



**Phase 1 and Phase 2 Geo-
Environmental Assessment
Clifton Slips, West Street,
Gravesend, Kent, DA11 0BW**



Report

EcologiaTM
experts on the ground

**Phase 1 and Phase 2 Geo-
Environmental Assessment
Clifton Slips, West Street,
Gravesend, Kent, DA11 0BW**

Prepared for: Quinn Estates Ltd.

References: EES 18.376.2 & 18.376.3

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Title: Phase 1 & Phase 2 Geo-Environmental Assessment
Clifton Slips, West Street, Gravesend, Kent DA11 0BW

Ecologia References: EES 18.376.2 & 18.376.3

Client:	Quinn Estates Ltd.	Client Reference:	Clifton Slips
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EXECUTIVE SUMMARY

Site Location and Description	The site is situated in Gravesend approximately 450m northwest of Gravesend Railway Station. It is primarily surrounded by high-rise residential and commercial / retail buildings. The site is generally irregular in shape and covers an area of approximately 0.58ha (split by B256 West Street road), consisting of three different areas: Area 1 and Pier which extends out into the River Thames and Area 2 located to the south of West Street. Area 1 currently comprises mostly concrete hardstanding and is generally flat (surface level recorded between 4.75m AOD and 5.25m AOD), with a pier extending out into the River Thames. The Pier is approximately 2.5-3m higher than Area 1 ground level. The pier is not in use / currently derelict and is constructed of a cast iron and wrought iron structural frame with three levels of timber decking supported on piles. Area 2 comprises open scrubland / vegetation and has a steep gradient towards West Street, differing in height from 10.00m AOD in the south to 5.75m AOD in the north adjacent to West Street.									
Environmental Setting	The site is situated on bedrock geology comprising the structureless Seaford Chalk Formation (classified as a Principal Aquifer). The underlying superficial deposits in Area 1 comprise Tidal River or Creek Deposits (classified as a Secondary undifferentiated aquifer); no superficial deposits are reported in Area 2. The closest surface water feature is the River Thames which borders Area 1 of the site and is likely to be in hydraulic continuity with the groundwater level.									
Historical and Industrial Setting	In 1863 the wharf in Area 1 was occupied by two buildings, labelled as a coal wharf. The two parcels of land were separated by West Street, and Area 2 was occupied by houses and a timber yard. In 1897, several railway lines passed through the western part of Area 2 and continued on to the pier, supported underneath by a viaduct that crossed West Street. A railway station was built immediately to the southwest of the site. For the next 30 years, the site remained relatively unchanged. A travelling crane was added to the northern end of the pier by 1933, indicating that the pier served cargo ships as well as passenger ferries. The railway tracks were eventually removed in 1975, but the viaduct still remained. From 1999, storage units were present across the site understood to be for building materials, shipping containers and boats. By 2007, the pier was closed to the public and the viaduct was removed; both areas were cleared.									
Site Investigation Works	Investigation works comprised the following: • Unexploded Ordnance (UXO) watching brief during trial pitting on Area 1. • Eighteen (18No.) trial pits to a maximum depth of 2.7m bgl, denoted as 'TP1 – TP18'. • Four (4No.) dual installation boreholes drilled using a Cable Percussive rig to a maximum depth 25m bgl to assist preliminary foundation design, denoted as 'CP1 – CP4', including: - In-situ Standard Penetration Tests (SPT); and - Installation for future ground gas and groundwater monitoring. • Three (3No.) rounds of groundwater monitoring in boreholes 'CP1 – CP4'. • Four (4No.) rounds of ground gas monitoring in boreholes 'CP1 – CP4'.									
Outline Conceptual Site Model	The following potential on-site sources have been identified: • Made Ground present across site, potential for a range of contaminants including metals, asbestos and hydrocarbons (TPH, BTEX and PAH). • Potential for ground gas (methane and carbon dioxide) associated with the presence of Made Ground and infilled ground on site. On the basis of the data collected during the site investigation the following risks / potential pollutant linkages have been identified: <table><tr><td>Future site users</td><td>Inhalation of asbestos fibres Gas accumulation and asphyxiation Direct contact with shallow Made Ground Hydrocarbon permeation of plastic supply pipes</td><td>HIGH MODERATE / LOW MODERATE MODERATE</td></tr><tr><td>Buildings/structures</td><td>Potential for explosive atmospheres</td><td>MODERATE / LOW</td></tr><tr><td>Controlled waters</td><td>Leaching contaminants from Made Ground and migration to local surface waters</td><td>MODERATE</td></tr></table>	Future site users	Inhalation of asbestos fibres Gas accumulation and asphyxiation Direct contact with shallow Made Ground Hydrocarbon permeation of plastic supply pipes	HIGH MODERATE / LOW MODERATE MODERATE	Buildings/structures	Potential for explosive atmospheres	MODERATE / LOW	Controlled waters	Leaching contaminants from Made Ground and migration to local surface waters	MODERATE
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Buildings/structures	Potential for explosive atmospheres	MODERATE / LOW								
Controlled waters	Leaching contaminants from Made Ground and migration to local surface waters	MODERATE								

Preliminary Geotechnical Assessment	At this stage, shallow foundations (such as traditional strip or trench-fill foundations) are not considered to be appropriate based on loadings of a typical high-rise building. The bedrock (structureless Seaford Chalk Formation) was encountered at depths of between 4.0m bgl and 8.10m bgl as such, pile depth will most likely be required at a greater depth. At current site levels, traditional shallow soakaways are not likely to be feasible due to the presence of deep Made Ground beneath the site. Deep bore soakaways are also unlikely to be feasible due to the shallow and continually fluctuating groundwater table within the Chalk. It is recommended that other drainage options are considered, such as SuDS techniques for surface waters and possible connection to existing public sewers following approval from Southern Water.
Recommendations	<u>Contamination:</u> We would recommend producing a Remediation Strategy prior to any construction works to mitigate the identified pollutant linkages in relation to the proposed development plan. As a minimum this is expected to comprise: • Appropriate disposal of 'fly-tipped' material. • Excavation works of Made Ground with any identified hotspot sources of contamination. • Contamination watching brief. • Implementation of suitable water treatment system to treat potentially contaminated perched water / groundwater on site, if identified. • Construction of an appropriate cover system in landscaped areas. As a minimum it would be expected that any construction works incorporate the following: • Appropriate personal protective equipment (PPE) for ground workers, to mitigate potential risks from dermal contact, ingestion and inhalation of materials/soils. • Good housekeeping rules should also be observed on site i.e. washing of hands before eating etc. in accordance with health and safety regulations. • A discovery strategy during re-development works in the event that unforeseen and suspected contamination is encountered, the client should stop works and further assessment undertaken by experienced Environmental Consultant. Additionally, if soils are to be re-used on site during future redevelopment works, this should be undertaken in accordance with CL:AIRE Definition of Waste Code of Practice (DoWCoP). If soils are to be removed from site due to development requirements, these should be disposed of under the appropriate duty of care. A 'Detailed UXO Risk Assessment' is recommended prior to start of any groundworks to determine overall risk for the site and the potential for future on-site watching brief works. <u>Geotechnical:</u> • Further investigations to determine locations and extents of historic underground structures / foundations associated with the previous viaduct. Previous site investigation works were limited in terms of depth and coverage close to the site boundaries (H&S concerns). • Although no dissolution features were encountered during Ecologia's works, a watching brief or geophysical scan may be required prior / during construction works on site. • Further geotechnical investigations to inform detailed foundation design are likely to be required (most notably for piling design). Due to the variation in the bearing capacity of the Seaford Chalk Formation further assessment will be required to determine if the thickness of the Structureless Chalk is constant across site or if the possibility of using shorter length piles can be considered.
<i>The outline conceptual site model, qualitative risk assessment and recommendations are made based on the proposed development of the site into high-rise residential dwellings and restoration of the pier to provide public amenity space. If the development plan changes, potential risks would need to be re-assessed and the GQRA and CSM refined accordingly.</i>	

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1. Introduction

1.1. Background

Ecologia was instructed by Quinn Estates Ltd to complete a Phase 1 and Phase 2 Geo-Environmental Assessment for Clifton Slips, West Street, Gravesend, Kent, DA11 0BW. The Geo-Environmental Assessment is required to support planning and re-development of the site.

1.2. Proposed Redevelopment

Ecologia understands a planning application has been permitted by Gravesham Borough Council (reference: 20160046) in January 2016 comprising the:

“Erection of two buildings to provide a total of 133no. dwellings with associated vehicle parking, highway works and landscaping, comprising erection of a thirteen storey building on the north side of West Street to provide 54no. dwellings and one ground floor B1(a) unit and a second building ranging in height from four storeys to nine storeys on the south side of West Street to provide 79no. dwellings; and the restoration and adaptation of the existing two-level pier structure to provide public and private amenity space to include erection of a glazed pavilion”.

The proposed development covers two areas of land either side of West Street. Area 1 is to the north of West Street and adjacent to the River Thames and Area 2 is to the south of West Street and west of Stuart Road. The proposed development plan denoting Area 1 and Area 2 is included within Figure 1, Appendix I.

1.3. Objectives

The objective of this report is to:

- Support planning condition No.14, requirement for a full land contamination survey and report, including a Phase 1 (desk-based review) and Phase 2 (intrusive ground investigation) assessment;
- Provide preliminary geotechnical information in relation to general ground conditions; and to aid foundation design; and,
- Provide recommendations for further work (if required).

1.4. Report Structure

This report has been prepared in accordance with the 'Model Procedures for the Management of Land Contamination' (CLR 11)^(Ref.1), which have been developed to provide the technical framework for applying a risk management process when dealing with land affected by contamination.

This report includes:

- A description of the site setting and current site status.
- A review of readily available information and an environmental data search comprising a review of:
 - the sites' environmental setting (geology, hydrogeology, hydrology and sensitive environmental land designations); and,

- historical mapping and existing and former industrial sites to determine former potentially contaminative land uses.
- Findings of the intrusive site investigation works carried out by Ecologia.
- Preliminary geotechnical information in relation to general ground conditions and to aid foundation design.
- Development of a Conceptual Site Model (CSM) establishing potential pollutant linkages and a qualitative assessment of whether these are likely to form an unacceptable risk.
- Recommendations for further works (if required).

1.5. Previous Site Investigation

A previous site investigation was undertaken by STATS Ltd in 2007:

- STATS Ltd: Report Ref: 35486-001 'Geotechnical and Geoenvironmental Report', dated 23rd March 2007^(Ref.2).

Site works consisted of the following:

- Four (4No.) deep boreholes to a maximum depth of 20.00 metres below ground level (mbgl) and seven (7No.) shallow boreholes to a maximum depth of 5.00 mbgl;
- Six (6No.) borehole installations for subsequent monitoring (1No. round of ground gas monitoring and 1No. round of groundwater monitoring);
- Seven (7No.) trial pits, including three (3No.) excavated by hand to a maximum depth of 0.60 mbgl and four (4No.) excavated by mechanical excavator to a maximum depth of 4.90 mbgl; and,
- Six (6No.) In-situ Dynamic Cone Penetrometer (DCP) tests in the Made Ground.

Intrusive locations completed by STATS Ltd^(Ref.2) are presented in Figure 2, Appendix I.

Results of the investigation identified the following:

- Made Ground in Area 1 was reported to be up to 6m thick and consisted of a reinforced concrete slab over sandy gravelly clay with flint, brick rubble and tarmac. A slight hydrocarbon odour was noted in WS2.
- Substructures associated with old viaduct abutments, brick walls and sheet pile river walls were exposed in all trial pits on Area 1.
- Made Ground in Area 2 was reported to be up to 6.5m thick and consisted of sandy gravelly clay with flint, brick rubble and tarmac, with rare clinker, roots, concrete and glass. A slight hydrocarbon odour was noted in BH3 and WS7. Some decomposing organic matter was encountered in WS6.
- One (1No.) round of gas monitoring indicated the site may be classified as Characteristic Situation 1 and would not require any special precautions or protective measures. However, additional monitoring is required to enable a full range of conditions to be established, including any tidal influence.
- One (1No.) round of groundwater monitoring did not reveal any exceedances when compared against the controlled water standards at the time of investigation. However, when compared to updated standards, potential exceedances for Polyaromatic Hydrocarbons (PAHs) were identified.

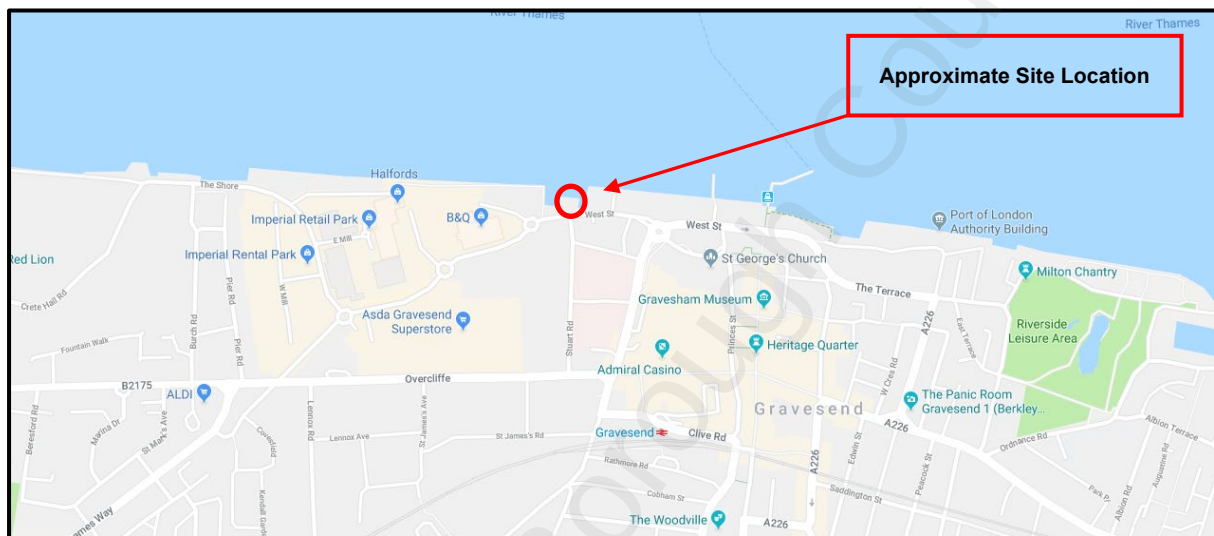
- Overall, limited contamination was noted across the samples scheduled for analysis; albeit, the investigation was limited in terms of chemical suites and quantity. However, no leachate analysis was undertaken to determine risks of migration through to controlled waters.

2. Site Setting

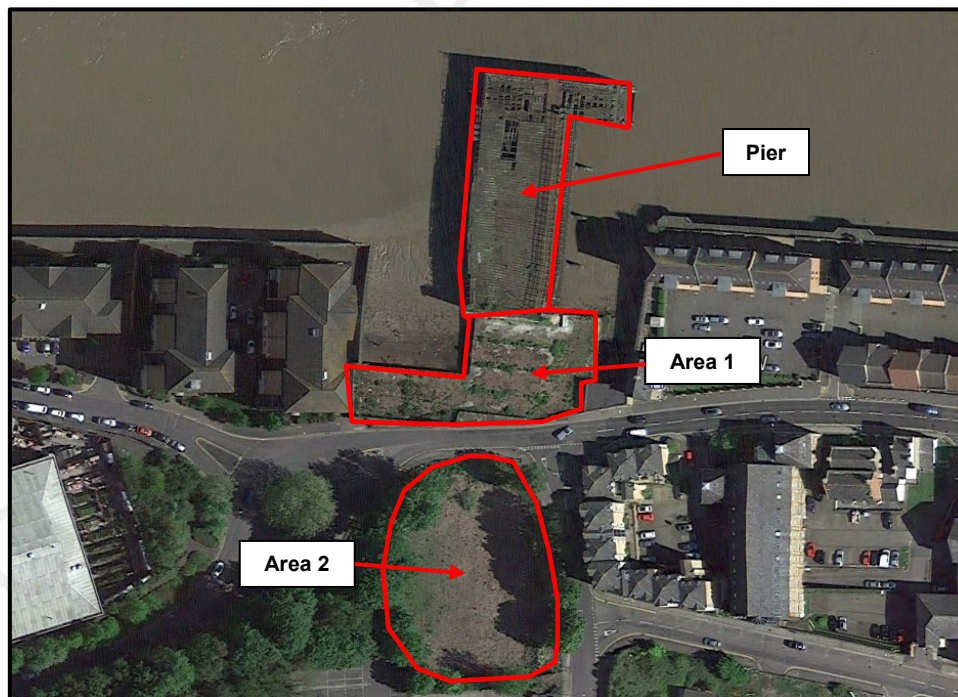
2.1. Site Location

The site address is: Clifton Slips,
West Street,
Gravesend,
Kent,
DA11 0BW

The location of the site is shown in Plan 1 and is approximately centred at grid reference 564391, 174435. The approximate site area is shown in Plan 2 (outlined in red).



Plan 1. Site Location (Source: Google Maps^(Ref.3)).



Plan 2. Approximate Proposed Development Area (Source: Google Earth^(Ref.4)).

2.2. Site Setting

The site is situated in Gravesend approximately 450m northwest of Gravesend Railway Station. It is primarily surrounded by high-rise residential and commercial / retail buildings.

The site is generally irregular in shape and covers an area of approximately 0.58ha (split by B256 West Street road), consisting of three different areas: Area 1 and Pier which extends out into the River Thames and Area 2 located to the south of West Street.

NB. Ecologia have completed this assessment for investigation of Areas 1 and 2 only.

2.3. Current Site Description

The site is no longer in use and considered derelict land.

Area 1 currently comprises mostly concrete hardstanding and is generally flat (surface level recorded between 4.75m AOD and 5.25m AOD), with a pier extending out into the River Thames. The Pier is approximately 2.5-3m higher than Area 1 ground level. The pier is not in use / currently derelict and is constructed of a cast iron and wrought iron structural frame with three levels of timber decking supported on piles.

Area 2 comprises open scrubland / vegetation and has a steep gradient towards West Street, differing in height from 10.00m AOD in the south to 5.75m AOD in the north adjacent to West Street.

A photographic report is included as Appendix II.

3. Environmental Setting

To provide a comprehensive assessment of the site, a report on the potential environmental receptors and hydrological sensitivity of the area, was commissioned from GroundSure. Information was also obtained from the British Geological Survey (BGS) website^(Ref.5), the MAGIC website^(Ref.6), GOV.UK website^(Ref.7) and Environment Agency (EA) website^(Ref.8).

The GroundSure information and environmental setting in relation to the site is summarised in the following sections. The full GroundSure report is included as Appendix III.

3.1. Geology

A review of readily available information in the GroundSure report, BGS website^(Ref.5) and the published BGS Dartford 271 (1998, 1:50,000) Solid and Drift edition has been undertaken.

The site is situated on sedimentary bedrock geology comprising the structureless Seaford Chalk Formation. The underlying superficial deposits in Area 1 comprise Tidal River or Creek Deposits (Clay and Silt); no superficial deposits are reported in Area 2.

3.1.1. Borehole Records

Information with regards to local borehole records was obtained from the BGS website^(Ref.4) (Geology of Britain Viewer) and is summarised in Table 3.1 below.

Table 3.1. Local Borehole Records

Reference	Name	Location	Length (m)	Description
TQ67SW55/B	Keller Bryant 45 West Street Gravesend	24m NE	32.77	Cellar up to 2.28m, followed by concrete slab 0.3m thick. Chalk with flints for the remaining borehole.
TQ67SW55/A	Asda Stores Gravesend	153m SW	15.00	Made Ground (ash) for 5.10m bgl. Remainder of borehole was Chalk becoming less weathered and more structured with depth.
TQ67SW313	78-82 West Street Gravesend	167m E	15.50	Concrete slab followed by Made Ground with brick and chalk fragments to 4.5m bgl. Firm Silt with shell fragments from 4.5-5.6m bgl. The remaining borehole was recorded as Chalk, becoming less weathered with depth.
TQ67SW54	B R Gravesend	173m SW	30.63	Gravel for first 2.13m bgl. Thanet Beds, loamy and green sands 5.03m thick. Chalk recorded for the remaining borehole.

3.1.2. Ground Hazards

The GroundSure report indicates the following ground hazards within a 50m buffer of the site:

- Landslide potential: very low and negligible risk.
- Shrink / swell: low and negligible risk.

- Compressible deposits: very low and negligible risk over majority of site. Area below pier is classified as moderate and high risk.
- Collapsible deposits: very low and negligible risk.
- Running sand: very low and negligible risk. Area below pier is classified as low and moderate risk.
- Ground dissolution of soluble rock: very low and negligible risk.

3.1.3. Mining, Extraction and Cavities

The GroundSure report identified one (1No.) Chalk mining activity. Underground mining is known to have occurred within or very close to the area. Potential for difficult ground conditions should be investigated. Potential for localised subsidence is at a level where it should be considered.

3.1.4. Radon Affected Areas and Protection Measures

The GroundSure report states that the site is not located in a radon affected area as less than 1% of properties are above the Action Level.

No radon protection measures are required in new builds or commercial developments, as described in publication BR211 by the Building Research Establishment^(Ref.8).

3.2. Hydrogeology

Information obtained from the MAGIC website^(Ref.6) and previous reports indicates the bedrock geology is classified as a Principal Aquifer, whilst the superficial deposits are classified as a Secondary (undifferentiated) aquifer. Although the site is not reported to be within a Source Protection Zone (SPZ), the Groundwater Vulnerability is classified as Major Aquifer High.

Groundwater Vulnerability Zones provide information about the likelihood of a pollutant discharged at ground level (i.e. above the soil zone) reaching groundwater for superficial and bedrock aquifers.

Information obtained from the EA website^(Ref.8) indicates the site is not situated in a Drinking Water Protected Area (DrWPA).

The GroundSure report indicates no groundwater abstraction licences are present within 1,000m of the site.

3.3. Hydrology

The closest surface water feature is the River Thames which borders Area 1 of the site. Groundwater underlying the site is likely to be in hydraulic continuity with the river, and the regional direction of groundwater flow is to the north, towards the Thames.

The GroundSure report indicates no surface water abstractions within 2,000m of the site.

One (1No.) Zone 2 floodplain (Fluvial/Tidal Models) and one (1No.) Zone 3 floodplain (Fluvial Models) have been identified onsite. A further Zone 3 floodplain has been identified 220m west of the site.

Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea.

Zone 3 floodplains show the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.

The Risk of Flooding from Rivers and the Sea (RoFRaS) identifies a High (1 in 30 or greater) chance of flooding in any given year for the area closest to the Thames. The RoFRaS for the remainder of the site is Very Low (annual chance of flooding of less than 0.1%) chance of flooding in any given year.

Flood defences are recorded as being present onsite.

3.4. Environmentally Sensitive Areas

The GroundSure report indicates one (1No.) record for an Environmentally Sensitive Area 1,930m east of site. Additionally, two (2No.) records of Nitrate Vulnerable Zones have been identified within 2,000m of site, the closest being 1,350m east.

4. Historical and Industrial Site Setting

4.1. Site and Surrounding Area Historical Development

Historical Maps (1:2,500 - 1:10,560) have been provided by GroundSure dating from 1864 to 2014 and copies are included within Appendix III.

Table 4.1 below summarises historical activities on site and significant land-use changes within 250m of the site boundary.

Table 4.1. Historical Summary

Dates	On Site	Locally (<250m)
1864-1866	West Street runs between Areas 1 and 2. Beach deposit (shingle) is shown at the north western corner of Area 1. A Coal Wharf is present on Area 1. Residential houses 'Clifton Terrace' runs along the north of Area 2. A Timber Yard is present to the south of Area 2.	A Chalk pit is present just beyond the southeast corner of Area 2. A Chalk Quarry is present just beyond the southwest corner of Area 2, with railway lines passing through and Lime Works present 140m to the west. Two (2No.) Timber Yards are present alongside the eastern boundary of Area 2 and approximately 50m southeast of Area 2. Residential properties are present to the east and further south of the site. A pier is located approximately 140m west of the site. A Hotel and Clifton Marine Parade is located 120m west of the site with Clifton Baths 160m to the west.
1897-1898	A viaduct has been constructed between Areas 1 and 2 with railway lines. L.C & D. Pier has been constructed at the northern end of Area 1, extending 65m north over the River Thames. Stuart Road is present along the eastern side of the site, extending southward to New Road.	Gravesend West Street Station has been built 20m to the south of Area 2. Additional residential houses have been constructed just beyond the Timber Yard to the southeast of Area 2. A hospital (Gravesend and North Kent) has been built 130m south of Area 2.
1909-1933	No significant changes on site.	A new Timber Yard has is present approximately 65m west of Area 1, on the beach deposits. The tramlines within the Chalk Quarry have been converted into a Rifle Range. A Brewery has been constructed on the eastern boundary of Area 2.
1939	Some of the railway lines running along the viaduct have been removed and a Travelling Crane installed at the end.	A new development has been constructed to the west, including Travelling Cranes and Imperial Paper Mills with chimneys built on the previous hotel and lime works location. The Rifle Range is no longer shown on the map. A water tower has been built approximately 200m south of the site.
1953	No significant changes on site.	A small woodland (cca. 20m²) is present adjacent to the western boundary of Area 2. Rough grassland replaces the Chalk Quarry to the southwest.
1964-1965	A building has been constructed in the west of Area 1.	A depot has replaced the Brewery on the east of Area 2 with engineering works and carparks developed further east.

Dates	On Site	Locally (<250m)
		A Contractors Yard has been developed approximately 130m to the south of the site. Carparks have been constructed to the south, where previous residential houses were.
1975-1978	Railway lines have been removed from the viaduct.	Additional small woodland has been planted approximately 130m southwest of Area 2. Railway lines removed from the Chalk Quarry with an entrance to the tunnel shown some 160m southwest of Area 2 Additional carparks have been constructed where previous houses were to the east and southeast. An electrical substation has been built to the west, approximately 230m away.
1983-1989	No significant changes on site.	A new carpark has been built in the previous Chalk Quarry to the south of Area 2, extending 170m west. Travelling Cranes to the west are no longer present. Shopping Centre (St. George Centre) has been constructed atop carparks to the southeast of the site.
1991-1994	No significant changes on site.	The Imperial Retail Park has been built to the west and southwest, up to 250m from site.
2010-2014	The viaduct has been demolished between Areas 1 and 2.	No significant changes locally.

Significant changes on site have been included below, taken from images on Google Earth^(Ref. 4). Storage facilities in 2004 are understood to be for building materials, shipping containers and boats. By 2007, the pier was closed off and the viaduct removed; both areas were cleared.



Plan 3: Clifton Slips in 1960



Plan 4: Clifton Slips in 2004



Plan 5: Clifton Slips in 2007

4.1.1. Historical Industrial Sites

The GroundSure report details one-hundred and eighty (180No.) historical potentially contaminative industrial land uses within 250m of the site. Entries are summarised below:

- Unspecified Wharf, located onsite (1888-1990) and 59m W (1907-1938) ;
- Railway Station, located onsite (1888-1966);
- Paper Mills, located onsite (1946-1977) and 93m SW (1966-1971);
- Railway Sidings, located onsite (1888-1971);
- Terminus, located onsite (1946);
- Tramway Sidings, located onsite (1895-1946);
- Whiting Works, located onsite (1888-1938) and 86m SW (1895-1916);
- Lime Works, located onsite (1895-1923) and 81m SW (1895);
- Tank, located onsite (1916);
- Hospital, located 46m E (1977-1990);
- Railway Building, located 52m W (1895-1938);
- Goods Shed, located 56m SW (1932-1946); and,
- Chalk Pit, located 89m SW (1888-1899).

4.1.2. Tank Database

The GroundSure report details nineteen (19No.) records of Tanks within 250m of the site. Entries are summarised below:

- Unspecified Tank 57m E (1933-1939);
- Unspecified Tank 120m SW (1953-1965);
- Tanks 153m W (1964-1965);
- Unspecified Tank 173m S (1933-1965); and,
- Tanks 217m W (1975-1909).

4.1.3. Energy Features Database

The GroundSure report details twenty-five (25No.) historical energy features within 250m of the site. Entries are summarised below:

- Electricity Transformer 45m SE (1975) and 178m S (1975); and,
- Electricity Substation 45m SE (1985-1993), 85m W (1953-1993), 186m S (1985-1993), 208m E (1978-1996) and 235m S (1985-1993).

4.1.4. Garages and Motor Vehicle Repairs

The GroundSure report details five (5No.) historical garage and motor vehicle repair site within 250m of the site. Entries are summarised below:

- Marine Engineering Works 108m E (1953); and,
- Service Area 212m SE (1983-1986).

4.1.5. Potentially Infilled Land

The GroundSure report details thirty-seven (37No.) records of potentially infilled features within 250m of the site, some of which are duplicates, twelve (12No.) located onsite. Entries include:

- Unspecified Wharf, located onsite (1923-1990) and 56m W (1907-1938);
- Chalk Pit 90m SW (1888-1977);
- Unspecified Ground Workings 100m SW (1865-1946); and,
- Unspecified Heap 157m SW (1946).

4.1.6. Landfill and Other Waste Sites

The GroundSure report identifies two (2No.) historic landfill sites and / or any other waste sites within 500m of the site. Entries are summarised below:

- Scrap Yard onsite (1985); and,
- ASDA Site Inert Waste 102m SW (1976).

4.1.7. Recorded Pollution Events

The GroundSure report identified six (6No.) pollution incidents within 500m of the site. The closest to site, 297m N, occurred in 2003. The pollutant was Oils and Fuels. The incident was categorised as Category 3 (Minor) for Water Impact, Category 4 (No Impact) for Land and Air Impact.

4.2. Current Land Uses

4.2.1. Current Industrial Activities

The GroundSure report indicates thirty (30No.) records of current potentially contaminative industrial land uses located within 250m of the site. The current land uses relate to the following:

- Eight (8No.) 'Mooring and Unloading Facilities', located onsite, 34m NW, 44m NE, 93m SE, 126m E, 130m W, 182m E and 204m E;
- One (1No.) 'Travelling Cranes and Gentries', located 1m N;
- Seven (7No.) 'Electrical Features', located 16m E, 45m SE, 99m E, 103m W, 181m S, 221m E and 236m S;
- One (1No.) 'Packaging', located 92m W;
- One (1No.) 'Industrial Engineers', located 93m E;
- One (1No.) 'Radar and Telecommunications Equipment', located 93m E;
- One (1No.) 'Distribution and Haulage', located 93m E;
- Two (2No.) 'Beds and Bedding', located 153m W and 246m SE;
- One (1No.) 'Hospitals', located 162m SE;
- One (1No.) 'Disability and Mobility Equipment', located 171m SE;
- One (1No.) 'Medical Equipment, Supplies and Pharmaceuticals', located 183m S;

- One (1No.) 'Bus and Coach Depots and Companies', located 211m S; and,
- Two (2No.) 'Ferries and Ferry Terminals', located 220m E.

