Total Aliphatics	Aromatics >C5-C7	Aromatics >C7-C8	Aromatics >EC8-EC10	Aromatics >EC10-EC12	Aromatics >EC12-EC16	Aromatics >EC16-EC21	Aromatics >EC21-EC35	Aromatics >EC35-EC44	Total Aromatics
				µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Dublin Port groundwater monitoring May 2018																						
SW1	02-May-2018	955493	1	< 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	02-May-2018	955494	2	< 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	02-May-2018	955495	3	< 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	02-May-2018	955488	4	< 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	02-May-2018	955489	5	< 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW7D	02-May-2018	955550	6	< 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	02-May-2018	955490	7	< 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10S	02-May-2018	955491	8	< 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	02-May-2018	955492	9	< 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring June 2018																						
SW1	06-Jun-18	978740	10	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
SW2	06-Jun-18	978741	11	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
SW3	06-Jun-18	978742	12	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
GW6S	06-Jun-18	978745	13	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
GW6D	06-Jun-18	978744	14	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
GW8D	06-Jun-18	978746	15	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
GW10D	06-Jun-18	978747	16	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
Dublin Port groundwater monitoring July 2018																						
SW1	03-Jul-18	995184	17	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
SW2	03-Jul-18	995185	18	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
SW3	03-Jul-18	995186	19	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
GW6S	03-Jul-18	995190	20	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
GW6D	03-Jul-18	995191	21	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
GW7D	03-Jul-18	995189	22	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
GW8D	03-Jul-18	995188	23	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
GW10D	03-Jul-18	995187	24	-	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10	< 1.0	< 1.0	< 1.0	< 10	< 10	< 10	< 10	-	< 10
MP2 Ground Investigation August 2018																						
MP2 BH01	22-Aug-2018	677655	25	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 BH02	22-Aug-2018	677649	26	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 BH04S	30-Aug-2018	679048	27	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 BH04D	30-Aug-2018	679049	28	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 BH06S	30-Aug-2018	679046	29	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 BH06D	30-Aug-2018	679047	30	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 BH08	30-Aug-2018	679050	31	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 BH12	22-Aug-2018	677650	32	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 BH13	30-Aug-2018	679052	33	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 BH14	30-Aug-2018	679053	34	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 BH15	30-Aug-2018	679051	35	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 BH16	22-Aug-2018	677651	36	-	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 5.0	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 0.10	[D] < 5.0
MP2 SW1	22-Aug-2018	677656	37	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 SW2	30-Aug-2018	679055	38	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
MP2 SW3	30-Aug-2018	679054	39	-	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0
1. WHO Health 2011																						
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016																						
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																						
4. Environmental Protection Agency Interim Guideline Values 2003																						
5. European Communities (Drinking Water) Regulations 2014 Ireland																						
6. Atkins WSV Commercial					198000	144000	2900	2230						8460	9090000	96500	380000					

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1

*, =, +, - sum of values

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	TPH (Ali & Aro)	PAHs	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Coronene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
				µg/l		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Dublin Port groundwater monitoring May 2018																						
SW1	02-May-2018	955493	1	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SW2	02-May-2018	955494	2	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SW3	02-May-2018	955495	3	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW6S	02-May-2018	955488	4	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW6D	02-May-2018	955489	5	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW7D	02-May-2018	955550	6	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW8D	02-May-2018	955490	7	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW10S	02-May-2018	955491	8	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW10D	02-May-2018	955492	9	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dublin Port groundwater monitoring June 2018																						
SW1	06-Jun-18	978740	10	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SW2	06-Jun-18	978741	11	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SW3	06-Jun-18	978742	12	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW6S	06-Jun-18	978745	13	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW6D	06-Jun-18	978744	14	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW8D	06-Jun-18	978746	15	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW10D	06-Jun-18	978747	16	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dublin Port groundwater monitoring July 2018																						
SW1	03-Jul-18	995184	17	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SW2	03-Jul-18	995185	18	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SW3	03-Jul-18	995186	19	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW6S	03-Jul-18	995190	20	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW6D	03-Jul-18	995191	21	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW7D	03-Jul-18	995189	22	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW8D	03-Jul-18	995188	23	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
GW10D	03-Jul-18	995187	24	-		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MP2 Ground Investigation August 2018																						
MP2 BH01	22-Aug-2018	677655	25	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 BH02	22-Aug-2018	677649	26	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 BH04S	30-Aug-2018	679048	27	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 BH04D	30-Aug-2018	679049	28	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 BH06S	30-Aug-2018	679046	29	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 BH06D	30-Aug-2018	679047	30	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 BH08	30-Aug-2018	679050	31	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 BH12	22-Aug-2018	677650	32	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 BH13	30-Aug-2018	679052	33	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 BH14	30-Aug-2018	679053	34	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 BH15	30-Aug-2018	679051	35	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 BH16	22-Aug-2018	677651	36	[D] < 10		[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010	[D] < 0.010
MP2 SW1	22-Aug-2018	677656	37	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 SW2	30-Aug-2018	679055	38	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
MP2 SW3	30-Aug-2018	679054	39	< 10		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1. WHO Health 2011										0.7												
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016				7.5						0.0075												
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)								0.1		0.00017							0.0063			2		
4. Environmental Protection Agency Interim Guideline Values 2003				10				10000		0.01	0.5	0.05	0.05				1		0.05	1		
5. European Communities (Drinking Water) Regulations 2014 Ireland										0.01	0.1+	0.1+	0.1+						0.1+			
6. Atkins WSV Commercial																				99800		

