

PREPARED BY:	Quantum Geotechnic Ltd	DATE:	07/08/20
CLIENT:	Mr H Singh	AUTHOR:	Phil Darby
PROJECT TITLE:	Proposed Development, Hunter Street, Britton Ferry	OUR REF:	G40104/LR01Rev03
RE:	Preliminary Geoenvironmental Assessment		

Introduction

Upon the instruction of Robert Bowen Planning and Development Ltd on behalf of the Client, Mr H Singh (after referred to as the Client), Quantum Geotechnic Ltd have been commissioned to undertake chemical testing and subsequent human health and environmental assessment on samples obtained from across the site of the proposed Nursing Home Development on Hunter Street, Britton Ferry. In addition, gas monitoring has been undertaken focusing on the Gravel Deposits identified previously at depth along with an associated Ground Gas Risk Assessment undertaken.

Figure 1 below shows the general site location.

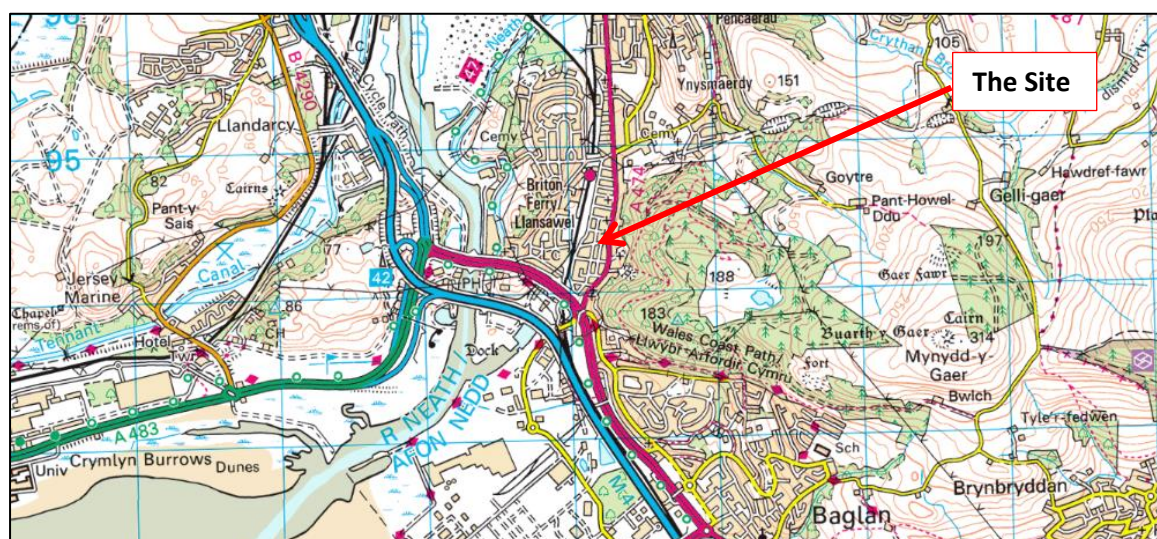


Figure 1: Site location. Not to Scale © Bing.com

Previous Ground Investigation

Phlorum Phase 1 Investigation (2017)

In summary the Phlorum Phase 1 report written in Nov 2017 did not identify any specific / localised sources of contamination other than possible gas / air storage tanks associated with patient treatment within the existing building and fuel spillages within the car parking area.

Quantum Geotechnical Ltd Ground Investigation & Mining Risk Assessment (2019)

In summary, the intrusive ground investigation encountered Made Ground across the site to depths of up to 2.10mbgl. The Made Ground was found to be underlain by Peat and Alluvial Deposits to depths of up to 10.8 mbgl overlying dense Gravel.

In terms of contamination and risk to human health, there is the potential that concentrations of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene and Dibenzo(a,h)anthracene within the Made Ground deposits may pose a significant risk to future site users.

Although no statistical analysis was undertaken, the spread of potentially significantly elevated contaminant concentrations within the Made Ground was considered to be site wide. The PID measurements recorded indicate volatiles are unlikely to pose a risk to future site users.

The report recommended additional exploratory holes are undertaken post demolition / when access is available to the entire site, and additional sampling, testing and analysis undertaken to determine if any identified potential contamination sources and associated risk to receptors are present in areas of the site not previously investigated due to the access restrictions.

In terms of risk to controlled waters, the single soil leachate test undertaken identified potentially significantly raised Copper concentration within the soil leachate from the sample of Made Ground from Trial Pit TP01. Although the concentration of Copper measured within the soil leachate from the Made Ground within TP01 only slightly exceeded the relevant EQS value, it may pose a risk to nearby controlled waters.

Additional Ground Investigation Works Undertaken

The additional fieldworks recommended within the initial ground investigation, along with the installation of additional ground gas monitoring equipment focused within the Gravels identified at depth, were undertaken between the 16th and 20th September 2019. The additional fieldworks comprised the excavation of 8 Trial Pits and the drilling of a single Cable Percussive Borehole.

The trial pitting method of investigation allows direct sampling of the near surface deposits for identification purposes, as well as assessment of any salient features and Made Ground or disturbed ground. The trial pits were logged in accordance with BS5930:2015; BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2004, and supervised at all times by an Engineering Geologist from QGL. All of the trial pits were backfilled with compacted layers of arisings with suitable surface reinstatement where required. Environmental samples were taken within the superficial deposits for laboratory testing purposes.

Based on the conclusions of the Phlorum (2017) desk study, a non-targeted sampling strategy was designed in accordance with CLR4 and BS10175:2011+A2:2017 using the Herringbone sampling strategy. In total, sampling at 13 locations across the site has been undertaken (including the February 2019 investigation). The sample frequency is based on a potential hotspot area of 300m² (<10% of site / approx. 17.5mx17.5m), is considered sensible given the historic uses of the various areas of the site and the absence of localised potential contaminant sources.

Light cable tool percussive techniques were used to sink one boreholes through the overlying Made Ground and Superficial deposits to allow the installation of ground gas monitoring equipment. The

response zone of the ground gas monitoring equipment was within the Gravels in which ground gas was not monitored within the initial ground investigation. Representative bulk disturbed samples were recovered from the borehole throughout the boring. The samples recovered from the boreholes were logged in accordance with BS5930:2015; BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2004, and supervised at all times by an Engineering Geologist from QGL.

The sequence of deposits encountered during the investigation is detailed within the Engineering Geologist's logs Appended. The logs highlight the nature of the soils encountered and provide descriptions of the strata revealed at the site. The general sequence of the ground conditions encountered across the site are summarised in Table 1 below.

Table 1: General sequence of strata encountered

General Strata Description	Elevation of base of strata (mbgl) in each exploratory hole								
	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	BH1
Made Ground	0.6	1.0+	1.2+	1.0	2.0+	2.5	0.7+	1.9	2.5
Alluvium & Peat	1.4+	--	--	1.9+	--	2.7	--	2.5+	9.0
Gravel	--	--	--	--	--	--	--	--	12.0+

+ base of strata not proven

-- strata not encountered

Figure 2 below shows indicative exploratory hole locations including the locations of the exploratory holes undertaken within the previous investigation.

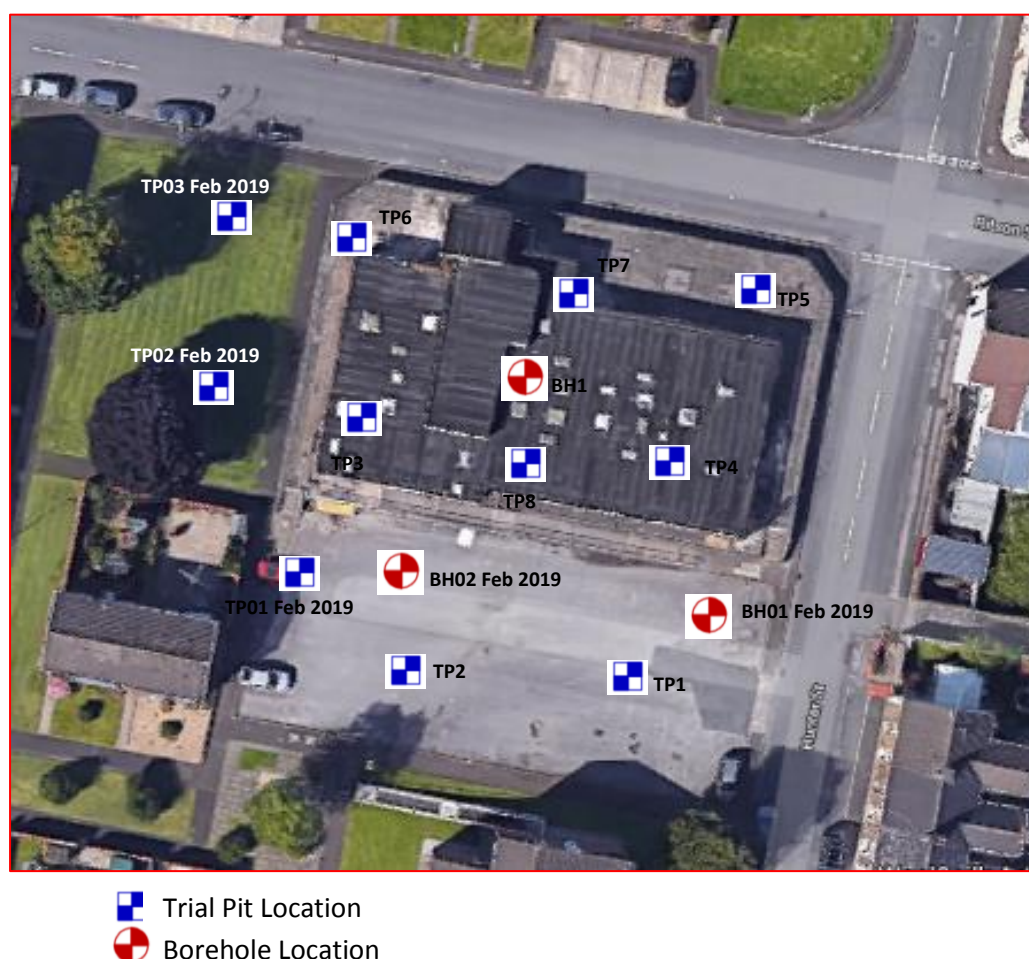


Figure 2: Exploratory Hole Location Plan. Not to Scale

Soil samples obtained were subject to chemical laboratory testing. Table 2 lists the determinants tested for within the report.