4.2.2. Petrol and Fuel Stations

According to the GroundSure report, there is one record of a currently active Asda Petrol Station located 339m SW.

4.2.3. Environmental Permits, Incidents and Registers

The GroundSure does not indicate any records of historic IPC Authorisations, Part A(1) and IPPC Authorised Activities, List 1 or 2 Dangerous Substances Inventory Sites, Water Industry Referrals, Planning Hazardous Substance Consents or Enforcements, or any Category 3 or 4 Radioactive Substances Authorisations within 250m of the site.

- One (1No.) record of a Red List Discharge Consent is registered within 250m of the site including 'Blue Circle Industries', located 240m NW, recorded as trade discharges – unspecified;
- One (1No.) record of Part A(2) and Part B Activities are registered within 250m of the Site including 'ASDA Petrol', located 168m SW, recorded as unloading petrol; and,
- Two (2No.) records of Licensed Discharge Consent are registered within 250m of the Site including 'Town Pier', located 90m E, recorded as sewage discharges – sewer storm overflow and 'Crawley Court', located 144m E, recorded as sewage discharges – sewer storm overflow.

5. Site Investigation Works

Ecologia completed intrusive investigation works between Monday 11th February and Friday 5th April 2019, with subsequent ground gas and groundwater monitoring completed on Wednesday 1st May 2019.

5.1. Scope of Work

Investigation locations were finalised based on the proposed development layout, potential areas of historical features, presence of underground services and accessibility of the locations. The works across both Area 1 and Area 2 comprised the following:

- Unexploded Ordnance (UXO) watching brief during trial pitting on Area 1.
- Eighteen (18No.) trial pits to a maximum depth of 2.7m bgl, denoted as 'TP1 – TP18'.
- Four (4No.) boreholes drilled using a Cable Percussive rig to a maximum depth 25m bgl, denoted as 'CP1 – CP4', incorporating:
 - In-situ Standard Penetration Tests (SPT); and
 - Installation with dual pipework to allow for shallow gas monitoring from the Made Ground horizon and groundwater monitoring from the Chalk.
- Three (3No.) rounds of groundwater monitoring in boreholes 'CP1 – CP4'.
- Four (4No.) rounds of ground gas monitoring in boreholes 'CP1 – CP4'.

The borehole and trial pit locations are annotated on the site investigation location plan (Figure 3) included within Appendix I.

Prior to commencement of intrusive investigation, a permit to dig was authorised, comprising a review of available service plans and scan of each location using a Cable Avoidance Tool (CAT). Each borehole on Area 2 was also hand dug to a depth of 1.2m to further verify the presence / absence of underground services. Boreholes on Area 1 were drilled through previously excavated trial pit locations.

5.2. Borehole Installations

The boreholes were installed with dual pipework to allow for shallow gas monitoring from the Made Ground horizon and groundwater monitoring from the Chalk (gas monitoring was also carried out on the deeper pipework). The response zones within the shallow gas standpipe incorporated a slotted pipe throughout the majority of Made Ground, up to the groundwater table, to allow for migration of ground gas, if generated. The response zone for the deeper groundwater standpipe incorporated plain pipework to screen off the Made Ground and slotted pipework for the remainder of the bedrock geology.

Table 5.1 overleaf details the gas and groundwater monitoring wells installed and monitored by Ecologia, illustrating the response zones (fully detailed in borehole logs - Appendix IV).

Table 5.1: Ecologia Gas and Groundwater Monitoring Installations & Response Zones

Borehole	Area	Geology	Response Zone (m bgl)	Strata Type of Response Zone	No. of Monitoring Rounds
CP1(S)	Area 1	Made Ground	2.00 – 3.50	Made Ground	4No. gas
CP1(D)		Bedrock Geology (Chalk)	5.00 – 25.00	Natural Ground	4No. gas, 3No. groundwater
CP2(S)		Made Ground	1.00 – 3.50	Made Ground	4No. gas
CP2(D)		Bedrock Geology (Chalk)	5.00 – 20.00	Natural Ground	4No. gas, 3No. groundwater
CP3(S)	Area 2	Made Ground	1.00 – 4.00	Made Ground	4No. gas
CP3(D)		Bedrock Geology (Chalk)	6.00 – 20.00	Natural Ground	4No. gas, 3No. groundwater
CP4(S)		Made Ground	1.00 – 7.00	Made Ground	4No. gas
CP4(D)		Bedrock Geology (Chalk)	9.00 – 20.00	Natural Ground	4No. gas, 3No. groundwater
(S) – shallow monitoring standpipe (ground gas monitoring purposes)					
(D) – deep monitoring standpipe (gas and groundwater monitoring purposes)					

5.3. Ground Conditions

General ground conditions encountered during the works sequentially comprised:

- Concrete slab with or without re-bar (Area 1 only);
- Made Ground; and,
- Structureless Chalk (Grade Dm Seaford Chalk Formation).

Detailed exploratory trial pit and borehole logs are included within Appendix IV.

5.4. Contamination Observations

In Area 1, hard standing was encountered across all intrusive locations, over Made Ground (up to 4.50 m thick). Made Ground consisted of brown / blackish sandy gravelly clay. Gravels comprised brick, concrete, bituminous material and flint. Some deleterious materials were also noted, including plastic, tiles and glass. Small fragments of asbestos cement sheeting were identified on the surface ground level and in the soils of trial pits TP1 and TP4. Railway sleepers were noted in TP1, TP3 and TP6.

Underground obstructions were identified on Area 1, including a concrete wall extending from TP1 and TP6 at a depth of 0.6m bgl to the base. A metal obstruction was encountered at the base of TP6 (at 2.1 mbgl). Concrete was identified at the base of TP7 (depth of 1.9m bgl) with a thin concrete layer encountered in TP8 at 1.25m bgl (0.2m thick). Brick walls were identified in the central section of the plot visible from ground level and extending down to 1m bgl in TP9 and TP7.

In Area 2, Made Ground was identified in all intrusive locations up to 8.10 metres thick and consisted of brown / blackish sandy gravelly clay. Gravels comprised brick, concrete, bituminous material and flint. Some deleterious materials were also noted, including plastic, tiles and glass.

Abundant rubbish was present in the southwest corner of Area 2, resulting from squatters on site. In general, 'fly-tipped' rubbish was observed around the boundaries of each area, generally alongside the road / pathways.

5.5. Soil Sampling

5.5.1. Environmental Testing

Soil samples were selected for testing based on visual and / or olfactory evidence of suspected contamination, if present, and also to be representative of Made Ground and natural ground encountered on site.

A total of ten (10No.) soil samples and seven (7No.) soil leachate samples were submitted to an MCERTS / UKAS accredited laboratory for chemical analysis, including the following determinants:

- Asbestos screening, ID and quantification;
- Fraction of Organic Carbon (FOC);
- Alkalinity (leachate analysis);
- Heavy Metals;
- Total Petroleum Hydrocarbons (TPHs), with aliphatic / aromatic split and carbon banding C8-C40;
- BTEX compounds (Benzene, Toluene, Ethylbenzene and Xylene); and,
- Polycyclic Aromatic Hydrocarbons (PAHs).

The environmental analytical results are discussed within Section 7 of this report.

5.5.2. Geotechnical Testing

In addition to the SPT on-site testing, a total of thirteen (13No.) soil samples were scheduled for geotechnical laboratory analysis comprising:

- Saturated Moisture Content;
- Intact Dry Density;
- Atterberg Limit – 4 Point; and
- BRE SD1 Suite.

The geotechnical analytical results are discussed within Section 9 of this report.

5.6. Groundwater Monitoring and Sampling

Groundwater monitoring incorporated recording of groundwater depth and the presence or absence of free product using an interface probe and collection of water samples for laboratory analysis.

The groundwater samples were obtained using low-flow techniques, based on guidance issued by US-EPA^(Ref.10), designed to induce minimal drawdown and to provide non-biased groundwater samples with reduced suspended particles (i.e. lower turbidity).

During the works, a peristaltic pump was installed within the water column, (at the mid-point of the measured saturated zone) and used to draw groundwater at low flow rates of 0.1-0.5l/min.

Through the low flow (purging and sampling works), the groundwater was monitored using a flow-through cell for dissolved oxygen (% and ppm), REDOX potential (mV), electrical conductivity ($\mu\text{S}/\text{cm}$), temperature ($^{\circ}\text{C}$) and pH using a calibrated multi-parameter probe (YSI 556 MPS probe). The abovementioned water quality parameters were recorded each minute

(for up to fifteen minutes) until similar readings (within 5% variation) were recorded consecutively prior to (low flow) sample collection.

Records were also noted of the groundwater odour and the presence of any product / sediment observed during sampling.

Twelve (12No.) groundwater samples were submitted to a UKAS / MCERTS accredited laboratory for the following determinants:

- Heavy Metals;
- Other inorganics (Total and Free Cyanide, Water Soluble Sulphate, Sulphide, Elemental Sulphur);
- TPHs, with aliphatic/aromatic split and carbon banding C8-C40;
- BTEX compounds;
- PAHs; and,
- Alkalinity.

The environmental analytical results are discussed within Section 7 of this report.

5.6.1. On-Site Groundwater Monitoring Results

Three (3No.) groundwater monitoring rounds were completed on 10/04/2019, 16/04/2019 and 24/04/2019. Four (4No.) boreholes were monitored, including CP1(D), CP2(D), CP3(D) and CP4(D); the details of groundwater depths are included in Table 5.2 below.

Table 5.2: Encountered Groundwater Depths

Borehole Location	Topographic Level (m AOD)	Round 1 - Groundwater Level		Round 2 - Groundwater Level		Round 3 - Groundwater Level	
		m bgl	m AOD	m bgl	m AOD	m bgl	m AOD
CP1(D) – Area 1	5.043	4.000	1.043	3.650	1.393	4.080	0.963
CP2(D) – Area 1	5.252	4.130	1.122	3.860	1.392	4.210	1.042
CP3(D) – Area 2	5.960	4.790	1.170	4.645	1.315	4.890	1.070
CP4(S) – Area 2	8.041	6.740	1.301	6.780	1.261	6.900	1.141
CP4(D) – Area 2	8.041	6.810	1.231	6.730	1.311	6.900	1.141

(S) – shallow monitoring standpipe (ground gas monitoring purposes)
(D) – deep monitoring standpipe (gas and groundwater monitoring purposes)

During the monitoring rounds, the average groundwater depths encountered across site were recorded between 1.133 and 1.234m AOD. The depth of the groundwater varied slightly during the monitoring visits indicating some tidal influence from the adjacent Thames Estuary. During groundwater monitoring no visible free product was identified or detected with the monitoring equipment.

Groundwater flow direction is inferred in a north east direction towards the River Thames.

The on-site groundwater monitoring data recorded concentrations of Dissolved Oxygen 'DO' within the boreholes ranging between 5.76 mg/l and 11.10 mg/l. The Reduction Potential 'ORP' was between 162.6 mV and 218.9 mV. The Electrical Conductivity 'SPC' was recorded between 1050 µS/cm and 2491 µS/cm. The pH was recorded between 7.02 and 7.20. The temperature of the water was recorded between 12.6 °C and 13.7 °C.

A full set of the on-site groundwater monitoring data is included within Appendix V.

5.7. Ground Gas Monitoring

Four (4No.) rounds of ground gas monitoring were completed on a weekly basis between 10/04/2019 and 01/05/2019 within all boreholes (CP1-CP4) at both high and low barometric pressure conditions. Ground gas monitoring was undertaken to assess potential methane (CH₄) and carbon dioxide (CO₂) gas concentrations.

The gas monitoring rounds were conducted using an infrared GA5000 landfill gas analyser, with internal flow-pod. Flow measurements were taken at 15 second intervals, followed by the monitoring of carbon dioxide (CO₂), methane (CH₄), oxygen (O₂), carbon monoxide (CO) and hydrogen sulphide (H₂S) concentrations at timed intervals of 0, 15, 30, 60, 90, 120, 180, 240 and 300 seconds respectively.

Atmospheric pressure and relative pressure were recorded at each location.

Table 5.1 (Section 5.2 above) details the gas and groundwater monitoring wells installed and monitored by Ecologia, illustrating the response zones. Table 5.3 below details the dates of the monitoring rounds completed and the boreholes monitored.

Figure 1 details the proposed re-development plan for the site, whilst Figure 3 details the locations of the monitoring wells. Geological borehole logs are included within Appendix IV and the on-site gas monitoring data is included within Appendix V.

Table 5.3: Ecologia Gas Monitoring (Rounds 1 – 4)

Gas Round No.	Date of Visit	Atmospheric Pressure (mbar)	Boreholes Monitored
1	10/04/2019	1020 – 1021	CP1(S), CP1(D), CP2(S), CP2(D), CP3(S), CP3(D), CP4(S) and CP4(D)
2	16/04/2019	1016 – 1017	CP1(S), CP1(D), CP2(S), CP2(D), CP3(S), CP3(D), CP4(S) and CP4(D)
3	24/04/2019	994	CP1(S), CP1(D), CP2(S), CP2(D), CP3(S), CP3(D), CP4(S) and CP4(D)
4	01/05/2019	1020	CP1(S), CP1(D), CP2(S), CP2(D), CP3(S), CP3(D), CP4(S) and CP4(D)
(S) – shallow monitoring standpipe (ground gas monitoring purposes)			
(D) – deep monitoring standpipe (gas and groundwater monitoring purposes)			

5.7.1. Ground Gas Summary Results

Following completion of the ground gas monitoring rounds, the following conditions are noted:

- Carbon Dioxide (CO₂) concentrations ranged between 0.0% and 1.4%;
- Methane (CH₄) concentrations were 0.0% in all monitoring rounds;
- Carbon Monoxide (CO) concentrations ranged between 0ppm and 6ppm; and,
- Hydrogen Sulphide (H₂S) concentrations ranged between 0ppm and 1ppm.

The maximum concentrations observed during the gas monitoring works are detailed in Table 5.4 overleaf. A full set of the on-site gas monitoring data is included within Appendix V.

Table 5.4: Summary of Gas Monitoring Data (Rounds 1 - 4)

Borehole	Area	Peak CH ₄ % (v/v)	Peak CO ₂ % (v/v)	Peak CO ppm	Peak H ₂ S ppm
CP1 (S)	Area 1	0.0	0.7	1	1
CP1 (D)		0.0	0.6	1	1
CP2 (S)		0.0	1.4	1	1
CP2 (D)		0.0	0.8	1	1
CP3 (S)	Area 2	0.0	0.5	1	1
CP3 (D)		0.0	0.2	1	1
CP4 (S)		0.0	0.7	1	1
CP4 (D)		0.0	1.2	6	1
(S) – shallow monitoring standpipe (ground gas monitoring purposes)					
(D) – deep monitoring standpipe (gas and groundwater monitoring purposes)					

6. Ground Gas Risk Assessment

Due to the proposed final end use of the site being high-rise residential units with public amenity areas, the Situation A - Wilson & Card Classification System^(Ref.11) has been used for the ground gas risk assessment.

The ground gas risk assessment herein has been undertaken, based on the following published literature guidance:

- CIRIA C665, 2007 'Assessing risks posed by hazardous ground gases to buildings'^(Ref.11).
- BS 8485:2015 + A1:2019 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'^(Ref.12).
- NHBC, 2007 'Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present'^(Ref.13).
- CIRIA C682. (2009). The VOCs Handbook. 'Investigating, assessing and managing risks from inhalation of VOCs at land affected by contamination'^(Ref.14).
- CIRIA C716. (2012). 'Remediating and mitigating risks from volatile organic compound (VOC) vapours from land affected by contamination'^(Ref.15).
- BRE 414. (2001). 'Protective measures for housing on gas contaminated land'^(Ref.16).
- BSI. (2013). 'BS 8576: Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs)'^(Ref.17).
- CL:AIRE Research Bulletin TB17, 2018 'Ground Gas Monitoring and the Lines of Evidence Approach to Risk Assessment'^(Ref.18).
- HSE. (2013). 'EH40/2005 Workplace exposure limits'^(Ref.19).

6.1. Situation A – Wilson and Card Classification System

This system incorporates all buildings / properties not described as low-rise housing and is therefore appropriate to characterise the gas regime for the proposed high-rise properties and commercial areas on site. This is a risk-based approach that is designed to identify the most suitable gas protection measures based on both gas concentrations and borehole flow rates to define a Characteristic Situation. A Gas Screening Value (GSV)^(Ref.11) was calculated for CO₂ and CH₄ based on the worst-case flow rate and concentration.

Overall, a Characteristic Situation 1 was calculated for both Areas 1 and 2, indicating that no special gas protection measures are required in the building structures^(Ref.12). The results of the screening / calculations for Areas 1 and 2 are detailed in Tables 6.1 and 6.2 respectively. Full details of these calculations can be found in Appendix VI.

Ground gas monitoring included one visit carried out during worst case conditions (low atmospheric conditions i.e. <1,000mb)^(Ref.18). PID readings ranged between 0.0 and 1.1ppm across the rounds.

A maximum CO concentration of 6ppm was recorded in borehole CP4(D) with no exceedances of either the long-term or short-term Occupational Exposure Limit (OEL) of 232ppm and 30ppm^(Ref.19) respectively.

A maximum H₂S concentration of 1ppm was recorded during the ground gas monitoring with no exceedances of either the time weighted average (TWA) of 5ppm or short-term Occupational Exposure Limit (OEL) of 10ppm^(Ref.19).

Table 6.1: Summary of Ecologia's GSV's & Characteristic Situation for Area 1

Borehole	Area	Atm. Pressure (mbar)	Max Flow (l/hr) #	Carbon Dioxide		Methane	
				Max Steady (%v/v)	GSV (l/hr)	Max Peak (%v/v)	GSV (l/hr)
CP1(S)	Area 1	994 – 1021	0.1	0.7	0.0007	0.0	0.0000
CP1(D)		994 – 1021	0.1	0.6	0.0006	0.0	0.0000
CP2(S)		994 – 1021	0.1	1.4	0.0014	0.0	0.0000
CP3(D)		994 - 1021	0.1	0.8	0.0008	0.0	0.0000
Worst case		-	0.1	1.4	0.0014	0.0	0.0000
Characteristic Situation		GSV Threshold (l/11hr)		Calculated GSV (l/hr) *			
				Carbon Dioxide		Methane	
CS1		<0.07 Where typical CO ₂ concentrations are <5% and CH ₄ concentrations are <1 %		0.0014		0.0000	
CS2		<0.7					
CS3		<3.5					
CS4		<15					
CS5		<70					
CS6		>70					
NOTES. GSV = Max Steady Concentration (%v/v) x Max Flow (l/hr). # 0.1 is the limit of detection for the GA5000 gas analyser. * Based on the multiplication of worst case steady concentrations with worst case flow rates.							

Table 6.2: Summary of Ecologia's GSV's & Characteristic Situation for Area 2

Borehole	Area	Atm. Pressure (mbar)	Max Flow (l/hr) #	Carbon Dioxide		Methane	
				Max Steady (%v/v)	GSV (l/hr)	Max Peak (%v/v)	GSV (l/hr)
CP3(S)	Area 2	994 - 1021	0.1	0.5	0.0005	0.0	0.0000
CP3(D)		994 - 1021	0.1	0.1	0.0001	0.0	0.0000
CP4(S)		994 - 1021	0.1	0.6	0.0006	0.0	0.0000
CP4(D)		994 - 1021	0.1	1.2	0.0012	0.0	0.0000
Worst case		-	0.1	1.2	0.0012	0.0	0.0000
Characteristic Situation		GSV Threshold (l/11hr)		Calculated GSV (l/hr) *			
				Carbon Dioxide		Methane	
CS1		<0.07 Where typical CO ₂ concentrations are <5% and CH ₄ concentrations are <1 %		0.0012		0.0000	
CS2		<0.7					
CS3		<3.5					
CS4		<15					
CS5		<70					
CS6		>70					
NOTES: GSV = Max Steady Concentration (%v/v) x Max Flow (l/hr). # 0.1 is the limit of detection for the GA5000 gas analyser. * Based on the multiplication of worst case steady concentrations with worst case flow rates.							

7. Generic Quantitative Risk Assessment (GQRA)

The GQRA has been undertaken in accordance with the tiered approach to risk assessment as outlined in the model procedures for management of land contamination CLR 11^(Ref.1).

7.1. Human Health

7.1.1. Methodology

In order to assess potential human health risks from potential contaminant concentrations in the soil, the laboratory analytical results have been compared against Ecologia's Generic Assessment Criteria (GAC) as an initial screen (included as Appendix VII). These are based on a 'minimum risk' approach described in the SR2 framework^(Ref.20) which has been adhered to. The selected screening criteria are based on, in order of preference:

- The Environment Agency Soil Guideline Values (SGV's) and toxicological reports.
- Where SGV's are not available, Ecologia derived Suitable for Use Levels (S4ULs) calculated using the Contaminated Land Exposure Assessment (CLEA)^(Ref.21) model and input parameters from guidance published by the Environment Agency (SR3) and SP1010 C4SL's^(Ref.22) have been selected.

However, in the case of lead (a contaminant without a published minimum risk number), the Category 4 Screening Level (C4SL) has been selected for use in the assessment herein.

Given that the proposed end-use of the land in question is to comprise residential units without gardens, GACs for residential land-use without home grown produce have been selected as screening criteria for the laboratory results.

An average percentage soil organic matter (SOM) content of 1.84% was calculated from the site analytical results therefore 1% SOM criteria have been selected to screen soils.

7.1.2. Soil Assessment

The analytical results are compared against the relevant GAC and summarised in Table 7.1. A full table of the results screened against the GAC is included in Appendix VIII. The laboratory analytical certificates are included as Appendix IX.

Where exceedances have been identified, these have been highlighted on Figure 4 within Appendix I.

Table 7.1: Residential (without Home Grown Produce) GAC Soil Results Screen

Determinant	Units	No. Tests	Max Value	Location of Max Value	GAC	No. Exceedances
pH	pH	10	10.8	TP4 (Area 1)	NA ^{Note.2}	NA
Fraction Organic Carbon (FOC)	%	10	0.031	TP1 (Area 1)	NA	NA
Asbestos in Soil Screen & fibre content	% w/w	10	0.084	TP1 (Area 1)	Positive detection	4
Cyanide (free)	mg/kg	10	< 1	NA	NA	0
Arsenic	mg/kg	10	110	TP3 (Area 1)	35	2
Beryllium	mg/kg	10	3.1	TP3 (Area 1)	1.7	1

Determinant			Units	No. Tests	Max Value	Location of Max Value	GAC	No. Exceedances
Boron (water soluble)			mg/kg	10	7.2	TP3 (Area 1)	11000	0
Cadmium			mg/kg	10	8.4	TP3 (Area 1)	85	0
Chromium (hexavalent)			mg/kg	10	< 4.0	NA	4	0
Chromium (III)			mg/kg	10	110	TP1 (Area 1)	886	0
Copper			mg/kg	10	13000	TP3 (Area 1)	7100	1
Lead			mg/kg	10	3800	TP3 (Area 1)	310	3
Mercury (Inorganic) ^{Note.1}			mg/kg	10	< 0.3	NA	240	0
Nickel			mg/kg	10	220	TP3 (Area 1)	180	1
Selenium			mg/kg	10	2.6	TP11 (Area 2)	600	0
Vanadium			mg/kg	10	330	TP1 (Area 1)	1200	0
Zinc			mg/kg	10	3800	TP3 (Area 1)	40000	0
Benzene			mg/kg	10	< 1.0	NA	0.27	0
Toluene			mg/kg	10	< 1.0	NA	610	0
Ethylbenzene			mg/kg	10	< 1.0	NA	170	0
p & m-xylene			mg/kg	10	< 1.0	NA	53	0
o-xylene			mg/kg	10	< 1.0	NA		0
TPH	Aliphatic	>EC5 - EC6	mg/kg	10	< 0.001	NA	42	0
		>EC6 - EC8	mg/kg	10	< 0.001	NA	100	0
		>EC8 - EC10	mg/kg	10	< 0.001	NA	27	0
		>EC10 - EC12	mg/kg	10	4.1	TP16 (Area 2)	130	0
		>EC12 - EC16	mg/kg	10	46	TP4 (Area 1)	1100	0
		>EC16 - EC21	mg/kg	10	92	TP4 (Area 1)	65000	0
		>EC21 - EC35	mg/kg	10	490	TP1 (Area 1)		0
	Aromatic	>EC5 - EC7	mg/kg	10	< 0.001	NA	370	0
		>EC7 - EC8	mg/kg	10	< 0.001	NA	860	0
		>EC8 - EC10	mg/kg	10	< 0.001	NA	47	0
		>EC10 - EC12	mg/kg	10	< 1.0	NA	250	0
		>EC12 - EC16	mg/kg	10	22	TP4 (Area 1)	1800	0
		>EC16 - EC21	mg/kg	10	93	TP4 (Area 1)	1900	0
		>EC21 - EC35	mg/kg	10	380	TP1 (Area 1)	1900	0
Total Phenols (monohydric)			mg/kg	10	< 1.0	NA	310	0
Naphthalene			mg/kg	10	0.6	TP1 (Area 1)	2.3	0
Acenaphthylene			mg/kg	10	< 0.05	NA	2900	0
Acenaphthene			mg/kg	10	0.42	TP12 (Area 2)	3000	0
Fluorene			mg/kg	10	0.52	TP12 (Area 2)	2800	0
Phenanthrene			mg/kg	10	6	TP12 (Area 2)	1300	0
Anthracene			mg/kg	10	1.3	TP12 (Area 2)	31000	0
Fluoranthene			mg/kg	10	10	TP1 (Area 1)	1500	0
Pyrene			mg/kg	10	8.7	TP1 (Area 1)	3700	0
Benzo(a)anthracene			mg/kg	10	5.6	TP1 (Area 1)	11	0
Chrysene			mg/kg	10	5.2	TP1 (Area 1)	30	0
Benzo(b)fluoranthene			mg/kg	10	6.4	TP1 (Area 1)	3.9	3
Benzo(k)fluoranthene			mg/kg	10	2.8	TP1 (Area 1)	110	0
Benzo(a)pyrene			mg/kg	10	5.4	TP1 (Area 1)	3.2	3
Indeno(1,2,3-cd)pyrene			mg/kg	10	2.7	TP1 (Area 1)	45	0

Determinant	Units	No. Tests	Max Value	Location of Max Value	GAC	No. Exceedances
Dibenz(a,h)anthracene	mg/kg	10	0.54	TP1 (Area 1)	0.31	4
Benzo(ghi)perylene	mg/kg	10	3.5	TP1 (Area 1)	360	0
Speciated Total EPA-16 PAHs	mg/kg	10	58.2	TP1 (Area 1)	NA	NA
Notes: 1. Mercury is given as three forms, Elemental Mercury, Inorganic Mercury and Methyl-Mercury. In accordance with SGV guidance for mercury, for general surface contamination the SGVs for inorganic mercury can be compared with chemical analysis for total mercury. However, it should be considered whether elemental mercury is likely to have been introduced to the soil by anthropogenic activity at the preliminary stage of risk assessment. Elemental mercury may be present due to historical use of the land. 2. NA - Not Applicable.						

7.1.3. Results Discussion

Asbestos Screening and Identification

All samples were screened for asbestos fibres. Four (4No.) samples returned a positive identification within the soil, including:

- TP1 (0.40 - 0.60 mbgl) – Chrysotile, Amosite & Crocidolite, 0.084% (Area 1);
- TP3 (1.50 - 2.00 mbgl) – Chrysotile & Amosite, 0.041% (Area 1);
- TP4 (0.30 - 0.50 mbgl) – Chrysotile & Amosite, 0.01% (Area 1); and,
- TP12 (0.50 - 0.08 mbgl) – Chrysotile, <0.001% (Area 2).

Overall for Area 1, small asbestos fragments of cement sheeting were visually identified on the surface ground level and within the soils of trial pits TP1 and TP4 (Area 1). Subsequent laboratory analysis confirmed low - moderate levels of asbestos fibres (<0.1%) in the Made Ground of the three (3No.) trial pits tested.

Overall for Area 2, no visible asbestos was identified during the works. Subsequent laboratory analysis did however confirm low fibre content (<0.001%) in one (1No.) of the Made Ground soil samples tested.

Heavy Metals

Several exceedances were identified (Area 1 only) when compared to the selected GAC, including:

- Arsenic exceedances above the GAC of 35 mg/kg were identified within two (2No.) trial pits on Area 1. Exceedances were identified in Made Ground samples from TP1 (0.40 – 0.60 mbgl) with a concentration of 53 mg/kg and in TP3 (1.50 – 2.00 mbgl) with a concentration of 110 mg/kg.
- Beryllium exceedance above the GAC of 1.7 mg/kg was identified in one (1No.) trial pit on Area 1. The exceedance was identified in the Made Ground sample from TP3 (1.50 – 2.00 mbgl) with a concentration of 3.1 mg/kg.
- Copper exceedance above the GAC of 7,100 mg/kg was identified in one (1No.) trial pit on Area 1. The exceedance was identified in the Made Ground sample from TP3 (1.50 – 2.00 mbgl) with a concentration of 13,000 mg/kg.
- Lead exceedances were identified above the GAC of 310 mg/kg in three (3No.) trial pits on Area 1. The exceedances were identified in the Made Ground samples from

TP1 (0.40 – 0.60 mbgl) with a concentration of 770 mg/kg, in TP3 (1.50 – 2.00 mbgl) with a concentration of 3,800 mg/kg and in TP4 (0.30 – 0.50 mbgl) with a concentration of 1,200 mg/kg.

- Nickel exceedance above the GAC of 180 mg/kg was identified in one (1No.) trial pit on Area 1. The exceedance was identified in the Made Ground sample from TP3 (1.50 – 2.00 mbgl) with a concentration of 220 mg/kg.

TPH, BTEX & Phenols

All the results were recorded below the respective GAC and laboratory limit of detection (LOD) for TPH, BTEX and total phenols (monohydric).

PAHs

Several exceedances were identified (mainly for Area 1) when compared to the selected GAC, including:

- Benzo(b)fluoranthene exceedances were identified above the GAC of 3.9 mg/kg in three (3No.) trial pits on Area 1. The exceedances were identified in the Made Ground samples from TP1 (0.40 – 0.60 mbgl) with a concentration of 6.4 mg/kg, in TP3 (1.50 – 2.00 mbgl) with a concentration of 5.3 mg/kg and in TP4 (0.30 – 0.50 mbgl) with a concentration of 5.6 mg/kg.
- Benzo(a)pyrene exceedances were identified above the GAC of 3.2 mg/kg in three (3No.) trial pits on Area 1. The exceedances were identified in the Made Ground samples from TP1 (0.40 – 0.60 mbgl) with a concentration of 5.4 mg/kg, in TP3 (1.50 – 2.00 mbgl) with a concentration of 4.4 mg/kg and in TP4 (0.30 – 0.50 mbgl) with a concentration of 4.5 mg/kg.
- Dibenzo(a,h)anthracene exceedances were identified above the GAC of 0.31 mg/kg in three (3No.) trial pits on Area 1 and one (1No.) trial pit on Area 2. The exceedances were identified in the Made Ground samples from TP1 (0.40 – 0.60 mbgl) with a concentration of 0.54 mg/kg, in TP3 (1.50 – 2.00 mbgl) with a concentration of 0.53 mg/kg, in TP4 (0.30 – 0.50 mbgl) with a concentration of 0.43 mg/kg and in TP12 (0.50 – 0.80 mbgl) with a concentration of 0.36 mg/kg.