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1
*, =, +, - sum of values

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	Total of 17 PAHs	PCBs	PCB 28	PCB 52	PCB 81	PCB 77	PSB 101	PCB 105	PCB 114	PCB 118	PCB 123	PCB 126	PCB 138	PCB 153	PCB 156	PCB 157	PCB 167	PCB 169	PCB 180
				ug/l		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Dublin Port groundwater monitoring May 2018																						
SW1	02-May-2018	955493	1	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
SW2	02-May-2018	955494	2	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
SW3	02-May-2018	955495	3	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW6S	02-May-2018	955488	4	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW6D	02-May-2018	955489	5	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW7D	02-May-2018	955550	6	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW8D	02-May-2018	955490	7	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW10S	02-May-2018	955491	8	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW10D	02-May-2018	955492	9	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
Dublin Port groundwater monitoring June 2018																						
SW1	06-Jun-18	978740	10	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
SW2	06-Jun-18	978741	11	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
SW3	06-Jun-18	978742	12	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW6S	06-Jun-18	978745	13	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW6D	06-Jun-18	978744	14	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW8D	06-Jun-18	978746	15	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW10D	06-Jun-18	978747	16	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
Dublin Port groundwater monitoring July 2018																						
SW1	03-Jul-18	995184	17	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
SW2	03-Jul-18	995185	18	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
SW3	03-Jul-18	995186	19	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW6S	03-Jul-18	995190	20	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW6D	03-Jul-18	995191	21	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW7D	03-Jul-18	995189	22	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW8D	03-Jul-18	995188	23	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
GW10D	03-Jul-18	995187	24	< 0.16		< 0.02	< 0.02	-	-	< 0.02	-	-	< 0.02	-	-	< 0.02	< 0.02	-	-	-	-	< 0.02
MP2 Ground Investigation August 2018																						
MP2 BH01	22-Aug-2018	677655	25	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 BH02	22-Aug-2018	677649	26	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 BH04S	30-Aug-2018	679048	27	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 BH04D	30-Aug-2018	679049	28	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 BH06S	30-Aug-2018	679046	29	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 BH06D	30-Aug-2018	679047	30	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 BH08	30-Aug-2018	679050	31	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 BH12	22-Aug-2018	677650	32	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 BH13	30-Aug-2018	679052	33	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 BH14	30-Aug-2018	679053	34	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 BH15	30-Aug-2018	679051	35	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 BH16	22-Aug-2018	677651	36	[D] < 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 SW1	22-Aug-2018	677656	37	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 SW2	30-Aug-2018	679055	38	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
MP2 SW3	30-Aug-2018	679054	39	< 0.20		-	-	< 0.010	< 0.010	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	-	-	< 0.010	< 0.010	< 0.010	< 0.010	-
1. WHO Health 2011																						
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016				0.075																		
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																						
4. Environmental Protection Agency Interim Guideline Values 2003				0.1																		
5. European Communities (Drinking Water) Regulations 2014 Ireland																						
6. Atkins WSV Commercial																						

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1

*, =, +, - sum of values

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	PCB 189	Total PCBs (12 Congeners)	PHENOLS	Resorcinol	Phenol	Cresols	Xylenols	1-Naphthol	Trimethylphenols	Total Phenols	MONOAROMATICS	Methyl Tert-Butyl Ether	N-Nitrosodimethylamine	Phenol	2-Chlorophenol	bis(2-Chloroethyl)ether	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,2-Dichlorobenzene
				ug/l	ug/l		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Dublin Port groundwater monitoring May 2018																						
SW1	02-May-2018	955493	1	-	< 0.14		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
SW2	02-May-2018	955494	2	-	< 0.14		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
SW3	02-May-2018	955495	3	-	< 0.14		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
GW6S	02-May-2018	955488	4	-	< 0.14		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
GW6D	02-May-2018	955489	5	-	< 0.14		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
GW7D	02-May-2018	955550	6	-	< 0.14		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
GW8D	02-May-2018	955490	7	-	< 0.14		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
GW10S	02-May-2018	955491	8	-	< 0.14		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
GW10D	02-May-2018	955492	9	-	< 0.14		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring June 2018																						
SW1	06-Jun-18	978740	10	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
SW2	06-Jun-18	978741	11	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
SW3	06-Jun-18	978742	12	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
GW6S	06-Jun-18	978745	13	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
GW6D	06-Jun-18	978744	14	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
GW8D	06-Jun-18	978746	15	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
GW10D	06-Jun-18	978747	16	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
Dublin Port groundwater monitoring July 2018																						
SW1	03-Jul-18	995184	17	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
SW2	03-Jul-18	995185	18	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
SW3	03-Jul-18	995186	19	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
GW6S	03-Jul-18	995190	20	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
GW6D	03-Jul-18	995191	21	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
GW7D	03-Jul-18	995189	22	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
GW8D	03-Jul-18	995188	23	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
GW10D	03-Jul-18	995187	24	-	< 0.14		-	-	-	-	-	-	-		< 1.0	-	-	-	-	-	-	-
MP2 Ground Investigation August 2018																						
MP2 BH01	22-Aug-2018	677655	25	< 0.010	< 0.010		[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH02	22-Aug-2018	677649	26	< 0.010	< 0.010		[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH04S	30-Aug-2018	679048	27	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH04D	30-Aug-2018	679049	28	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH06S	30-Aug-2018	679046	29	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH06D	30-Aug-2018	679047	30	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH08	30-Aug-2018	679050	31	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH12	22-Aug-2018	677650	32	< 0.010	< 0.010		[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH13	30-Aug-2018	679052	33	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH14	30-Aug-2018	679053	34	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH15	30-Aug-2018	679051	35	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH16	22-Aug-2018	677651	36	< 0.010	< 0.010		[BD] < 0.0050	[BD] < 0.0050	[BD] < 0.0050	[BD] < 0.0050	[BD] < 0.0050	[BD] < 0.0050	[BD] < 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 SW1	22-Aug-2018	677656	37	< 0.010	< 0.010		[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.0050	[B] < 0.030		[C] < 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 SW2	30-Aug-2018	679055	38	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 SW3	30-Aug-2018	679054	39	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.10	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1. WHO Health 2011																0.1					300	1000
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016															10							
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																						
4. Environmental Protection Agency Interim Guideline Values 2003					0.01			0.0005							30		0.5	200				10
5. European Communities (Drinking Water) Regulations 2014 Ireland																						
6. Atkins WSV Commercial								269							33800000		269000000					