Table 2: Contaminants tested from soil samples

Analytical Parameter (Soil Analysis)	Accreditation Status	No of Tests	Analytical Parameter (Soil Analysis)	Accreditation Status	No of Tests
Asbestos in Soil	ISO 17025	8	Boron (water soluble)	MCERTS	8
General			Cadmium (aqua regia extractable)	MCERTS	8
pH - Automated	MCERTS	8	Chromium (aqua regia extractable)	MCERTS	8
Total Cyanide	MCERTS	8	Copper (aqua regia extractable)	MCERTS	8
Water Sol. Sulphate as SO ₄	MCERTS	8	Lead (aqua regia extractable)	MCERTS	8
Organic Matter	MCERTS	8	Mercury (aqua regia extractable)	MCERTS	8
Volatiles			Nickel (aqua regia extractable)	MCERTS	8
Speciated Semi Volatile Organic Compounds	MCERTS	8			
Speciated Volatile Organic Compounds	MCERTS	8			
Total Phenols			Selenium (aqua regia extractable)	MCERTS	8
Total Phenols (monohydric)	MCERTS	8	Vanadium (aqua regia extractable)	MCERTS	8
Speciated PAHs			Zinc (aqua regia extractable)	MCERTS	8
			Petroleum Hydrocarbons		
Naphthalene	MCERTS	8	TPH-CWG - Aliphatic >EC5 - EC6	MCERTS	8
Acenaphthylene	MCERTS	8	TPH-CWG - Aliphatic >EC6 - EC8	MCERTS	8
Acenaphthene	MCERTS	8	TPH-CWG - Aliphatic >EC8 - EC10	MCERTS	8
Fluorene	MCERTS	8	TPH-CWG - Aliphatic >EC10 - EC12	MCERTS	8
Phenanthrene	MCERTS	8	TPH-CWG - Aliphatic >EC12 - EC16	MCERTS	8
Anthracene	MCERTS	8	TPH-CWG - Aliphatic >EC16 - EC21	MCERTS	8
Fluoranthene	MCERTS	8	TPH-CWG - Aliphatic >EC21 - EC35	MCERTS	8
Pyrene	MCERTS	8	TPH-CWG - Aliphatic (EC5 - EC35)	MCERTS	8
Benzo(a)anthracene	MCERTS	8	TPH-CWG - Aromatic >EC5 - EC7	MCERTS	8
Chrysene	MCERTS	8	TPH-CWG - Aromatic >EC7 - EC8	MCERTS	8
Benzo(b)fluoranthene	MCERTS	8	TPH-CWG - Aromatic >EC8 - EC10	MCERTS	8
Benzo(k)fluoranthene	MCERTS	8	TPH-CWG - Aromatic >EC10 - EC12	MCERTS	8
Benzo(a)pyrene	MCERTS	8	TPH-CWG - Aromatic >EC12 - EC16	MCERTS	8
Indeno(1,2,3-cd)pyrene	MCERTS	8	TPH-CWG - Aromatic >EC16 - EC21	MCERTS	8
Dibenz(a,h)anthracene	MCERTS	8	TPH-CWG - Aromatic >EC21 - EC35	MCERTS	8

Benzo(ghi)perylene	MCERTS	8	
Total PAH			
Speciated Total EPA-16 PAHs	MCERTS	8	
Heavy Metals / Metalloids			
Arsenic (aqua regia extractable)	MCERTS	8	
Barium (aqua regia extractable)	MCERTS	8	
Beryllium (aqua regia extractable)	MCERTS	8	

Table 3: Geo-environmental tests undertaken on Soil Leachate sample

Analytical Parameter (Leachate Analysis)	Accreditation Status	No of Tests	Analytical Parameter (Leachate & Groundwater Analysis)	Accreditation Status	No of Tests
			Boron (dissolved)	MCERTS	3
General			Cadmium (dissolved)	MCERTS	3
pH - Automated	MCERTS	3	Chromium (dissolved)	MCERTS	3
Total Cyanide	MCERTS	3	Copper (dissolved)	MCERTS	3
Sulphate as SO ₄	MCERTS	3	Lead (dissolved)	MCERTS	3
Hardness - Total	None	3	Mercury (dissolved)	MCERTS	3
			Nickel (dissolved)	MCERTS	3
			Selenium (dissolved)	MCERTS	3
Total Phenols			Zinc (dissolved)	MCERTS	3
Total Phenols (monohydric)	MCERTS	3			
Speciated PAHs					
Naphthalene	MCERTS	3			
Acenaphthylene	MCERTS	3			
Acenaphthene	MCERTS	3			
Fluorene	MCERTS	3			
Phenanthrene	MCERTS	3			
Anthracene	MCERTS	3			
Fluoranthene	MCERTS	3			
Pyrene	MCERTS	3			
Benzo(a)anthracene	MCERTS	3			
Chrysene	MCERTS	3			

Benzo(b)fluoranthene	MCERTS	3
Benzo(k)fluoranthene	MCERTS	3
Benzo(a)pyrene	MCERTS	3
Indeno(1,2,3-cd)pyrene	MCERTS	3
Dibenz(a,h)anthracene	MCERTS	3
Benzo(ghi)perylene	MCERTS	3
Total PAH		
Speciated Total EPA-16 PAHs	MCERTS	3
Heavy Metals / Metalloids		
Arsenic (dissolved)	MCERTS	3
Calcium (dissolved)	MCERTS	3
Magnesium (dissolved)	MCERTS	3

A copy of the test results are appended.

Human Health Risk Assessment:

Chemical contamination testing has been undertaken on eight representative samples of Made Ground recovered from across the site. The following section summarises the results and compares them to relevant available threshold values (Soil Guideline Values – SGVs, LQM Generic Assessment Criteria) for Residential Land Use with Plant Uptake.

Heavy Metal and Inorganic Compounds

The concentrations of heavy metal and inorganic compounds within the samples tested are summarised in the table below

Table 4: Summary of Heavy Metals Test Results

Determinand	Results Range (mg/kg)	LQM/CIEH S4ULs (2015) (mg/kg) Residential End Use With Plant Uptake	Exceedances
Arsenic	11-56	37	3 TP4 @ 0.5mbgl TP6 @ 0.5mbgl TP8 @ 1.0mbgl
Boron (water soluble)	0.3-1.8	290	0
Cadmium	<0.2-0.7	11	0
Chromium (hex)	<0.4	6	0
Chromium	11-24	910	0
Copper	16-430	2400	0
Lead ⁽⁴⁾	17-370	200	1 TP8 @ 1.0mbgl
Mercury	<0.3-1.8	40	0

Nickel	13-43	130	0
Zinc	65-490	3700	0
Cyanide (Total)	<1	34	0
Selenium	<1-3.2	250	0

Arsenic concentrations within samples of Made Ground from TP4 at 0.5mbgl, TP6 at 0.5mbgl and TP8 at 1.0mbgl were above the relevant assessment criteria. The Lead concentration within sample of Made Ground from TP8 at 1.0mbgl was above the relevant assessment criteria.

Polycyclic Aromatic Hydrocarbons (PAH)

The concentrations of PAH measured within the soil samples tested are summarised in the Table 5.