Summary

Overall, the majority of elevated concentrations appears to be on Area 1 when compared against GAC for a residential end use without gardens. Similar Made Ground soils were present across Area 1; therefore, it is considered likely that contamination levels will be uniform throughout.

7.2. Controlled Waters

7.2.1. Methodology

An assessment of the laboratory results for the soil leachate and groundwater analysis have been undertaken in relation to the relevant Water Quality Standards (WQS).

Due to the fact that the site is situated alongside the River Thames and located on a Principal Aquifer, the results have been screened against both the current surface water Environmental Quality Standard (EQS) for rivers and lakes and also Drinking Water Standards (DWS) to identify potential exceedances.

7.2.2. Soil Leachate Assessment

Exceedances identified from the screening process for both EQS and DWS are highlighted in Tables 7.2 and 7.3 below. The laboratory screening results are included in Appendix VIII and full analytical certificates are attached in Appendix IX.

Table 7.2: Environmental Quality Standard (EQS) Soil Leachate Results Screen

Determinant	Units	No. of Tests	Max Value	Location of Max Value	EQS	No. of Exceedances
Cadmium	µg/l	7	0.19	TP3 (Area 1)	0.08	1
Copper	µg/l	7	290	TP4 (Area 1)	1	7
Nickel	µg/l	7	4.9	TP3 (Area 1)	4	1
Lead	µg/l	7	4.8	TP4 (Area 1)	1.2	6
Zinc	µg/l	7	65	TP3 (Area 1)	10.9	1
Chromium (hexavalent)	µg/l	7	14	TP4 (Area 1)	3.4	7
Mercury	µg/l	7	<0.5	All	0.07	7
Total Phenols (monohydric)	µg/l	7	<10	All	7.7	7
Total Cyanide	µg/l	7	<10	All	1	7
Anthracene	µg/l	7	1.4	TP1 (Area 1)	0.1	2
Fluoranthene	µg/l	7	3.2	TP1 (Area 1)	0.0063	7
Benzo(a)pyrene	µg/l	7	2.6	TP1 (Area 1)	0.00017	7

Table 7.3: Drinking Water Standard (DWS) Soil Leachate Results Screen

Determinant	Units	No. of Tests	Max Value	Location of Max Value	DWS	No. of Exceedances
Benzo(a)pyrene	µg/l	7	2.6	TP1 (Area 1)	0.01	2
Total EPA-16 PAHs*	µg/l	7	32	TP1 (Area 1)	0.1	7

**Directive requirements at consumers' taps of the sum of the specified compounds: benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene.*

7.2.3. Soil Leachate Results Discussion

Heavy Metals

Several exceedances for heavy metals were reported when compared to current standards:

- Copper exceedances were recorded in the majority of samples above the EQS of 1 µg/l. The maximum concentration was recorded in TP4 at 0.30 – 0.50 mbgl (290 µg/l) with the remainder of results being below 22 µg/l. The DWS for Copper is 2,000 µg/l, therefore, the results obtained for this parameter do not appear significant. Further bio-availability assessment may be required.
- Lead exceedances were recorded in the majority of samples above the EQS of 1.2 µg/l. The maximum concentration was recorded in CP3 at 3.00 mbgl (5.4 µg/l). The DWS for Lead is 10 µg/l; therefore, these results do not appear significant. Further bio-availability assessment may be required.
- Chromium VI concentrations were recorded in all samples above the EQS of 3.4 µg/l. The maximum concentration was recorded in TP4 at 0.30 – 0.50 mbgl (14 µg/l) with the remainder of results all below the LOD of 5 µg/l. The DWS for Chromium VI is 50

µg/l; therefore, these results do not appear significant. However, further assessment may be required.

- Cadmium exceedance was identified in one (1No.) sample from TP3 at 1.50 - 2.00 mbgl. A value of 0.19 µg/l was identified above the EQS of 0.08 µg/l. The remainder of samples were all below the LOD. The DWS for Cadmium is 5 µg/l, therefore, this result does not appear significant.
- Total Cyanide was identified below detection limits in the majority of samples except for TP4 at 0.30 – 0.50 mbgl. A value of 12 µg/l was identified above the EQS of 1 µg/l. The remainder of samples were all below the LOD. The DWS for Total Cyanide is 50 µg/l, therefore, this result does not appear significant.
- Nickel exceedance was identified in one (1No.) sample from TP3 at 1.50 – 2.00 mbgl. A value of 4.9 µg/l was identified above the EQS of 4 µg/l. The DWS for Nickel is 20 µg/l; therefore, this slight exceedance does not appear significant. However, further bio-availability assessment may be required.
- Zinc exceedance was identified in one (1No.) sample from TP3 at 1.50 – 2.00 mbgl. A value of 65 µg/l was identified above the EQS of 10.9 µg/l. No DWS exists for Zinc.
- Mercury is identified below LOD in all samples, however, the selected EQS is particularly stringent and is lower than the limit of detection (EQS of 0.07 µg/l against a detection limit of 0.5 µg/l). The DWS for Mercury is 1 µg/l; all concentrations are recorded below this value; therefore, these results do not appear significant.

TPH, BTEX & Total Phenols

The results indicate the majority of TPH concentrations are below the LOD with the exception of TP1 (0.40 – 0.60 mbgl) with a concentration of 21 µg/l in the aromatic carbon band >C21 – C31.

The results indicate all BTEX compounds are below the LOD.

Although the EQS for total phenol is set at 7.7 µg/l, the results indicate all samples are below the laboratory LOD and, therefore, not considered further. No DWS exists for total phenols.

PAHs

Several exceedances for PAHs were reported when compared to current standards:

- Anthracene exceedances were identified in two (2No.) Made Ground samples from Area 1, including TP1 at 0.40 – 0.6 mbgl (1.4 µg/l) and TP4 at 0.30 – 0.50 mbgl (0.22 µg/l) above the EQS of 0.1 µg/l. No DWS exists for Anthracene.
- Fluoranthene exceedances were identified in all samples due to the LOD being set at 0.01 µg/l and EQS target being particularly stringent at 0.0063 µg/l. Samples which exceeded the LOD include TP1 at 0.40 – 0.6 mbgl (3.2 µg/l) and TP4 at 0.30 – 0.50 mbgl (0.97 µg/l). No DWS exists for Fluoranthene.
- Benzo(a)pyrene exceedances were identified in all samples due to the LOD being set at 0.01 µg/l and EQS target being particularly stringent at 0.00017 µg/l. Samples which exceeded the LOD include TP1 at 0.40 – 0.6 mbgl (2.6 µg/l) and TP4 at 0.30 – 0.50 mbgl (0.97 µg/l). The DWS for Benzo(a)pyrene is 0.01 µg/l.
- Total EPA-16 PAHs exceedances were identified for two (2No.) Made Ground samples from Area 1, including TP1 at 0.40 – 0.6 mbgl (32 µg/l) and TP4 at 0.30 – 0.50 mbgl (11 µg/l) above the DWS of 0.1 µg/l. No EQS exists for Total EPA-16 PAHs.

Summary

Overall for Area 1, leachate laboratory analysis revealed predominantly low contaminations with some exceedances for PAHs and heavy metals (namely, copper, nickel, lead, zinc, and chromium VI) in all samples when compared to current EQS, protective of the nearby surface waters, which are particularly stringent. When compared against current DWS, protective of the underlying aquifer, only minor PAH exceedances were identified.

Overall for Area 2, leachate laboratory analysis revealed minor exceedances for heavy metals (namely copper and lead) when compared to EQS. No exceedances were identified when compared against DWS.

Further risk assessment may be required due to proximity to controlled water resources (River Thames and underlying Principal Aquifer).

7.2.4. Groundwater Assessment

Groundwater exceedances identified from the screening process against both EQS and DWS are highlighted in Tables 7.4 and 7.5 below. The laboratory screening results are included in Appendix VIII and full analytical certificates are attached in Appendix IX.

Table 7.4: Environmental Quality Standard (EQS) Groundwater Results Screen

Determinant	Units	No. of tests	Max Value	Location of Max Value	EQS	No. of Exceedances
Copper	µg/l	12	7.8	TP1 (Area 1)	1	9
Zinc	µg/l	12	12	TP4 (Area 1)	10.9	1
Chromium (hexavalent)	µg/l	12	<5	All	3.4	12
Total Phenols (monohydric)	µg/l	12	<10	All	7.7	12
Total Cyanide	µg/l	12	<10	All	1	12
Fluoranthene	µg/l	12	<0.01	All	0.0063	12
Benzo(a)pyrene	µg/l	12	<0.01	All	0.00017	12

Table 7.5: Drinking Water Standard (DWS) Groundwater Results Screen

Determinant	Units	No. of tests	Max Value	Location of Max Value	DWS	No. of Exceedances
Selenium	µg/l	12	11	CP1 (Area 2)	10	1
Total EPA-16 PAHs*	µg/l	12	<0.16	All	0.1	12

**Directive requirements at consumers' taps of the sum of the specified compounds: benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene.*

7.2.5. Groundwater Results Discussion

Heavy Metals

Several exceedances for heavy metals were reported when compared to current standards:

- Copper exceedances were recorded in the majority of samples above the EQS of 1 µg/l; the maximum concentration was recorded in CP1 (round 1, Area 1) with a value of 7.8 µg/l. The DWS for Copper is 2,000 µg/l, therefore, the results obtained for this

parameter do not appear significant. Further bio-availability assessment may be required.

- Chromium VI concentrations were recorded in all samples above the EQS of 3.4 µg/l; all results were, however, below the LOD of 5 µg/l. The DWS for Chromium VI is 50 µg/l; therefore, these results do not appear significant.
- Total Cyanide was recorded in all samples above the EQS of 1 µg/l; all results were, however, below the LOD of 10 µg/l. The DWS for Total Cyanide is 50 µg/l, therefore, these results do not appear significant.
- Slight exceedance of Selenium was identified in one (1No.) sample from CP1 (round 2, Area 1). A value of 11 µg/l was identified above the DWS of 10 µg/l. No EQS target exists for Selenium.
- Slight exceedance of Zinc was identified in one (1No.) sample from CP4 (round 1, Area 2). A value of 12 µg/l was identified above the EQS of 10.9 µg/l. No DWS exists for Zinc.

TPH, BTEX & Total Phenols

The results indicate all BTEX compounds and TPH concentrations are below the LOD.

Although the EQS for total phenol is set at 7.7 µg/l, the results indicate all samples are below the laboratory LOD and therefore not considered further. No DWS exists for total phenols.

PAHs

Some minor exceedances for PAHs were reported when compared to current standards:

- Fluoranthene exceedances were identified in all samples due to the LOD being set at 0.01 µg/l and EQS target being particularly stringent at 0.0063 µg/l. All samples were below the LOD. No target exists for DWS; therefore, these results do not appear to be significant.
- Benzo(a)pyrene exceedances were identified in all samples due to the LOD being set at 0.01 µg/l and EQS target being particularly stringent at 0.00017 µg/l. All results were below the LOD. The DWS for Benzo(a)pyrene is 0.01 µg/l; therefore, these results do not appear to be significant.
- Total EPA-16 PAHs exceedances were identified for all samples when compared against the DWS of 0.1 µg/l. All samples were, however, below the LOD which is set at 0.01 µg/l. No EQS exists for Total EPA-16 PAHs; therefore, these results do not appear to be significant.

Summary

Overall, groundwater concentrations appear to be low, however, further monitoring and assessment may be required due to controlled water sensitivity (Principal Aquifer and River Thames).

7.3. Preliminary Waste Assessment

Ecologia have completed a Waste Classification Report to identify non-hazardous and hazardous materials on site, following receipt of site investigation laboratory results.

Results of the assessment revealed that the all Made Ground samples on Area 1 are classified as hazardous (EWC 17 05 03) based on the concentrations of copper, lead and zinc.

All results across Area 2 are classified as non-hazardous (EWC 17 05 04).

The assessment is dated 13th June 2019 and is contained within Appendix X.

8. Outline Conceptual Site Model (CSM)

8.1. Introduction

This outline Conceptual Site Model (CSM) has been developed cognisant of the Model Procedures for the Management of Land Contamination (CLR 11)^(Ref. 1) and follows the principle of the identification of:

Source ⇒ Pathway ⇒ Receptor.

For a potential risk to be realised all three components must be identified and a pollutant linkage established. Once a potential pollutant linkage is identified, the severity of any potential harm is assessed by a staged iterative process of initially qualitative assessment (Preliminary Risk Assessment) then numerically through Quantitative Risk Assessment (QRA).

8.2. Sources of Contamination

A source is defined as a substance which is located in, on or under the land and has the potential to cause harm to human health, water resources or the wider environment.

8.2.1. Potential On-site Sources

The site historically comprised several industrial uses, including a coal wharf, timber yard, connecting viaduct with railway lines and travelling crane, and building merchant with storage facilities.

Information collected from the intrusive site investigation identified the presence of Made Ground underlying the site, with elevated concentrations of asbestos, PAHs and Metals within the Made Ground when compared to residential GAC screening values.

The following potential on-site sources have been identified:

- Made Ground from previous site history.
 - Potential for a range of inorganic contaminants including metals, bulk asbestos containing materials and asbestos fibres in shallow soils.
 - Potential presence of hydrocarbon (TPH, BTEX, PAH) contamination from the former oil storage tank.
- Potential for ground gas (methane and carbon dioxide) associated with the presence of Made Ground and infilled ground on site.

Reference has been made at this stage to any potential sources identified following review of previous reports, potentially contaminative land uses identified from the historical review and from site investigation works undertaken.

8.2.2. Potential Off-site Sources

Potential sources of contamination have been identified within 250m of the site in connection to the following activities:

- Railway land continuing off site to the south (potential for contaminants including fuels, mineral oils, metals, ash, sulphate and VOCs).
- Backfilled quarry to the southwest of the site – potential for ground gas generation.

- Timber yard to the south east of the site – potential for contaminants including fuels, mineral oils, phenols, metals and asbestos.

8.3. Receptors

A receptor is something which could come to harm, including human health, water resources, surface water courses or the wider environment. The following potential receptors to any site-based impact have been identified:

- Human Health.
- Controlled Waters.

8.3.1. Human Health

The following potential human health receptors have been identified:

- Future Site Users comprising:
 - Residential occupants.
 - Members of the public (commercial units along the pier).
- Construction groundworkers.

8.3.2. Controlled Water

The following Controlled Waters have been identified as potential receptors:

- River Thames adjacent to the northern site boundary of Area 1.
- Principal Aquifer associated with the underlying Chalk bedrock geology.

8.3.3. Building / Infrastructure

The following property has been identified as potential receptors:

- The proposed new residential building.
- Utility infrastructure.

8.4. Pathways

A pathway is the means or route by which a source of contamination can migrate; an identified receptor can be exposed to or be affected by an identified source.

8.4.1. Human Health

Future Site Users

The identification of potential pathways has been undertaken cognisant of the Contaminated Land Exposure Assessment (CLEA) model^(Ref.21) and CIRIA guidance^(Ref.11) on ground gas risks.

A contamination pathway to the underlying shallow Made Ground currently exists on site. To mitigate this pathway and reduce the risks to future site users, it would be advisable to remove / treat any contaminated materials prior to development. Alternatively, a capping system can be installed.

Maintenance / Construction Groundworkers

Short term human health risks during groundworks as part of any redevelopment have been excluded from further consideration on the basis that risks of acute exposure can be addressed through the use of appropriate Personal Protective Equipment (PPE) and good standards of health and safety practice.

8.4.2. Controlled Waters

The Environment Agency Groundwater Protection Guides^(Ref.23) and Remedial Targets Methodology 'Hydrogeological Risk Assessment for Land Contamination'^(Ref.24) discusses potential pathways as:

- The geological and hydrogeological characteristic of the ground.
- The depth and distribution of groundwater and its direction and rates of flow.
- The attenuating properties of the soil and aquifer materials:
 - potential leaching through soils into underlying strata and aquifers from induced infiltration; and,
 - potential vertical/lateral migration of contaminants through groundwater bodies.
- Influences of preferential flow via fissures, drainage systems, soakaways, man-made structures foundations, old mines, boreholes etc.
- Surface water run-off in areas of low permeability surfacing and/or susceptible to flooding.

The site is located on the structureless Seafood Chalk Formation, which is classified as a Principal Aquifer.

8.4.3. Building / Infrastructure

Buildings and Structures

The migration via granular and / or fissured strata of ground and / or groundwater gas / vapours and their accumulation of in confined spaces to explosive limits.

Aggressive ground conditions that may influence sub surface concrete foundations.

Utility Infrastructure

Notably, aggressive ground conditions and possibility for TPH permeation of water supply pipework.

8.5. Conceptual Model Summary

The outline CSM for the site has been summarised in Table 8.1 overleaf.

The qualitative risk assessment methodology has been included within Appendix XI.

Table 8.1: Conceptual Site Model and Qualitative Risk Assessment

Potential Source	Potential Receptor	Possible Pathway	Probability	Consequences	Risk
Localised shallow Made Ground soils (inorganic and organic contaminants)	Future site users	Direct dermal contact, inhalation and ingestion.	Low Likelihood Exceedances of the GAC recorded and therefore a pollutant linkage and circumstances are possible under which an event could occur.	Medium Possibility of chronic damage to Human Health.	Moderate
			Likely Asbestos fibres in soil (Area 1) reported a maximum value of <0.084% with visual cement sheeting identified at ground level. Asbestos fibres in soil (Area 2) reported a maximum value of <0.001% in one area.	Severe Potential for significant harm to Human Health	High
		Potential permeation of plastic supply pipes.	Low Likelihood There is a pollutant linkage and circumstances are possible under which an event could occur based on historic usage. SI locations did not reveal any exceedances for TPH against the GAC.	Medium Potential chronic damage to Human Health if a risk of potential permeation of plastic supply pipes occurs.	Moderate
	Controlled Waters- Surface water & Groundwater	Leaching of dissolved phase contaminants from impacted Made Ground and migration (via recharge) / drainage network and attenuation (through aquifer)	Likely Soil leachate results have indicated some exceedances against the selected EQS / DWS. Given the close proximity of the River Thames and underlying Principal Aquifer, further risk assessment is recommended. In addition, the Groundwater vulnerability is reported to be 'High' at the site.	Medium Short term risk of pollution to water resources	Moderate
Ground Gas	Future residents	Gas accumulation in confined spaces.	Unlikely Four (4No.) rounds of gas monitoring and risk assessment works has identified a CS1 across both plots, indicating no gas measures are required.	Severe Short term risk to human health likely to result in 'significant damage'	Moderate / Low
	Buildings and structures	Potential for explosive atmospheres and asphyxiation as a result of potential ground gas generation (CH4 and CO2) and migration in granular deposits.		Severe Catastrophic damage to buildings from explosion	Moderate / Low

9. Preliminary Geotechnical Assessment

Preliminary geotechnical works have been undertaken in order to give initial outline considerations of the underlying geology and ground properties on site.

9.1. Encountered Ground Conditions

The general stratigraphic sequence encountered on site comprises Made Ground overlying bedrock comprising structureless Seaford Chalk Formation.

Made Ground varies in thickness across the site by Area. Boreholes CP1 and CP2 in Area 1 encountered 4.5m and 4.0m of Made Ground respectively, comprising soft, gravelly, cobbly and bouldery clays. Boreholes CP3 and CP4 in Area 2 encountered 4.6m and 8.1m of Made Ground respectively, comprising soft, gravelly, cobbly clay containing brick, tile and flint.

Structureless Seaford Chalk Formation bedrock was encountered at depths ranging from 4.0 mbgl to 8.10 mbgl to the base of all boreholes.

Underground obstructions were identified on Area 1, including a concrete wall extending from TP1 and TP6 at a depth of 0.6m bgl to the base. A metal obstruction was encountered at the base of TP6 (at 2.1 mbgl). Concrete was identified at the base of TP7 (depth of 1.9m bgl) with a thin concrete layer encountered in TP8 at 1.25m bgl (0.2m thick). Brick walls were identified in the central section of the plot visible from ground level and extending down to 1m bgl in TP9 and TP7. NB site investigation works were limited in terms of depth and coverage close to the site boundaries, therefore, the potential for additional structures / foundations associated with the previous viaduct should not be ruled out.

No dissolution features were encountered in the Chalk during Ecologia's works.

9.2. In-Situ Testing

9.2.1. Standard Penetration Tests

Standard Penetration Tests (SPTs) have been carried out at 1.0m intervals between 3.0m and 5.0m and 1.5m intervals thereafter on all boreholes (CP1 to CP4). No SPTs were undertaken between ground level and 3.0m depth in CP1 or CP2 as the positions were sited over former 2.5m deep trial pits.

Each test has been performed in accordance with BS1377: Part 9: 1990, for the determination of the resistance of soil (clay and sand) at the base of the borehole to the penetration of the split-barrel sampler. Where gravels or gravelly sand have been encountered, the drive shoe has been replaced by a solid 60° cone.

A total of fifty-seven (57No.) SPTs were carried out investigating all the geological strata encountered, the results of which are included in the exploratory borehole logs enclosed in Appendix IV.

9.3. Laboratory Results

For soil classification purposes, selected soil samples were sent to an independent UKAS / MCERTS accredited laboratory for the following analysis:

- 19No. Saturated Moisture Content / Intact Dry Density (SMC/IDD) of Chalk;
- 2No. Atterberg Limits; and,
- 21No. Moisture Content.

Summaries of the geotechnical laboratory results are included within Tables 9.1 and 9.2 below. Laboratory analytical certificates are included in Appendix IX.

Nineteen (19No.) SMC/IDD tests were scheduled, these results indicated that the Chalk beneath the site is generally Low Density with occasional bands of Medium and High Density Chalk.

Table 9.1: Results of Classification Based on the SMC/IDD of Chalk Tests

Sample ID	Depth (m bgl)	SMC (%)	Dry Density (Mg/m ³)	Chalk Density (CIRIA C574)
CP1	5.0-5.5	25	1.60	Medium Density
CP1	9.0-9.5	30	1.50	Low Density
CP1	13.0-13.5	29	1.51	Low Density
CP1	17.0-17.5	30	1.49	Low Density
CP1	21.0-21.5	31	1.47	Low Density
CP1	25.0	30	1.49	Low Density
CP2	8.0-8.5	31	1.46	Low Density
CP2	12.0-12.5	32	1.44	Low Density
CP2	16.0-16.5	32	1.45	Low Density
CP2	20.0	32	1.44	Low Density
CP3	7.0	27	1.55	Medium Density
CP3	11.0	32	1.45	Low Density
CP3	15.0	33	1.42	Low Density
CP3	19.0	35	1.39	Low Density
CP4	4.0	31	1.47	Low Density
CP4	10.0	32	1.45	Low Density
CP4	12.0	34	1.42	Low Density
CP4	16.0	19	1.79	High Density
CP4	20.0	38	1.34	Low Density

Table 9.2: Results Based on the Laboratory Plasticity Tests

Sample ID	Depth (m bgl)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (PI)	(*) Classification based on A-Line chart
CP1	5.0-5.5	21	32	22	10	CL
CP2	6.0-6.5	24	35	23	12	CL/CI
(*) The symbols presented in this column are subgroup symbols for laboratory identifications. CL indicates the clay is within the range of Low Plasticity. CI indicates the clay is within the range of intermediate plasticity.						

A summary of corrected SPT N-values and indicative allowable bearing capacities are provided in Table 9.3 below.

Table 9.3: Indicative Allowable Bearing Capacity

Level (m bgl)	Ground conditions	Mean corrected SPT Values*	Indicative allowable bearing pressure** (kN/m ²)
From GL to approximately 4.0-8.10m	MADE GROUND	-	NA
From approximately 4.0- 8.5m	STRUCTURELESS SEAFORD CHALK FORMATION	37	150-200
From approximately 8.5-10.0m	STRUCTURELESS SEAFORD CHALK FORMATION	23	90-110
From approximately 10.0-11.5m	STRUCTURELESS SEAFORD CHALK FORMATION	20	80-100
From approximately 11.5-13.0m	STRUCTURELESS SEAFORD CHALK FORMATION	25	100-120
From approximately 13.0-14.5m	STRUCTURELESS SEAFORD CHALK FORMATION	26	100-120
From approximately 14.5-16.0m	STRUCTURELESS SEAFORD CHALK FORMATION	35	150-180
From approximately 16.0-17.5m	STRUCTURELESS SEAFORD CHALK FORMATION	29	125-150
From approximately 17.5-19.0m	STRUCTURELESS SEAFORD CHALK FORMATION	24	90-110
From approximately 19.0-20.0m	STRUCTURELESS SEAFORD CHALK FORMATION	33	140-170
From approximately 20.5-22.0m	STRUCTURELESS SEAFORD CHALK FORMATION	25	100-120
From approximately 22.0-23.5m	STRUCTURELESS SEAFORD CHALK FORMATION	24	90-110
From approximately 23.5-25.5m	STRUCTURELESS SEAFORD CHALK FORMATION	33	140-170
*Taking into account any overburden pressure.			
** Based upon In-situ SPT N Values.			

9.4. Geotechnical Discussion

The preliminary ground investigation confirms that the area is underlain by Made Ground over bedrock geology of structureless Seaford Chalk Formation.

A summary of the field and laboratory geotechnical results is presented below:

- Made Ground beneath the site generally comprises soft, gravelly clays between 4.0m and 8.1m thick. The thickness of the Made Ground increases from 4.0-4.5m in lowest regions of the site (Area 1 and in the north of Area 2) towards the top of the slope in the south of Area 2.
- Due to the heterogeneity of the Made Ground soils across the site and soft consistency of the deposits these strata are not suitable for traditional strip or trench-fill foundations.
- A piled foundation solution extending through the Made Ground into the Chalk is recommended.
- Although there were no indications of Chalk dissolution features, the presence of such features cannot be ruled out and should be considered during the design process.

- The structureless Seaford Chalk Formation underlying the site is generally Low Density, with an indicative allowable bearing capacity of 225kN/m² (based upon CIRIA C574).
- However, correlation SPT testing within the structureless Chalk suggest that a lower bearing capacity of between 100-125kN/m² may be more likely within the Chalk between depths of 8.0-25.0m bgl and piling may not be favourable at depths shallower than 8.0m bgl.
- Plasticity index testing of two (2No.) samples of Chalk from 5.0-6.0m indicates a material of Low Plasticity.
- Groundwater was encountered in all deep boreholes. The depth of the groundwater varied slightly during the monitoring visits indicating some tidal influence from the adjacent Thames Estuary. On average, groundwater depths ranged between 1.133m AOD to 1.234m AOD.
- Based on the test results an indicative classification for buried concrete of DS1 AC-1 is considered suitable. Only one sample of the Made Ground and natural Chalk were tested for BRE SD1 criteria, therefore, this classification should be confirmed by additional testing.
- Infiltration testing has not been undertaken on the site at this stage to determine suitability of underlying strata for surface water drainage discharge. At current site levels, traditional shallow soakaways are not likely to be feasible due to the presence of deep Made Ground beneath the site.
- Deep bore soakaways are also unlikely to be feasible due the shallow and continually fluctuating groundwater table within the Chalk.

10. Summary & Recommendations

10.1. Summary

Ecologia was instructed by Quinn Estates Ltd to undertake a Geo-Environmental Assessment for Clifton Slips, West Street, Gravesend, DA11 0BW.

At this stage, the works are in support of planning conditions associated to the proposed site re-development comprising high-rise residential units without gardens and restoration of the pier to provide public amenity space.

The site is situated over bedrock geology of structureless Seaford Chalk Formation, classified as a Principal Aquifer. No superficial deposits were identified on site. Made Ground was identified across the site ranging from 4.0m in Area 1 and up to 8.1m thick in the south of Area 2.

The site historically comprised several industrial uses, including a coal wharf, timber yard, connecting viaduct with railway lines and travelling crane, and building merchant with storage facilities.

Intrusive investigations were undertaken between February and April 2019 with gas and groundwater monitoring completed between April and May 2019. Investigation works have included soil, leachate and groundwater sampling and analysis for contamination assessment purposes. Additionally, in-situ testing and laboratory analysis have been undertaken in order to provide a preliminary outline geotechnical assessment.

10.1.1. Contamination

Overall, laboratory analysis has confirmed the majority of contamination appears to be primarily in Made Ground soils on Area 1; contamination included exceedances for metals, PAHs and asbestos. However, the proposed end use with hard cover / buildings will mitigate risk to future end users. Where soft landscaped areas are proposed, an appropriate cover system is recommended.

Moderate to low exceedances were identified from leachate and groundwater laboratory analysis. Due to the sensitivity of controlled water resources (River Thames and Principal Aquifer), further monitoring and risk assessment may be required.

Results of the waste classification assessment revealed that the all Made Ground samples on Area 1 are classified as hazardous (EWC 17 05 03) based on the concentrations of copper, lead and zinc. All results across Area 2 are classified as non-hazardous (EWC 17 05 04).

10.1.2. Geotechnical

At this stage, shallow foundations (such as traditional strip or trench-fill foundations) are not considered to be appropriate based on loadings of a typical high-rise building. The bedrock (Structureless Seaford Chalk Formation) was encountered at depths of between 4.0m bgl and 8.10m bgl as such, pile depths will most likely be required at a greater depth.

Infiltration testing has not been undertaken on the site at this stage to determine suitability of underlying strata for surface water drainage discharge. At current site levels, traditional shallow soakaways are not likely to be feasible due to the presence of deep Made Ground beneath the site. Deep bore soakaways are also unlikely to be feasible due the shallow and continually fluctuating groundwater table within the Chalk. It is recommended that other drainage options are considered, such as SuDS techniques for surface waters and possible connection to existing public sewers following approval from Southern Water.

10.2. Recommendations

10.2.1. Further Works

In consideration of the Moderate Risk posed to the proposed development as reported in the outline CSM, the preparation of a Remediation Strategy is recommended.

The Remediation Strategy will delineate the best practicable techniques in order to ensure that on completion of the development works the identified relevant pollutant linkages will be addressed by either:

- removing or treating the pollutant;
- breaking or removing the pathway; and / or;
- protecting or removing the receptor.