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1
*, =, +, - sum of values

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	2-Methylphenol (o-Cresol)	Bis(2-Chloroisopropyl)Ether	Hexachloroethane	n-Nitroso-n-dipropylamine	4-Methylphenol	Nitrobenzene	Isophorone	2-Nitrophenol	2,4-Dimethylphenol	bis(2-Chloroethoxy)methane	2,4-Dichlorophenol	1,2,4-Trichlorobenzene	Naphthalene	4-Chloroaniline	Hexachlorobutadiene	4-Chloro-3-methylphenol	2-Methylnaphthalene	Hexachlorocyclopentadiene	2,4,6-Trichlorophenol
				µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Dublin Port groundwater monitoring May 2018																						
SW1	02-May-2018	955493	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	02-May-2018	955494	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	02-May-2018	955495	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	02-May-2018	955488	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	02-May-2018	955489	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW7D	02-May-2018	955550	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	02-May-2018	955490	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10S	02-May-2018	955491	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	02-May-2018	955492	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring June 2018																						
SW1	06-Jun-18	978740	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	06-Jun-18	978741	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	06-Jun-18	978742	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	06-Jun-18	978745	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	06-Jun-18	978744	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	06-Jun-18	978746	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	06-Jun-18	978747	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring July 2018																						
SW1	03-Jul-18	995184	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	03-Jul-18	995185	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	03-Jul-18	995186	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	03-Jul-18	995190	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	03-Jul-18	995191	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW7D	03-Jul-18	995189	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	03-Jul-18	995188	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	03-Jul-18	995187	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MP2 Ground Investigation August 2018																						
MP2 BH01	22-Aug-2018	677655	25	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH02	22-Aug-2018	677649	26	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH04S	30-Aug-2018	679048	27	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH04D	30-Aug-2018	679049	28	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH06S	30-Aug-2018	679046	29	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH06D	30-Aug-2018	679047	30	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH08	30-Aug-2018	679050	31	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH12	22-Aug-2018	677650	32	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH13	30-Aug-2018	679052	33	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH14	30-Aug-2018	679053	34	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH15	30-Aug-2018	679051	35	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH16	22-Aug-2018	677651	36	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 SW1	22-Aug-2018	677656	37	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 SW2	30-Aug-2018	679055	38	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 SW3	30-Aug-2018	679054	39	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1. WHO Health 2011																		0.6				200
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016																						
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)															0.4	2						
4. Environmental Protection Agency Interim Guideline Values 2003							10									1						200
5. European Communities (Drinking Water) Regulations 2014 Ireland																						
6. Atkins WSV Commercial						50000						30900000				99800						

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1

*, =, +, - sum of values

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	2,4,5-Trichlorophenol	2-Chloronaphthalene	2-Nitroaniline	Acenaphthylene	Dimethyl phthalate	2,6-Dinitrotoluene	Acenaphthene	3-Nitroaniline	Dibenzofuran	4-Chlorophenylphenylether	2,4-Dinitrotoluene	Fluorene	Diethyl phthalate	4-Nitroaniline	2-Methyl-4,6-Dinitrophenol	Azobenzene	4-Bromophenylphenylether	Hexachlorobenzene	Pentachlorophenol
				µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Dublin Port groundwater monitoring May 2018																						
SW1	02-May-2018	955493	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	02-May-2018	955494	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	02-May-2018	955495	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	02-May-2018	955488	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	02-May-2018	955489	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW7D	02-May-2018	955550	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	02-May-2018	955490	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10S	02-May-2018	955491	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	02-May-2018	955492	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring June 2018																						
SW1	06-Jun-18	978740	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	06-Jun-18	978741	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	06-Jun-18	978742	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	06-Jun-18	978745	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	06-Jun-18	978744	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	06-Jun-18	978746	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	06-Jun-18	978747	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring July 2018																						
SW1	03-Jul-18	995184	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	03-Jul-18	995185	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	03-Jul-18	995186	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	03-Jul-18	995190	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	03-Jul-18	995191	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW7D	03-Jul-18	995189	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	03-Jul-18	995188	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	03-Jul-18	995187	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MP2 Ground Investigation August 2018																						
MP2 BH01	22-Aug-2018	677655	25	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH02	22-Aug-2018	677649	26	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH04S	30-Aug-2018	679048	27	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH04D	30-Aug-2018	679049	28	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH06S	30-Aug-2018	679046	29	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH06D	30-Aug-2018	679047	30	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH08	30-Aug-2018	679050	31	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH12	22-Aug-2018	677650	32	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH13	30-Aug-2018	679052	33	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH14	30-Aug-2018	679053	34	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH15	30-Aug-2018	679051	35	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 BH16	22-Aug-2018	677651	36	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 SW1	22-Aug-2018	677656	37	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 SW2	30-Aug-2018	679055	38	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MP2 SW3	30-Aug-2018	679054	39	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1. WHO Health 2011																						9
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016																						
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																						0.4
4. Environmental Protection Agency Interim Guideline Values 2003																					0.03	2
5. European Communities (Drinking Water) Regulations 2014 Ireland																						
6. Atkins WSV Commercial					62700																	

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1

*, =, +, - sum of values

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	Phenanthrene	Anthracene	Carbazole	n-Dibutyl phthalate	Fluoranthene	Pyrene	Butylbenzyl phthalate	Benzo[a]anthracene	Chrysene	bis(2-Ethylhexyl) phthalate	n-Dioctyl phthalate	Benzo[b]fluoranthene	Benzo[k]fluoranthene	Benzo[a]pyrene	Indeno(1,2,3-c,d)Pyrene	Dibenz(a,h)Anthracene	Benzo[g,h,i]perylene	4-Nitrophenol	Dichlorodifluoromethane
				µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Dublin Port groundwater monitoring May 2018																						
SW1	02-May-2018	955493	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	02-May-2018	955494	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	02-May-2018	955495	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	02-May-2018	955488	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	02-May-2018	955489	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW7D	02-May-2018	955550	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	02-May-2018	955490	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10S	02-May-2018	955491	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	02-May-2018	955492	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring June 2018																						
SW1	06-Jun-18	978740	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	06-Jun-18	978741	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	06-Jun-18	978742	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	06-Jun-18	978745	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	06-Jun-18	978744	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	06-Jun-18	978746	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	06-Jun-18	978747	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring July 2018																						
SW1	03-Jul-18	995184	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	03-Jul-18	995185	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	03-Jul-18	995186	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	03-Jul-18	995190	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	03-Jul-18	995191	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW7D	03-Jul-18	995189	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	03-Jul-18	995188	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	03-Jul-18	995187	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MP2 Ground Investigation August 2018																						
MP2 BH01	22-Aug-2018	677655	25	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 BH02	22-Aug-2018	677649	26	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 BH04S	30-Aug-2018	679048	27	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 BH04D	30-Aug-2018	679049	28	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 BH06S	30-Aug-2018	679046	29	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 BH06D	30-Aug-2018	679047	30	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 BH08	30-Aug-2018	679050	31	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 BH12	22-Aug-2018	677650	32	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 BH13	30-Aug-2018	679052	33	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 BH14	30-Aug-2018	679053	34	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 BH15	30-Aug-2018	679051	35	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 BH16	22-Aug-2018	677651	36	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 SW1	22-Aug-2018	677656	37	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	[C] < 0.10
MP2 SW2	30-Aug-2018	679055	38	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
MP2 SW3	30-Aug-2018	679054	39	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.10
1. WHO Health 2011																	0.7					
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016											6						0.0075					
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)					0.1			0.0063			1.3						0.00017					
4. Environmental Protection Agency Interim Guideline Values 2003					10000		2	1			8		0.5	0.05	0.01	0.05		0.05				
5. European Communities (Drinking Water) Regulations 2014 Ireland													0.1+	0.1+	0.01	0.1+		0.1+				
6. Atkins WSV Commercial																						