Table 5: Summary of PAH Test Results

Determinand	Results Range (mg/kg)	LQM/ClEH S4ULs (2015) (mg/kg) Residential End Use with Plant Uptake	Exceedances
Naphthalene	<0.05-0.24	2.3-13	0
Acenaphthylene	<0.05-0.26	170-920	0
Acenaphthene	<0.05	210-1100	0
Fluorene	<0.05-0.19	170-860	0
Phenanthrene	<0.05-2.4	95-440	0
Anthracene	<0.05-0.54	2400-11000	0
Fluoranthene	<0.05-5.9	280-890	0
Pyrene	<0.05-5.2	620-2000	0
Benzo(a)anthracene	<0.05-3.3	7.2-13	0
Chrysene	<0.05-3.9	15-27	0
Benzo(b)fluoranthene	<0.05-5	2.6-3.7	2 TP3 @ 0.5mbgl TP8 @ 1.0mbgl
Benzo(k)fluoranthene	<0.05-2.1	77-100	0
Benzo(a)pyrene	<0.05-3.8	2.2-3.0	2 TP3 @ 0.5mbgl TP8 @ 1.0mbgl
Indeno(1,2,3-cd)pyrene	<0.05-2.6	27-41	0
Dibenz(a,h)anthracene	<0.05-0.85	0.24-0.3	3 TP1 @ 0.5mbgl TP3 @ 0.5mbgl TP8 @ 1.0mbgl
Benzo(ghi)perylene	<0.05-3.2	320-350	0

Benzo(b)fluoranthene and Benzo(a)pyrene concentrations within samples of Made Ground from TP3 at 0.5mbgl and TP8 at 1.0mbgl were above the relevant assessment criteria. Dibenz(a,h)anthracene concentrations within samples of Made Ground from TP1 at 0.5mbgl, TP3 at 0.5mbgl and TP8 at 1.0mbgl were above the relevant assessment criteria.

Total Petroleum Hydrocarbons (TPH)

The concentrations of speciated TPH measured within the soil samples tested are summarised in Table 6.

Table 6: Summary of TPH Test Results

Determinand	Results Range (mg/kg)	LQM/CIEH S4ULs (2015) (mg/kg) Residential End Use with Plant Uptake	Exceedances
TPH-CWG - Aliphatic >EC5 - EC6	<0.1	42-160	0
TPH-CWG - Aliphatic >EC6 - EC8	<0.1	100-530	0
TPH-CWG - Aliphatic >EC8 - EC10	<0.1	27-150	0
TPH-CWG - Aliphatic >EC10 - EC12	<0.1	130-760	0
TPH-CWG - Aliphatic >EC12 - EC16	<2.0	1100-4300	0
TPH-CWG - Aliphatic >EC16 - EC21	<8	6500-11000	0
TPH-CWG - Aliphatic >EC21 - EC35	<8-24	6500-11000	0
TPH-CWG - Aromatic >EC5 - EC7	<0.1	70-300	0
TPH-CWG - Aromatic >EC7 - EC8	<0.1	130-660	0
TPH-CWG - Aromatic >EC8 - EC10	<0.1	34-190	0
TPH-CWG - Aromatic >EC10 - EC12	<1.0	74-380	0
TPH-CWG - Aromatic >EC12 - EC16	<2.0	140-660	0
TPH-CWG - Aromatic >EC16 - EC21	<10-42	260-930	0
TPH-CWG - Aromatic >EC21 - EC35	<10-110	1100-1700	0

Notes :- 1. CLEA (2009) SGV's (Underlined) derived from Soil Guideline Values Science Report SC050021 and are based on a sandy loam soil as defined in Environment Agency (2009b) and 6% soil organic matter (SOM). 2. SGV's derived from CLEA 2002 in Normal Font. 3. SGV's derived from LQM/CIEH GAC in *Italics*. 4. NYS - Not Yet Specified. 5. Petroleum Hydrocarbons should be assessed as Aliphatic and Aromatic compounds (C5 - C70), for 1%, 2.5% & 5% Soil Organic Matter Content respectively (SOM). For individual petroleum hydrocarbon compounds/fractions, refer to LQM/CIEH GAC document. 6. NT = Not Tested 7. SGV's derived from CL:AIRE GAC in *Italics*.

No soil samples tested contained speciated TPH concentrations above the relevant assessment criteria.

BTEX Compounds

BTEX Compounds were measured within seven soil samples tested, with the concentration within each sample below the laboratory test detection limit.

Volatile Organic Compounds (VOC's)

The results of levels of potential VOC's have been compared to generic assessment criteria as described, for a residential end use for a Soil Organic Matter (SOM) content of 1% for a conservative approach. The concentrations of speciated Petroleum Hydrocarbons are summarised and compared in the table overpage.

Table 7: Summary of VOC's Soil Test Results

Determinand	Site Results Range (mg/kg)	LQM/CIEH (2015), CL:AIRE 2010 Generic Assessment Criteria Residential Land Use (mg/kg)	
		1% SOM	Exceedances
Chloromethane	<1.0	0.0083	0
Chloroethane	<1.0	8.3	0
Bromomethane	<1.0	NYS	-
Vinyl Chloride	<1.0	NYS	-
Trichlorofluoromethane	<1.0	NYS	-
1,1-dichloroethene	<1.0	0.2	0
1,1,2-Trichloro 1,2,2-Trifluoroethane	<1.0	NYS	-
Cis-1,2-dichloroethene	<1.0	0.11	0
MTBE (Methyl Tertiary Butyl Ether)	<1.0	49	0
1,1-dichloroethane	<1.0	2.4	0
2,2-Dichloropropane	<1.0	NYS	-
Trichloromethane	<1.0	0.75	0
1,1,1-Trichloromethane	<1.0	NYS	0
1,2-dichloroethane	<1.0	0.0054	0
1,1-Dichloropropene	<1.0	NYS	-
Trans-1,2-dichloroethene	<1.0	NYS	-
Benzene	<1.0	0.087	0
Tetrachloromethane	<1.0	2.9	0
1,2-dichloropropane	<1.0	3.3	0
Trichloroethene	<1.0	0.11	0
Dibromomethane	<1.0	NYS	-
Bromodichloromethane	<1.0	0.016	0
Cis-1,3-dichloropropene	<1.0	NYS	-
Trans-1,3-dichloropropene	<1.0	NYS	-
Toluene	<1.0	130	0
1,1,2-Trichloroethane	<1.0	0.6	0
1,3-Dichloropropane	<1.0	NYS	-
Dibromochloromethane	<1.0	NYS	-
Tetrachloroethene	<1.0	NYS	0
1,2-Dibromoethene	<1.0	NYS	-
Chlorobenzene	<1.0	0.33	0
1,1,1,2-Tetrachloroethane	<1.0	NYS	0
Ethylbenzene	<1.0	47	0
p & m-xylene	<1.0	NYS	-
Stylene	<1.0	8.1	0

Notes :- 1. CLEA (2009) SGV's (Underlined) derived from Soil Guideline Values Science Report SC050021 and are based on a sandy loam soil as defined in Environment Agency (2009b) and 6% soil organic matter (SOM). 2. SGV's derived from CLEA 2002 in Normal Font. 3. SGV's derived from LQM/CIEH GAC in *Italics*. 4. NYS - Not Yet Specified. 5. Petroleum Hydrocarbons should be assessed as Aliphatic and Aromatic compounds (C5 - C70), for 1%, 2.5% & 5% Soil Organic Matter Content respectively (SOM). For individual petroleum hydrocarbon compounds/fractions, refer to LQM/CIEH GAC document. 6. NT = Not Tested 7. SGV's derived from CL:AIRE GAC in *Italics*.

The measured VOC's from the three samples of Made Ground tested fell below the relevant GAC for Residential land use with consumption of home grown produce and/or below the laboratory test detection limit.

Semi Volatile Organic Compounds (SVOC's)

The results of levels of potential SVOC's have been compared to generic assessment criteria as described, for a residential end use for a Soil Organic Matter (SOM) content of 1% for a conservative approach. The concentrations of speciated Petroleum Hydrocarbons are summarised and compared in the table below.

Table 8: Summary of Semi Volatile Organic Compounds Soil Test Results

Determinand	Site Results Range (mg/kg)	LQM/CIEH (2007), CL:AIRE 2010 Generic Assessment Criteria Residential Land Use (mg/kg)	
		1% SOM	Exceedances
Aniline	<0.1	NYS	-
Phenol	<0.2	280	0
2-Chlorophenol	<0.1	0.87	0
Bis(2-chloroethyl)ether	<0.2	NYS	-
1,3-Dichlorobenzene	<0.2	0.40	0
1,2-Dichlorobenzene	<0.1	23	0
1,4-Dichlorobenzene	0.2	61	0
Bis(2-chloroisopropyl)ether	<0.1	NYS	-
2-Methylphenol	<0.3	NYS	-
Hexachloroethane	<0.05	NYS	
Nitrobenzene	<0.3	NYS	-
4-Methylphenol	<0.2	NYS	-
Isophorone	<0.2	NYS	-
2-Nitrophenol	<0.3	NYS	-
2,4-Dimethylphenol	<0.3	19	0
Bis(2-chloroethoxy)methane	<0.3	NYS	-
1,2,4-Trichlorobenzene	<0.3	2.6	0
2,4-Dichlorophenol	<0.5	NYS	-

4-Chloroaniline	<0.3	NYS	-
Hexachlorobutadiene	<0.1	0.29	0
4-Chloro-3-methylphenol	<0.1	NYS	-
2,4,6-Trichlorophenol	<0.1	NYS	-
2,4,5-Trichlorophenol	<0.2	NYS	-
2-Methylnaphthalene	<0.1 – 0.5	NYS	-
2-Chloronaphthalene	<0.1	NYS	-
Dimethylphthalate	<0.1	NYS	-
2,6-Dinitrotoluene	<0.1	0.78	0
2,4-Dinitrotoluene	<0.2	1.5	0
Dibenzofuran	2.6-37	NYS	-
4-Chlorophenyl phenyl ether	<0.3	NYS	-
Diethyl phthalate	<0.2	120	0
4-Nitroaniline	<0.2	NYS	-
Azobenzene	<0.3	NYS	-
Bromophenyl phenyl ether	<0.2	NYS	-
Hexachlorobenzene	<0.3	1.8	0
Carbazole	1.2-23	NYS	-
Dibutyl phthalate	<0.2	NYS	-
Anthraquinone	<0.3	NYS	-
Butyl benzyl phthalate	<0.3	1400	0

Notes :- 1. CLEA (2009) SGV's (Underlined) derived from Soil Guideline Values Science Report SC050021 and are based on a sandy loam soil as defined in Environment Agency (2009b) and 1% soil organic matter (SOM). 2. SGV's derived from CLEA 2002 in Normal Font. 3. SGV's derived from LQM/CIEH GAC in *Italics*. 4. NYS - Not Yet Specified. 5. Petroleum Hydrocarbons should be assessed as Aliphatic and Aromatic compounds (C5 - C70), for 1%, 2.5% & 5% Soil Organic Matter Content respectively (SOM). For individual petroleum hydrocarbon compounds/fractions, refer to LQM/CIEH GAC document. 6. NT = Not Tested 7. SGV's derived from CL:AIRE GAC in *Italics*.