As a minimum the Remediation Strategy is expected to comprise:

- Appropriate disposal of 'fly-tipped' material.
- Where required, excavation of Made Ground with any identified hotspot sources of contamination.
- Contamination watching brief.
- Implementation of suitable water treatment system to treat potentially contaminated perched water / groundwater on site, if encountered and identified.
- Construction of an appropriate cover system in landscaped areas (hard cover and buildings act as a capping system).
- Confirmation of gas protection requirements for proposed development.
- A discovery strategy in the event that unforeseen and suspected contamination is encountered.
- Verification process.

As a minimum it would be expected that any construction works incorporate the following:

- Appropriate personal protective equipment (PPE) for ground workers, to mitigate potential risks from dermal contact, ingestion and inhalation of materials / soils.
- Asbestos management plan: sampling of the ground before any excavation / demolition work, watch and brief of excavation, damping the spoil and excavation, dust monitoring, collection the run-off water and training of the groundworkers.
- Good housekeeping rules should also be observed on site i.e. washing of hands before eating etc. in accordance with health and safety regulations.
- A discovery strategy during re-development works in the event that unforeseen and suspected contamination is encountered, the client should stop works and further assessment undertaken by an experienced Environmental Consultant.

Additionally, if soils are to be re-used on site during future redevelopment works, this should be undertaken in accordance with a Materials Management Plan (MMP) in accordance with the CL:AIRE 'The Definition of Waste: Development Industry Code of Practice'^(Ref.25). If soils are to be removed from site due to development requirements, these should be disposed of under the appropriate duty of care.

A 'Detailed UXO Risk Assessment' is recommended prior to start of any groundworks to determine overall risk for the site and the potential for future on-site watching brief works.

Should future redevelopment proposals change, the Conceptual Site Model and qualitative risk assessment for the site updated accordingly.

10.2.2. Geotechnical

- Further investigations to determine locations and extents of historic underground structures / foundations associated with the previous viaduct. Previous site investigation works were limited in terms of depth and coverage close to the site boundaries (H&S concerns).
- Although no dissolution features were encountered during Ecologia's works, a watching brief or geophysical scan may be required prior / during construction works on site.
- Further geotechnical investigations to inform detailed foundation design are likely to be required (most notably for piling design). Due to the variation in the bearing capacity of the Seaford Chalk Formation further assessment will be required to determine if the thickness of the Structureless Chalk is constant across site or if the possibility of using shorter length piles can be considered.

11. References

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APPENDIX I

FIGURES

Gravesham Borough Council

Legend

INDICATIVE



Title:
Proposed
Development Plan

Site:
Clifton Slips
West Street
Gravesend
Kent
DA11 0BW

Date:
13/06/2019

Scale / Paper:
NTS / A4

Version:
1

Figure:
1

Drawn by:
N/A

Checked by:
N/A



0 5 10 20 30m

CLIFTON SLIPWAYS, GRAVESEND
GENERAL ARRANGEMENT PLANS

This drawing is the copyright of Guy Holloway and shall not be used in any other project without the written consent of Guy Holloway. All dimensions are to be checked on site before construction and the Architect shall be notified of any discrepancy. Do not scale from this drawing.



Project | Clifton Slipways
Gravesend, Kent
Client | Quare Estate
Title | General Arrangement Plans - Typical Level
Status | PLANNING
Scale | 1:500 Date | Jan 2019 Drawn | LC
Checked | JAR

guy holloway
ARCHITECTS
11-145 Old Kent Road, London SE16 1JL
Tel: 020 7461 1111 Fax: 020 7461 1112
Email: info@guyholloway.co.uk Website: www.guyholloway.co.uk
Drawing Number
18.137
Rev Number

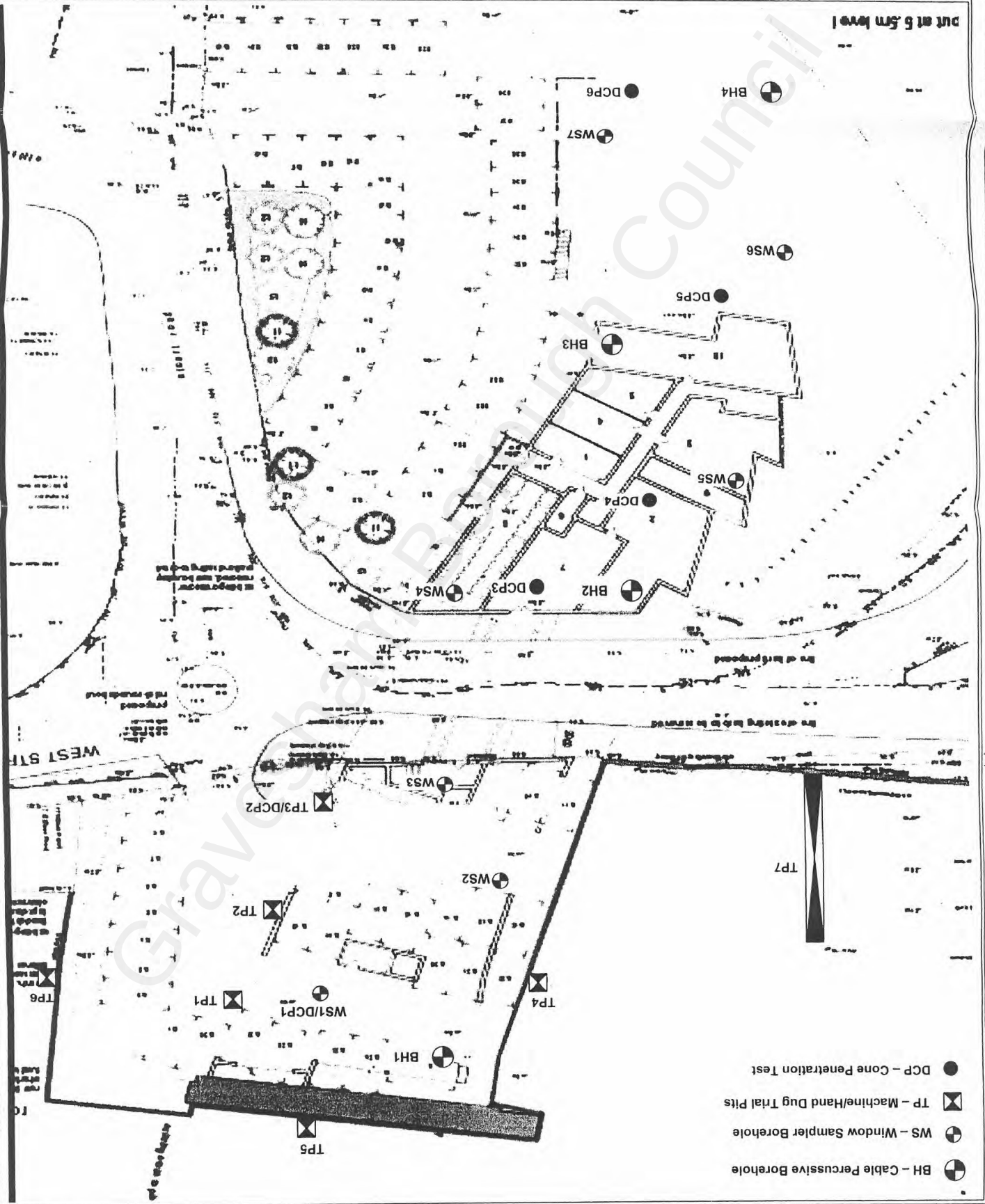
SITE LAYOUT PLAN

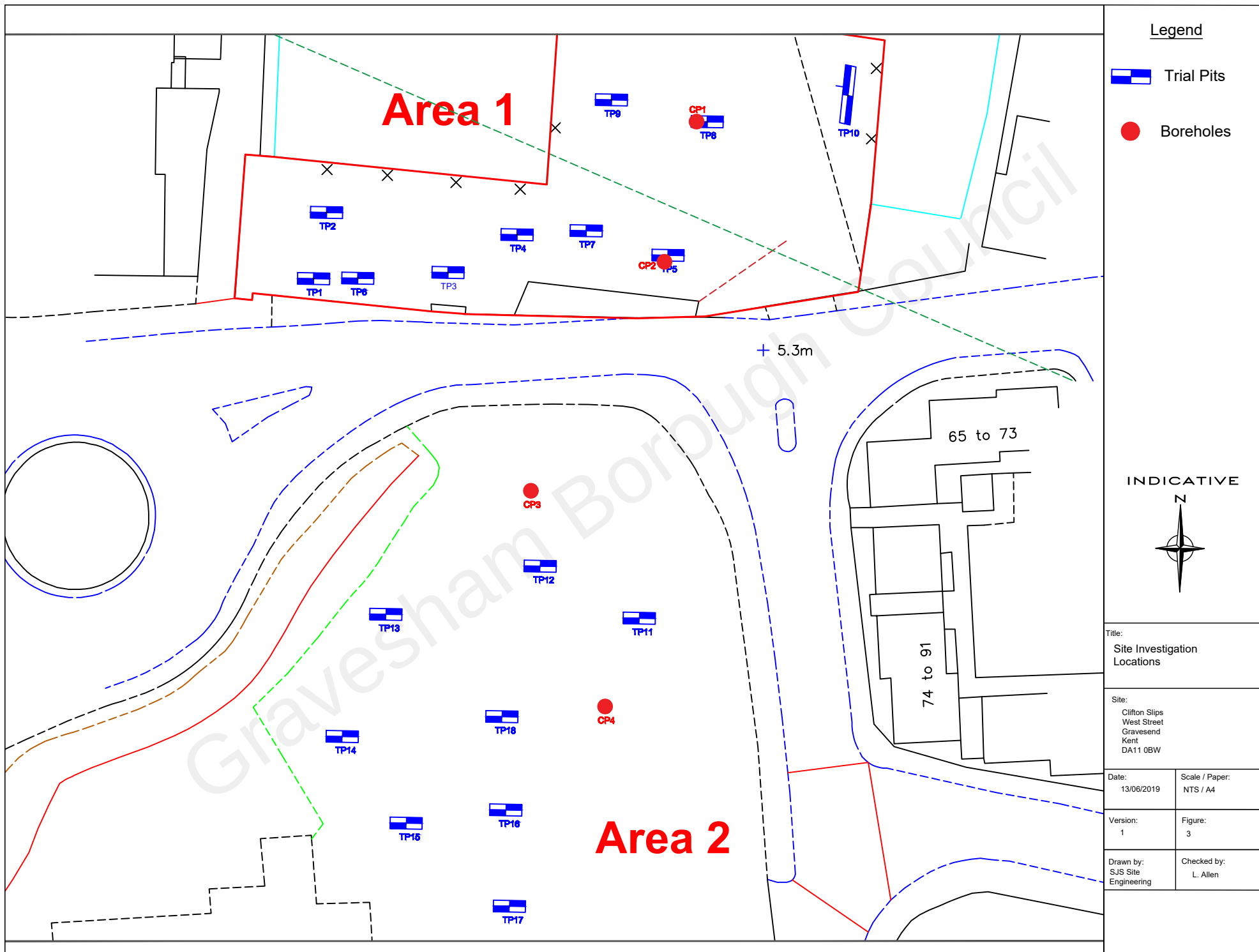
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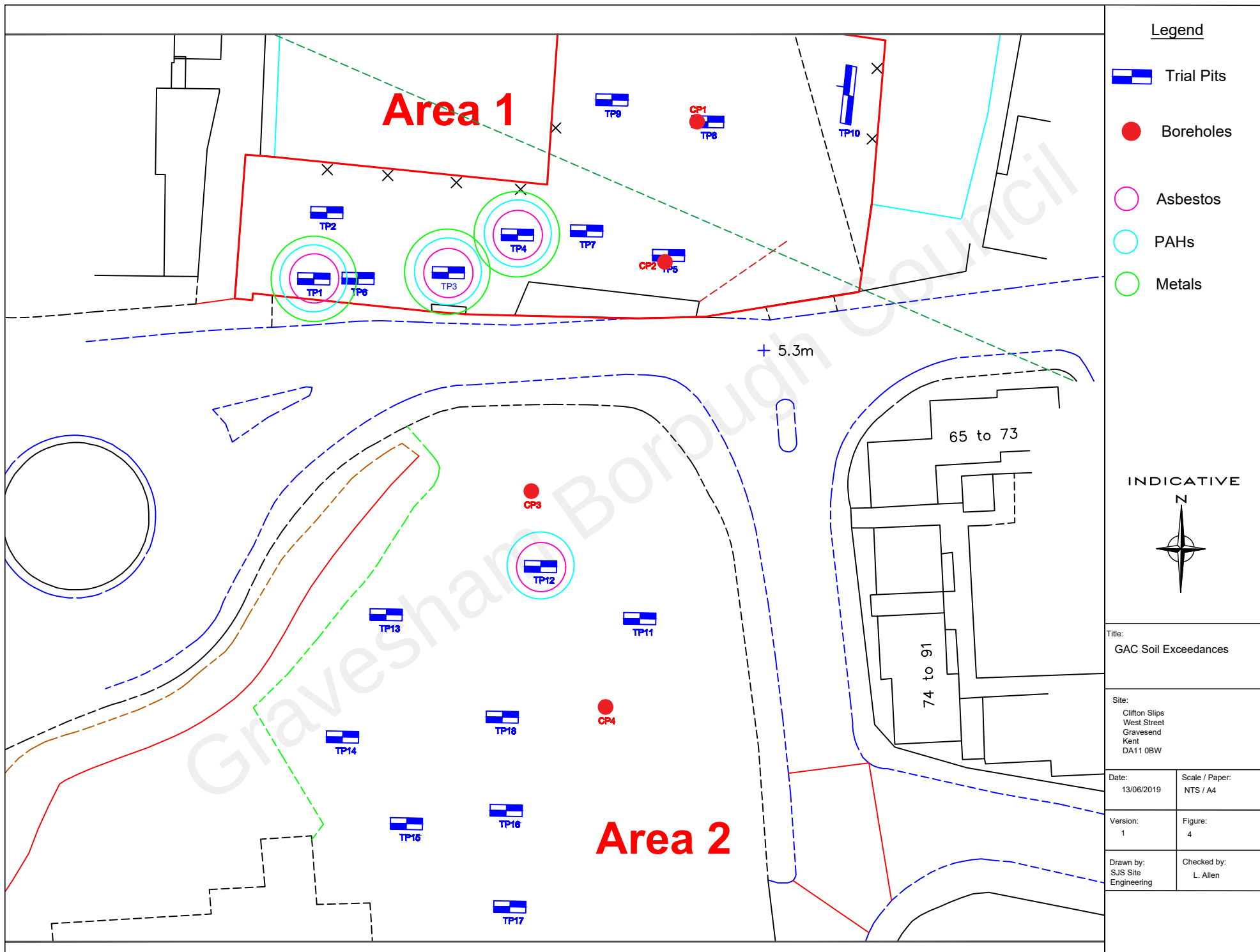
Source: Gary Gabriel Associates	Scale: NTS	Client: Da Vinci Properties
Site: Clifton Silpways		

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put at 5.5m level







Known Underground Obstructions



Figure 5 – Known Underground Obstructions

Potential Extensions of Underground Obstructions

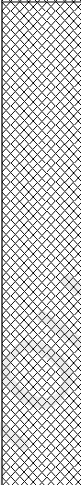


Figure 6 – Potential Extensions of Underground Obstructions

EXPLORATORY BOREHOLE AND TRIAL PIT LOGS

Gravesham Borough Council

				Trial Pit Log				Trialpit No TP1 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564362.80 - 174443.87 Level: 4.92		Date 11/02/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m):		Scale 1:25		Logged LA	
Client: Quinn Estates Ltd				Depth 2.20					

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.40 - 0.50	ES		0.20	4.72		Concrete slab with metal re-bar. (CONCRETE)		
									Greyish black, clayey, fine to coarse sandy gravel. Gravel is fine to coarse angular brick, plastic, wood and metal. (MADE GROUND).
					0.60	4.32			Soft, orangish blackish brown mottled white, gravelly clay. Gravel is fine to coarse angular to sub-rounded chalk, metal sheets, glass, brick and wood. (MADE GROUND).
				2.20	2.72		End of pit at 2.20 m		

Remarks: No groundwater encountered. Southern wall of TP was concrete from 0.6-2.2m, full extent not uncovered.		
Stability: Small collapse within made ground.		

				Trial Pit Log				Trialpit No TP10 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564418.54 - 174462.97 Level: 4.76		Date 12/02/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): 0.6 1.5 1.5				Scale 1:25	
Client: Quinn Estates Ltd				Depth 2.20				Logged RW	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.40 - 0.60	ES		0.20	4.56		Concrete slab with re-bar. (CONCRETE).	
				0.40	4.36		Dark brown, slightly clayey, slightly gravelly, fine to coarse sand. Gravel is fine to coarse sub-angular to rounded flint, brick and concrete with frequent roots. (MADE GROUND).	
				0.60	4.16		Black, fine to coarse sandy gravel. Gravel is fine to coarse sub-rounded flint and brick. (MADE GROUND).	
							Structureless, white mottled brown CHALK. Gravel is fine to coarse, angular to sub-rounded sand, flint and chalk. (Potentially Reworked GRADE Dm SEAFORD CHALK).	
				2.20	2.56		End of pit at 2.20 m	

1

2

3

4

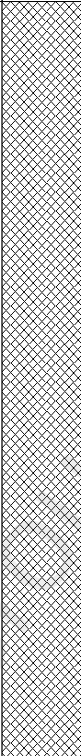
5

Remarks: No groundwater encountered.

Stability: Stable



				Trial Pit Log				Trialpit No TP11 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564396.77 - 174408.44 Level: 7.29		Date 03/04/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): 0.6 1.5				Scale 1:25	
Client: Quinn Estates Ltd				Depth 2.50				Logged RW	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	2.00 - 2.40	ES		2.50	4.78		Firm, light brown mottled white, slightly sandy, cobbly, gravelly, clay. Gravel is fine to coarse brick, chalk, concrete and flint. Occasional angular to sub-angular plastic and wood. Cobbles are concrete and chalk. (MADE GROUND)	1
							<i>Between 2.0-2.05m bgl; very thin black stained layer.</i>	2
							End of pit at 2.50 m	3
								4
								5

Remarks: No groundwater encountered.		
Stability: Stable		

				Trial Pit Log				Trialpit No TP13 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564370.33 - 174408.85 Level: 8.12		Date 03/04/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): 1.5 0.6 2.50				Scale 1:25	
Client: Quinn Estates Ltd								Logged RW	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.70 - 1.00	ES				Gravel	Firm, light greyish brown, slightly gravelly, sandy, clay. Gravel is fine, sub-rounded, chalk and flint. Occasional plant roots. (MADE GROUND)	1
	2.20 - 2.50	ES		1.80	6.32		Firm, grey mottled white, sandy, gravelly, cobbly, clay. Gravel is fine to coarse, angular to sub-rounded, chalk, flint, concrete and brick. Occasional cobbles of brick and chalk. (MADE GROUND)	2
				2.50	5.62		End of pit at 2.50 m	3
								4
								5

Remarks: No groundwater encountered.

Stability: Stable



				Trial Pit Log				Trialpit No TP14 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564365.78 - 174396.10 Level: 9.57		Date 03/04/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m):		Scale 1:25		Logged RW	
Client: Quinn Estates Ltd				Depth 2.30					

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	1.20 - 1.50	ES		0.50	9.07		Soft, brown, sandy, cobbly, very gravelly, clay. Gravel is fine to coarse, angular, brick, flint, chalk and tile. Cobbles are brick. (MADE GROUND)	1 2 3 4 5
							Firm, white mottled brown, slightly sandy, gravelly, clay. Gravel is fine to coarse, sub-angular to sub-rounded, chalk and flint. Rare boulders of chalk. (MADE GROUND)	
							Firm, light brown mottled white, slightly sandy, slightly cobbly, gravelly, clay. Gravel is chalk, brick and flint. Cobbles are bituminous material and chalk. (MADE GROUND)	
				2.30	7.27		End of pit at 2.30 m	

Remarks: No groundwater encountered.		
Stability: Stable		

				Trial Pit Log				Trialpit No TP15 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564372.45 - 174387.07 Level: 9.93		Date 03/04/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): Depth 2.40 0.6 1.5		Scale 1:25		Logged LA	
Client: Quinn Estates Ltd									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
							Soft, light brown mottled white, slightly sandy, gravelly, clay. Gravel is fine to coarse, brick, concrete, block paving, chalk, timber and bituminous material. Occasional cobbles of chalk. Rare plastic. (MADE GROUND)	
				2.40	7.53		End of pit at 2.40 m	

Remarks: No groundwater encountered.		
Stability: Stable		

				Trial Pit Log				Trialpit No TP16 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564382.84 - 174388.44 Level: 9.38		Date 03/04/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): Depth 2.70 0.6 1.5		Scale 1:25		Logged RW	
Client: Quinn Estates Ltd									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	2.50 - 2.70	ES		0.90	8.48		Soft, dark brown, sandy, gravelly, clay. Gravel is fine to coarse, angular to sub-rounded, brick, chalk, flint and tile. (MADE GROUND)	1
							Firm, white mottled light brown, sandy, very gravelly, clay. Gravel is chalk (80%) and flint. (MADE GROUND)	
				1.20	8.18		Firm, brown, slightly sandy, gravelly, slightly cobbly, clay. Gravel is fine to coarse, angular, chalk, flint, tile, and brick. Cobbles are brick. (MADE GROUND)	
				2.70	6.68		End of pit at 2.70 m	
								4
								5

Remarks: No groundwater encountered.		
Stability: Stable		

				Trial Pit Log				Trialpit No TP17 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564383.22 - 174378.40 Level: 9.91		Date 03/04/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): 1.5 0.6 2.40				Scale 1:25 Logged RW	
Client: Quinn Estates Ltd									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.50	9.41		Soft, greyish brown, cobbly, sandy, very gravelly, clay. Gravel is fine to coarse, angular, brick, concrete and flint. Cobbles are brick. (MADE GROUND)	1
							Firm, white mottled light brown, very gravelly, cobbly, clay. Gravel is fine to coarse, angular, chalk(60%), flint and brick. Cobbles are chalk and flint. (MADE GROUND)	2
	2.20 - 2.40	ES		2.40	7.51		End of pit at 2.40 m	3
								4
								5

Remarks: No groundwater encountered.

Stability: Stable - minor collapse of the sides.

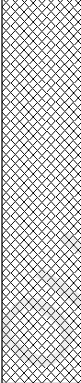


				Trial Pit Log				Trialpit No TP18 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564382.44 - 174398.18 Level: 8.66		Date 03/04/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): Depth 2.40 0.6 1.5		Scale 1:25		Logged RW	
Client: Quinn Estates Ltd									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				1.00	7.66		Soft, greyish brown mottled white, sandy, cobbly, very gravelly, clay. Gravel is fine to coarse, angular, brick, tile, chalk and flint. Cobbles are brick and concrete. (MADE GROUND)	1
							<u>Boulder of concrete at 0.8m bgl.</u>	
				1.90	6.76		Soft, greyish brown, slightly gravelly, very sandy, clay. Gravel is fine, rounded, chalk and flint. (MADE GROUND)	
				2.40	6.26		Firm, light brown mottled white, sandy, cobbly, slightly bouldery, gravelly, clay. Gravel is fine to coarse, angular to sub-rounded, chalk, flint and tile. Boulders and cobbles of chalk. (MADE GROUND)	2
							End of pit at 2.40 m	
								3
								4
								5

Remarks: No groundwater encountered.		
Stability: Stable		

				Trial Pit Log				Trialpit No TP3 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564376.82 - 174444.51 Level: 5.03		Date 11/02/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): 1.5 0.6 2.00				Scale 1:25 Logged RW	
Client: Quinn Estates Ltd									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	1.50 - 2.00	ES		0.20	4.82		Concrete slab with metal re-bar. (CONCRETE).	1 2 3 4 5
				0.50	4.53		Light grey, fine to coarse sandy gravel. Gravel is fine to coarse angular to sub-rounded flint, brick and concrete. (MADE GROUND).	
							Brown, gravelly fine to coarse sand. Gravel is fine to coarse angular to sub-round brick, metal, concrete, wood and rope. (MADE GROUND).	
				2.00	3.02			
							End of pit at 2.00 m	

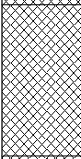
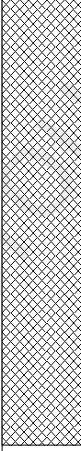
Remarks: No groundwater encountered.		
Stability: Minor collapse within made ground.		

				Trial Pit Log				Trialpit No TP4 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564384.02 - 174448.45 Level: 5.03		Date 11/02/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): 0.6 1.5				Scale 1:25	
Client: Quinn Estates Ltd				Depth 2.00				Logged RW	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30 - 0.50	ES		0.30	4.73		Concrete slab with metal re-bar. (CONCRETE).	
				0.50	4.53		Light grey, fine to coarse sandy, gravel. Gravel is fine to coarse angular to sub-rounded flint, brick and concrete. (MADE GROUND).	
							Soft, orangish blackish brown mottled white, gravelly clay. Gravel is fine to coarse angular to sub-rounded chalk, flint and brick. (MADE GROUND).	
				1.25	3.78		Dark brown, fine to coarse sandy gravel. Gravel is fine to coarse sub-angular to sub-rounded flint and brick. (MADE GROUND).	
				1.90	3.13		Soft, orangish blackish brown mottled white, gravelly clay. Gravel is fine to coarse angular to sub-rounded chalk, flint and brick (MADE GROUND).	
				2.00	3.03		End of pit at 2.00 m	

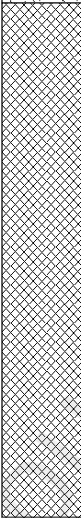
Remarks: No groundwater encountered. Potential asbestos fragment found.		
Stability: Stable		

				Trial Pit Log				Trialpit No TP5 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564399.77 - 174446.30 Level: 5.28		Date 11/02/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m):		1.5 		Scale 1:25	
Client: Quinn Estates Ltd				Depth 2.70		0.6 		Logged LA	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	1.10 - 1.20	ES		0.20	5.08		Concrete slab with metal re-bar. Blue membrane immediately below concrete. (CONCRETE).	1 2 3 4 5
				0.50	4.78		Light grey, fine to coarse sandy gravel. Gravel is fine to coarse angular to sub-rounded flint and concrete. (MADE GROUND).	
				1.00	4.28		Soft, orangish brown mottled white, gravelly, fine to coarse sandy clay. Gravel is fine to coarse angular to sub-angular chalk, concrete and brick. (MADE GROUND).	
				1.15	4.13		Structureless, white mottled brown gravel. Gravel is fine to coarse, sub-rounded to angular sand, flint and chalk. (MADE GROUND).	
				1.20	4.08		Loose, black, clayey gravel. Gravel is fine to coarse angular bituminous material. (MADE GROUND). Structureless, white mottled brown CHALK. Gravel is fine to coarse, angular to sub-rounded sand, flint and chalk. (Potentially Reworked GRADE Dm SEAFORD CHALK).	
				2.70	2.58		End of pit at 2.70 m	

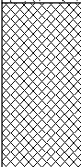
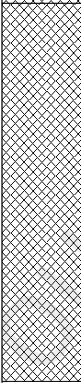
Remarks: No groundwater encountered.		
Stability: Stable		

				Trial Pit Log				Trialpit No TP7 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564391.23 - 174448.86 Level: 5.29		Date 12/02/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): Depth 1.90 0.6 1.5		Scale 1:25		Logged RW	
Client: Quinn Estates Ltd									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20	5.09		Concrete slab with metal re-bar. (CONCRETE).	1
							Light brown mottled white, gravelly, fine to coarse sand. Gravel is fine to coarse sub-angular to sub-rounded chalk, flint and brick. (MADE GROUND).	
				1.90	3.39		Concrete slab. (CONCRETE).	2
				1.90	3.39		End of pit at 1.90 m	
								3
								4
								5

Remarks: No groundwater encountered. Southern wall of TP was brick from 0-1.2m bgl. Concrete at base (1.9m bgl) preventing further excavation.		
Stability: Stable		

				Trial Pit Log				Trialpit No TP8 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564403.85 - 174460.23 Level: 5.03		Date 12/02/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): Depth 2.00 0.6 1.5		Scale 1:25		Logged RW	
Client: Quinn Estates Ltd									

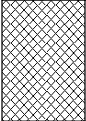
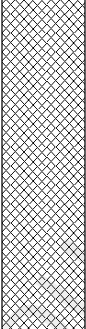
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	1.50 - 2.00	ES		0.20	4.83		Concrete slab with metal re-bar. Blue membrane immediately below concrete. (CONCRETE).	1
				0.75	4.28		Light brownish grey, fine to coarse sandy gravel. Gravel is fine to coarse angular to sub-rounded flint and concrete. (MADE GROUND).	
				2.00	3.03		Structureless, white mottled brown CHALK. Gravel is fine to coarse, sub-rounded to angular sand, flint and chalk. (Potentially Reworked GRADE Dm SEAFORD CHALK).	
				End of pit at 2.00 m				
								2
								3
								4
								5

Remarks: No groundwater encountered. Thin layer of concrete extending from northern wall of TP half way across, @ 1.25m bgl, 0.2m thick.

 Stability: Stable



				Trial Pit Log				Trialpit No TP9 Sheet 1 of 1	
Project Name: Clifton Slips				Project No. 18.376.2		Co-ords: 564393.86 - 174462.51 Level: 4.93		Date 12/02/2019	
Location: Clifton Slipways, West Street, Gravesend, Kent, DA11 0BW				Dimensions (m): Depth 1.80 0.6 1.5				Scale 1:25 Logged RW	
Client: Quinn Estates Ltd									

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.30	4.63		Concrete slab. (CONCRETE).	
				0.70	4.23		Brownish black, fine to coarse sandy gravel. Gravel is fine to coarse angular to sub-rounded flint, brick and tile. (MADE GROUND).	
				1.80	3.13		Brownish black mottled white, fine to coarse sandy GRAVEL. Gravel is fine to coarse angular to sub-rounded chalk, flint and brick. (MADE GROUND)	
							End of pit at 1.80 m	

1

2

3

4

5

Remarks: No groundwater encountered. Southern wall of TP was a brick wall from 0-1m bgl.