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1

*, =, +, - sum of values

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	Chloromethane	Vinyl chloride	Bromomethane	Chloroethane	Trichlorofluoromethane	1,1-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethane	cis-1,2-Dichloroethene	Bromochloromethane	Chloroform	1,1,1-Trichloroethane	Carbontetrachloride	1,1-Dichloropropene	Benzene	1,2-Dichloroethane	Trichloroethene	1,2-Dichloropropane	Dibromomethane
				µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Dublin Port groundwater monitoring May 2018																						
SW1	02-May-2018	955493	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	02-May-2018	955494	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	02-May-2018	955495	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	02-May-2018	955488	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	02-May-2018	955489	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW7D	02-May-2018	955550	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	02-May-2018	955490	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10S	02-May-2018	955491	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	02-May-2018	955492	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring June 2018																						
SW1	06-Jun-18	978740	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
SW2	06-Jun-18	978741	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
SW3	06-Jun-18	978742	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
GW6S	06-Jun-18	978745	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
GW6D	06-Jun-18	978744	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
GW8D	06-Jun-18	978746	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
GW10D	06-Jun-18	978747	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
Dublin Port groundwater monitoring July 2018																						
SW1	03-Jul-18	995184	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
SW2	03-Jul-18	995185	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
SW3	03-Jul-18	995186	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
GW6S	03-Jul-18	995190	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
GW6D	03-Jul-18	995191	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
GW7D	03-Jul-18	995189	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
GW8D	03-Jul-18	995188	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
GW10D	03-Jul-18	995187	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	-	-	-	-
MP2 Ground Investigation August 2018																						
MP2 BH01	22-Aug-2018	677655	25	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 BH02	22-Aug-2018	677649	26	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 BH04S	30-Aug-2018	679048	27	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 BH04D	30-Aug-2018	679049	28	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 BH06S	30-Aug-2018	679046	29	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 BH06D	30-Aug-2018	679047	30	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 BH08	30-Aug-2018	679050	31	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 BH12	22-Aug-2018	677650	32	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 BH13	30-Aug-2018	679052	33	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 BH14	30-Aug-2018	679053	34	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 BH15	30-Aug-2018	679051	35	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 BH16	22-Aug-2018	677651	36	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 SW1	22-Aug-2018	677656	37	[C] < 0.10	[C] < 0.10	[C] < 2.0	[C] < 0.20	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.50	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.20	[C] < 0.10	[C] < 0.10	[C] < 0.10
MP2 SW2	30-Aug-2018	679055	38	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
MP2 SW3	30-Aug-2018	679054	39	< 0.10	< 0.10	< 2.0	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10
1. WHO Health 2011					0.3							50		300		4		10	30	20	40	
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016					0.375							0.375						0.75	2.25	7.5=		
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																12		8	10			
4. Environmental Protection Agency Interim Guideline Values 2003														12	500			1	3	70		
5. European Communities (Drinking Water) Regulations 2014 Ireland					0.5									100~				1	3	10-		
6. Atkins WSV Commercial				5500	249		4180000		65600	65700	1110000	54600		369000	1270000	3310		8460	3540		11100	

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1

*, =, +, - sum of values

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	Bromodichloromethane	cis-1,3-Dichloropropene	Toluene	trans-1,3-Dichloropropene	1,1,2-Trichloroethane	Tetrachloroethene	1,3-Dichloropropane	Dibromochloromethane	1,2-Dibromoethane	Chlorobenzene	1,1,1,2-Tetrachloroethane	Ethylbenzene	m,p-Xylene	o-Xylene	Styrene	Bromoform	Isopropylbenzene	Bromobenzene	1,2,3-Trichloropropane
				µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Dublin Port groundwater monitoring May 2018																						
SW1	02-May-2018	955493	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	02-May-2018	955494	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	02-May-2018	955495	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	02-May-2018	955488	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	02-May-2018	955489	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW7D	02-May-2018	955550	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	02-May-2018	955490	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10S	02-May-2018	955491	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	02-May-2018	955492	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring June 2018																						
SW1	06-Jun-18	978740	10	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
SW2	06-Jun-18	978741	11	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
SW3	06-Jun-18	978742	12	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
GW6S	06-Jun-18	978745	13	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
GW6D	06-Jun-18	978744	14	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
GW8D	06-Jun-18	978746	15	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
GW10D	06-Jun-18	978747	16	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
Dublin Port groundwater monitoring July 2018																						
SW1	03-Jul-18	995184	17	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
SW2	03-Jul-18	995185	18	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
SW3	03-Jul-18	995186	19	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
GW6S	03-Jul-18	995190	20	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
GW6D	03-Jul-18	995191	21	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
GW7D	03-Jul-18	995189	22	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
GW8D	03-Jul-18	995188	23	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
GW10D	03-Jul-18	995187	24	-	-	< 1.0	-	-	-	-	-	-	-	-	< 1.0	< 1.0	< 1.0	-	-	-	-	-
MP2 Ground Investigation August 2018																						
MP2 BH01	22-Aug-2018	677655	25	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 BH02	22-Aug-2018	677649	26	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 BH04S	30-Aug-2018	679048	27	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 BH04D	30-Aug-2018	679049	28	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 BH06S	30-Aug-2018	679046	29	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 BH06D	30-Aug-2018	679047	30	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 BH08	30-Aug-2018	679050	31	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 BH12	22-Aug-2018	677650	32	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 BH13	30-Aug-2018	679052	33	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 BH14	30-Aug-2018	679053	34	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	0.14	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 BH15	30-Aug-2018	679051	35	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 BH16	22-Aug-2018	677651	36	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 SW1	22-Aug-2018	677656	37	[C] < 0.50	[C] < 1.0	[C] < 0.10	[C] < 1.0	[C] < 0.1	[C] < 0.10	[C] < 0.20	[C] < 1.0	[C] < 0.50	[C] < 0.10	[C] < 0.20	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 1.0	[C] < 0.10	[C] < 0.10	[C] < 5.0
MP2 SW2	30-Aug-2018	679055	38	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
MP2 SW3	30-Aug-2018	679054	39	< 0.50	< 1.0	< 0.10	< 1.0	< 0.1	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0
1. WHO Health 2011				60		700	20		40		100				300	Total 500		20	100			
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016						525			7.5=													
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																						
4. Environmental Protection Agency Interim Guideline Values 2003						10			40				1		10	10						
5. European Communities (Drinking Water) Regulations 2014 Ireland				100~					10-		100~								100~			
6. Atkins WSV Commercial				6820		9090000		208000	174000		38700		1300000	96700	1250000	413000	503000	3530000	1770000	389000	87700	