The measured SVOC's from the three samples of Made Ground tested fell below the relevant GAC for Residential land use with consumption of home grown produce and/or below the laboratory test detection limit.

Asbestos

An asbestos screen was undertaken on the eight samples. Loose fibrous debris asbestos in the form of Amosite was identified within the sample of Made Ground from TP1 at 0.5mbgl, located below the existing hardstanding / former carpark in the southern area of the site. Asbestos quantification undertaken on the sample measured 0.011% fibres within the sample. Asbestos fibres were not detected in any of the other samples.

Summary Assessment of Risk to Human Health

Arsenic concentrations within samples of Made Ground from TP4 at 0.5mbgl, TP6 at 0.5mbgl and TP8 at 1.0mbgl were above the relevant assessment criteria. The Lead concentration within sample of Made Ground from TP8 at 1.0mbgl was above the relevant assessment criteria.

Benzo(b)fluoranthene and Benzo(a)pyrene concentrations within samples of Made Ground from TP3 at 0.5mbgl and TP8 at 1.0mbgl were above the relevant assessment criteria. Dibenzo(a,h)anthracene concentrations within samples of Made Ground from TP1 at 0.5mbgl, TP3 at 0.5mbgl and TP8 at 1.0mbgl were above the relevant assessment criteria.

In addition, the February 2019 investigations measured concentrations of Benzo(a)anthracene in Trial Pit TP02 (Feb 2019), Benzo(a)pyrene Trial Pits TP02 (Feb 2019) and TP03 (Feb 2019), Benzo(b)fluoranthene Trial Pits TP02 (Feb 2019) and TP03 (Feb 2019) and Borehole BH02 (Feb 2019) and Dibenzo(a,h)anthracene Trial Pits TP01 (Feb 2019), TP02 (Feb 2019), TP03 (Feb 2019) and Borehole BH02 (Feb 2019), within the Made Ground, exceeded the relevant assessment criteria for Residential Land Use with plant uptake.

Further analysis found the majority of these potential contaminants also exceed the assessment criteria for Residential Land Use without plant uptake.

The Asbestos quantity measured within the sample of Made Ground within TP1 at 0.5mbgl is at a level that may pose a risk to human health.

Risk to Construction Workers

The geo-environmental laboratory testing showed raised potential contamination concentrations within the Made Ground deposits, therefore a risk to construction operatives from chemical contaminants from the shallow ground may exist. In addition, given a single sample of Made Ground contained Asbestos fibres, a risk to construction workers and neighboring site users will exist from air borne migration.

Operatives working with, or likely to come into contact with Made Ground with the potential to harness raised concentrations of contaminants, should observe particular precautions concerning personal hygiene. They should be issued with the appropriate personal protective equipment and should be instructed in safe working methods.

The quantity of Asbestos measured within the Made Ground within TP1, located in the southern area of the site is at a quantity that may pose a risk to human health and although asbestos was only identified in a single exploratory hole, the relatively consistent nature of the Made Ground suggests the potential exists for asbestos fibres to be present across the site that may pose a risk to human health.

The presence of Asbestos fibres suggests there is a potential risk, particularly during any groundworks, including post construction if the Made Ground is to remain on site. It is recommended that the

guidelines given in CIRIA Report C733 'asbestos in soil and made ground: a guide to understanding and managing risks' (2014) is consulted as regards risks to workers from ACM.

It is anticipated a piling foundation system will be utilized within the proposed development. Displacement (driven piles) would be most appropriate in reducing the potential for the airborne mobilisation of contaminated arisings.

In addition, instructions should be issued in the recognition of potentially hazardous materials including oily and odorous soil and water and also any discoloured or fibrous substances for example. Operatives should be warned to avoid contact between hands and mouth before washing. The consumption of food must be confined to designated clean areas with suitable welfare including washing facilities should be provided.

Risk to Future Site Users

Based on the laboratory test results from both investigations, there is the potential the concentrations of Arsenic, Lead, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene and Dibenzo(a,h)anthracene and the quantity of Asbestos within the Made Ground may pose a significant risk to future site users.

Although no statistical analysis has been undertaken, the spread of potentially significantly elevated contaminant concentrations within the Made Ground can be considered to be site wide.

The PID measurements recorded to date and VOC & SVOC concentrations measured indicate volatiles are unlikely to pose a risk to future site users.

In order to remove / reduce the risk to future site users the potential contaminant source (Made Ground) can be removed and disposed of off-site or the potential contaminant pathway can be removed by installing a suitably designed capping layer above the potentially contaminated material to remove the contamination pathway.

It is understood the western area of the site is to remain as soft landscaping. The cover system within this area of the site may be an appropriate thickness of clean soil. Based on BRE 465, cover Systems for Land Regeneration, the Cover System should be 520mm thick. This thickness may be reduced by the installation of a suitable geo textile / membrane to reduce potential mixing of the soils and to act as a physical barrier against dermal contact, creating an Engineered Cover System.

Products such as Terram Geotextile would be suitable for use within an Engineered Cover System. Suppliers should be consulted to ensure suitability for use with the known contaminants.

The Geotextile / membrane should be covered with a suitable thickness of Topsoil to allow future plant growth. The geotextile / membrane should be installed in accordance with the manufacturer's instructions and may require treatment of the subgrade material (compaction, removal of debris etc).

A quality assurance programme should be followed, comprising a combination of quality control testing and observations to an agreed quality assurance plan. The quality assurance should contain

elements that verify the proposed subgrade is acceptable (if required), materials used in construction are adequate and the methods of construction are acceptable.

Risks to the Environment & Controlled Waters

The risk to the environment and controlled waters, i.e. nearby watercourses, is defined by the potential for any contaminants present on site to leach from the soils beneath the site.

Once the leaching potential is known the risk from this can be assessed in terms of pathways by which it may migrate, the impact on the receptors and if need be, addressed by remedial actions.

The results of the selected soil leachate tests obtained from site should be compared to UK Drinking Water Standards (UKDWS) and Environmental Quality Standards (EQS), in order to assess risks to local waterways.

The results are presented together with the threshold levels given by the United Kingdom Drinking Water Standards (UKDWS) as well as the Environmental Quality Standards (EQS) guideline values.

Table 9: Summary of Leachate Test Results

Determinand	Units	Results (mg/kg)	Environmental Quality Standards – Freshwater ¹	Environmental Quality Standards – Saltwater ¹	UK Drinking Water Standards ²	
Arsenic	µg/l	<1.1-20	50	25	10	0
Cadmium	µg/l	<0.08	5	2.5	5	0
Chromium	µg/l	0.7-1.4	5 - 250	15	50	0
Copper	µg/l	7.2-14	1-28	5	2000	³ TP2 @ 0.5mbgl TP6 @ 0.5mbgl TP8 @ 1.0mbgl
Lead	µg/l	1.0-3.5	4 - 250	25	10	¹ TP8 @ 1.0mbgl
Mercury	µg/l	<0.5	1	0.3	1	0
Nickel	µg/l	0.5-2.0	50-200	30	20	0
Zinc	µg/l	7.5-20	8 – 500	Not Available	5000	0
Boron	µg/l	<10-60	2,000	7,000	1,000	0
Total cyanide	µg/l	<10	1 (5)	1 (5)	50 ug CN/l	0
Total Phenol	µg/l	<10	6.53 - 20.6	0.0005	Not Available	0
Napthalene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Acenaphthylene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Acenaphthene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Fluorene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Phenanthrene	µg/l	<0.01	Not Available	Not Available	Not Available	0

Anthracene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Fluoranthene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Pyrene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Benzo(a)anthracene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Chrysene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Benzo(b)fluoranthene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Benzo(k)fluoranthene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Benzo(a)pyrene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Indeno(1,2,3-cd)pyrene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Dibenz(a,h)anthracene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Benzo(ghi)perylene	µg/l	<0.01	Not Available	Not Available	Not Available	0
Total PAH Speciated	µg/l	<0.2	Not Available	Not Available	0.1	0
TPH1 (C10 – C40)	µg/l	<10	Not Available	Not Available	0.1	0
TPH2 (C6-C10)	µg/l	<10	Not Available	Not Available	0.1	0

¹Figures for Environmental Quality Standards (EQS) are Annual Average Concentrations derived from the Environment Agency

²UK Drinking Water Standards taken from; Water Supply (Water Quality) Regulations 1989 (SI 1989/1147) (as amended), and Water Supply (Water Quality) Regulations 2000 (SI 2000/3184) (as amended). NT – Not Tested. I/S – Insufficient Sample. * - Minimum detection level is higher than threshold value.