Stability: Stable



Project Name: Clifton Slips

Project No.
18.376.3

Co-ords: 564393.17 - 174399.15

Hole Type
CP

Location: Clifton Slipways, West Street, Gravesend DA11 0BW

Level: 8.04

Scale
1:90

Client: Quinn Estates

Dates: 04/04/2019 - 05/04/2019

Logged By
RW

Back fill / Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		1.50	S	N=3 (1,0/1,0,1,1)	1.50			Greyish brown, sandy, gravelly, clay. Gravel is chalk, flint, with rare brick and tile. (MADE GROUND)	1
		2.50	S	N=4 (1,0/1,1,1,1)	2.40 2.50	5.64			2
		3.50	S	N=3 (1,0/1,1,0,1)	3.50			Soft, white mottled light brown, slightly sandy, gravelly, clay. Gravel is fine to coarse, angular to sub-angular, chalk, flint. (MADE GROUND)	3
		4.00 - 4.50	B		4.20	3.84			4
		4.50	S	N=13 (1,2/3,3,4,3)	4.50			Firm, greyish brown, sandy, gravelly, clay. Gravel is chalk, flint, brick and tile. (MADE GROUND)	5
		5.50	S	N=10 (2,4/2,3,2,3)	5.50				6
		6.00 - 6.50	B						7
		7.00	S	N=6 (1,0/1,2,1,2)	7.00				8
		8.00 - 8.50	B		8.10	-0.06			9
		8.50	S	N=22 (2,3/5,5,6,6)	8.50			Structureless greyish white CHALK. Recovered as slightly gravelly SILT. Gravel is fine to coarse, sub angular, extremely weak, white speckled reddish brown chalk with occasional fine to coarse angular flint gravel. (GRADE Dm SEAFORD CHALK FORMATION)	10
		10.00	S	N=20 (3,4/5,3,6,6)	10.00				11
		10.00 - 10.50	B						12
		11.50	S	N=25 (4,5/9,5,6,5)	11.50				13
		12.00 - 12.50	B						14
		13.00	S	N=28 (3,6/9,6,6,7)	13.00				15
		14.00 - 14.50	B						16
		14.50	S	N=40 (4,5/16,9,8,7)	14.50				17
		16.00	S	N=28 (5,8/6,7,7,8)	16.00				18
		16.00 - 16.50	B						
		17.50	S	N=31 (4,5/6,7,7,11)	17.50				
		18.00 - 18.50	B						

Continued on next sheet

Remarks

Cased to 20.0m bgl.

Groundwater level recorded at 5.0m bgl.

Project Name: Clifton Slips

Project No.
18.376.3

Co-ords: 564393.17 - 174399.15

Hole Type
CP

Location: Clifton Slipways, West Street, Gravesend DA11 0BW

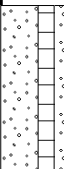
Level: 8.04

Scale
1:90

Client: Quinn Estates

Dates: 04/04/2019 - 05/04/2019

Logged By
RW

Back fill / Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		19.00	S	N=22 (4,4/6,6,5,5)	19.00				19
		20.00 20.00 - 20.50	S B	N=29 (4,4/6,6,7,10)	20.00 20.00	-11.96			20
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30
									31
									32
									33
									34
									35
									36

Remarks

Cased to 20.0m bgl.

Groundwater level recorded at 5.0m bgl.

Project Name: Clifton Slips

Project No.
18.376.3

Co-ords: 564385.61 - 174421.83

Hole Type
CP

Location: Clifton Slipways, West Street, Gravesend DA11 0BW

Level: 5.96

Scale
1:90

Client: Quinn Estates

Dates: 03/04/2019 - 04/04/2019

Logged By
RW

Back fill / Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		1.50	S	N=19 (4,4/6,5,4,4)	1.50 1.50	4.46		Light grey mottled white, slightly sandy, very gravelly clay. Gravel is fine to coarse, angular to sub-rounded, chalk, flint, tile, brick, cloth. (MADE GROUND)	1
		2.50	S	N=11 (2,2/3,3,3,2)	2.50			Firm, white mottled light brown, slightly sandy, gravelly, clay. Gravel is fine to coarse, angular to sub-angular, chalk, flint with sparse brick and tile. (MADE GROUND)	2
		3.00 - 3.50	B						3
		3.50	S	N=9 (2,2/2,2,1,4)	3.50				4
		4.50	S	N=5 (1,2/3,1,1,0)	4.50 4.60	1.36		Structureless greyish white CHALK. Recovered as slightly gravelly SILT. Gravel is fine to coarse, sub angular, extremely weak, white speckled reddish brown chalk with occasional fine to coarse angular flint gravel. (GRADE Dm SEAFORD CHALK FORMATION)	5
		5.00 - 5.50	B						6
		5.50	S	N=15 (2,3/4,3,4,4)	5.50				7
		7.00	S	N=34 (3,5/5,5,8,16)	7.00				8
		7.00 - 7.50	B						9
		8.50	S	N=31 (3,4/6,6,8,11)	8.50				10
		9.00 - 9.50	B						11
		10.00	S	N=26 (3,4/5,5,9,7)	10.00				12
		11.00 - 11.50	B						13
		11.50	S	N=18 (3,3/3,4,5,6)	11.50				14
		13.00	S	N=21 (3,4/5,4,5,7)	13.00				15
		13.00 - 13.50	B						16
		14.50	S	N=32 (6,8/8,7,7,10)	14.50				17
		15.00 - 15.50	B						18
		17.00 - 17.50	B						

Continued on next sheet

Remarks

Cased to 20.0m bgl.

Groundwater level recorded at 7.7m bgl.

Project Name: Clifton Slips

Project No.
18.376.3

Co-ords: 564385.61 - 174421.83

Hole Type
CP

Location: Clifton Slipways, West Street, Gravesend DA11 0BW

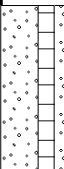
Level: 5.96

Scale
1:90

Client: Quinn Estates

Dates: 03/04/2019 - 04/04/2019

Logged By
RW

Back fill / Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		19.00 - 19.50	B						19
					20.00	-14.04		End of borehole at 20.00 m	20
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30
									31
									32
									33
									34
									35
									36

Remarks

Cased to 20.0m bgl.

Groundwater level recorded at 7.7m bgl.

Project Name: Clifton Slips

Project No.
18.376.3

Co-ords: 564399.36 - 174445.72

Hole Type
CP

Location: Clifton Slipways, West Street, Gravesend DA11 0BW

Level: 5.25

Scale
1:90

Client: Quinn Estates

Dates: 22/03/2019 - 26/03/2019

Logged By
RW

Back fill / Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								Dark grey mottled white, sandy, very gravelly, bouldery clay. Gravel is fine to coarse, brick, flint, concrete, chalk, blue plastic sheeting. Boulders are concrete. (MADE GROUND)	1
		3.00 - 3.50	B						2
		3.50 - 4.00	B		3.50	1.75			3
		4.00	S	N=24 (3,5/6,8,5,5)	4.00	1.25		Light brown mottled white, slightly fine to coarse sandy, gravelly clay. Gravel is fine to coarse, angular brick, flint and chalk. (MADE GROUND)	4
		5.00	S	N=32 (5,5/8,9,8,7)	5.00			Structureless greyish white CHALK. Recovered as slightly gravelly SILT. Gravel is fine to coarse, sub angular, extremely weak, white speckled reddish brown chalk with occasional fine to coarse angular flint gravel. (GRADE Dm SEAFORD CHALK FORMATION)	5
		6.00	S	N=24 (3,5/8,6,5,5)	6.00				6
		6.00 - 6.50	B						7
		7.50	S	N=21 (3,5/5,5,6,5)	7.50				8
		8.00 - 8.50	B						9
		9.00	S	N=19 (4,4/4,5,5,5)	9.00				10
		10.00 - 10.50	B						11
		10.50	S	N=19 (1,4/5,6,4,4)	10.50				12
		12.00	S	N=26 (3,4/6,6,8,6)	12.00				13
		12.00 - 12.50	B						14
		13.50	S	N=31 (3,5/5,8,8,10)	13.50				15
		14.00 - 14.50	B						16
		15.00	S	50 (4,20/50 for 0mm)	15.00				17
		16.00 - 16.50	B						18
		16.50	S	N=36 (9,9/11,8,8,9)	16.50				
		18.00	S	N=26 (3,3/5,7,7,7)	18.00				

Continued on next sheet

Remarks

Cased to 20.0m bgl.

Groundwater level within the borehole fluctuated with the tide throughout the course of the day between 4.5m and 7.5m bgl.

Project Name: Clifton Slips

Project No.
18.376.3

Co-ords: 564399.36 - 174445.72

Hole Type
CP

Location: Clifton Slipways, West Street, Gravesend DA11 0BW

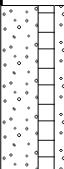
Level: 5.25

Scale
1:90

Client: Quinn Estates

Dates: 22/03/2019 - 26/03/2019

Logged By
RW

Back fill / Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		18.00 - 18.50	B	N=30 (5,6/6,7,8,9)					
		19.50	S		19.50				19
		20.00	B		20.00	-14.75			20
								End of borehole at 20.00 m	20
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30
									31
									32
									33
									34
									35
									36

Remarks

Cased to 20.0m bgl.

Groundwater level within the borehole fluctuated with the tide throughout the course of the day between 4.5m and 7.5m bgl.

Project Name: Clifton Slips

Project No.
18.376.3

Co-ords: 564402.71 - 174460.13

Hole Type
CP

Location: Clifton Slipways, West Street, Gravesend DA11 0BW

Level: 5.04

Scale
1:90

Client: Quinn Estates

Dates: 21/03/2019 - 22/03/2019

Logged By
RW

Back fill / Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.20	3.84		Grey dark brown mottled white, very clayey, sandy, cobbly, gravel. Gravel is fine to coarse, angular to sub-rounded, flint, chalk, wood, brick and concrete. Cobbles are angular bricks and concrete. (MADE GROUND)	1
					2.50	2.54		Soft, light brown mottled white, sandy, very gravelly, clay. Gravel is fine to coarse, angular chalk. (MADE GROUND).	2
		3.00 - 3.50	B					Very soft, grey mottled white, fine to coarse, sandy, gravelly, cobbly, clay. Gravel is fine to coarse chalk, brick, flint. Cobbles are angular brick. (MADE GROUND).	3
		4.50	S	N=26 (2,4/4,4,9,9)	4.50	0.54			4
		5.00 - 5.50	B		4.50				5
		5.50	S	N=38 (5,6/8,10,11,9)	5.50			Structureless greyish white CHALK. Recovered as slightly gravelly SILT. Gravel is fine to coarse, sub angular, extremely weak, white speckled reddish brown chalk with occasional fine to coarse angular flint gravel. (GRADE Dm SEAFORD CHALK FORMATION)	6
		7.00	S	N=21 (3,4/5,5,6,5)	7.00				7
		7.00 - 7.50	B						8
		8.50	S	N=23 (4,4/4,7,6,6)	8.50				9
		9.00 - 9.50	B						10
		10.00	S	N=17 (4,5/5,4,4,4)	10.00				11
		11.00 - 11.50	B						12
		11.50	S	N=34 (12,12/5,7,11,11)	11.50				13
		13.00	S	N=24 (3,5/5,5,6,8)	13.00				14
		13.00 - 13.50	B						15
		14.50	S	N=25 (4,6/6,5,7,7)	14.50				16
		15.00 - 15.50	B						17
		16.00	S	N=24 (3,4/5,6,6,7)	16.00				18
		17.00 - 17.50	B						
		17.50	S	N=24 (4,4/5,6,7,6)	17.50				

Continued on next sheet

Remarks

Cased to 25.0m bgl.

Groundwater level within the borehole fluctuated with the tide throughout the course of the day between 4.5m and 7.5m bgl.

Flint in SPT recovery at 19.0m bgl.

Project Name: Clifton Slips

Project No.
18.376.3

Co-ords: 564402.71 - 174460.13

Hole Type
CP

Location: Clifton Slipways, West Street, Gravesend DA11 0BW

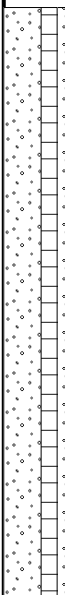
Level: 5.04

Scale
1:90

Client: Quinn Estates

Dates: 21/03/2019 - 22/03/2019

Logged By
RW

Back fill / Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		19.00	S	N=44 (3,3/10,12,12,10)	19.00				19			
		19.00 - 19.50	B						20			
		20.50	S	N=30 (4,5/7,7,8,8)	20.50				21			
		21.00 - 21.50	B						22			
		22.00	S	N=25 (4,6/6,6,6,7)	22.00				23			
		23.00 - 23.50	B						24			
		23.50	S	N=24 (4,5/6,7,7,4)	23.50				25			
		25.00	B		25.00	-19.96			26			
		25.00	S	N=33 (3,4/7,7,7,12)	25.00				27			
		End of borehole at 25.00 m									28	
									29			
									30			
									31			
									32			
									33			
									34			
									35			
									36			

Remarks

Cased to 25.0m bgl.

Groundwater level within the borehole fluctuated with the tide throughout the course of the day between 4.5m and 7.5m bgl.

Flint in SPT recovery at 19.0m bgl.

ON-SITE MONITORING DATA (GROUND GAS & GROUNDWATER)

Gravesham Borough Council

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 1				Site: Clifton Slips Client: Quinn Estates Scientist: LA		Site Ref: 18.376.3 Date: 10/04/2019 Time: 11:05	
Landfill Gas Analyser				Model: GA5000		Calibration: Yes	
Borehole No: CP1(S) Atmospheric Pressure (mbar): 1021 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.08	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	-0.15	0	0.0	0.1	21.1	78.8
	0.0		15	0.0	0.7	20.5	78.9
	0.0		30	0.0	0.7	20.2	79.1
			60	0.0	0.7	20.2	79.1
			90	0.0	0.7	20.2	79.1
			120	0.0	0.7	20.2	79.1
			180	0.0	0.7	20.2	79.0
			240	0.0	0.7	20.3	79.0
			300	0.0	0.7	20.3	79.0
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	0	0	0	0	0	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 1				Site: Clifton Slips Client: Quinn Estates Scientist: LA		Site Ref: 18.376.3 Date: 10/04/2019 Time: 11:00	
Landfill Gas Analyser				Model: GA5000		Calibration: Yes	
Borehole No: CP1(D) Atmospheric Pressure (mbar): 1021 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): 4.50 Depth to base of borehole (mbTOC): 25.50	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.1	-0.07	0	0.0	0.1	21.1	78.8
	0.0		15	0.0	0.5	20.8	78.7
	0.0		30	0.0	0.5	20.5	79.0
			60	0.0	0.5	20.5	79.0
			90	0.0	0.5	20.5	79.0
			120	0.0	0.5	20.5	79.0
			180	0.0	0.5	20.5	79.0
			240	0.0	0.6	20.5	79.0
			300	0.0	0.6	20.5	78.9
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	0	0	0	0	0	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 1		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 10/04/2019 Time: 10:57			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP2(S) Atmospheric Pressure (mbar): 1021 Casing Height (above ground level): 0.56 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.18	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	-0.02	0	0.0	0.1	20.9	79.0
	0.0		15	0.0	1.2	20.4	78.6
	0.0		30	0.0	1.2	19.8	79.0
			60	0.0	1.2	19.8	79.0
			90	0.0	1.2	19.8	79.0
			120	0.0	1.2	19.8	79.0
			180	0.0	1.2	19.8	78.9
			240	0.0	1.2	19.9	78.9
			300	0.0	1.2	19.9	78.9
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	0	0	0	0	0	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 1				Site: Clifton Slips Client: Quinn Estates Scientist: LA		Site Ref: 18.376.3 Date: 10/04/2019 Time: 10:50	
Landfill Gas Analyser				Model: GA5000		Calibration: Yes	
Borehole No: CP2(D) Atmospheric Pressure (mbar): 1021 Casing Height (above ground level): 0.56 Depth to top of Groundwater (mbTOC): 4.69 Depth to base of borehole (mbTOC): 20.83	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.00	0	0.0	0.1	20.9	78.2
	0.0		15	0.0	0.8	20.2	79.0
	0.0		30	0.0	0.7	20.1	79.1
			60	0.0	0.7	20.1	79.1
			90	0.0	0.7	20.1	79.1
			120	0.0	0.7	20.1	79.2
			180	0.0	0.7	20.1	79.2
			240	0.0	0.8	20.1	79.2
			300	0.0	0.8	20.1	79.2
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	1	1	1	
Hydrogen Sulphide H ₂ S (ppm)	0	0	0	0	0	0	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 1				Site: Clifton Slips Client: Quinn Estates Scientist: LA		Site Ref: 18.376.3 Date: 10/04/2019 Time: 10:34	
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP3(S) Atmospheric Pressure (mbar): 1020 Casing Height (above ground level): 0.54 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.65	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.02	0	0.0	0.1	20.7	79.2
	0.0		15	0.0	0.5	20.4	79.2
	0.0		30	0.0	0.5	20.0	79.5
			60	0.0	0.5	20.0	79.5
			90	0.0	0.5	20.1	79.4
			120	0.0	0.4	20.2	79.4
			180	0.0	0.4	20.2	79.4
			240	0.0	0.5	20.1	79.4
			300	0.0	0.5	20.1	79.4
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 1				Site: Clifton Slips Client: Quinn Estates Scientist: LA		Site Ref: 18.376.3 Date: 10/04/2019 Time: 10:40	
Landfill Gas Analyser				Model: GA5000		Calibration: Yes	
Borehole No: CP3(D) Atmospheric Pressure (mbar): 1021 Casing Height (above ground level): 0.54 Depth to top of Groundwater (mbTOC): 5.33 Depth to base of borehole (mbTOC): 17.60	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.14	0	0.0	0.1	20.8	79.1
	0.0		15	0.0	0.1	20.9	79.0
	0.0		30	0.0	0.1	20.9	79.0
			60	0.0	0.1	20.9	79.0
			90	0.0	0.1	20.9	79.0
			120	0.0	0.1	20.9	79.0
			180	0.0	0.1	20.9	79.0
			240	0.0	0.1	21.0	79.0
			300	0.0	0.1	21.0	79.0
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	1	0	0	0	0	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 1		Site: Clifton Slips Client: Quinn Estates Scientist: LA		Ecologia experts on the ground Site Ref: 18.376.3 Date: 10/04/2019 Time: 10:14			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP4(S) Atmospheric Pressure (mbar): 1021 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): 7.24 Depth to base of borehole (mbTOC): 7.68	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.02	0	0.0	0.1	20.7	78.7
	0.0		15	0.0	0.7	20.2	79.2
	0.0		30	0.0	0.7	20.0	79.4
			60	0.0	0.7	19.9	79.4
			90	0.0	0.6	19.9	79.4
			120	0.0	0.6	20.0	79.4
			180	0.0	0.6	20.0	79.4
			240	0.0	0.5	20.2	79.3
			300	0.0	0.3	20.4	79.2
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	0	0	0	0	0	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form

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Gas Monitoring Round No. & Job Details		Site: Clifton Slips		Site Ref: 18.376.3			
Round 1		Client: Quinn Estates		Date: 10/04/2019		Time: 10:23	
		Scientist: LA					
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP4(D)		Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)
Atmospheric Pressure (mbar): 1021		0.0	-0.03	0	0.0	0.1	20.7
		0.0		15	0.0	0.2	20.5
Casing Height (above ground level): 0.50		0.0		30	0.0	0.2	20.5
				60	0.0	0.2	20.5
Depth to top of Groundwater (mbTOC): 7.31				90	0.0	0.2	20.4
				120	0.0	0.2	20.4
Depth to base of borehole (mbTOC): 17.13				180	0.0	0.2	20.4
				240	0.0	0.2	20.4
				300	0.0	0.2	20.5
Time (minutes)		0	1	2	3	4	5
Carbon monoxide CO (ppm)		2	6	6	6	5	5
Hydrogen Sulphide H ₂ S (ppm)		0	0	1	1	1	1
Notes:							
mbTOC: metres below top of casing.							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 2		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 16/04/2019 Time: 12:28			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP1(S) Atmospheric Pressure (mbar): 1016 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.08	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.05	0	0.0	0.0	20.8	79.1
	0.0		15	0.0	0.1	20.8	79.1
	0.0		30	0.0	0.2	20.5	79.2
			60	0.0	0.3	20.5	79.2
			90	0.0	0.3	20.5	79.2
			120	0.0	0.3	20.5	79.2
			180	0.0	0.3	20.5	79.2
			240	0.0	0.3	20.5	79.2
			300	0.0	0.3	20.5	79.2
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	0	0	0	0	0	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 2				Site: Clifton Slips Client: Quinn Estates Scientist: LA		Site Ref: 18.376.3 Date: 16/04/2019 Time: 12:35	
Landfill Gas Analyser				Model: GA5000		Calibration: Yes	
Borehole No: CP1(D) Atmospheric Pressure (mbar): 1016 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): 4.15 Depth to base of borehole (mbTOC): 25.4	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.09	0	0.0	0.0	20.9	79.0
	0.0		15	0.0	0.4	20.6	79.1
	0.0		30	0.0	0.4	20.5	79.2
			60	0.0	0.4	20.5	79.2
			90	0.0	0.4	20.4	79.2
			120	0.0	0.4	20.4	79.2
			180	0.0	0.4	20.4	79.2
			240	0.0	0.4	20.4	79.2
			300	0.0	0.3	20.4	79.3
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	1	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	0	0	0	0	0	
Notes: mbTOC: metres below top of casing.							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 2		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 16/04/2019 Time: 12:16			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP2(S) Atmospheric Pressure (mbar): 1016 Casing Height (above ground level): 0.56 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.18	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	-0.14	0	0.0	0.0	20.5	79.4
	0.1		15	0.0	0.8	19.0	80.3
	0.1		30	0.0	0.8	18.5	80.7
			60	0.0	0.8	18.4	80.8
			90	0.0	0.8	18.4	80.8
			120	0.0	0.8	18.4	80.8
			180	0.0	0.8	18.4	80.8
			240	0.0	0.8	18.3	80.9
			300	0.0	0.8	18.3	80.9
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form

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Gas Monitoring Round No. & Job Details

Round 2

 Site: Clifton Slips
 Client: Quinn Estates
 Scientist: LA

 Site Ref: 18.376.3
 Date: 16/04/2019 Time: 12:20

Landfill Gas Analyser

Model: GA5000

Calibration: Yes

Borehole No: **CP2(D)**Atmospheric Pressure (mbar):
1017Casing Height (above ground level):
0.56Depth to top of Groundwater (mbTOC):
4.42Depth to base of borehole (mbTOC):
20.83

Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
0.0	0.05	0	0.0	0.1	20.7	79.3
0.0		15	0.0	0.3	20.5	79.3
0.0		30	0.0	0.2	20.4	79.4
		60	0.0	0.2	20.5	79.4
		90	0.0	0.1	20.6	79.3
		120	0.0	0.1	20.6	79.3
		180	0.0	0.1	20.6	79.3
		240	0.0	0.1	20.7	79.2
		300	0.0	0.1	20.7	79.2

Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	1	1	1	1	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	

Notes:

mbTOC: metres below top of casing.

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 2		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 16/04/2019 Time: 11:58			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP3(S) Atmospheric Pressure (mbar): 1016 Casing Height (above ground level): 0.54 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.65	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	-0.09	0	0.0	0.1	20.4	79.5
	0.0		15	0.0	0.1	20.4	79.5
	0.0		30	0.0	0.1	20.4	79.5
			60	0.0	0.1	20.4	79.6
			90	0.0	0.1	20.4	79.6
			120	0.0	0.1	20.4	79.6
			180	0.0	0.1	20.4	79.6
			240	0.0	0.1	20.3	79.6
			300	0.0	0.1	20.3	79.6
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 2		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 16/04/2019 Time: 12:03			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP3(D) Atmospheric Pressure (mbar): 1016 Casing Height (above ground level): 0.54 Depth to top of Groundwater (mbTOC): 5.19 Depth to base of borehole (mbTOC): 17.6	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.02	0	0.0	0.1	20.4	79.6
	0.0		15	0.0	0.1	20.5	79.4
	0.0		30	0.0	0.1	20.4	79.5
			60	0.0	0.1	20.4	79.5
			90	0.0	0.1	20.4	79.5
			120	0.0	0.1	20.4	79.5
			180	0.0	0.1	20.4	79.5
			240	0.0	0.1	20.5	79.5
			300	0.0	0.1	20.5	79.5
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	1	1	1	0	0	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form																																																																																																															
Gas Monitoring Round No. & Job Details Round 2				Site: Clifton Slips Client: Quinn Estates Scientist: LA		Site Ref: 18.376.3 Date: 16/04/2019 Time: 11:42																																																																																																									
Landfill Gas Analyser				Model: GA5000		Calibration: Yes																																																																																																									
<table border="1"> <thead> <tr> <th></th> <th>Flow (l/hr)</th> <th>Relative Pressure (mb)</th> <th>Time (s)</th> <th>CH₄ %(v/v)</th> <th>CO₂ %(v/v)</th> <th>O₂ %(v/v)</th> <th>Balance Gases (%)</th> </tr> </thead> <tbody> <tr> <td>Borehole No: CP4(S)</td> <td>0.0</td> <td>-0.15</td> <td>0</td> <td>0.0</td> <td>0.1</td> <td>20.6</td> <td>79.2</td> </tr> <tr> <td>Atmospheric Pressure (mbar): 1017</td> <td>0.0</td> <td></td> <td>15</td> <td>0.0</td> <td>0.2</td> <td>20.7</td> <td>79.2</td> </tr> <tr> <td>Casing Height (above ground level): 0.50</td> <td>0.0</td> <td></td> <td>30</td> <td>0.0</td> <td>0.2</td> <td>20.6</td> <td>79.3</td> </tr> <tr> <td></td> <td></td> <td></td> <td>60</td> <td>0.0</td> <td>0.2</td> <td>20.5</td> <td>79.3</td> </tr> <tr> <td>Depth to top of Groundwater (mbTOC): 7.28</td> <td></td> <td></td> <td>90</td> <td>0.0</td> <td>0.2</td> <td>20.5</td> <td>79.3</td> </tr> <tr> <td></td> <td></td> <td></td> <td>120</td> <td>0.0</td> <td>0.2</td> <td>20.5</td> <td>79.3</td> </tr> <tr> <td>Depth to base of borehole (mbTOC): 7.68</td> <td></td> <td></td> <td>180</td> <td>0.0</td> <td>0.2</td> <td>20.5</td> <td>79.3</td> </tr> <tr> <td></td> <td></td> <td></td> <td>240</td> <td>0.0</td> <td>0.2</td> <td>20.4</td> <td>79.4</td> </tr> <tr> <td></td> <td></td> <td></td> <td>300</td> <td>0.0</td> <td>0.3</td> <td>20.3</td> <td>79.4</td> </tr> <tr> <td>Time (minutes)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Carbon monoxide CO (ppm)</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td></td> </tr> <tr> <td>Hydrogen Sulphide H₂S (ppm)</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td></td> </tr> </tbody> </table>									Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)	Borehole No: CP4(S)	0.0	-0.15	0	0.0	0.1	20.6	79.2	Atmospheric Pressure (mbar): 1017	0.0		15	0.0	0.2	20.7	79.2	Casing Height (above ground level): 0.50	0.0		30	0.0	0.2	20.6	79.3				60	0.0	0.2	20.5	79.3	Depth to top of Groundwater (mbTOC): 7.28			90	0.0	0.2	20.5	79.3				120	0.0	0.2	20.5	79.3	Depth to base of borehole (mbTOC): 7.68			180	0.0	0.2	20.5	79.3				240	0.0	0.2	20.4	79.4				300	0.0	0.3	20.3	79.4	Time (minutes)	0	1	2	3	4	5		Carbon monoxide CO (ppm)	0	0	0	0	0	0		Hydrogen Sulphide H ₂ S (ppm)	0	0	0	1	1	1	
	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)																																																																																																								
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Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 2				Site: Clifton Slips Client: Quinn Estates Scientist: LA		Site Ref: 18.376.3 Date: 16/04/2019 Time: 11:49	
Landfill Gas Analyser				Model: GA5000		Calibration: Yes	
Borehole No: CP4(D) Atmospheric Pressure (mbar): 1016 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): 7.23 Depth to base of borehole (mbTOC): 17.13	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	-0.12	0	0.0	0.1	20.5	79.5
	0.0		15	0.0	0.4	20.2	79.5
	0.0		30	0.0	0.4	19.9	79.7
			60	0.0	0.4	19.9	79.7
			90	0.0	0.4	19.9	79.7
			120	0.0	0.4	19.9	79.7
			180	0.0	0.4	19.9	79.7
			240	0.0	0.4	19.8	79.8
			300	0.0	0.4	19.8	79.8
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	2	5	5	5	4	4	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 3		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 24/04/2019 Time: 12:41			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP1(S) Atmospheric Pressure (mbar): 994 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.08	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.00	0	0.0	0.0	21.0	78.9
	0.0		15	0.0	0.3	20.5	79.2
	0.0		30	0.0	0.3	20.5	79.2
			60	0.0	0.3	20.5	79.2
			90	0.0	0.3	20.6	79.1
			120	0.0	0.2	20.6	79.1
			180	0.0	0.2	20.7	79.1
			240	0.0	0.2	20.8	79.0
			300	0.0	0.2	20.8	79.0
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	0	0	0	0	0	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 3		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 24/04/2019 Time: 12:48			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP1(D) Atmospheric Pressure (mbar): 994 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): 4.58 Depth to base of borehole (mbTOC): 25.4	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.17	0	0.0	0.0	21.2	78.8
	0.0		15	0.0	0.4	20.5	79.2
	0.0		30	0.0	0.4	20.4	79.3
			60	0.0	0.4	20.4	79.3
			90	0.0	0.4	20.4	79.2
			120	0.0	0.4	20.4	79.2
			180	0.0	0.4	20.4	79.2
			240	0.0	0.3	20.6	79.0
			300	0.0	0.2	20.9	78.9
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	1	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	0	0	0	0	0	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 3		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 24/04/2019 Time: 12:29			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP2(S) Atmospheric Pressure (mbar): 994 Casing Height (above ground level): 0.56 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.18	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.12	0	0.0	0.0	20.7	79.3
	0.0		15	0.0	1.1	18.6	80.6
	0.0		30	0.0	1.1	17.9	81.0
			60	0.0	1.1	17.8	81.0
			90	0.0	1.1	17.8	81.0
			120	0.0	1.2	17.8	81.0
			180	0.0	1.2	17.9	80.9
			240	0.0	1.3	18.0	80.7
			300	0.0	1.4	18.1	80.6
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	1	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 3		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 24/04/2019 Time: 12:35			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP2(D) Atmospheric Pressure (mbar): 994 Casing Height (above ground level): 0.56 Depth to top of Groundwater (mbTOC): 4.77 Depth to base of borehole (mbTOC): 20.83	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.02	0	0.0	0.0	20.8	79.1
	0.0		15	0.0	0.4	20.4	79.5
	0.0		30	0.0	0.4	19.9	79.8
			60	0.0	0.4	19.9	79.8
			90	0.0	0.4	19.9	79.8
			120	0.0	0.4	19.8	79.8
			180	0.0	0.4	19.8	79.8
			240	0.0	0.4	19.7	79.9
			300	0.0	0.4	19.7	79.9
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	0	1	1	1	1	1	
Hydrogen Sulphide H ₂ S (ppm)	1	0	1	1	0	0	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 3		Site: Clifton Slips Client: Quinn Estates Scientist: LA		Ecologia experts on the ground Site Ref: 18.376.3 Date: 24/04/2019 Time: 12:13			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP3(S) Atmospheric Pressure (mbar): 994 Casing Height (above ground level): 0.54 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.65	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.07	0	0.0	0.1	20.5	79.4
	0.0		15	0.0	0.1	20.5	79.5
	0.0		30	0.0	0.1	20.4	79.5
			60	0.0	0.1	20.4	79.5
			90	0.0	0.1	20.4	79.5
			120	0.0	0.1	20.5	79.5
			180	0.0	0.1	20.4	79.5
			240	0.0	0.1	20.4	79.5
			300	0.0	0.1	20.4	79.5
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 3		Site: Clifton Slips Client: Quinn Estates Scientist: LA		Ecologia experts on the ground Site Ref: 18.376.3 Date: 24/04/2019 Time: 12:19			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP3(D) Atmospheric Pressure (mbar): 994 Casing Height (above ground level): 0.54 Depth to top of Groundwater (mbTOC): 5.43 Depth to base of borehole (mbTOC): 17.6	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.03	0	0.0	0.0	20.6	79.4
	0.0		15	0.0	0.1	20.6	79.3
	0.0		30	0.0	0.1	20.6	79.4
			60	0.0	0.1	20.6	79.4
			90	0.0	0.0	20.6	79.4
			120	0.0	0.0	20.6	79.4
			180	0.0	0.0	20.6	79.4
			240	0.0	0.0	20.6	79.4
			300	0.0	0.0	20.6	79.4
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	0	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 3		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 24/04/2019 Time: 11:59			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP4(S) Atmospheric Pressure (mbar): 994 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): 7.40 Depth to base of borehole (mbTOC): 7.68	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.17	0	0.0	0.1	20.8	79.1
	0.0		15	0.0	0.4	20.4	79.3
	0.0		30	0.0	0.4	20.4	79.3
			60	0.0	0.4	20.4	79.3
			90	0.0	0.4	20.3	79.3
			120	0.0	0.4	20.3	79.3
			180	0.0	0.4	20.3	79.3
			240	0.0	0.4	20.3	79.4
			300	0.0	0.3	20.3	79.4
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	0	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	0	0	0	0	0	0	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 3		Site: Clifton Slips Client: Quinn Estates Scientist: LA		Ecologia experts on the ground Site Ref: 18.376.3 Date: 24/04/2019 Time: 12:05			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP4(D) Atmospheric Pressure (mbar): 994 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): 7.42 Depth to base of borehole (mbTOC): 17.13	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	0.07	0	0.0	0.0	20.6	79.4
	0.1		15	0.0	0.9	19.7	79.5
	0.1		30	0.0	0.9	19.4	79.8
			60	0.0	0.9	19.3	79.8
			90	0.0	0.9	19.3	79.8
			120	0.0	0.9	19.3	79.8
			180	0.0	0.9	19.3	79.8
			240	0.0	0.8	19.4	79.8
			300	0.0	0.7	19.5	79.7
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	3	3	3	2	2	
Hydrogen Sulphide H ₂ S (ppm)	0	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 4		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 01/05/2019 Time: 11:46			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP1(S) Atmospheric Pressure (mbar): 1020 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.08	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	-0.17	0	0.0	0.0	20.4	79.5
	0.0		15	0.0	0.3	20.2	79.7
	0.0		30	0.0	0.3	20.0	79.8
			60	0.0	0.3	20.0	79.8
			90	0.0	0.3	20.0	79.8
			120	0.0	0.3	20.0	79.8
			180	0.0	0.3	20.0	79.7
			240	0.0	0.3	20.0	79.7
			300	0.0	0.3	20.0	79.7
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	1	1	1	1	1	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 4		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 01/05/2019 Time: 11:39			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP1(D) Atmospheric Pressure (mbar): 1020 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): 4.25 Depth to base of borehole (mbTOC): 25.4	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	-0.03	0	0.0	0.0	20.2	79.8
	0.0		15	0.0	0.3	19.7	79.9
	0.0		30	0.0	0.3	19.7	80.0
			60	0.0	0.3	19.7	80.0
			90	0.0	0.3	19.7	80.0
			120	0.0	0.3	19.7	80.0
			180	0.0	0.3	19.7	79.9
			240	0.0	0.3	19.7	79.9
			300	0.0	0.3	19.8	79.9
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	1	1	1	1	1	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 4		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 01/05/2019 Time: 11:33			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP2(S) Atmospheric Pressure (mbar): 1020 Casing Height (above ground level): 0.56 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.18	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.1	0.07	0	0.0	0.0	20.0	79.9
	0.0		15	0.0	1.3	17.7	8.1
	0.0		30	0.0	1.3	17.6	8.1
			60	0.0	1.3	17.6	81.2
			90	0.0	1.3	17.6	81.2
			120	0.0	1.3	17.6	81.2
			180	0.0	1.3	17.5	81.2
			240	0.0	1.3	17.4	81.2
			300	0.0	1.4	17.4	81.2
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	1	1	1	1	1	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 4		Site: Clifton Slips		Site Ref: 18.376.3			
		Client: Quinn Estates		Date: 01/05/2019		Time: 11:28	
		Scientist: LA					
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP2(D) Atmospheric Pressure (mbar): 1020 Casing Height (above ground level): 0.56 Depth to top of Groundwater (mbTOC): 4.55 Depth to base of borehole (mbTOC): 20.83	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	-0.09	0	0.0	0.0	20.0	79.9
	0.1		15	0.0	0.6	18.9	80.4
	0.1		30	0.0	0.6	18.9	80.4
			60	0.0	0.6	18.9	80.4
			90	0.0	0.6	18.9	80.5
			120	0.0	0.6	18.9	80.6
			180	0.0	0.6	18.8	80.6
			240	0.0	0.6	18.8	80.6
			300	0.0	0.6	18.8	80.6
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	1	1	1	1	1	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: mbTOC: metres below top of casing.							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 4		Site: Clifton Slips Client: Quinn Estates Scientist: LA		Ecologia experts on the ground Site Ref: 18.376.3 Date: 01/05/2019 Time: 11:17			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP3(S) Atmospheric Pressure (mbar): 1020 Casing Height (above ground level): 0.54 Depth to top of Groundwater (mbTOC): No groundwater Depth to base of borehole (mbTOC): 4.65	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	-0.02	0	0.0	0.0	20.5	79.1
	0.1		15	0.0	0.1	20.5	79.5
	0.1		30	0.0	0.1	20.4	79.5
			60	0.0	0.1	20.3	79.5
			90	0.0	0.1	20.3	79.6
			120	0.0	0.1	20.3	79.6
			180	0.0	0.2	20.1	79.7
			240	0.0	0.2	19.9	79.8
			300	0.0	0.3	19.7	80.1
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	0	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: mbTOC: metres below top of casing.							

Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 4		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 01/05/2019 Time: 11:11			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP3(D) Atmospheric Pressure (mbar): 1020 Casing Height (above ground level): 0.54 Depth to top of Groundwater (mbTOC): 5.35 Depth to base of borehole (mbTOC): 17.6	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	-0.02	0	0.0	0.1	20.6	79.3
	0.0		15	0.0	0.1	20.6	79.3
	0.0		30	0.0	0.2	20.5	79.3
			60	0.0	0.2	20.5	79.3
			90	0.0	0.1	20.6	79.3
			120	0.0	0.1	20.6	79.3
			180	0.0	0.1	20.6	79.4
			240	0.0	0.1	20.6	79.4
			300	0.0	0.1	20.6	79.4
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	1	1	0	0	0	0	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Gas Monitoring Form																																																																																																															
Gas Monitoring Round No. & Job Details Round 4		Site: Clifton Slips		Site Ref: 18.376.3																																																																																																											
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		Scientist: LA																																																																																																													
Landfill Gas Analyser		Model: GA5000		Calibration: Yes																																																																																																											
<table border="1"> <thead> <tr> <th>Borehole No: CP4(S)</th> <th>Flow (l/hr)</th> <th>Relative Pressure (mb)</th> <th>Time (s)</th> <th>CH₄ %(v/v)</th> <th>CO₂ %(v/v)</th> <th>O₂ %(v/v)</th> <th>Balance Gases (%)</th> </tr> </thead> <tbody> <tr> <td>Atmospheric Pressure (mbar): 1020</td> <td>0.0</td> <td>-0.09</td> <td>0</td> <td>0.0</td> <td>0.1</td> <td>20.8</td> <td>79.1</td> </tr> <tr> <td></td> <td>0.0</td> <td></td> <td>15</td> <td>0.0</td> <td>0.5</td> <td>20.7</td> <td>78.9</td> </tr> <tr> <td>Casing Height (above ground level): 0.50</td> <td>0.0</td> <td></td> <td>30</td> <td>0.0</td> <td>0.5</td> <td>20.4</td> <td>79.1</td> </tr> <tr> <td></td> <td></td> <td></td> <td>60</td> <td>0.0</td> <td>0.5</td> <td>20.4</td> <td>79.1</td> </tr> <tr> <td>Depth to top of Groundwater (mbTOC): 7.46</td> <td></td> <td></td> <td>90</td> <td>0.0</td> <td>0.5</td> <td>20.3</td> <td>79.2</td> </tr> <tr> <td></td> <td></td> <td></td> <td>120</td> <td>0.0</td> <td>0.5</td> <td>20.3</td> <td>79.2</td> </tr> <tr> <td>Depth to base of borehole (mbTOC): 7.68</td> <td></td> <td></td> <td>180</td> <td>0.0</td> <td>0.5</td> <td>20.3</td> <td>79.2</td> </tr> <tr> <td></td> <td></td> <td></td> <td>240</td> <td>0.0</td> <td>0.5</td> <td>20.2</td> <td>79.3</td> </tr> <tr> <td></td> <td></td> <td></td> <td>300</td> <td>0.0</td> <td>0.6</td> <td>20.1</td> <td>79.3</td> </tr> <tr> <td>Time (minutes)</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Carbon monoxide CO (ppm)</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td></td> </tr> <tr> <td>Hydrogen Sulphide H₂S (ppm)</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td></td> </tr> </tbody> </table>								Borehole No: CP4(S)	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)	Atmospheric Pressure (mbar): 1020	0.0	-0.09	0	0.0	0.1	20.8	79.1		0.0		15	0.0	0.5	20.7	78.9	Casing Height (above ground level): 0.50	0.0		30	0.0	0.5	20.4	79.1				60	0.0	0.5	20.4	79.1	Depth to top of Groundwater (mbTOC): 7.46			90	0.0	0.5	20.3	79.2				120	0.0	0.5	20.3	79.2	Depth to base of borehole (mbTOC): 7.68			180	0.0	0.5	20.3	79.2				240	0.0	0.5	20.2	79.3				300	0.0	0.6	20.1	79.3	Time (minutes)	0	1	2	3	4	5		Carbon monoxide CO (ppm)	0	0	0	0	0	0		Hydrogen Sulphide H ₂ S (ppm)	0	0	0	1	1	1	
Borehole No: CP4(S)	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)																																																																																																								
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Borehole Gas Monitoring Form							
Gas Monitoring Round No. & Job Details Round 4		Site: Clifton Slips Client: Quinn Estates Scientist: LA		 Ecologia experts on the ground Site Ref: 18.376.3 Date: 01/05/2019 Time: 11:05			
Landfill Gas Analyser		Model: GA5000		Calibration: Yes			
Borehole No: CP4(D) Atmospheric Pressure (mbar): 1020 Casing Height (above ground level): 0.50 Depth to top of Groundwater (mbTOC): 7.39 Depth to base of borehole (mbTOC): 17.13	Flow (l/hr)	Relative Pressure (mb)	Time (s)	CH ₄ %(v/v)	CO ₂ %(v/v)	O ₂ %(v/v)	Balance Gases (%)
	0.0	-0.07	0	0.0	0.1	20.6	79.3
	0.0		15	0.0	1.2	19.7	79.3
	0.0		30	0.0	1.2	19.4	79.5
			60	0.0	1.2	19.3	79.5
			90	0.0	1.2	19.3	79.5
			120	0.0	1.2	19.3	79.5
			180	0.0	1.2	19.3	79.5
			240	0.0	1.2	19.3	79.6
			300	0.0	1.1	19.3	79.6
Time (minutes)	0	1	2	3	4	5	
Carbon monoxide CO (ppm)	0	2	2	2	1	1	
Hydrogen Sulphide H ₂ S (ppm)	1	1	1	1	1	1	
Notes: <i>mbTOC: metres below top of casing.</i>							

Borehole Low Flow Groundwater Monitoring Form



Job Details: Groundwater Round 1	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 10/04/2019 Time: 14:40
	Scientist: LA	Weather obs: Sunny

Onsite Equipment		
Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)

Borehole No: CP1(D)	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	108.5	11.21	1177	203.4	13.2	7.37
Casing Height (above ground level) (m):	1	102.5	10.75	1168	204.4	13.2	7.31
0.50	2	100.0	10.49	1163	204.8	13.2	7.28
	3	100.1	10.50	1165	205.1	13.2	7.34
Depth to base (mbTOC)	4	101.2	10.58	1167	205.3	13.2	7.22
25.40	5	102.8	10.42	1176	205.6	13.0	7.18
Depth to Groundwater (before sampling) mbTOC	6	105.3	11.02	1179	205.7	13.1	7.17
4.50	7	105.4	11.10	1179	206.0	13.0	7.15
Depth to Groundwater (after sampling) mbTOC	8						
4.19	9						
Well Diameter (OD / ID) (mm)	10						
63/50mm	11						
Odours? (Describe):	12						
No	13						
Colour? (Describe):	14						
Clear	15						
Sediment? (Describe):	16						
No	17						
Piping retained? (yes / no)	18						
No	19						
	20						

Notes:

Borehole Low Flow Groundwater Monitoring Form

Job Details: Groundwater Round 1	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 10/04/2019 Time: 14:10
	Scientist: LA	Weather obs: Sunny

Onsite Equipment		
Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)							
Borehole No: CP2(D)	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	103.9	10.71	1264	206.8	13.0	7.29
Casing Height (above ground level) (m): 0.56	1	93.3	9.73	1267	207.1	13.0	7.25
	2	89.2	9.35	1264	207.1	13.0	7.21
	3	88.1	9.25	1257	207.0	13.0	7.19
Depth to base (mbTOC) 20.83	4	87.1	9.17	1254	207.1	13.0	7.15
	5	88.0	9.25	1250	207.1	13.0	7.15
Depth to Groundwater (before sampling) mbTOC 4.69	6	87.5	9.16	1247	207.0	13.0	7.13
	7						
Depth to Groundwater (after sampling) mbTOC 4.52	8						
	9						
Well Diameter (OD / ID) (mm) 63/50mm	10						
	11						
Odours? (Describe): No	12						
	13						
Colour? (Describe): Clear	14						
	15						
Sediment? (Describe): None	16						
	17						
Piping retained? (yes / no) No	18						
	19						
	20						

Notes:

Borehole Low Flow Groundwater Monitoring Form

Job Details: Groundwater Round 1	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 10/04/2019 Time: 13:00
	Scientist: LA	Weather obs: Sunny

Onsite Equipment		
Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)							
Borehole No: CP3(D)	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	82.8	8.63	1074	212.2	12.8	7.16
Casing Height (above ground level) (m): 0.54	1	76.1	8.01	1073	217.5	12.8	7.14
	2	74.0	7.77	1072	217.0	12.8	7.12
	3	72.9	7.74	1072	216.4	12.6	7.1
Depth to base (mbTOC) 17.60	4	71.5	7.59	1071	215.4	12.7	7.07
	5	71.0	7.51	1072	214.7	12.3	7.06
Depth to Groundwater (before sampling) mbTOC 5.33	6	70.0	7.41	1072	214.1	12.7	7.05
	7	71.1	7.54	1072	213.7	12.6	7.04
Depth to Groundwater (after sampling) mbTOC 5.35	8	70.7	7.48	1073	213.2	12.7	7.03
	9	70.2	7.49	1074	212.9	12.6	7.03
Well Diameter (OD / ID) (mm) 63/50mm	10	70.7	7.52	1073	212.7	12.6	7.02
	11						
Odours? (Describe): No	12						
	13						
Colour? (Describe): Clear/Whitish	14						
	15						
Sediment? (Describe): No	16						
	17						
Piping retained? (yes / no) No	18						
	19						
	20						

Notes:

Borehole Low Flow Groundwater Monitoring Form

Job Details: Groundwater Round 1	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 10/04/2019 Time: 11:38
	Scientist: LA	Weather obs: Sunny

Onsite Equipment		
Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)							
Borehole No: CP4(D)	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	97.1	10.24	1080	262.9	12.5	7.32
Casing Height (above ground level) (m): 0.50	1	79.2	8.24	1085	257.7	12.8	7.27
	2	68.0	7.18	1086	253.0	12.8	7.23
	3	61.5	6.47	1086	247.5	12.9	7.20
Depth to base (mbTOC) 17.13	4	57.4	6.08	1087	242.5	12.8	7.17
	5	56.1	6.00	1086	236.0	12.9	7.13
Depth to Groundwater (before sampling) mbTOC 7.31	6	55.1	5.81	1086	231.6	12.9	7.11
	7	55.5	5.78	1087	228.0	13.0	7.09
Depth to Groundwater (after sampling) mbTOC 7.36	8	54.1	5.69	1087	224.3	12.9	7.07
	9	54.0	5.71	1087	221.0	13.0	7.06
Well Diameter (OD / ID) (mm) 63/50mm	10	54.7	5.76	1087	218.9	12.9	7.05
	11						
Odours? (Describe): No	12						
	13						
Colour? (Describe): Clear/Whitish	14						
	15						
Sediment? (Describe): No	16						
	17						
Piping retained? (yes / no) No	18						
	19						
	20						

Notes:

Borehole Low Flow Groundwater Monitoring Form

Job Details: Groundwater Round 2	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 16/04/2019 Time: 14:43
	Scientist: LA	Weather obs: Overcast, Humid

Onsite Equipment		
Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)							
Borehole No: CP1(D)	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	270.4	17.79	2605	190.0	13.0	7.31
Casing height (above ground level) (m) 0.500	1	99.7	10.87	2593	189.2	13.1	7.29
	2	96.0	10.01	2580	188.5	13.0	7.27
	3	94.6	9.88	2570	188.1	13.1	7.25
Depth to base (mbTOC) 25.40	4	94.7	9.90	2558	187.7	13.1	7.23
	5	95.1	9.93	2541	187.4	13.1	7.22
Depth to Groundwater (before sampling) mbTOC 4.15	6	95.7	9.98	2517	186.8	13.1	7.20
	7	96.2	10.06	2498	186.2	13.1	7.18
Depth to Groundwater (after sampling) mbTOC 4.34	8	97.0	10.12	2491	185.8	13.1	7.17
	9						
Well Diameter (OD / ID) (mm) 63/50mm	10						
	11						
Odours? (Describe) None	12						
	13						
Colours? (Describe) Clear	14						
	15						
Sediment? (Describe): No	16						
	17						
Piping retained? (yes / no) No	18						
	19						
	20						

Notes:

Borehole Low Flow Groundwater Monitoring Form

Job Details: Groundwater Round 2	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 16/04/2019 Time: 14:21
	Scientist: LA	Weather obs: Overcast, Humid

Onsite Equipment		
Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)							
Borehole No: CP2(D)	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	106.9	11.21	991	184.5	12.8	7.4
Casing height (above ground level) (m)	1	98.1	10.29	1092	187.1	12.8	7.33
0.56	2	94.3	9.88	1119	187.7	12.8	7.29
	3	91.1	9.61	1137	188.1	12.9	7.26
Depth to base (mbTOC)	4	89.9	9.45	1151	188.2	12.8	7.23
20.83	5	88.7	8.53	1154	188.0	12.9	7.2
Depth to Groundwater (before sampling) mbTOC	6	88.4	9.31	1152	188.0	12.9	7.18
4.42	7	88.3	9.34	1155	188.0	12.9	7.17
Depth to Groundwater (after sampling) mbTOC	8	88.6	9.32	1156	187.9	12.9	7.15
4.51	9						
Well Diameter (OD / ID) (mm)	10						
63/50mm	11						
Odours? (Describe)	12						
None	13						
Colours? (Describe)	14						
Clear	15						
Sediment? (Describe):	16						
No	17						
Piping retained? (yes / no)	18						
No	19						
	20						

Notes:

Borehole Low Flow Groundwater Monitoring Form

Job Details: Groundwater Round 2	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 16/04/2019 Time: 13:23
	Scientist: LA	Weather obs: Overcast, Humid

Onsite Equipment		
Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)							
Borehole No: CP3(D)	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	98.6	10.16	1051	188.3	13.4	7.26
Casing height (above ground level) (m)	1	98.5	9.59	1051	189.0	13.2	7.21
0.54	2	86.1	9.00	1050	189.3	13.2	7.18
	3	82.0	8.57	1050	189.1	13.2	7.14
Depth to base (mbTOC)	4	80.3	8.38	1050	188.8	13.2	7.12
17.60	5	79.5	8.32	1050	188.5	13.2	7.1
Depth to Groundwater (before sampling) mbTOC	6	79.0	8.23	1050	188.1	13.2	7.09
5.185	7	78.1	8.13	1050	187.7	13.3	7.08
Depth to Groundwater (after sampling) mbTOC	8						
5.155	9						
Well Diameter (OD / ID) (mm)	10						
63/50mm	11						
Odours? (Describe)	12						
None	13						
Colours? (Describe)	14						
Clear	15						
Sediment? (Describe):	16						
No	17						
Piping retained? (yes / no)	18						
No	19						
	20						

Notes:

Borehole Low Flow Groundwater Monitoring Form

Job Details: Groundwater Round 2	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 16/04/2019 Time: 13:00
	Scientist: LA	Weather obs: Overcast, Humid

Onsite Equipment		
Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)							
Borehole No: CP4(D)	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	96.1	9.83	1091	193.2	13.6	7.42
Casing height (above ground level) (m)	1	80.0	8.29	1089	194.3	13.5	7.34
0.50	2	72.6	7.52	1088	194.5	13.5	7.28
	3	68.2	7.08	1088	194.4	13.5	7.23
Depth to base (mbTOC)	4	64.2	6.67	1087	193.8	13.5	7.19
17.13	5	61.7	6.43	1088	192.9	13.5	7.16
	6	60.2	6.24	1088	192.9	13.5	7.13
Depth to Groundwater (before sampling) mbTOC	7	59.7	6.19	1087	191.0	13.5	7.11
7.23	8	60.0	6.21	1087	190.4	13.5	7.1
	9	60.7	6.29	1087	189.4	13.5	7.07
Depth to Groundwater (after sampling) mbTOC	10	60.5	6.29	1087	188.6	13.4	7.07
17.19	11						
Well Diameter (OD / ID) (mm)	12						
63/50mm	13						
	14						
Odours? (Describe)	15						
None	16						
	17						
Colours? (Describe)	18						
Clear	19						
	20						
Sediment? (Describe):							
No							
Piping retained? (yes / no)							
No							

Notes:

Borehole Low Flow Groundwater Monitoring Form

Job Details: Groundwater Round 3	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 24/04/2019 Time: 13:25
	Scientist: LA	Weather obs: Cloudy

Onsite Equipment		
Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)							
Borehole No: CP1	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	113.1	11.51	1274	179.9	13.5	7.39
Casing height (above ground level) (m)	1	99.2	10.31	1272	179.7	13.3	7.33
0.50	2	95.6	9.97	1267	179.4	13.3	7.29
	3	93.9	9.75	1273	178.9	13.4	7.25
Depth to base (mbTOC)	4	93.8	9.77	1268	178.2	13.3	7.23
25.40	5	93.6	9.78	1271	177.8	13.3	7.21
Depth to Groundwater (before sampling) mbTOC	6	93.9	9.78	1264	177.3	13.3	7.20
4.58	7						
Depth to Groundwater (after sampling) mbTOC	8						
4.35	9						
Well Diameter (OD / ID) (mm)	10						
63/50mm	11						
Odours? (Describe)	12						
None	13						
Colours? (Describe)	14						
Clear	15						
Sediment? (Describe):	16						
No	17						
Piping retained? (yes / no)	18						
No	19						
	20						

Notes:

Borehole Low Flow Groundwater Monitoring Form

Job Details: Groundwater Round 3	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 24/04/2019 Time: 14:38
	Scientist: LA	Weather obs: Cloudy and sunny

Onsite Equipment

Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)

Borehole No: CP2(D)	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	111.4	11.83	1295	181.2	13.4	7.12
Casing height (above ground level) (m)	1	89.7	9.22	1297	179.8	13.5	7.11
0.56	2	84.3	8.73	1300	178.8	13.5	7.10
	3	82.3	8.66	1308	177.8	13.5	7.09
Depth to base (mbTOC)	4	81.8	8.47	1308	176.8	13.4	7.09
20.83	5	81.2	8.42	1306	175.6	13.5	7.08
Depth to Groundwater (before sampling) mbTOC	6	81.4	8.46	1293	174.4	13.5	7.08
4.77	7	82.3	8.54	1283	173.5	13.5	7.07
Depth to Groundwater (after sampling) mbTOC	8	82.9	8.61	1284	173.0	13.4	7.07
4.596	9	83.6	8.71	1282	172.7	13.3	7.07
Well Diameter (OD / ID) (mm)	10	83.3	8.66	1285	172.4	13.5	7.06
63/50mm	11						
Odours? (Describe)	12						
None	13						
Colours? (Describe)	14						
Clear	15						
Sediment? (Describe):	16						
No	17						
Piping retained? (yes / no)	18						
No	19						
	20						

Notes:

Borehole Low Flow Groundwater Monitoring Form

Job Details: Groundwater Round 3	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 24/04/2019 Time: 13:55
	Scientist: LA	Weather obs: Cloudy

Onsite Equipment		
Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)							
Borehole No: CP3(D)	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	100.4	10.26	1064	168.2	13.9	7.26
Casing height (above ground level) (m)	1	90.2	9.38	1064	170.4	13.4	7.18
0.54	2	84.9	8.83	1061	170.9	13.3	7.13
	3	82.0	8.63	1063	171.1	13.3	7.11
Depth to base (mbTOC)	4	80.4	8.37	1059	171.0	13.3	7.09
17.60	5	79.0	8.25	1062	170.9	13.3	7.07
	6	78.5	8.20	1063	170.9	13.3	7.06
Depth to Groundwater (before sampling) mbTOC	7						
5.43	8						
	9						
Depth to Groundwater (after sampling) mbTOC	10						
5.415	11						
	12						
Well Diameter (OD / ID) (mm)	13						
63/50mm	14						
	15						
Odours? (Describe)	16						
None	17						
	18						
Colours? (Describe)	19						
Clear	20						
Sediment? (Describe):							
No							
Piping retained? (yes / no)							
No							

Notes:

Borehole Low Flow Groundwater Monitoring Form

Job Details: Groundwater Round 3	Site: Clifton Slips	Site Ref: EES 18.376.3
	Client: Quinn Estates	Date: 24/04/2019 Time: 13:36
	Scientist: LA	Weather obs: Cloudy

Onsite Equipment		
Interface Probe 12	Model:	Calibration:
Peristaltic Pump II	Model:	
YSI II	Model:	Calibration:

Readings(s)							
Borehole No: CP4	Time (Mins)	DO (%)	DO (mg/l / ppm)	Electrical Conductivity (uS/cm)	REDOX (mV / ORP)	Temp (°C)	pH
	0	114.8	11.26	1174	155.9	14.2	7.44
Casing height (above ground level) (m)	1	80.2	8.18	1104	160.0	13.8	7.26
0.50	2	71.1	7.33	1093	161.9	13.8	7.20
	3	66.8	6.79	1088	162.7	14.0	7.1
Depth to base (mbTOC)	4	64.2	6.58	1087	162.9	14.0	7.06
17.19	5	63.6	6.64	1087	162.7	13.9	7.04
Depth to Groundwater (before sampling) mbTOC	6	64.2	6.63	1087	162.7	13.7	7.03
7.40	7	63.7	6.57	1087	162.6	13.7	7.02
Depth to Groundwater (after sampling) mbTOC	8						
7.435	9						
Well Diameter (OD / ID) (mm)	10						
63/50mm	11						
Odours? (Describe)	12						
None	13						
Colours? (Describe)	14						
Clear	15						
Sediment? (Describe):	16						
No	17						
Piping retained? (yes / no)	18						
No	19						
	20						

Notes:

GAS SCREENING VALUE CALCULATION

Gravesham Borough Council

Wilson and Card (Situation A)

Borehole	Pipe depth (m bgl)	Response zone top (bgl. / m AOD)	Response zone base (bgl. / m AOD)	Target strata	Groundwater level (mbgl)	Date	Atmospheric pressure (mb)	Flow (l/hr)	Rel Pressure (mb)	Steady CH4 (%)	Peack CH4 (%)	Steady CO2 (%)	O2 (%) steady	Carbon Monoxide (ppm)	H2S (ppm)	BGVF CH4	BGVF CO2
CP1(S) Area 1	3.50	2.00	3.50	Made Ground	No Groundwater	10/04/19	1021	0.1	-0.15	0.00	0.00	0.7	20.3	1	0	0.0000	0.0007
						16/04/19	1016	0.1	0.05	0.00	0.00	0.3	20.5	1	0	0.0000	0.0003
						24/04/19	994	0.1	0.00	0.00	0.00	0.2	20.8	1	0	0.0000	0.0002
						01/05/19	1020	0.1	-0.17	0.00	0.00	0.3	20	1	1	0.0000	0.0003
CP1(D) Area 1	20.00	5.00	20.00	Bedrock Geology: Chalk	4.00	10/04/19	1021	0.1	-0.07	0.00	0.00	0.6	20.5	1	0	0.0000	0.0006
					3.65	16/04/19	1016	0.1	0.09	0.00	0.00	0.4	20.4	1	0	0.0000	0.0004
					4.08	24/04/19	994	0.1	0.17	0.00	0.00	0.4	20.4	1	0	0.0000	0.0004
					3.75	01/05/19	1020	0.1	-0.03	0.00	0.00	0.3	19.7	1	1	0.0000	0.0003
CP2(S) Area 1	3.50	1.00	3.50	Made Ground	No Groundwater	10/04/19	1021	0.1	-0.02	0.00	0.00	1.2	19.9	1	0	0.0000	0.0012
						16/04/19	1016	0.1	-0.14	0.00	0.00	0.8	18.4	1	1	0.0000	0.0008
						24/04/19	994	0.1	0.12	0.00	0.00	1.4	17.9	1	1	0.0000	0.0014
						01/05/19	1020	0.1	0.07	0.00	0.00	1.3	17.4	1	1	0.0000	0.0013
CP2(D) Area 1	20.00	5.00	20.00	Bedrock Geology: Chalk	4.15	10/04/19	1021	0.1	0.00	0.00	0.00	0.8	20.1	1	0	0.0000	0.0008
					3.88	16/04/19	1017	0.1	0.05	0.00	0.00	0.1	20.7	1	1	0.0000	0.0001
					4.23	24/04/19	994	0.1	0.02	0.00	0.00	0.4	19.8	1	1	0.0000	0.0004
					4.01	01/05/19	1020	0.1	-0.09	0.00	0.00	0.6	18.8	1	1	0.0000	0.0006
CP3(S) Area 2	4.00	1.00	4.00	Made Ground	No Groundwater	10/04/19	1020	0.1	0.02	0.00	0.00	0.5	20.1	1	1	0.0000	0.0005
						16/04/19	1016	0.1	-0.09	0.00	0.00	0.1	20.4	1	1	0.0000	0.0001
						24/04/19	994	0.1	0.07	0.00	0.00	0.1	20.4	1	1	0.0000	0.0001
						01/05/19	1020	0.1	-0.02	0.00	0.00	0.3	20.3	1	1	0.0000	0.0003
CP3(D) Area 2	20.00	6.00	20.00	Bedrock Geology: Chalk	4.77	10/04/19	1021	0.1	0.14	0.00	0.00	0.1	21	1	1	0.0000	0.0001
					4.63	16/04/19	1016	0.1	0.02	0.00	0.00	0.1	20.5	1	1	0.0000	0.0001
					4.87	24/04/19	994	0.1	0.03	0.00	0.00	0.1	20.6	0	1	0.0000	0.0001
					4.79	01/05/19	1020	0.1	-0.02	0.00	0.00	0.1	20.6	1	1	0.0000	0.0001
CP4(S) Area 2	7.00	1.00	7.00	Made Ground	6.74	10/04/19	1021	0.1	0.02	0.00	0.00	0.6	20.2	1	0	0.0000	0.0006
					6.78	16/04/19	1017	0.1	-0.15	0.00	0.00	0.2	20.5	0	1	0.0000	0.0002
					6.90	24/04/19	994	0.1	0.17	0.00	0.00	0.4	20.3	0	0	0.0000	0.0004
					6.96	01/05/19	1020	0.1	-0.09	0.00	0.00	0.5	20.3	0	1	0.0000	0.0005
CP4(D) Area 2	20.00	9.00	20.00	Bedrock Geology: Chalk	6.81	10/04/19	1021	0.1	0.00	0.00	0.00	0.2	20.5	6	1	0.0000	0.0002
					6.73	16/04/19	1016	0.1	-0.12	0.00	0.00	0.4	19.7	5	1	0.0000	0.0004
					6.92	24/04/19	994	0.1	0.07	0.00	0.00	0.9	19.3	3	1	0.0000	0.0009
					6.89	01/05/19	1020	0.1	-0.07	0.00	0.00	1.2	19.3	2	1	0.0000	0.0012

Maximum	0.1	0.0	0.0	1.4	0.0000	0.0014
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Maximum conc. x maximum flow rate
CH4CO2

		CS 3	3.5	3.5
		CS2	0.7	0.7
		CS1	1	1
			5	0.07
				0.07

Characteristic Situation

GENERIC ASSESSMENT CRITERIA (GAC)

Gravesham Borough Council

Generic Assessment Criteria (GACs) (Version 2 - October 2015) CLEA v1.071

Sandy loam with 1% SOM

[Numbers in bold are SGVs or GSSCs that are derived based on SGV report input (toxicology & exposure) parameters, numbers in italics are S4ULs,

numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters,

underlined numbers are derived C4SLs (only 6% C4SLs published - not 1% and 2.5%) based on C4SL input (toxicology & exposure) parameters.]