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1

*, =, +, - sum of values

Sample ID	Sample Date.	Chemtest Sample ID	Sample No.	n-Propylbenzene	2-Chlorotoluene	1,3,5-Trimethylbenzene	4-Chlorotoluene	tert-Butylbenzene	1,2,4-Trimethylbenzene	sec-Butylbenzene	1,3-Dichlorobenzene	4-iso-Propyltoluene	1,4-Dichlorobenzene	n-Butylbenzene	1,2-Dichlorobenzene	1,2-Dibromo-3-chloropropane	1,2,4-Trichlorobenzene	Hexachlorobutadiene	1,2,3-Trichlorobenzene
				µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Dublin Port groundwater monitoring May 2018																			
SW1	02-May-2018	955493	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	02-May-2018	955494	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	02-May-2018	955495	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	02-May-2018	955488	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	02-May-2018	955489	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW7D	02-May-2018	955550	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	02-May-2018	955490	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10S	02-May-2018	955491	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	02-May-2018	955492	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring June 2018																			
SW1	06-Jun-18	978740	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	06-Jun-18	978741	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	06-Jun-18	978742	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	06-Jun-18	978745	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	06-Jun-18	978744	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	06-Jun-18	978746	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	06-Jun-18	978747	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dublin Port groundwater monitoring July 2018																			
SW1	03-Jul-18	995184	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	03-Jul-18	995185	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW3	03-Jul-18	995186	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6S	03-Jul-18	995190	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW6D	03-Jul-18	995191	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW7D	03-Jul-18	995189	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW8D	03-Jul-18	995188	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW10D	03-Jul-18	995187	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MP2 Ground Investigation August 2018																			
MP2 BH01	22-Aug-2018	677655	25	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 BH02	22-Aug-2018	677649	26	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 BH04S	30-Aug-2018	679048	27	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 BH04D	30-Aug-2018	679049	28	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 BH06S	30-Aug-2018	679046	29	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 BH06D	30-Aug-2018	679047	30	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 BH08	30-Aug-2018	679050	31	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 BH12	22-Aug-2018	677650	32	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 BH13	30-Aug-2018	679052	33	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 BH14	30-Aug-2018	679053	34	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 BH15	30-Aug-2018	679051	35	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 BH16	22-Aug-2018	677651	36	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 SW1	22-Aug-2018	677656	37	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 0.10	[C] < 5.0	[C] < 0.10	[C] < 0.10	[C] < 0.20
MP2 SW2	30-Aug-2018	679055	38	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
MP2 SW3	30-Aug-2018	679054	39	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
1. WHO Health 2011													300		1000	1		0.6	
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016																			
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																	0.4		0.4
4. Environmental Protection Agency Interim Guideline Values 2003															10		0.4	0.1	
5. European Communities (Drinking Water) Regulations 2014 Ireland																			
6. Atkins WSV Commercial				1100000					9830										

Exceedance of 2 or 3
Exceedance of 4
Exceedance of 1

*, =, +, - sum of values

Appendix D

Summary of Leachate Analysis

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.		Nitrate as N	Nitrite as N	Phosphate as P	Total Cyanide	Ammonia (Free) as N	pH	Dibutyltin	Tributyltin	Aluminium	Arsenic	Barium
						mg/l	mg/l	mg/l	ug/l	mg/l	pH Units	ug/l	ug/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1		< 0.20	< 0.010	< 0.050	<5	< 0.050	8.5	< 0.050	< 0.050	13	< 1.0	< 5.0
BH02	2.0	13-Aug-2018	672016	2		0.31	< 0.010	0.10	<5	0.056	9.0	< 0.050	< 0.050	200	2.4	5.8
BH08	0.5	06-Aug-2018	668911	3		< 0.20	< 0.010	< 0.050	<5	< 0.050	9.0	< 0.050	< 0.050	150	1.1	21
BH09	0.5	07-Aug-2018	669860	4		< 0.20	< 0.010	< 0.050	<5	< 0.050	8.8	< 0.050	< 0.050	120	1.2	9.1
BH12	0.5	09-Aug-2018	672019	5		0.29	< 0.010	< 0.050	<5	0.060	9.0	< 0.050	< 0.050	77	1.1	< 5.0
BH14	3.0	08-Aug-2018	669871	6		< 0.20	< 0.010	< 0.050	<5	< 0.050	8.2	< 0.050	< 0.050	15	< 1.0	14
BH15	4.0	08-Aug-2018	669878	7		< 0.20	< 0.010	< 0.050	<5	< 0.050	8.5	< 0.050	< 0.050	42	< 1.0	< 5.0
1. WHO Health 2011							3								10	700
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016						37.5	0.375							150	7.5	
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)												0.0002	0.0002			
4. Environmental Protection Agency Interim Guideline Values 2003						25	0.1		10		≥6.5 and ≤9.5			200	10	100
5. European Communities (Drinking Water) Regulations 2014 Ireland						50	0.5		50							
6. Atkins WSV Commercial																