Summary Assessment of Risk to Controlled Waters

The risk to controlled waters, i.e. nearby water courses, is defined by the potential for any contaminants present on site to leach from the soils beneath the site, or to migrate from underground storage apparatus.

Potentially significantly elevated Copper concentrations were measured within the soil leachate of each of the samples of Made Ground tested. Potentially significantly elevated Lead concentration was measured within the soil leachate of the sample obtained from TP8.

In addition, the single soil leachate test undertaken within the February 2019 investigation identified potentially significantly raised Copper concentration with the soil leachate from the sample of Made Ground from Trial Pit TP01 (Feb 2019). The concentration of Copper measured within the soil leachate from the Made Ground within TP01 (Feb 2019) only slightly exceeded the relevant EQS value.

Therefore, based on the findings, the potential for leachate generation which may contain concentrations of Copper and Lead and may pose a risk to controlled waters. Given the extensive current and historical land uses in the area, the presence of relatively impermeable Alluvial deposits underlying the Made Ground and the absence of nearby surface water bodies, it is likely the impact of potential leachate generation from the Made Ground present on site on controlled waters is low.

In addition, based on the findings of the QGL (Feb 2019) report, a piling foundation system is likely to be utilised within the proposed development. The piles would be required to extend through the Made Ground and soft Alluvial Deposits to found / bear on the underlying dense gravels and may potentially create a pathway between any soil leachate generated within the Made Ground and groundwater within the underlying Gravel. Consideration should be given to the proposed piling technique to minimise the potential for the creation of a contamination pathway.

There is a body of evidence that demonstrates that driven piles through potentially contaminated Made Ground do not constitute or create an increased risk to controlled waters. The EA document Piling into Contaminated Sites (2002) gives advice on differing scenarios relating to potential hazards when piling on contaminated sites. This reference indicates that the use of displacement (driven) piles was considered most appropriate based on avoiding contamination arisings.

Furthermore, the use of displacement piles also results in local compaction of the soil surrounding the pile, generally leading to a reduction in permeability of the penetrated soil (Federation of Piling Specialists, 2000). The radial movement of the soil from the driving process will also create a stress field in the zone of influence that will tend to make the soil close up and 'seal' around the pile after driving is complete, especially in cohesive material (National Groundwater & Contaminated Land Centre Report NC/99/73).

The thickness of the cohesive layer that currently (in theory) acts as a barrier between the Made Ground and Gravels varies greater across the site and should be taken into account when designing the pile diameter as Environment Agency Report SC020074/SR states that a minimum thickness of 2 pile diameters of ductile or plastic clay will provide an effective seal.

In addition, the piles should be designed to minimise the low risk associated with slender piles taking material down in a blunt ended piling shoe with the use if a pointed driving shoe.

Ground Gas Monitoring Results

The February 2019 QGL investigation identified the risk from ground gases within the Made Ground and Alluvial Deposits (Peat, Silt and Clay) as being very low to low. Given the proposed foundation solution recommended within the February 2019 report (a piled foundation bearing on the underlying Gravels), an assessment of the ground gas generation potential and subsequent risk from the deposits at depth is required.

At time of writing 10 No. post-fieldwork monitoring ground gas visits have been undertaken on the monitoring installation during a period of low to high atmospheric pressure with a response zone within the Gravels at depth. The monitoring records are appended with the results discussed below.

The results show Methane (CH₄) concentrations of between 7 and 57.8%v/v and (Carbon Dioxide) CO₂ concentrations of between 4.0 and 10.6%v/v. Methane concentrations were found to generally drop over the monitoring period. Maximum measured flow rate was recorded as 20.6l/hr whilst Oxygen (O₂) levels ranged between 3.7 and 10.5%v/v. No Hydrogen Sulphide (H₂S) or Carbon Monoxide (CO) was recorded.

The potential risks posed by any recorded presence of potentially harmful gases can be assessed on a semi-quantitative basis by reference to the guidance in documents CIRIA 665 and BS8485. The assessment comprises multiplying the maximum measured steady gas flow rate (expressed as litres per hour) by the maximum steady gas concentration (expressed as percentage-by-volume; divided by 100) to derive a Gas Screening Value (GSV). The GSV can then be used to determine a risk classification and a Characteristic Situation for the site as defined in the Table below.

Table 10: Gas Screening Value and Characteristic Situation Classification

Characteristic Situation	Risk Classification	Gas Screening Value (l/hr) – GSV
1	Very low	<0.07
2	Low	>0.07, <0.7
3	Moderate	>0.7, <3.5
4	Moderate to High	>3.5, <15
5	High	>15, <70
6	Very High	>70

Based on the ground gas monitoring findings, the risk classification of the Gravels at depth is classified as Moderate to High Risk.

If a piled foundation system is to be used for the development, as indicated by the Client, this may potentially create a migration pathway from the Gravels (ground gas source) at depth up to the proposed development level.

The gas monitoring results would therefore suggest the following protective measures will be required based on a moderate to high risk classification:

- a. Reinforced concrete cast in situ floor slab with at least 1200g DPM² and underfloor venting.
- b. Beam and block or pre cast concrete and 2000g DPM/reinforced gas membrane and underfloor venting.
- All joints and penetrations sealed.
- Proprietary gas resistant membrane and passively ventilated underfloor subspace or positively pressurised underfloor sub-space, oversite capping or binding and in-ground venting layer.

In addition, consideration should be given to the piling method and reducing the risk of upward gas migration from the Gravels at depth to the surface. As discussed above, the use of driven piles can reduce the risk of creating migration pathways through the cohesive / impermeable layer currently breaking the upward migration pathway from the Gravels at depth, which would in itself reduce the pathway by which deep seated ground gas can migrate to surface.

If a shallow foundation solution can be developed and utilised, it may be possible to revise the ground gas classification based on the gas generation potential of the shallow deposits, as determined within the February 2019 investigation.

Updated Conceptual Site Model

By incorporating the mitigation measures discussed, the Conceptual Site Model (CSM) for the scheme can be updated. The aim of the updated CSM is to identify any realised or 'known to exist' pollutant linkages and present the mitigation to reduce any risks to acceptable levels.

The resulting updated Conceptual Site Model is tabulated below.

Human Health

Potential Source	Pathway	Receptor During Construction	Level of Risk with Mitigation	Receptor Post-Construction	Level of Risk with Mitigation	Recommended Mitigation to Reduce Risk
Ground Gas within Gravels at Depth	Inhalation (Accumulation in confined spaces) Pathway created by Piling	N/A	N/A	Future Site Users	Low	Use appropriate gas proof membrane in construction. Reduction in permeability around driven pile shaft; Sufficient penetration through cohesive soils above secondary aquifer; Use of pointed drive-shoe to limit 'drive' of contaminated soil through strata.
Site Soils	Ingestion, inhalation, dermal contact	N/A	N/A	Future Site Users Construction Workers	Low	Cap Made Ground. Prevent airborne dust migration

Controlled Waters

Potential Source	Pathway	Receptor During Construction	Level of Risk with Mitigation	Receptor Post-Construction	Level of Risk with Mitigation	Recommended Mitigation to Reduce Risk
Leachate generated within Made Ground	Pathway created by piling	Controlled Waters	Low	Controlled Waters	Low	Reduction in permeability around driven pile shaft; Sufficient penetration through cohesive soils above secondary aquifer; Use of pointed drive-shoe to limit 'drive' of contaminated soil through strata.

Additional Remarks

It is recommended a competent Piling Contractor is consulted to confirm the most effective methodology. The Piling Contractor can provide a method statement in support of the proposed piling solution.



We trust that the foregoing is of assistance. Should you require any further information or have any queries please do not hesitate to contact us.

Yours faithfully,

**For and on behalf of
QUANTUM GEOTECHNIC LTD**

A handwritten signature in black ink, appearing to read "P Darby", is positioned above the printed name.