	Soil Guideline values (SGVs) or Generic Assessment Criteria (GAC) if no SGV available for standard landuses (for model software used see comments)									
Contaminants	Residential with home grown produce	Residential without home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}	Vapour saturation limit	Aqueous saturation limit		
Metals										
Beryllium	1.7	1.7	35	12	2.2	63	26			
Boron	290	11,000	45	240,000	21,000	46,000				
Cadmium	10 ⁽⁸⁾ 22	85 ⁽⁸⁾ 150	1.8 3.9	230 410	120 220	560 880				
Chromium III	886	886	15,300	8,600	1,500	33,000				
Chromium VI	4 21	4 21	1.8 170	33 49	7.7 21	220 250				
Lead	200	310	80	2,300	630	1,300				
Mercury (elemental)	1	1	26	26	16	26* [30]				
(inorganic)	170	240	80	3600	120	240				
Nickel	130	180	50	980	230	800				
Vanadium	410	1200	91	9000	2000	5000				
Copper	2400	7100	520	68000	12000	44000				
Zinc	3700	40000	620	730000	81000	170000				
Semi-Metals and non-metals										
Arsenic	32 ⁽⁷⁾ 37	35 ⁽⁷⁾ 40	43 ⁽⁷⁾ 49	640 ⁽⁷⁾ 640	79 79	170 170				
Antimony		550		7500	1500	3300				
Selenium	350	600	120	13000	1100	1800				
Inorganic chemicals										
Free Cyanide	256 ⁽¹³⁾		23700 ⁽¹³⁾	51 ⁽¹³⁾						
Organic contaminants										
<i>Aliphatic risk banded hydrocarbons - TPHCWG method</i>										
EC _{>5} - EC ₆	42	42	730	3200	570000	95000	510	340		
EC _{>6} - EC ₈	100	100	2300	7800	600000	150000	280	160		
EC _{>8} - EC ₁₀	27	27	320	2000	13000	14000	18	82		
EC ₁₀ -EC ₁₂	130	130	2200	9700	13000	21000	130	50		
EC ₁₂ -EC ₁₆	1100	1100	11000	59000	13000	25000	63	22		
EC _{>16} - EC ₃₅	65000	65000	260000	1600000	250000	450000	28	9.2		
EC _{>35} - EC ₄₄	65000	65000	260000	1600000	250000	450000				
<i>Aromatic risk banded hydrocarbons - TPHCWG method</i>										
EC _{>5} - EC ₇	70	370	13	26000	56000	76000	1400	620		
EC _{>7} - EC ₈	130	860	22	56000	56000	87000				
EC _{>8} - EC ₁₀	34	47	8.6	3500	5000	7200				
EC ₁₀ - EC ₁₂	74	250	13	16000	5000	9200			9200	370
EC ₁₂ - EC ₁₆	140	1800	23	36000	5100	10000			460	170
EC _{>16} - EC ₂₁	260	1900	46	28000	3800	7600			210	60
EC _{>21} - EC ₃₅	1100	1900	370	28000	3800	7800			31	4.8
EC _{>35} - EC ₄₄	1100	1900	370	28000	3800	7800				
Aliph + Arom EC >44-70	1600	1900	1200	28000	3800	7800				
<i>Aromatic</i>										
Benzene	0.08 0.2 ⁽⁶⁾	0.27 0.89 ⁽⁶⁾	0.017 0.039 ⁽⁶⁾	28 27 ⁽⁶⁾	72 142 ⁽⁶⁾	90 190 ⁽⁶⁾	1200	1200		
Ethyl benzene	65	170	16	520* [17000]	520* [24000]	520* [17000]	520	520		
Toluene	120	610	22	860* [59000]	860* [56000]	860* [87000]	860	860		
Xylene**	41	53	28	480* [69000]	480* [41000]	480* [17000]	520	480		
Phenol	180	310	66	760 ⁽⁹⁾ (31000)	760 ⁽⁹⁾ (10000)	760 ⁽⁹⁾ (7600)	41000	62000		
Polycyclic Aromatic Hydrocarbons (PAH)										
Naphthalene	2.3	2.3	4.1	190	4900	1200	76	0.91		
Acenaphthylene	170	2900	28	83000	15000	29000	2.8			
Acenaphthene	210	3000	34	84000	15000	29000				
Fluorene	170	2800	27	63000	9900	20000				
Phenanthrene	95	1300	15	22000	3100	6200				
Anthracene	2400	31000	380	520000	74000	150000				
Fluoranthene	280	1500	52	23000	3100	6300				
Pyrene	620	3700	110	54000	7400	15000				
Benz(a)anthracene	7.2	11	2.9	170	29	49				
Chrysene	15	30	4.1	350	57	93				
Benzo(b)fluoranthene	2.6	3.9	0.99	44	7.1	13				
Benzo(k)fluoranthene	77	110	37	1200	190	370				
Benzo(a)pyrene	2.2 5 ⁽⁷⁾	3.2 5.3 ⁽⁷⁾	0.97 5.72 ⁽⁷⁾	35 77 ⁽⁷⁾	5.7 10 ⁽⁷⁾	11 21.4 ⁽⁷⁾				
Indeno(123cd)pyrene	27	45	9.5	500	82	150				
Dibenzo(ah)anthracene	0.24	0.31	0.14	3.5	0.57	1.1				
Benzo(ghi)perylene	320	360	290	3900	640	1400				
Chlorinated Aliphatic Hydrocarbons										
Vinyl chloride	0.00064	0.00077	0.00055	0.059	3.5	4.8		1500	1500	
Trichloroethene (TCE)	0.016	0.017	0.041	1.2	120	70				
1,1,1,2 Tetrachloroethane	1.2	1.5	0.79	110	1400	1500				
1,1,2,2 Tetrachloroethane	1.6	3.9	0.41	270	1400	1800				
Tetrachlorethene (PCE)	0.18	0.18	0.65	19	1400	810	424			
1,1,1 Trichlorethane	8.8	9	48	660	140000	57000				

All values above are in mg/kg

Soil organic matter (SOM) is assumed to be 1%

Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE

For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model

For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly

For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m-3

*Based on vapour saturation limit as suggested by EA / [] model value

**Lowest of o-, m- and p-xylene

⁵⁾Based on comparison of inhalation exposure with inhalation TDI

⁶⁾Based on comparison of oral, dermal, and inhalation exposure with the oral TDI

⁷⁾Based on a comparison of oral and dermal soil exposure with oral Index Dose only.

⁸⁾Averaged over and based on lifetime exposure

⁹⁾ Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure provided for illustration only)

⁽¹⁰⁾Based on the assumption that the average daily exposure (ADE) is approximately 5.9% of the overall exposure from dioxins, furans and dioxin-like PCBs

⁽¹¹⁾Based on the assumption that the average daily exposure (ADE) is approximately 5.5% of the overall exposure from dioxins, furans and dioxin-like PCBs

⁽¹²⁾Based on the assumption that the average daily exposure (ADE) is approximately 5.6% of the overall exposure from dioxins, furans and dioxin-like PCBs

NA: Not applicable

⁽¹³⁾Derived in-house Ecologia GAC

LABORATORY SCREENING TABLES

Gravesham Borough Council

				AREA 1 - TRIAL PITTING & DRILLING											AREA 2 - TRIAL PITTING & DRILLING				
Category	Parameter	Units	LOD	Sample ID GAC - Resi. without home grown produce (1% SOM)	TP1	TP3	TP4	TP8	CP1	TP11	TP12	TP13	TP14	TP16					
					0.40-0.60	1.50-2.00	0.30-0.50	1.50-2.00	5.00-5.50	2.00-2.40	0.50-0.80	0.70-1.00	1.20-1.50	2.50-2.70					
					Date	11/02/2019	11/02/2019	11/02/2019	12/02/2019	26/03/2019	03/04/2019	03/04/2019	03/04/2019	03/04/2019					
					Report No.	19-28780-1	19-28780-1	19-28780-1	19-28780-1	19-35615-1	19-36219-1	19-36219-1	19-36219-1	19-36219-1	19-36759-1				
Inorganic	Stone Content	%	0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1					
	Moisture Content	%	N/A		19	15	13	23	19	17	15	17	19	14					
	Total mass of sample received	kg	0.001		1.3	1.2	1.5	1.4	1.6	2	1.7	2	1.8	2					
	Asbestos Identification Name	Type	N/A		Chrysotile & Amosite & Crocidolite	Chrysotile & Amosite	Chrysotile & Amosite	-	-	-	Chrysotile	-	-	-					
	Asbestos in Soil Screen	Type	N/A		Detected	Detected	Detected	Not-detected	Not-detected	Not-detected	Detected	Not-detected	Not-detected	Not-detected					
	Asbestos Quantification (Stage 2)	%	0.001	Detection	0.084	0.041	0.01				< 0.001								
PAH	Asbestos Quantification Total	%	0.001	Detection	0.084	0.041	0.01				< 0.001								
	pH - Automated	pH Units	N/A		7.9	7.7	10.8	8.9	8.5	8.6	8.5	8.1	8.2	8.2					
	Total Cyanide	mg/kg	1		< 1	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1					
	Free Cyanide	mg/kg	1		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1					
	Total Sulphate as SO4	mg/kg	50		2600	6200	2800	900	650	900	950	660	1200	810					
	Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125		0.58	0.74	0.17	0.34	< 0.0013	0.055	0.054	0.018	0.39	0.043					
	Sulphide	mg/kg	1		6.7	4	11	< 1.0	2.8	1.5	15	< 1.0	< 1.0	< 1.0					
	Elemental Sulphur	mg/kg	5		8.6	15	8.6	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	7.8					
	Fraction Organic Carbon (FOC)	N/A	0.001		0.031	0.03	0.023	0.0015	0.0015	0.0061	0.0051	0.0025	0.0017	0.0043					
	Total Phenols (monohydric)	mg/kg	1	310	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
	Naphthalene	mg/kg	0.05	2.3	0.6	0.28	0.27	< 0.05	< 0.05	< 0.05	0.41	< 0.05	< 0.05	< 0.05					
	Acenaphthylene	mg/kg	0.1	2900	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05					
	Acenaphthene	mg/kg	0.1	3000	0.27	< 0.05	0.37	< 0.05	< 0.05	< 0.05	0.42	< 0.05	< 0.05	< 0.05					
	Fluorene	mg/kg	0.1	2800	0.3	0.19	0.32	< 0.05	< 0.05	< 0.05	0.52	< 0.05	< 0.05	< 0.05					
	Phenanthrene	mg/kg	0.1	1300	5.3	3.9	4.3	< 0.05	< 0.05	1.3	6	< 0.05	< 0.05	< 0.05					
	Anthracene	mg/kg	0.1	31000	0.98	0.66	0.83	< 0.05	< 0.05	0.37	1.3	< 0.05	< 0.05	< 0.05					
	Fluoranthene	mg/kg	0.1	1500	10	7.2	8	< 0.05	< 0.05	1.9	7	< 0.05	< 0.05	< 0.05					
	Pyrene	mg/kg	0.1	3700	8.7	6.5	6.9	< 0.05	< 0.05	1.7	5.6	< 0.05	< 0.05	< 0.05					
	Benzo(a)anthracene	mg/kg	0.1	11	5.6	4.6	4.1	< 0.05	< 0.05	0.95	2.6	< 0.05	< 0.05	< 0.05					
	Chrysene	mg/kg	0.05	30	5.2	3.8	4	< 0.05	< 0.05	0.85	3	< 0.05	< 0.05	< 0.05					
	Benzo(b)fluoranthene	mg/kg	0.1	3.9	6.4	5.3	5.6	< 0.05	< 0.05	0.83	2.4	< 0.05	< 0.05	< 0.05					
	Benzo(k)fluoranthene	mg/kg	0.1	110	2.8	2.4	2.2	< 0.05	< 0.05	0.47	1.6	< 0.05	< 0.05	< 0.05					
	Benzo(a)pyrene	mg/kg	0.1	3.2	5.4	4.4	4.5	< 0.05	< 0.05	0.65	2.4	< 0.05	< 0.05	< 0.05					
	Indeno(1,2,3-cd)pyrene	mg/kg	0.1	45	2.7	2.4	2.3	< 0.05	< 0.05	0.3	1.3	< 0.05	< 0.05	< 0.05					
	Dibenz(a,h)anthracene	mg/kg	0.1	0.31	0.54	0.53	0.43	< 0.05	< 0.05	< 0.05	0.36	< 0.05	< 0.05	< 0.05					
	Benzo(ghi)perylene	mg/kg	0.05	360	3.5	3	2.9	< 0.05	< 0.05	0.49	1.6	< 0.05	< 0.05	< 0.05					
Metals	Speciated Total EPA-16 PAHs	mg/kg	1.6		58.2	45	47	< 0.80	< 0.80	9.83	36.4	< 0.80	< 0.80	< 0.80					
	Arsenic (aqua regia extractable)	mg/kg	1	35	53	110	28	2.6	< 1.0	5.7	7.3	6.5	< 1.0	6.7					
	Beryllium (aqua regia extractable)	mg/kg	0.06	1.7	1	3.1	0.5	< 0.06	< 0.06	0.38	0.63	1.7	0.21	0.51					
	Boron (water soluble)	mg/kg	0.2	11000	6.3	7.2	2.1	0.9	0.4	0.9	1.3	1	0.9	1.1					
	Cadmium (aqua regia extractable)	mg/kg	0.2	85	6	8.4	0.9	0.4	0.3	0.3	0.4	< 0.2	0.4	0.2					
	Chromium (hexavalent)	mg/kg	4	4	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0					
	Chromium (aqua regia extractable)	mg/kg	1	886	110	95	36	3.6	2.9	16	31	84	14	19					
	Copper (aqua regia extractable)	mg/kg	1	7100	5200	13000	370	23	5.9	180	28	13	6.1	19					
	Lead (aqua regia extractable)	mg/kg	1	310	770	3800	1200	21	4.2	99	46	12	5.8	24					
	Mercury (aqua regia extractable)	mg/kg	0.3	1	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3					
	Nickel (aqua regia extractable)	mg/kg	1	180	160	220	42	5.8	2.9	12	21	23	8.2	14					
	Selenium (aqua regia extractable)	mg/kg	1	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.6	< 1.0	< 1.0	< 1.0	1					
	Vanadium (aqua regia extractable)	mg/kg	1	1200	330	140	42	8.6	4.8	20	33	61	13	29					
	Zinc (aqua regia extractable)	mg/kg	1	40000	2000	3800	790	24	19	110	60	61	20	41					
BTEX	Benzene	µg/kg	1	270	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
	Toluene	µg/kg	1	610000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
	Ethylbenzene	µg/kg	1	170000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
	p & m-xylene	µg/kg	1	53000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
	o-xylene	µg/kg	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
TPH	MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
	TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	42	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001					
	TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	100	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001					
	TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	27	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001					
	TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	130	< 1.0	< 1.0	1.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	4.1					
	TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	1100	11	15	46	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	8.6					
	TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8		81	51	92	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	18					
	TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	65000	490	380	210	< 8.0	< 8.0	< 8.0	34	< 8.0	< 8.0	57					
	TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10		580	440	350	< 10	< 10	< 10	41	< 10	< 10	87					
	TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	370	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001					
	TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	860	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001					
	TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	47	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001					
	TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	250	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0					
	TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	1800	4	5.8	22	< 2.0	< 2.0	< 2.0	6.3	< 2.0	< 2.0	< 2.0					
	TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	1900	68	53	93	< 10	< 10	20	59	< 10	< 10	< 10					
	TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	1900	310	250	200	< 10	< 10	30	110	< 10	< 10	< 10					
	TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10		380	310	310	< 10	< 10	50	170	< 10	< 10	< 10					
	TPHCWG - Total C5 - C44 Aliphatic & Aromatic	mg/kg	10		960	750	660	< 10	< 10	50	210	< 10	< 10	87					

					AREA 1 - TRIAL PITTING & DRILLING					AREA 2 - TRIAL PITTING & DRILLING	
				Sample ID	TP1	TP3	TP4	TP8	CP1	TP16	CP3
				Depth	0.40-0.60	1.50-2.00	0.30-0.50	1.50-2.00	5.00-5.50	2.50-2.70	3
				Date	11/02/2019	11/02/2019	11/02/2019	12/02/2019	26/03/2019	03/04/2019	04/04/2019
				Report No.	19-28780-1	19-28780-1	19-28780-1	19-28780-1	19-35636-1	19-36759-1	19-36780-1
Category	Parameter	Unit	LOD	EQS							
Metals	Boron (dissolved)	µg/l	10	NA	120	130	39	23	< 10	< 10	49
	Arsenic (dissolved)	µg/l	1.1	50	3.9	4.6	2.3	3.5	2.7	3	2.1
	Cadmium (dissolved)	µg/l	0.08	0.08	< 0.08	0.19	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
	Copper (dissolved)	µg/l	0.7	1	13	21	290	7.8	< 0.7	13	3.6
	Nickel (dissolved)	µg/l	0.3	4	1.1	4.9	3.7	< 0.3	< 0.3	0.9	0.8
	Lead (dissolved)	µg/l	1	1.2	2	3.5	4.8	1.5	2.4	< 1.0	5.4
	Selenium (dissolved)	µg/l	4	NA	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
	Zinc (dissolved)	µg/l	0.4	10.9	10	65	2.8	4	0.7	4.3	0.9
TPH	Chromium (hexavalent)	µg/l	5	3.4	< 5.0	< 5.0	14	< 5.0	< 5.0	< 5.0	< 5.0
	TPH7 - Aliphatic >C5 - C6	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	TPH7 - Aliphatic >C6 - C8	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	TPH7 - Aliphatic >C8 - C10	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	TPH7 - Aliphatic >C10 - C12	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	TPH7 - Aliphatic >C12 - C16	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	TPH7 - Aliphatic >C16 - C21	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	TPH7 - Aliphatic >C21 - C35	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	TPH7 - Aromatic >C5 - C7	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	TPH7 - Aromatic >C7 - C8	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	TPH7 - Aromatic >C8 - C10	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	TPH7 - Aromatic >C10 - C12	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	TPH7 - Aromatic >C12 - C16	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	TPH7 - Aromatic >C16 - C21	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	TPH7 - Aromatic >C21 - C35	µg/l	10	NA	21	< 10	< 10	< 10	< 10	< 10	< 10
PAH	Naphthalene	µg/l	0.01	2	0.72	< 0.01	0.5	< 0.01	< 0.01	< 0.01	< 0.01
	Acenaphthylene	µg/l	0.01	NA	0.11	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Acenaphthene	µg/l	0.01	NA	0.2	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Fluorene	µg/l	0.01	NA	0.35	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Phenanthrene	µg/l	0.01	NA	1.7	< 0.01	0.46	< 0.01	< 0.01	< 0.01	< 0.01
	Anthracene	µg/l	0.01	0.1	1.4	< 0.01	0.22	< 0.01	< 0.01	< 0.01	< 0.01
	Fluoranthene	µg/l	0.01	0.0063	3.2	< 0.01	0.97	< 0.01	< 0.01	< 0.01	< 0.01
	Pyrene	µg/l	0.01	NA	3.2	< 0.01	0.96	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo(a)anthracene	µg/l	0.01	NA	2.7	< 0.01	0.96	< 0.01	< 0.01	< 0.01	< 0.01
	Chrysene	µg/l	0.01	NA	2.9	< 0.01	1.1	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo(b)fluoranthene	µg/l	0.01	NA	2.7	< 0.01	1	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo(k)fluoranthene	µg/l	0.01	NA	2.8	< 0.01	1.1	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo(a)pyrene	µg/l	0.01	0.00017	2.6	< 0.01	0.97	< 0.01	< 0.01	< 0.01	< 0.01
	Dibenz(a,h)anthracene	µg/l	0.01	NA	2.5	< 0.01	0.99	< 0.01	< 0.01	< 0.01	< 0.01
	Indeno(1,2,3-cd)pyrene	µg/l	0.01	NA	2.5	< 0.01	0.98	< 0.01	< 0.01	< 0.01	< 0.01
	Benzo(ghi)perylene	µg/l	0.01	NA	2.5	< 0.01	0.98	< 0.01	< 0.01	< 0.01	< 0.01
	Total EPA-16 PAHs	µg/l	0.2	NA	32	< 0.2	11	< 0.2	< 0.2	< 0.2	< 0.2
	Inorganic	Total Phenols (monohydric)	µg/l	10	7.7	< 10	< 10	< 10	< 10	< 10	< 10
Total Cyanide		µg/l	10	1	< 10	< 10	12	< 10	< 10	< 10	< 10
Free Cyanide		µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Total Organic Carbon (TOC)		mg/l	0.1	NA	7.64	6.41	21.6	4.19	2.3	3.26	3
BTEX	Benzene	µg/l	1	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	Toluene	µg/l	1	74	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	Ethylbenzene	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	p & m-xylene	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	o-xylene	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Inorganic	pH	pH Units	N/A	NA	7.9	8	11	7.9	8.7	8.3	8.8
	Sulphate as SO4	µg/l	100	NA	84700	78000	11800	24100	3340	2980	60100
	Sulphide	µg/l	5	NA	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Metals	Beryllium (dissolved)	µg/l	0.2	NA	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	Chromium (dissolved)	µg/l	0.4	NA	1	2.9	28	0.6	< 0.4	1.5	1.4
	Mercury (dissolved)	µg/l	0.5	0.07	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Vanadium	µg/l	1.7	NA	3.4	< 1.7	5.7	< 1.7	< 1.7	5.2	5.3
	TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10

				ROUND 1 - 10/04/2019				ROUND 2 - 16/04/2019				ROUND 3 - 24/04/2019			
			Sample ID	CP1	CP2	CP3	CP4	CP1	CP2	CP3	CP4	CP1	CP2	CP3	CP4
			Date	10/04/2019	10/04/2019	10/04/2019	10/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	24/04/2019	24/04/2019	24/04/2019	24/04/2019
			Report No.	19-37087-1	19-37087-1	19-37087-1	19-37087-1	19-37917-1	19-37917-1	19-37917-1	19-37917-1	19-38710-1	19-38710-1	19-38710-1	19-38710-1
Parameter	Units	LOD	EQS												
pH	pH Units	N/A	NA	7.5	7.3	7.3	7.3	7.4	7.3	7.3	7.3	7.3	7.3	7.2	7.2
Total Cyanide	µg/l	10	1	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Free Cyanide	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Sulphate as S04	µg/l	45	NA	50600	72100	75100	84400	97100	64400	77200	73000	61500	79900	78900	98800
Sulphide	µg/l	5	NA	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Organic Carbon (TOC)	mg/l	0.1	NA	1.5	3.49	1.77	3.19	2.56	2.79	2.43	1.75	0.68	1.84	0.88	2.22
Alkalinity	mgCaCO3/l	3	NA	470	540	500	260	400	370	460	400	450	430	410	450
Total Phenols (monohydric)	µg/l	10	7.7	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene	µg/l	0.01	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
Acenaphthylene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	0.0063	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	0.00017	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total EPA-16 PAHs	µg/l	0.16	NA	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
Arsenic (dissolved)	µg/l	0.15	50	0.36	0.28	< 0.15	0.2	0.67	0.42	< 0.15	0.17	0.75	0.27	0.25	0.18
Beryllium (dissolved)	µg/l	0.1	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	NA	75	110	110	130	170	100	120	140	83	110	110	120
Cadmium (dissolved)	µg/l	0.02	0.08	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Chromium (hexavalent)	µg/l	5	3.4	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2	50	0.3	0.3	0.3	< 0.2	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3
Copper (dissolved)	µg/l	0.5	1	7.8	3	1.2	2.8	1.5	3.1	2.6	7	0.6	0.8	< 0.5	1.5
Lead (dissolved)	µg/l	0.2	1.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.3	0.4	< 0.2	< 0.2	< 0.2	< 0.2
Mercury (dissolved)	µg/l	0.05	0.07	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	4	< 0.5	1.7	2.1	3.3	< 0.5	1.5	2.6	3.2	0.8	1.5	2.1	3
Selenium (dissolved)	µg/l	0.6	NA	7.4	6.2	4.9	4.9	11	4.6	3.8	4	< 0.6	< 0.6	< 0.6	< 0.6
Vanadium (dissolved)	µg/l	0.2	NA	0.6	0.3	0.3	< 0.2	0.7	0.6	0.3	0.2	0.5	0.3	0.3	< 0.2
Zinc (dissolved)	µg/l	0.5	10.9	< 0.5	< 0.5	5	12	< 0.5	1	7.4	8.4	1.8	1.8	5.4	9.2
Benzene	µg/l	1	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	74	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aliphatic >C5 - C6	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aliphatic >C6 - C8	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aliphatic >C8 - C10	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aliphatic >C10 - C12	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C12 - C16	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C16 - C21	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C21 - C35	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic (C5 - C35)	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C5 - C7	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aromatic >C7 - C8	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aromatic >C8 - C10	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aromatic >C10 - C12	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C12 - C16	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C16 - C21	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C21 - C35	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic (C5 - C35)	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

				ROUND 1 - 10/04/2019				ROUND 2 - 16/04/2019				ROUND 3 - 24/04/2019			
			Sample ID	CP1	CP2	CP3	CP4	CP1	CP2	CP3	CP4	CP1	CP2	CP3	CP4
			Date	10/04/2019	10/04/2019	10/04/2019	10/04/2019	16/04/2019	16/04/2019	16/04/2019	16/04/2019	24/04/2019	24/04/2019	24/04/2019	24/04/2019
			Report No.	19-37087-1	19-37087-1	19-37087-1	19-37087-1	19-37917-1	19-37917-1	19-37917-1	19-37917-1	19-38710-1	19-38710-1	19-38710-1	19-38710-1
Parameter	Units	LOD	DWS												
pH	pH Units	N/A	NA	7.5	7.3	7.3	7.3	7.4	7.3	7.3	7.3	7.3	7.3	7.2	7.2
Total Cyanide	µg/l	10	50	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Free Cyanide	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Sulphate as S04	µg/l	45	250000	50600	72100	75100	84400	97100	64400	77200	73000	61500	79900	78900	98800
Sulphide	µg/l	5	NA	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Organic Carbon (TOC)	mg/l	0.1	NA	1.5	3.49	1.77	3.19	2.56	2.79	2.43	1.75	0.68	1.84	0.88	2.22
Alkalinity	mgCaCO3/l	3	NA	470	540	500	260	400	370	460	400	450	430	410	450
Total Phenols (monohydric)	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	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
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NA	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total EPA-16 PAHs	µg/l	0.16	0.1	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
Arsenic (dissolved)	µg/l	0.15	10	0.36	0.28	< 0.15	0.2	0.67	0.42	< 0.15	0.17	0.75	0.27	0.25	0.18
Beryllium (dissolved)	µg/l	0.1	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	1000	75	110	110	130	170	100	120	140	83	110	110	120
Cadmium (dissolved)	µg/l	0.02	5	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Chromium (hexavalent)	µg/l	5	NA	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2	50	0.3	0.3	0.3	< 0.2	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3
Copper (dissolved)	µg/l	0.5	2000	7.8	3	1.2	2.8	1.5	3.1	2.6	7	0.6	0.8	< 0.5	1.5
Lead (dissolved)	µg/l	0.2	10	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.3	0.4	< 0.2	< 0.2	< 0.2	< 0.2
Mercury (dissolved)	µg/l	0.05	1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	20	< 0.5	1.7	2.1	3.3	< 0.5	1.5	2.6	3.2	0.8	1.5	2.1	3
Selenium (dissolved)	µg/l	0.6	10	7.4	6.2	4.9	4.9	11	4.6	3.8	4	< 0.6	< 0.6	< 0.6	< 0.6
Vanadium (dissolved)	µg/l	0.2	NA	0.6	0.3	0.3	< 0.2	0.7	0.6	0.3	0.2	0.5	0.3	0.3	< 0.2
Zinc (dissolved)	µg/l	0.5	NA	< 0.5	< 0.5	5	12	< 0.5	1	7.4	8.4	1.8	1.8	5.4	9.2
Benzene	µg/l	1	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aliphatic >C5 - C6	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aliphatic >C6 - C8	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aliphatic >C8 - C10	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aliphatic >C10 - C12	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C12 - C16	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C16 - C21	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic >C21 - C35	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aliphatic (C5 - C35)	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C5 - C7	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aromatic >C7 - C8	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aromatic >C8 - C10	µg/l	1	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH7 - Aromatic >C10 - C12	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C12 - C16	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C16 - C21	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic >C21 - C35	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH7 - Aromatic (C5 - C35)	µg/l	10	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