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	Beryllium	Boron	Cadmium	Copper	Chromium	Chromium (hexavalent)	Iron	Lead	Manganese	Mercury	Nickel	Selenium
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 1.0	< 20	< 0.080	< 1.0	< 1.0	< 20	< 20	< 1.0	< 1.0	< 0.010	< 1.0	< 1.0
BH02	2.0	13-Aug-2018	672016	2	< 1.0	29	< 0.080	< 1.0	< 1.0	< 20	< 20	< 1.0	< 1.0	0.16	< 1.0	< 1.0
BH08	0.5	06-Aug-2018	668911	3	< 1.0	< 20	< 0.080	< 1.0	< 1.0	[B] < 20	< 20	< 1.0	1.4	< 0.010	< 1.0	< 1.0
BH09	0.5	07-Aug-2018	669860	4	< 1.0	< 20	< 0.080	< 1.0	< 1.0	< 20	< 20	< 1.0	2.0	< 0.010	< 1.0	< 1.0
BH12	0.5	09-Aug-2018	672019	5	< 1.0	< 20	< 0.080	< 1.0	< 1.0	< 20	< 20	< 1.0	1.2	0.14	< 1.0	< 1.0
BH14	3.0	08-Aug-2018	669871	6	< 1.0	25	< 0.080	< 1.0	< 1.0	< 20	56	< 1.0	52	< 0.010	< 1.0	< 1.0
BH15	4.0	08-Aug-2018	669878	7	< 1.0	< 20	< 0.080	< 1.0	< 1.0	< 20	63	< 1.0	2.2	< 0.010	< 1.0	< 1.0
1. WHO Health 2011						2400	3	2000	50			10		6	70	40
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016									37.5	7.5		7.5		0.75		
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)							0.2					1.3			8.6	
4. Environmental Protection Agency Interim Guideline Values 2003						1000	5	30	30		200	10	50	1	20	
5. European Communities (Drinking Water) Regulations 2014 Ireland						1000	5	2000	50			10		1	20	10
6. Atkins WSV Commercial														428		

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	Vanadium	Zinc		Aliphatics >C5-C6	Aliphatics >C6-C8	Aliphatics >C8-C10	Aliphatics >C10-C12	Aliphatics >C12-C16	Aliphatics >C16-C21	Aliphatics >C21-C35	Aliphatics >C35-C44	Total Aliphatics	Aromatics >C5-C7
					µg/l	µg/l		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 1.0	< 1.0		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10
BH02	2.0	13-Aug-2018	672016	2	3.4	< 1.0		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10
BH08	0.5	06-Aug-2018	668911	3	< 1.0	< 1.0		[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 5.0	[B] < 0.10
BH09	0.5	07-Aug-2018	669860	4	< 1.0	< 1.0		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10
BH12	0.5	09-Aug-2018	672019	5	1.8	< 1.0		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10
BH14	3.0	08-Aug-2018	669871	6	< 1.0	< 1.0		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10
BH15	4.0	08-Aug-2018	669878	7	< 1.0	7.0		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10
1. WHO Health 2011																	
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016						75											
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																	
4. Environmental Protection Agency Interim Guideline Values 2003						100											
5. European Communities (Drinking Water) Regulations 2014 Ireland																	
6. Atkins WSV Commercial								198000	144000	2900	2230						8460

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	Aromatics >C7-C8	Aromatics >EC8-EC10	Aromatics >EC10-EC12	Aromatics >EC12-EC16	Aromatics >EC16-EC21	Aromatics >EC21-EC35	Total Aromatics	TPH (Ali & Aro)		Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l		µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 10		< 0.010	< 0.010	< 0.010	< 0.010
BH02	2.0	13-Aug-2018	672016	2	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 10		< 0.010	< 0.010	< 0.010	< 0.010
BH08	0.5	06-Aug-2018	668911	3	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 5.0	[B] < 10		< 0.010	< 0.010	< 0.010	< 0.010
BH09	0.5	07-Aug-2018	669860	4	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 10		< 0.010	< 0.010	< 0.010	< 0.010
BH12	0.5	09-Aug-2018	672019	5	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 10		< 0.010	< 0.010	< 0.010	< 0.010
BH14	3.0	08-Aug-2018	669871	6	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 10		< 0.010	< 0.010	< 0.010	< 0.010
BH15	4.0	08-Aug-2018	669878	7	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 10		< 0.010	< 0.010	< 0.010	< 0.010
1. WHO Health 2011																	
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016												7.5					
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																0.1	
4. Environmental Protection Agency Interim Guideline Values 2003												10				10000	
5. European Communities (Drinking Water) Regulations 2014 Ireland																	
6. Atkins WSV Commercial					9090000	96500	380000										

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Coronene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH02	2.0	13-Aug-2018	672016	2	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH08	0.5	06-Aug-2018	668911	3	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH09	0.5	07-Aug-2018	669860	4	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH12	0.5	09-Aug-2018	672019	5	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH14	3.0	08-Aug-2018	669871	6	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH15	4.0	08-Aug-2018	669878	7	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1. WHO Health 2011					0.7												
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016					0.0075												
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)					0.00017							0.0063			2		
4. Environmental Protection Agency Interim Guideline Values 2003					0.01	0.5	0.05	0.05				1		0.05	1		
5. European Communities (Drinking Water) Regulations 2014 Ireland					0.01	0.1+	0.1+	0.1+						0.1+			
6. Atkins WSV Commercial															99800		

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	Total of 17 PAHs		PCB 81	PCB 77	PCB 105	PCB 114	PCB 118	PCB 123	PCB 126	PCB 156	PCB 157	PCB 167	PCB 169
					µg/l		ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
BH01	4.0	14-Aug-2018	672721	1	< 0.20		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH02	2.0	13-Aug-2018	672016	2	< 0.20		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH08	0.5	06-Aug-2018	668911	3	< 0.20		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH09	0.5	07-Aug-2018	669860	4	< 0.20		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH12	0.5	09-Aug-2018	672019	5	< 0.20		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH14	3.0	08-Aug-2018	669871	6	< 0.20		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
BH15	4.0	08-Aug-2018	669878	7	< 0.20		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1. WHO Health 2011																	
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016					0.075												
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																	
4. Environmental Protection Agency Interim Guideline Values 2003					0.1												
5. European Communities (Drinking Water) Regulations 2014 Ireland																	
6. Atkins WSV Commercial																	