**P Darby, B.Sc. (Hons), M.Sc., C.Geol., F.G.S.
Senior Engineering Geologist**

Page 1 of 1

Installation Date:				
GL (mAOD)	Pipe	Type	Installation Depth (mbgl)	Response Zone (mbgl)
	A	50mm		

[illegible]

Contract : Hunter Street Additional Investigation Client : H Singh							Trial Pit No. TP1	
Dates : 16/9/19 - 16/9/19 Location :			Job Number : G40104 Engineer :			Ground Level : Coordinates:		

m B.G.L.	Samples		Tests		Strata			WATER	
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend		Depth (Thickness)
1					0.05	Asphalt		(0.05)	
					0.05	MADE GROUND: Grey GRAVEL. Gravel is fine to coarse angular limetone.		0.05	
					0.10			(0.10)	
					0.15	MADE GROUND: Black slightly clayey sandy GRAVEL. Gravel is fine to coarse sub-rounded and angular clinker, sandstone, mudstone and brick.		0.15	
					0.45			(0.45)	
					0.60	Dark grey silty gravelly SAND. Gravel is fine to coarse sub-rounded to sub-angular sandstone and mudstone.		0.60	
					0.80			(0.80)	
					1.40			1.40	

PLAN

Groundwater:

 Stability: Stable

 Shoring: N/A

Remarks :

Equipment Used: JCB 3CX

	Ty Berwig, Bynea, Llanelli SA14 9ST Tel: 01554 744880 Fax: email: enquiries@quantumgeotech.co.uk	Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	
		QGL		1 Of 2	3		

Contract : Hunter Street Additional Investigation

Client : H Singh

**Trial Pit No.
TP1**

Dates : 16/9/19 - 16/9/19

Job Number : G40104

Ground Level :

Location :

Engineer :

Coordinates:



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Sheet No.
2 Of 2

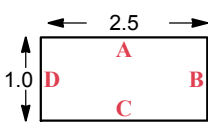
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All measurements in
metres unless
otherwise stated



Contract : Hunter Street Additional Investigation							Trial Pit No.	
Client : H Singh							TP2	
Dates : 16/9/19 - 16/9/19			Job Number : G40104			Ground Level :		
Location :			Engineer :			Coordinates:		

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Depth (Thickness)	
1					0.05	Asphalt		(0.05)	
					0.05	MADE GROUND: Grey GRAVEL. Gravel is fine to coarse angular limetone.		0.05	
					0.25			(0.25)	
					0.30	MADE GROUND: Black slightly clayey sandy GRAVEL. Gravel is fine to coarse sub-rounded and angular clinker, sandstone, mudstone and brick.		0.30	
					0.70			(0.70)	
					1.00	Terminated at 1.0mbgl upon encountering pipe.		1.00	

PLAN 		Groundwater: Stability: Stable Shoring: N/A	Remarks :
Equipment Used: JCB 3CX			

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		QGL		1 Of 2	3		

Contract : Hunter Street Additional Investigation

Client : H Singh

Trial Pit No.

TP2

Dates : 16/9/19 - 16/9/19

Job Number : G40104

Ground Level :

Location :

Engineer :

Coordinates:



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2 Of 2

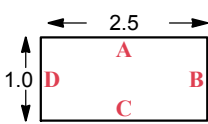
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All measurements in
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Contract : Hunter Street Additional Investigation Client : H Singh							Trial Pit No. TP3	
Dates : 16/9/19 - 16/9/19 Location :			Job Number : G40104 Engineer :			Ground Level : Coordinates:		

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Depth (Thick-ness)	
1					0.25	MADE GROUND: Grey sandy GRAVEL. Gravel is fine to coarse angular concrete and brick.		(0.25)	
					0.25	Dark grey sandy GRAVEL with high cobble content. Gravel is fine to coarse sub-rounded sandstone.		0.25	
					0.95			(0.95)	
					1.20			1.20	

PLAN 		Groundwater: Stability: Stable Shoring: N/A		Remarks :	
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Equipment Used: JCB 3CX

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		QGL		1 Of 2	3		

Contract : Hunter Street Additional Investigation

Client : H Singh

**Trial Pit No.
TP3**

Dates : 16/9/19 - 16/9/19

Job Number : G40104

Ground Level :

Location :

Engineer :

Coordinates:



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Sheet No.
2 Of 2

m Per
Page

All measurements in
metres unless
otherwise stated



Contract : Hunter Street Additional Investigation Client : H Singh							Trial Pit No. TP4			
Dates : 16/9/19 - 16/9/19 Location :			Job Number : G40104 Engineer :			Ground Level : Coordinates:				
m B.G.L.	Samples		Tests		Strata				WATER	
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Depth (Thickness)		
1					0.30	MADE GROUND: Pinkish grey sandy GRAVEL. Gravel is fine to coarse angular limestone.		(0.30)		
					0.30	MADE GROUND: Black slightly clayey sandy GRAVEL with low cobble content. Gravel is fine to coarse sub-rounded to angular clinker, brick and mudstone. Cobbles are sub-angular to angular brick and slag.		0.30		
					0.70			(0.70)		
					1.00	Grey brown silty gravelly SAND. Gravel is fine to coarse sub-rounded to sub-angular sandstone and mudstone.		1.00		
					0.60			(0.60)		
				1.60	Brown clayey fibrous PEAT.		1.60			
				0.30			(0.30)			
				1.90			1.90			
PLAN 			Groundwater: Stability: Stable Shoring: N/A			Remarks :				
Equipment Used: JCB 3CX										
			Ty Berwig, Bynea, Llanelli SA14 9ST Tel: 01554 744880 Fax: email: enquiries@quantumgeotech.co.uk			Operator: QGL		Logged By.		
					Sheet No. 1 Of 2		m Per Page 3		All measurements in metres unless otherwise stated	

Contract : Hunter Street Additional Investigation

Client : H Singh

Trial Pit No.

TP4

Dates : 16/9/19 - 16/9/19

Job Number : G40104

Ground Level :

Location :

Engineer :

Coordinates:



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Sheet No.
2 Of 2

m Per
Page

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otherwise stated



Contract : Hunter Street Additional Investigation Client : H Singh							Trial Pit No. TP5	
Dates : 16/9/19 - 16/9/19 Location :			Job Number : G40104 Engineer :			Ground Level : Coordinates:		

m B.G.L.	Samples		Tests		Strata			WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	
1					0.10	MADE GROUND: Grey GRAVEL. Gravel is fine to coarse angular limestone.		(0.10)
					0.10	MADE GROUD: Dark grey sandy GRAVEL with low cobble content. Gravel is fine to coarse angular limestone, concrete and occasional brick.		0.10
					0.30			(0.30)
					0.40			MADE GROUND: Dark brown snady gravelly CLAY. Gravel is fine to coarse sub-rounded sandstone and mudstone.
					0.50	(0.50)		
2					0.90	MADE GROUND: Black slightly clayey sandy GRAVEL with low cobbled content. Gravel is fine to coarse sub-rounded to angular clinker, sandstone and mudstone. Cobbles are angular brick.		0.90
					1.10			(1.10)
					2.00	Terminated at 2.0mbgl due to significant instability		2.00

PLAN 		Groundwater: No groundwater encountered Stability: Significant Instability Shoring: N/A	Remarks :
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Equipment Used: JCB 3CX

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Contract : Hunter Street Additional Investigation

Client : H Singh

**Trial Pit No.
TP5**

Dates : 16/9/19 - 16/9/19

Job Number : G40104

Ground Level :

Location :

Engineer :

Coordinates:



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Operator:
QGL

Logged By:
M Burke

Sheet No.
2 Of 2

m Per
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All measurements in
metres unless
otherwise stated



Contract : Hunter Street Additional Investigation Client : H Singh							Trial Pit No. TP6										
Dates : 16/9/19 - 16/9/19 Location :			Job Number : G40104 Engineer :			Ground Level : Coordinates:											
m B.G.L.	Samples		Tests		Strata				WATER								
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Depth (Thickness)									
1					0.30	MADE GROUND: Grey GRAVEL. Gravel is fine to coarse angular limetone.		(0.30)									
					0.30	MADE GROUND: Black slightly clayey sandy GRAVEL. Gravel is fine to coarse sub-rounded and angular clinker, sandstone, mudstone and brick.		0.30									
					0.80			(0.80)									
					1.10	MADE GROUND: Brown and grey sandy gravelly SILT/CLAY with low cobble content. Gravel is fine to coarse sub-rounded to sub-angular sandstone and mudstone. Cobbles are rounded sandstone.		1.10									
					0.40	 slight hydrocarbon odour below 1.1mbgl		(0.40)									
					1.50	MADE GROUND: Black clayey sandy GRAVEL with medium cobble and boulder content. Gravel is fine to coarse sub-rounded to angular clinker, sandstone, mudstone and brick. Cobbles are boulders are sub-rounded slag, brick and concrete.		1.50									
2					1.00			(1.00)									
					2.50	Brown clayey fibrous PEAT.		2.50									
					0.20			(0.20)									
					2.70			2.70									
PLAN 			Groundwater: No groundwater encountered Stability: Stable Shoring: N/A			Remarks :											
Equipment Used: JC 3CX																	
			Ty Berwig, Bynea, Llanelli SA14 9ST Tel: 01554 744880 Fax: email: enquiries@quantumgeotech.co.uk			Operator: QGL		Logged By.		Sheet No. 1 Of 2		m Per Page 3		All measurements in metres unless otherwise stated			

Contract : Hunter Street Additional Investigation

Client : H Singh

**Trial Pit No.
TP6**

Dates : 16/9/19 - 16/9/19

Job Number : G40104

Ground Level :

Location :

Engineer :

Coordinates:



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Operator:
QGL

Logged By:

Sheet No.
2 Of 2

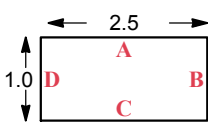
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All measurements in
metres unless
otherwise stated



Contract : Hunter Street Additional Investigation Client : H Singh							Trial Pit No. TP7	
Dates : 16/9/19 - 16/9/19 Location :			Job Number : G40104 Engineer :			Ground Level : Coordinates:		