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	PCB 189	Total PCBs (12 Congeners)		Resorcinol	Phenol	Cresols	Xylenols	1-Naphthol	Trimethylphenols	Total Phenols		Phenol
					ug/l	ug/l		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.050
BH02	2.0	13-Aug-2018	672016	2	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.050
BH08	0.5	06-Aug-2018	668911	3	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.050
BH09	0.5	07-Aug-2018	669860	4	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.050
BH12	0.5	09-Aug-2018	672019	5	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.050
BH14	3.0	08-Aug-2018	669871	6	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.050
BH15	4.0	08-Aug-2018	669878	7	< 0.010	< 0.010		< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.030		< 0.050
1. WHO Health 2011																
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016																
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																
4. Environmental Protection Agency Interim Guideline Values 2003						0.01			0.0005							0.5
5. European Communities (Drinking Water) Regulations 2014 Ireland																
6. Atkins WSV Commercial									269							269000000

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	2-Chlorophenol	bis(2-Chloroethyl)ether	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,2-Dichlorobenzene	2-Methylphenol (o-Cresol)	Bis(2-Chloroisopropyl)Ether	Hexachloroethane	n-Nitroso-n-dipropylamine	4-Methylphenol	Nitrobenzene	Isophorone	2-Nitrophenol
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH02	2.0	13-Aug-2018	672016	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH08	0.5	06-Aug-2018	668911	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH09	0.5	07-Aug-2018	669860	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH12	0.5	09-Aug-2018	672019	5	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH14	3.0	08-Aug-2018	669871	6	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH15	4.0	08-Aug-2018	669878	7	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1. WHO Health 2011								300	1000								
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016																	
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																	
4. Environmental Protection Agency Interim Guideline Values 2003					200				10						10		
5. European Communities (Drinking Water) Regulations 2014 Ireland																	
6. Atkins WSV Commercial												50000					

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	2,4-Dimethylphenol	bis(2-Chloroethoxy)methane	2,4-Dichlorophenol	1,2,4-Trichlorobenzene	Naphthalene	4-Chloroaniline	Hexachlorobutadiene	4-Chloro-3-methylphenol	2-Methylnaphthalene	Hexachlorocyclopentadiene	2,4,6-Trichlorophenol	2,4,5-Trichlorophenol	2-Chloronaphthalene
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH02	2.0	13-Aug-2018	672016	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH08	0.5	06-Aug-2018	668911	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH09	0.5	07-Aug-2018	669860	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH12	0.5	09-Aug-2018	672019	5	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH14	3.0	08-Aug-2018	669871	6	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH15	4.0	08-Aug-2018	669878	7	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1. WHO Health 2011											0.6				200		
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016																	
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)								0.4	2								
4. Environmental Protection Agency Interim Guideline Values 2003									1						200		
5. European Communities (Drinking Water) Regulations 2014 Ireland																	
6. Atkins WSV Commercial					30900000				99800								62700

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	2-Nitroaniline	Acenaphthylene	Dimethyl phthalate	2,6-Dinitrotoluene	Acenaphthene	3-Nitroaniline	Dibenzofuran	4-Chlorophenylphenylether	2,4-Dinitrotoluene	Fluorene	Diethyl phthalate	4-Nitroaniline	2-Methyl-4,6-Dinitrophenol
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH02	2.0	13-Aug-2018	672016	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH08	0.5	06-Aug-2018	668911	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH09	0.5	07-Aug-2018	669860	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH12	0.5	09-Aug-2018	672019	5	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH14	3.0	08-Aug-2018	669871	6	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH15	4.0	08-Aug-2018	669878	7	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1. WHO Health 2011																	
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016																	
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																	
4. Environmental Protection Agency Interim Guideline Values 2003																	
5. European Communities (Drinking Water) Regulations 2014 Ireland																	
6. Atkins WSV Commercial																	

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	Azobenzene	4-Bromophenylphenylether	Hexachlorobenzene	Pentachlorophenol	Phenanthrene	Anthracene	Carbazole	n-Dibutyl phthalate	Fluoranthene	Pyrene	Butylbenzyl phthalate	Benzo[a]anthracene	Chrysene
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH02	2.0	13-Aug-2018	672016	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH08	0.5	06-Aug-2018	668911	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH09	0.5	07-Aug-2018	669860	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH12	0.5	09-Aug-2018	672019	5	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH14	3.0	08-Aug-2018	669871	6	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
BH15	4.0	08-Aug-2018	669878	7	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
1. WHO Health 2011								9									
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016																	
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)								0.4		0.1			0.0063				
4. Environmental Protection Agency Interim Guideline Values 2003							0.03	2		10000		2	1				
5. European Communities (Drinking Water) Regulations 2014 Ireland																	
6. Atkins WSV Commercial																	

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	bis(2-Ethylhexyl) phthalate	n-Dioctyl phthalate	Benzo[b]fluoranthene	Benzo[k]fluoranthene	Benzo[a]pyrene	Indeno(1,2,3-c,d)Pyrene	Dibenz(a,h)Anthracene	Benzo[g,h,i]perylene		Dichlorodifluoromethane	Chloromethane	Vinyl chloride	Bromomethane
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l		µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050		< 0.10	< 0.10	< 0.10	< 2.0
BH02	2.0	13-Aug-2018	672016	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050		< 0.10	< 0.10	< 0.10	< 2.0
BH08	0.5	06-Aug-2018	668911	3	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050		[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 2.0
BH09	0.5	07-Aug-2018	669860	4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050		< 0.10	< 0.10	< 0.10	< 2.0
BH12	0.5	09-Aug-2018	672019	5	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050		< 0.10	< 0.10	< 0.10	< 2.0
BH14	3.0	08-Aug-2018	669871	6	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050		< 0.10	< 0.10	< 0.10	< 2.0
BH15	4.0	08-Aug-2018	669878	7	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050		< 0.10	< 0.10	< 0.10	< 2.0
1. WHO Health 2011									0.7							0.3	
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016					6				0.0075							0.375	
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)					1.3				0.00017								
4. Environmental Protection Agency Interim Guideline Values 2003					8		0.5	0.05	0.01	0.05		0.05					
5. European Communities (Drinking Water) Regulations 2014 Ireland							0.1+	0.1+	0.01	0.1+		0.1+				0.5	
6. Atkins WSV Commercial															5500	249	