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Depth (Thickness)	
					0.20	MADE GROUND: Grey GRAVEL. Gravel is fine to coarse angular limestone.		(0.20)	
					0.20	MADE GROUND: Black sandy GRAVEL. Gravel is fine to coarse sub-rounded to sub-angular clinker.		0.20	
					0.50			(0.50)	
					0.70	Terminated at 0.7mbgl. Unable to proceed through slag boulders		0.70	

PLAN 		Groundwater: No groundwater encountered Stability: Stable Shoring: N/A		Remarks :	
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Equipment Used: JCB 3CX						
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Contract : Hunter Street Additional Investigation

Client : H Singh

**Trial Pit No.
TP7**

Dates : 16/9/19 - 16/9/19

Job Number : G40104

Ground Level :

Location :

Engineer :

Coordinates:



Ty Berwig, Bynea, Llanelli
SA14 9ST
Tel: 01554 744880
Fax:
email: enquiries@quantumgeotech.co.uk

Operator:
QGL

Logged By:

Sheet No.
2 Of 2

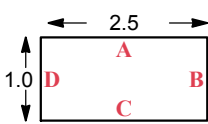
m Per
Page

All measurements in
metres unless
otherwise stated



Contract : Hunter Street Additional Investigation Client : H Singh							Trial Pit No. TP8	
Dates : 16/9/19 - 16/9/19 Location :			Job Number : G40104 Engineer :			Ground Level : Coordinates:		

m B.G.L.	Samples		Tests		Strata				WATER
	Depth	Type No.	Depth	Test Results	Depth (Thickness)	Description	Legend	Depth (Thickness)	
1					0.70	MADE GROUND: Grey GRAVEL. Gravel is fine to coarse angular limetone.		(0.70)	
					0.70	MADE GROUND: Black slightly clayey sandy GRAVEL. Gravel is fine to coarse sub-rounded and angular clinker, sandstone, mudstone and brick.		0.70	
					1.20			(1.20)	
					1.90	Brown clayey fibrous PEAT.		1.90	
2					0.60			(0.60)	
					2.50				2.50

PLAN 		Groundwater: No groundwater encountered Stability: Stable Shoring: N/A		Remarks :	
--	--	--	--	-----------	--

Equipment Used: JCB 3CX						
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	Ty Berwig, Bynea, Llanelli SA14 9ST Tel: 01554 744880 Fax: email: enquiries@quantumgeotech.co.uk		Operator: QGL	Logged By:	Sheet No. 1 Of 2	m Per Page 3	All measurements in metres unless otherwise stated	
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Contract : Hunter Street Additional Investigation

Client : H Singh

**Trial Pit No.
TP8**

Dates : 16/9/19 - 16/9/19

Job Number : G40104

Ground Level :

Location :

Engineer :

Coordinates:



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Operator:
QGL

Logged By.

Sheet No.
2 Of 2

m Per
Page

All measurements in
metres unless
otherwise stated



Contract : Hunter Street Additional Investigation Client : H Singh										Borehole No. BH1		
Dates : 20/9/19 - 20/9/19 Location :				Job Number : G40104 Engineer :				Ground Level : Coordinates:				

m B.G.L.	Samples		Insitu Test Results		Strata				Water	Install/ Backfill
	Depth	Type No. Blows	Depth	Test Results	Depth (Thick- ness)	Description	Legend	Depth (Thick- ness)		
0						MADE GROUND - Black and grey sandy gravelly CLAY. Gravel is fine to coarse angular sandstone, brick and concrete.		(2.00)		
1					(2.00)					
2					2.00 (0.50)	MADE GROUND - Black sandy GRAVEL. Gravel is fine to coarse angular clinker.		2.00 (0.50)		
3					2.50	Soft dark grey silty CLAY. (ALLUVIUM)		2.50		
4										
5					(5.50)			(5.50)		
6										
7										
8					8.00	Greyish brown slightly clayey sandy GRAVEL with low cobble content. Gravel is fine to coarse rounded to sub-rounded siltstone, mudstone and sandstone. Cobbles are rounded to sub-rounded sandstone.		8.00		
9										
10					(4.00)			(4.00)		
11										
12					12.00	Terminated at 12.0mbgl		12.00		
13										
14										

Hole Progress / Water Obs				Casing		Groundwater				Chiselling		
Date / Time	H. Depth	C. Depth	Water	Depth	Cas. Dia.	Struck	Rose To	Behaviour	Sealed	From	To	Hours

Equipment / plant used:
 Remarks:

	Ty Berwig, Bynea, Llanelli SA14 9ST Tel: 01554 744880 Fax: email: enquiries@quantumgeotech.co.uk	Operator:	Logged By:	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	
				1 Of 1	15		

**Phil Darby**

Quantum Geotechnic Ltd
Ty Berwig
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e: PhilDarby@QuantumGeotech.co.uk

Analytical Report Number : 19-59935

Replaces Analytical Report Number : 19-59935, issue no. 1

Project / Site name:	Hunter Street, Briton Ferry	Samples received on:	16/09/2019
Your job number:	G40104	Samples instructed on:	16/09/2019
Your order number:		Analysis completed by:	21/11/2019
Report Issue Number:	2	Report issued on:	21/11/2019
Samples Analysed:	3 leachate samples - 8 soil samples		

Signed:

Zina Abdul Razzak
Senior Quality Specialist

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 19-59935-2 Hunter Street, Briton Ferry G40104

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The results included within the report are representative of the samples submitted for analysis.

Page 1 of 15

Analytical Report Number: 19-59935

Project / Site name: Hunter Street, Briton Ferry

Lab Sample Number				1317428	1317429	1317430	1317431	1317432
Sample Reference				TP1	TP2	TP3	TP4	TP5
Sample Number				1	1	1	1	1
Depth (m)				0.50	0.50	0.50	0.50	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	19	19	14	18	13
Total mass of sample received	kg	0.001	NONE	1.2	1.4	1.4	1.2	1.7

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Amosite	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.011	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	0.011	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.0	7.9	7.8	8.5	7.9
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	1	< 1	< 1
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.29	0.27	0.36	0.11	0.029
Organic Matter	%	0.1	MCERTS	7.3	5.2	6.7	9.9	1.9

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.21	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.26	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.1	0.39	1.5	0.43	< 0.05
Anthracene	mg/kg	0.05	MCERTS	0.28	0.11	0.43	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	2.2	0.78	4.5	0.65	< 0.05
Pyrene	mg/kg	0.05	MCERTS	1.8	0.67	4.0	0.58	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.4	0.50	3.1	0.56	< 0.05
Chrysene	mg/kg	0.05	MCERTS	1.6	0.55	3.4	0.64	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	1.9	0.74	5.0	0.77	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.86	0.28	2.1	0.27	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.4	0.50	3.8	0.50	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.91	0.34	2.6	0.30	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.30	< 0.05	0.85	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1	0.40	3.2	0.39	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	14.9	5.26	35.1	5.09	< 0.80
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Analytical Report Number: 19-59935

Project / Site name: Hunter Street, Briton Ferry

Lab Sample Number				1317428	1317429	1317430	1317431	1317432
Sample Reference				TP1	TP2	TP3	TP4	TP5
Sample Number				1	1	1	1	1
Depth (m)				0.50	0.50	0.50	0.50	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	27	11	30	56	19
Boron (water soluble)	mg/kg	0.2	MCERTS	1.8	0.7	0.6	0.5	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	0.3	0.7	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	11	16	20	11
Copper (aqua regia extractable)	mg/kg	1	MCERTS	85	55	120	110	16
Lead (aqua regia extractable)	mg/kg	1	MCERTS	150	72	150	120	17
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	0.8	< 0.3	0.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	21	13	25	38	20
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	150	110	300	140	65

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH C10 - C40	mg/kg	10	MCERTS	41	35	120	16	< 10
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	11	32	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	31	23	70	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	41	35	100	16	< 10



Analytical Report Number: 19-59935

Project / Site name: Hunter Street, Briton Ferry

Lab Sample Number				1317428	1317429	1317430	1317431	1317432
Sample Reference				TP1	TP2	TP3	TP4	TP5
Sample Number				1	1	1	1	1
Depth (m)				0.50	0.50	0.50	0.50	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
Chloroethane	µg/kg	1	NONE	-	< 1.0	-	-	-
Bromomethane	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
Vinyl Chloride	µg/kg	1	NONE	-	< 1.0	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	< 1.0	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	< 1.0	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Trichloromethane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	< 1.0	-	-	-
Benzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Trichloroethene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Dibromomethane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
Tetrachloroethene	µg/kg	1	NONE	-	< 1.0	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Styrene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Tribromomethane	µg/kg	1	NONE	-	< 1.0	-	-	-
o-Xylene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Bromobenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Butylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	< 1.0	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	< 1.0	-	-	-



Analytical Report Number: 19-59935

Project / Site name: Hunter Street, Briton Ferry

Lab Sample Number				1317428	1317429	1317430	1317431	1317432
Sample Reference				TP1	TP2	TP3	TP4	TP5
Sample Number				1	1	1	1	1
Depth (m)				0.50	0.50	0.50	0.50	0.50
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

SVOCs

Aniline	mg/kg	0.1	NONE	-	< 0.1	-	-	-
Phenol	mg/kg	0.2	ISO 17025	-	< 0.2	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	< 0.1	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	< 0.2	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	< 0.2	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	< 0.1	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	< 0.2	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	< 0.1	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	< 0.3	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	< 0.2	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	< 0.2	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	< 0.3	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	< 0.3	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	< 0.3	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	< 0.3	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	< 0.1	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	< 0.1	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	< 0.1	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	< 0.1	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	< 0.2	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	< 0.1	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	< 0.1	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	< 0.1	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	< 0.1	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	< 0.2	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	< 0.2	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	< 0.3	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	< 0.2	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	< 0.2	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	< 0.2	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	0.39	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	0.11	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	< 0.3	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	< 0.2	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	< 0.3	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	0.78	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	0.67	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	< 0.3	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	0.50	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	0.55	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	0.74	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	0.28	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	0.50	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	0.34	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	0.40	-	-	-

Analytical Report Number: 19-59935

Project / Site name: Hunter Street, Briton Ferry

Lab Sample Number				1317433	1317434	1317435		
Sample Reference				TP6	TP7	TP8		
Sample Number				1	1	2		
Depth (m)				0.50	0.50	1.00		
Date Sampled				Deviating	Deviating	Deviating		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	22	23	34		
Total mass of sample received	kg	0.001	NONE	0.94	0.86	1.4		

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-		
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-		

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.9	8.1	7.5		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.062	0.063	0.28		
Organic Matter	%	0.1	MCERTS	14	14	9.0		

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.25	< 0.05	0.24		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.20		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.19		
Phenanthrene	mg/kg	0.05	MCERTS	1.1	0.22	2.4		
Anthracene	mg/kg	0.05	MCERTS	0.10	< 0.05	0.54		
Fluoranthene	mg/kg	0.05	MCERTS	0.52	0.25	5.9		
Pyrene	mg/kg	0.05	MCERTS	0.55	0.20	5.2		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.54	0.21	3.3		
Chrysene	mg/kg	0.05	MCERTS	0.79	0.21	3.9		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.89	0.29	4.7		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.25	0.12	2.1		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.56	< 0.05	3.5		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.56	< 0.05	2.2		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.18	< 0.05	0.69		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.74	< 0.05	2.7		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	6.98	1.50	37.7		
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Analytical Report Number: 19-59935

Project / Site name: Hunter Street, Briton Ferry

Lab Sample Number				1317433	1317434	1317435		
Sample Reference				TP6	TP7	TP8		
Sample Number				1	1	2		
Depth (m)				0.50	0.50	1.00		
Date Sampled				Deviating	Deviating	Deviating		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	44	26	51		
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	0.3	1.8		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	0.7		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	12	12	24		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	83	94	430		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	98	53	370		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	28	36	43		
Zinc (aqua regia extractable)	mg/ka	1	MCERTS	150	56	490		

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH C10 - C40	mg/kg	10	MCERTS	13	< 10	200		
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	24		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	28		
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	42		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	110		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	13	< 10	160		



Analytical Report Number: 19-59935

Project / Site name: Hunter Street, Briton Ferry

Lab Sample Number				1317433	1317434	1317435		
Sample Reference				TP6	TP7	TP8		
Sample Number				1	1	2		
Depth (m)				0.50	0.50	1.00		
Date Sampled				Deviating	Deviating	Deviating		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
VOCs								
Chloromethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
Chloroethane	µg/kg	1	NONE	< 1.0	-	< 1.0		
Bromomethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
Vinyl Chloride	µg/kg	1	NONE	< 1.0	-	< 1.0		
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	-	< 1.0		
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0		
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Trichloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0		
Benzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Trichloroethene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Dibromomethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
Tetrachloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0		
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Styrene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Tribromomethane	µg/kg	1	NONE	< 1.0	-	< 1.0		
o-Xylene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Bromobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	-	< 1.0		
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0		



Analytical Report Number: 19-59935

Project / Site name: Hunter Street, Briton Ferry

Lab Sample Number				1317433	1317434	1317435		
Sample Reference				TP6	TP7	TP8		
Sample Number				1	1	2		
Depth (m)				0.50	0.50	1.00		
Date Sampled				Deviating	Deviating	Deviating		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	< 0.1	-	< 0.1		
Phenol	mg/kg	0.2	ISO 17025	< 0.2	-	< 0.2		
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1		
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2		
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2		
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1		
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2		
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1		
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3		
Hexachloroethane	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05		
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3		
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	-	< 0.2		
Isophorone	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2		
2-Nitrophenol	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3		
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3		
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3		
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3		
Naphthalene	mg/kg	0.05	MCERTS	0.25	-	0.24		
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3		
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	< 0.1		
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1		
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	< 0.1		
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1		
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2		
2-Methylnaphthalene	mg/kg	0.1	NONE	0.5	-	< 0.1		
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1		
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1		
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	0.20		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05		
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2		
Dibenzofuran	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2		
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	< 0.3	-	< 0.3		
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2		
4-Nitroaniline	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	0.19		
Azobenzene	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3		
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2		
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3		
Phenanthrene	mg/kg	0.05	MCERTS	1.1	-	2.4		
Anthracene	mg/kg	0.05	MCERTS	0.10	-	0.54		
Carbazole	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3		
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2		
Anthraquinone	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3		
Fluoranthene	mg/kg	0.05	MCERTS	0.52	-	5.9		
Pyrene	mg/kg	0.05	MCERTS	0.55	-	5.2		
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3	-	< 0.3		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.54	-	3.3		
Chrysene	mg/kg	0.05	MCERTS	0.79	-	3.9		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.89	-	4.7		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.25	-	2.1		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.56	-	3.5		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.56	-	2.2		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.18	-	0.69		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.74	-	2.7		



Analytical Report Number: 19-59935
Project / Site name: Hunter Street, Briton Ferry
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1317428	TP1	0.50	130	Loose Fibrous Debris	Amosite	0.011	0.011

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.



Analytical Report Number: 19-59935

Project / Site name: Hunter Street, Briton Ferry

Lab Sample Number				1317436	1317437	1317438		
Sample Reference				TP2	TP6	TP8		
Sample Number				1	1	2		
Depth (m)				0.50	0.50	1.00		
Date Sampled				Deviating	Deviating	Deviating		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Leachate Analysis)				Units	Limit of detection	Accreditation Status		

General Inorganics

pH	pH Units	N/A	ISO 17025	8.2	8.1	8.1		
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10		
Sulphate as SO ₄	mg/l	0.1	ISO 17025	24.8	5.7	17.2		
Hardness - Total	mgCaCO ₃ /l	1	NONE	92.0	51.0	104		

Total Phenols

Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10		
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2		
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	< 1.1	20	5.6		
Boron (dissolved)	µg/l	10	ISO 17025	13	< 10	60		
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08		
Chromium (dissolved)	µg/l	0.4	ISO 17025	0.8	0.7	1.4		
Copper (dissolved)	µg/l	0.7	ISO 17025	7.6	7.2	13		
Lead (dissolved)	µg/l	1	ISO 17025	4.4	9.0	11		
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5		
Nickel (dissolved)	µg/l	0.3	ISO 17025	2.0	0.5	1.7		
Zinc (dissolved)	µg/l	0.4	ISO 17025	9.2	7.5	20		

Calcium (dissolved)	mg/l	0.012	ISO 17025	34	18	39		
Magnesium (dissolved)	mg/l	0.005	ISO 17025	1.7	1.7	1.5		

Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	< 10	< 10	< 10		
TPH2 (C6 - C10)	µg/l	10	NONE	< 10	< 10	< 10		



Analytical Report Number : 19-59935

Project / Site name: Hunter Street, Briton Ferry

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1317428	TP1	1	0.50	Brown sandy clay with gravel and vegetation.
1317429	TP2	1	0.50	Brown sandy clay with gravel and vegetation.
1317430	TP3	1	0.50	Brown sandy clay with gravel.
1317431	TP4	1	0.50	Brown sandy loam with gravel.
1317432	TP5	1	0.50	Light brown clay and sand with gravel.
1317433	TP6	1	0.50	Black gravely sand with clinker.
1317434	TP7	1	0.50	Black gravely sand with clinker.
1317435	TP8	2	1.00	Brown clay and sand with gravel.

Analytical Report Number : 19-59935

Project / Site name: Hunter Street, Briton Ferry

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In-house method based on BS1377 Part 2, 1990, Classification tests	L019-UK/PL	W	NONE
Monohydric phenols in leachate	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
NRA Leachate Prep	10:1 extract with de-ionised water shaken for 24 hours then filtered.	In-house method based on National Rivers Authority	L020-PL	W	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests ^{***}	L009-PL	D	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE

Iss No 19-59935-2 Hunter Street, Briton Ferry G40104

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The results included within the report are representative of the samples submitted for analysis.

Page 13 of 15

Analytical Report Number : 19-59935

Project / Site name: Hunter Street, Briton Ferry

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil	L039-PL	W	ISO 17025
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total Hardness of leachates	Determination of hardness in leachates by calculation from calcium and magnesium.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	NONE
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS
TPH1 (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPH2 (Leachates)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/cleanup.	L088/76-PL	W	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.