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	Chloroethane	Trichlorofluoromethane	1,1-Dichloroethene	Dichloromethane	1,1-Dichloroethane	cis-1,2-Dichloroethene	Bromochloromethane	Chloroform	1,1,1-Trichloroethane	Carbontetrachloride	1,1-Dichloropropene	Benzene	1,2-Dichloroethane
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.20	< 0.10	< 0.10	< 100	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20
BH02	2.0	13-Aug-2018	672016	2	< 0.20	< 0.10	< 0.10	< 100	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20
BH08	0.5	06-Aug-2018	668911	3	[B] < 0.20	[B] < 0.10	[B] < 0.10	[B] < 100	[B] < 0.10	[B] < 0.10	[B] < 0.50	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.20
BH09	0.5	07-Aug-2018	669860	4	< 0.20	< 0.10	< 0.10	< 100	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20
BH12	0.5	09-Aug-2018	672019	5	< 0.20	< 0.10	< 0.10	< 100	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20
BH14	3.0	08-Aug-2018	669871	6	< 0.20	< 0.10	< 0.10	< 100	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20
BH15	4.0	08-Aug-2018	669878	7	< 0.20	< 0.10	< 0.10	< 100	< 0.10	< 0.10	< 0.50	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.20
1. WHO Health 2011								20		50		300		4		10	30
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016								15		0.375						0.75	2.25
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)								20						12		8	10
4. Environmental Protection Agency Interim Guideline Values 2003								10				12	500			1	3
5. European Communities (Drinking Water) Regulations 2014 Ireland												100~				1	3
6. Atkins WSV Commercial					4180000		65600	1500000	1110000	54600		369000	1270000	3310		8460	3540

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	Trichloroethene	1,2-Dichloropropane	Dibromomethane	Bromodichloromethane	cis-1,3-Dichloropropene	Toluene	trans-1,3-Dichloropropene	1,1,2-Trichloroethane	Tetrachloroethene	1,3-Dichloropropane	Dibromochloromethane	1,2-Dibromoethane	Chlorobenzene
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.10	< 0.10	< 0.10	< 0.50	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10
BH02	2.0	13-Aug-2018	672016	2	< 0.10	< 0.10	< 0.10	< 0.50	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10
BH08	0.5	06-Aug-2018	668911	3	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.50	[B] < 1.0	[B] < 0.10	[B] < 1.0	[B] < 1.0	[B] < 0.10	[B] < 0.20	[B] < 1.0	[B] < 0.50	[B] < 0.10
BH09	0.5	07-Aug-2018	669860	4	< 0.10	< 0.10	< 0.10	< 0.50	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10
BH12	0.5	09-Aug-2018	672019	5	< 0.10	< 0.10	< 0.10	< 0.50	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10
BH14	3.0	08-Aug-2018	669871	6	< 0.10	< 0.10	< 0.10	< 0.50	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10
BH15	4.0	08-Aug-2018	669878	7	< 0.10	< 0.10	< 0.10	< 0.50	< 1.0	< 0.10	< 1.0	< 1.0	< 0.10	< 0.20	< 1.0	< 0.50	< 0.10
1. WHO Health 2011					20	40		60		700	20		40		100		
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016					7.5=					525			7.5=				
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																	
4. Environmental Protection Agency Interim Guideline Values 2003					70					10			40				1
5. European Communities (Drinking Water) Regulations 2014 Ireland					10-			100~					10-		100~		
6. Atkins WSV Commercial						11100		6820		9090000		208000	174000		38700		1300000

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	1,1,1,2-Tetrachloroethane	Ethylbenzene	m,p-Xylene	o-Xylene	Styrene	Bromoform	Isopropylbenzene	Bromobenzene	1,2,3-Trichloropropane	n-Propylbenzene	2-Chlorotoluene	1,3,5-Trimethylbenzene	4-Chlorotoluene
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10
BH02	2.0	13-Aug-2018	672016	2	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10
BH08	0.5	06-Aug-2018	668911	3	[B] < 0.20	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 1.0	[B] < 0.10	[B] < 0.10	[B] < 5.0	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10
BH09	0.5	07-Aug-2018	669860	4	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10
BH12	0.5	09-Aug-2018	672019	5	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10
BH14	3.0	08-Aug-2018	669871	6	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10
BH15	4.0	08-Aug-2018	669878	7	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.10	< 0.10
1. WHO Health 2011						300	Total 500		20	100							
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016																	
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)																	
4. Environmental Protection Agency Interim Guideline Values 2003						10	10										
5. European Communities (Drinking Water) Regulations 2014 Ireland										100~							
6. Atkins WSV Commercial					96700	1250000	413000	503000	3530000	1770000	389000	87700		1100000			

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values

Sample ID	Depth (m bgl)	Sample Date.	Chemtest Sample ID	Sample No.	tert-Butylbenzene	1,2,4-Trimethylbenzene	sec-Butylbenzene	1,3-Dichlorobenzene	4-iso-Propyltoluene	1,4-Dichlorobenzene	n-Butylbenzene	1,2-Dichlorobenzene	1,2-Dibromo-3-chloropropane	1,2,4-Trichlorobenzene	Hexachlorobutadiene	1,2,3-Trichlorobenzene
					µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BH01	4.0	14-Aug-2018	672721	1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
BH02	2.0	13-Aug-2018	672016	2	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
BH08	0.5	06-Aug-2018	668911	3	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 0.10	[B] < 5.0	[B] < 0.10	[B] < 0.10	[B] < 0.20
BH09	0.5	07-Aug-2018	669860	4	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
BH12	0.5	09-Aug-2018	672019	5	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
BH14	3.0	08-Aug-2018	669871	6	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
BH15	4.0	08-Aug-2018	669878	7	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 5.0	< 0.10	< 0.10	< 0.20
1. WHO Health 2011										300		1000	1		0.6	
2. European Union Environmental Objectives (Groundwater) (Amendment) Regulations 2016																
3. European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2015 (AA-EQS Other surface water)														0.4		0.4
4. Environmental Protection Agency Interim Guideline Values 2003												10		0.4	0.1	
5. European Communities (Drinking Water) Regulations 2014 Ireland																
6. Atkins WSV Commercial						9830										

Exceedance of 2 or 3

Exceedance of 4

Exceedance of 1

*, =, +, - sum of values