LABORATORY ANALYTICAL CERTIFICATES

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Analytical Report Number : 19-28780

Project / Site name:	Clifton Slipways	Samples received on:	13/02/2019
Your job number:	18.376.2	Samples instructed on:	14/02/2019
Your order number:	68,930	Analysis completed by:	20/02/2019
Report Issue Number:	1	Report issued on:	20/02/2019
Samples Analysed:	4 leachate samples - 4 soil samples		

Signed:

Jordan Hill
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

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

Analytical Report Number: 19-28780

Project / Site name: Clifton Slipways

Your Order No: 68,930

Lab Sample Number	1154490	1154491	1154492	1154493	
Sample Reference	TP1	TP3	TP4	TP8	
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)	0.40-0.60	1.50-2.00	0.30-0.50	1.50-2.00	
Date Sampled	11/02/2019	11/02/2019	11/02/2019	12/02/2019	
Time Taken	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
Moisture Content	%	N/A	NONE	19	15
Total mass of sample received	kg	0.001	NONE	1.3	1.2

Asbestos Identification Name	Type	N/A	ISO 17025	Chrysotile & Amosite & Crocidolite	Chrysotile & Amosite	Chrysotile & Amosite	-	
Asbestos in Soil Screen	Type	N/A	ISO 17025	Detected	Detected	Detected	Not-detected	
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.084	0.041	0.010	-	
Asbestos Quantification Total	%	0.001	ISO 17025	0.084	0.041	0.010	-	

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.9	7.7	10.8	8.9	
Total Cyanide	mg/kg	1	MCERTS	< 1	2	< 1	< 1	
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	
Total Sulphate as SO ₄	mg/kg	50	MCERTS	2600	6200	2800	900	
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.58	0.74	0.17	0.34	
Sulphide	mg/kg	1	MCERTS	6.7	4.0	11	< 1.0	
Elemental Sulphur	mg/kg	5	MCERTS	8.6	15	8.6	< 5.0	
Fraction Organic Carbon (FOC)	N/A	0.001	NONE	0.031	0.030	0.023	0.0015	

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	0.60	0.28	0.27	< 0.05	
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	
Acenaphthene	mg/kg	0.05	MCERTS	0.27	< 0.05	0.37	< 0.05	
Fluorene	mg/kg	0.05	MCERTS	0.30	0.19	0.32	< 0.05	
Phenanthrene	mg/kg	0.05	MCERTS	5.3	3.9	4.3	< 0.05	
Anthracene	mg/kg	0.05	MCERTS	0.98	0.66	0.83	< 0.05	
Fluoranthene	mg/kg	0.05	MCERTS	10	7.2	8.0	< 0.05	
Pyrene	mg/kg	0.05	MCERTS	8.7	6.5	6.9	< 0.05	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	5.6	4.6	4.1	< 0.05	
Chrysene	mg/kg	0.05	MCERTS	5.2	3.8	4.0	< 0.05	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	6.4	5.3	5.6	< 0.05	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	2.8	2.4	2.2	< 0.05	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	5.4	4.4	4.5	< 0.05	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.7	2.4	2.3	< 0.05	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.54	0.53	0.43	< 0.05	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.5	3.0	2.9	< 0.05	

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	58.2	45.0	47.0	< 0.80	
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Analytical Report Number: 19-28780

Project / Site name: Clifton Slipways

Your Order No: 68,930

Lab Sample Number	1154490	1154491	1154492	1154493	
Sample Reference	TP1	TP3	TP4	TP8	
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)	0.40-0.60	1.50-2.00	0.30-0.50	1.50-2.00	
Date Sampled	11/02/2019	11/02/2019	11/02/2019	12/02/2019	
Time Taken	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	53	110	28	2.6	
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.0	3.1	0.50	< 0.06	
Boron (water soluble)	mg/kg	0.2	MCERTS	6.3	7.2	2.1	0.9	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	6.0	8.4	0.9	0.4	
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	110	95	36	3.6	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	5200	13000	370	23	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	770	3800	1200	21	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	160	220	42	5.8	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	330	140	42	8.6	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	2000	3800	790	24	

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
o-xylene	µg/kg	1	MCERTS	< 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	

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 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	
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	1.6	< 1.0	
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	11	15	46	< 2.0	
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	81	51	92	< 8.0	
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	490	380	210	< 8.0	
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	580	440	350	< 10	

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 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	
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 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	
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	4.0	5.8	22	< 2.0	
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	68	53	93	< 10	
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	310	250	200	< 10	
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	380	310	310	< 10	

TPHCWG - Total C5 - C44 Aliphatic & Aromatic	mg/kg	10	NONE	960	750	660	< 10	
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Analytical Report Number: 19-28780
Project / Site name: Clifton Slipways
Your Order No: 68,930

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
1154490	TP1	0.40-0.60	145	Loose Fibrous Debris & Loose Fibres	Chrysotile & Amosite & Crocidolite	0.084	0.084
1154491	TP3	1.50-2.00	138	Loose Fibrous Debris & Loose Fibres	Chrysotile & Amosite	0.041	0.041
1154492	TP4	0.30-0.50	153	Loose Fibrous Debris & Hard/Cement Type Material	Chrysotile & Amosite	0.010	0.010

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



Analytical Report Number: 19-28780

Project / Site name: Clifton Slipways

Your Order No: 68,930

Lab Sample Number				1154494	1154495	1154496	1154497	
Sample Reference				TP1	TP3	TP4	TP8	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.40-0.60	1.50-2.00	0.30-0.50	1.50-2.00	
Date Sampled				11/02/2019	11/02/2019	11/02/2019	12/02/2019	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					
Boron (dissolved)	µg/l	10	ISO 17025	120	130	39	23	
Arsenic (dissolved)	µg/l	1.1	ISO 17025	3.9	4.6	2.3	3.5	
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	0.19	< 0.08	< 0.08	
Copper (dissolved)	µg/l	0.7	ISO 17025	13	21	290	7.8	
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.1	4.9	3.7	< 0.3	
Lead (dissolved)	µg/l	1	ISO 17025	2.0	3.5	4.8	1.5	
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0	< 4.0	
Zinc (dissolved)	µg/l	0.4	ISO 17025	10	65	2.8	4.0	
Chromium (hexavalent)	µg/l	5	NONE	< 5.0	< 5.0	14	< 5.0	
TPH7 - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	21	< 10	< 10	< 10	
Naphthalene	µg/l	0.01	ISO 17025	0.72	< 0.01	0.50	< 0.01	
Acenaphthylene	µg/l	0.01	ISO 17025	0.11	< 0.01	< 0.01	< 0.01	
Acenaphthene	µg/l	0.01	ISO 17025	0.20	< 0.01	< 0.01	< 0.01	
Fluorene	µg/l	0.01	ISO 17025	0.35	< 0.01	< 0.01	< 0.01	
Phenanthrene	µg/l	0.01	ISO 17025	1.7	< 0.01	0.46	< 0.01	
Anthracene	µg/l	0.01	ISO 17025	1.4	< 0.01	0.22	< 0.01	
Fluoranthene	µg/l	0.01	ISO 17025	3.2	< 0.01	0.97	< 0.01	
Pyrene	µg/l	0.01	ISO 17025	3.2	< 0.01	0.96	< 0.01	
Benzo(a)anthracene	µg/l	0.01	ISO 17025	2.7	< 0.01	0.96	< 0.01	
Chrysene	µg/l	0.01	ISO 17025	2.9	< 0.01	1.1	< 0.01	
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	2.7	< 0.01	1.0	< 0.01	
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	2.8	< 0.01	1.1	< 0.01	
Benzo(a)pyrene	µg/l	0.01	ISO 17025	2.6	< 0.01	0.97	< 0.01	
Dibenz(a,h)anthracene	µg/l	0.01	NONE	2.5	< 0.01	0.99	< 0.01	
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	2.5	< 0.01	0.98	< 0.01	
Benzo(ghi)perylene	µg/l	0.01	NONE	2.5	< 0.01	0.98	< 0.01	
Total EPA-16 PAHs	µg/l	0.2	NONE	32	< 0.2	11	< 0.2	
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	12	< 10	
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	
Total Organic Carbon (TOC)	mg/l	0.1	NONE	7.64	6.41	21.6	4.19	
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10	< 10	< 10	
pH	pH Units	N/A	ISO 17025	7.9	8.0	11.0	7.9	



Analytical Report Number: 19-28780

Project / Site name: Clifton Slipways

Your Order No: 68,930

Lab Sample Number				1154494	1154495	1154496	1154497	
Sample Reference				TP1	TP3	TP4	TP8	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.40-0.60	1.50-2.00	0.30-0.50	1.50-2.00	
Date Sampled				11/02/2019	11/02/2019	11/02/2019	12/02/2019	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

Sulphate as SO ₄	µg/l	100	ISO 17025	84700	78000	11800	24100	
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	

Heavy Metals / Metalloids

Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.0	2.9	28	0.6	
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	
Vanadium (dissolved)	µg/l	1.7	ISO 17025	3.4	< 1.7	5.7	< 1.7	

Petroleum Hydrocarbons

TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH-CWG - Aliphatic >C8 - C16	µg/l	10	NONE	< 10	-	-	-	

TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	21	< 10	< 10	< 10	
TPH-CWG - Aromatic >C8 - C16	µg/l	10	NONE	< 10	-	-	-	
TPH-CWG - Aromatic >C10 - C16	µg/l	10	NONE	< 10	-	-	-	
TPH-CWG - Aromatic >C10 - C35	µg/l	10	NONE	21	-	-	-	



Analytical Report Number : 19-28780

Project / Site name: Clifton Slipways

* 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 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 *
1154490	TP1	None Supplied	0.40-0.60	Brown clay and sand with rubble and gravel
1154491	TP3	None Supplied	1.50-2.00	Brown sand with gravel and vegetation.
1154492	TP4	None Supplied	0.30-0.50	Light brown sand with rubble and gravel.
1154493	TP8	None Supplied	1.50-2.00	Beige clay and sand with chalk.

Analytical Report Number : 19-28780

Project / Site name: Clifton Slipways

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 leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
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
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Elemental sulphur in soil	Determination of elemental sulphur in soil by extraction in acetonitrile followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	D	MCERTS
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L009-PL	D	NONE
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Free cyanide in soil	Determination of free 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	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide 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.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical 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

Iss No 19-28780-1 Clifton Slipways 18.376.2

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

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Analytical Report Number : 19-28780

Project / Site name: Clifton Slipways

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
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
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
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
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 2006 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
Sulphide in leachate	Determination of sulphide in leachate by ion selective electrode.	In-house method	L010-PL	W	NONE
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-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 organic carbon in leachate	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPH Chromatogram in Leachate	TPH Chromatogram in Leachate.	In-house method	L070-PL	W	NONE
TPH Chromatogram in Soil	TPH Chromatogram in Soil.	In-house method	L064-PL	D	NONE
TPH7 Ali Aro Sum	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS, speciation by interpretation.	In-house method	L064-PL	D	NONE

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

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Analytical Report Number : 19-28780

Project / Site name: Clifton Slipways

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
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

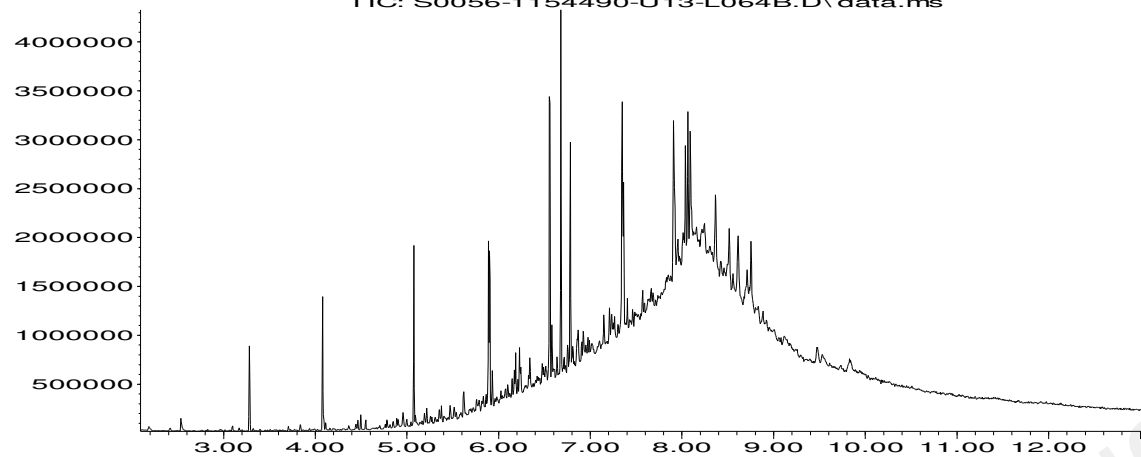
For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

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

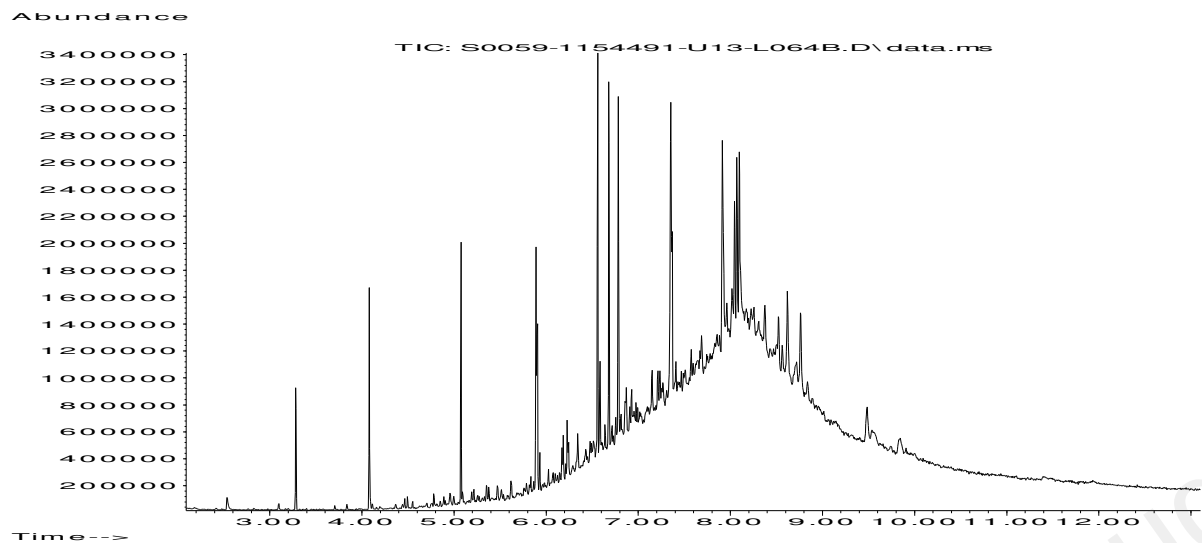
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Abundance

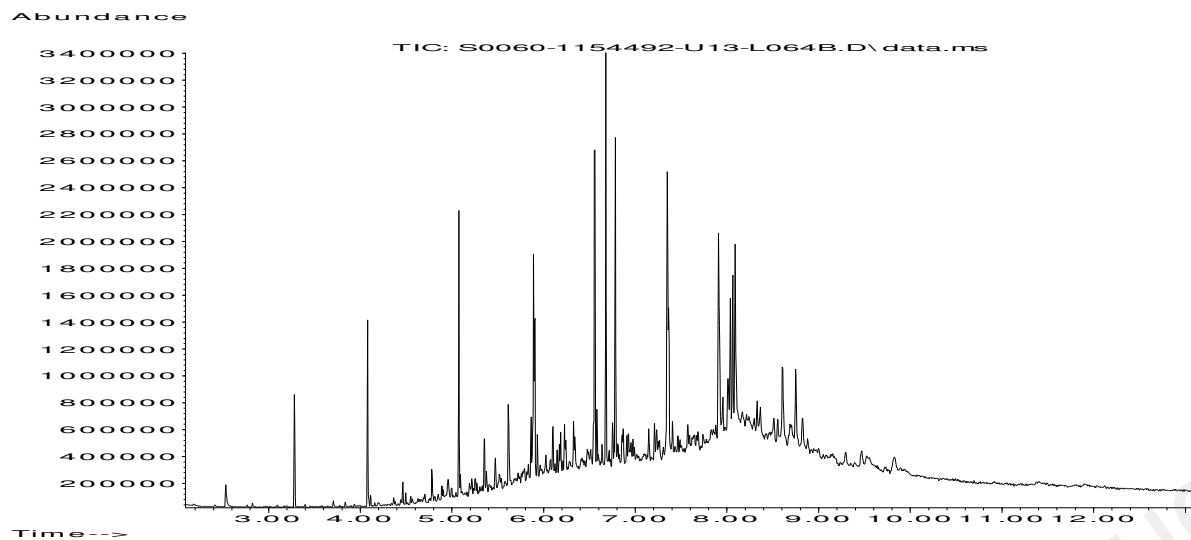
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Time-->

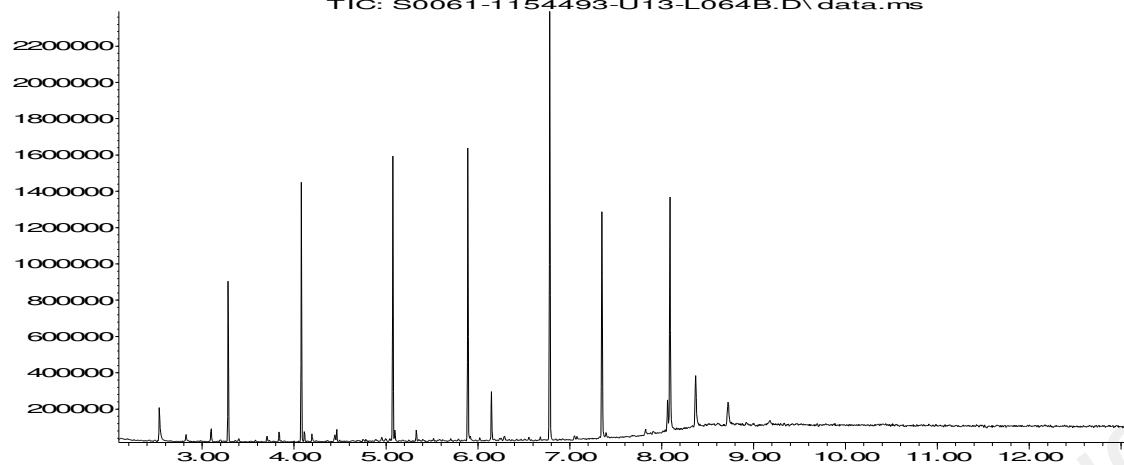


Gravesham Borough Council



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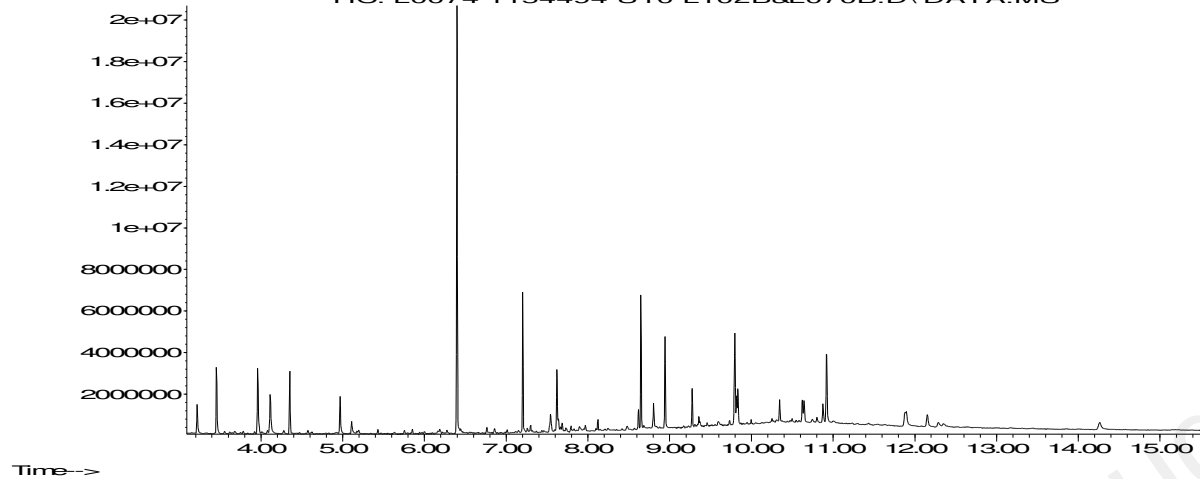


Time-->

Gravesham Borough Council

Abundance

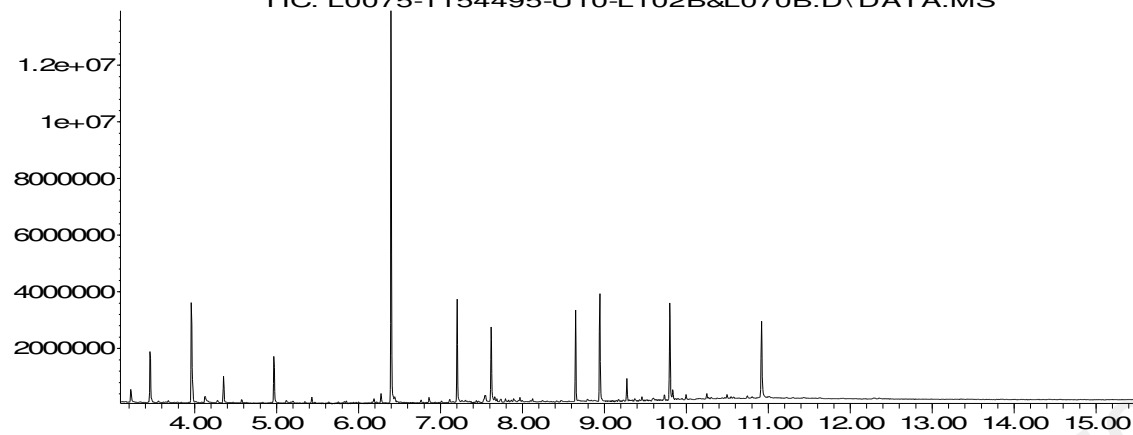
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Gravesham Borough Council

Abundance

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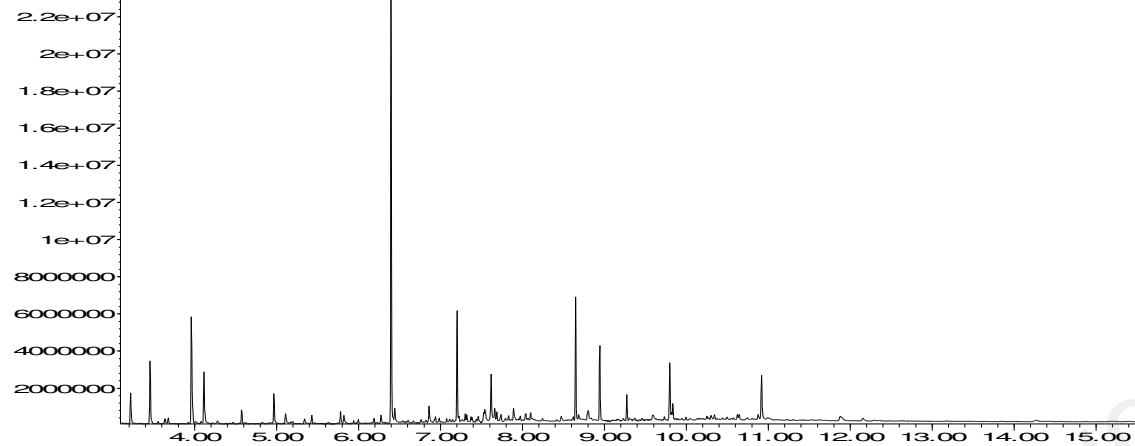


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Gravesham Borough Council

Abundance

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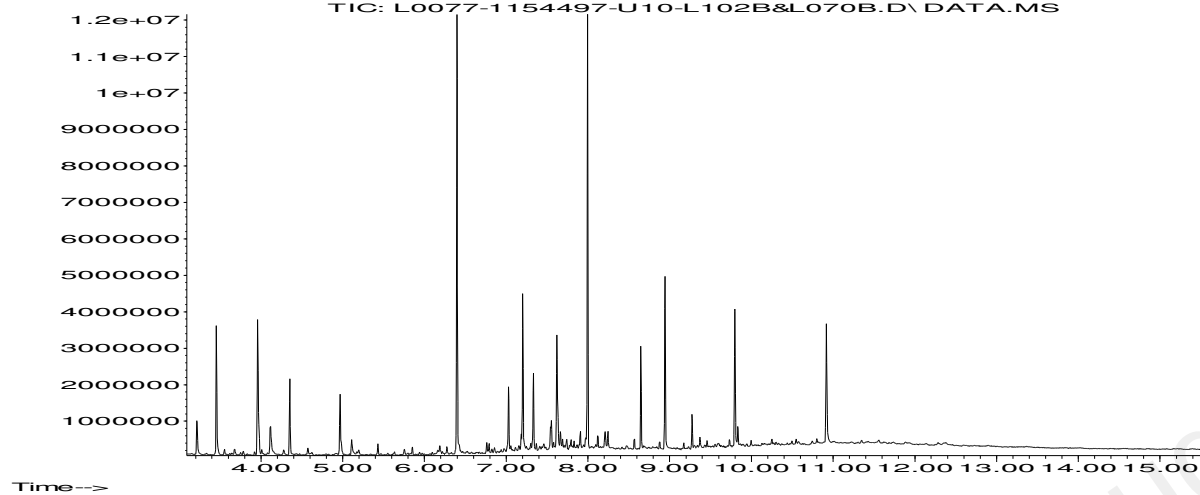


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Gravesham Borough Council

Abundance

TIC: L0077-1154497-U10-L102B&L070B.D\ DATA.MS



Time-->

Gravesham Borough Council

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Analytical Report Number : 19-35636

Project / Site name: Clifton Slips, Gravesend

Samples received on: 29/03/2019

Your job number: 18.376.3

Samples instructed on: 29/03/2019

Your order number: 69394

Analysis completed by: 05/04/2019

Report Issue Number: 1

Report issued on: 05/04/2019

Samples Analysed: 1 leachate sample - 1 soil sample

Signed: 

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

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Analytical Report Number: 19-35636

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69394

Lab Sample Number	1191406				
Sample Reference	CP1				
Sample Number	None Supplied				
Depth (m)	5.00-5.50				
Date Sampled	26/03/2019				
Time Taken	None Supplied				

Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	19				
Total mass of sample received	kg	0.001	NONE	1.6				

Asbestos in Soil Screen	Type	N/A	ISO 17025	Not-detected				
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.5				
Total Cyanide	mg/kg	1	MCERTS	< 1				
Free Cyanide	mg/kg	1	MCERTS	< 1				
Total Sulphate as SO ₄	mg/kg	50	MCERTS	650				
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	< 0.0013				
Sulphide	mg/kg	1	MCERTS	2.8				
Elemental Sulphur	mg/kg	5	MCERTS	< 5.0				
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	0.0015				

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05				
Fluorene	mg/kg	0.05	MCERTS	< 0.05				
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05				
Anthracene	mg/kg	0.05	MCERTS	< 0.05				
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05				
Pyrene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05				
Chrysene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05				
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05				
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05				

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80				
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Analytical Report Number: 19-35636

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69394

Lab Sample Number				1191406				
Sample Reference				CP1				
Sample Number				None Supplied				
Depth (m)				5.00-5.50				
Date Sampled				26/03/2019				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	< 0.06				
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	2.9				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	5.9				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	4.2				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	2.9				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	4.8				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	19				

Monoaromatics & Oxygenates

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

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				

TPHCWG - Total C5 - C44 Aliphatic & Aromatic	mg/kg	10	NONE	< 10				
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Analytical Report Number: 19-35636

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69394

Lab Sample Number				1191407				
Sample Reference				CP1				
Sample Number				None Supplied				
Depth (m)				5.00-5.50				
Date Sampled				26/03/2019				
Time Taken				None Supplied				
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					
Boron (dissolved)	µg/l	10	ISO 17025	< 10				
Arsenic (dissolved)	µg/l	1.1	ISO 17025	2.7				
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08				
Copper (dissolved)	µg/l	0.7	ISO 17025	< 0.7				
Nickel (dissolved)	µg/l	0.3	ISO 17025	< 0.3				
Lead (dissolved)	µg/l	1	ISO 17025	2.4				
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0				
Zinc (dissolved)	µg/l	0.4	ISO 17025	0.7				
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0				
TPH7 - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
Naphthalene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01				
Fluorene	µg/l	0.01	ISO 17025	< 0.01				
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01				
Anthracene	µg/l	0.01	ISO 17025	< 0.01				
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Pyrene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Chrysene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01				
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2				
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10				
Total Cyanide	µg/l	10	ISO 17025	< 10				
Free Cyanide	µg/l	10	ISO 17025	< 10				
Total Organic Carbon (TOC)	mg/l	0.1	NONE	2.30				
Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10				
pH	pH Units	N/A	ISO 17025	8.7				



Analytical Report Number: 19-35636

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69394

Lab Sample Number				1191407				
Sample Reference				CP1				
Sample Number				None Supplied				
Depth (m)				5.00-5.50				
Date Sampled				26/03/2019				
Time Taken				None Supplied				
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

Sulphate as SO ₄	µg/l	100	ISO 17025	3340				
Sulphide	µg/l	5	NONE	< 5.0				

Heavy Metals / Metalloids

Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Chromium (dissolved)	µg/l	0.4	ISO 17025	< 0.4				
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5				
Vanadium (dissolved)	µg/l	1.7	ISO 17025	< 1.7				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10				



Analytical Report Number : 19-35636

Project / Site name: Clifton Slips, Gravesend

* 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 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 *
1191406	CP1	None Supplied	5.00-5.50	White clay with chalk and gravel.

Analytical Report Number : 19-35636

Project / Site name: Clifton Slips, Gravesend

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
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 leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
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
Elemental sulphur in soil	Determination of elemental sulphur in soil by extraction in acetonitrile followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	D	MCERTS
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L009-PL	D	MCERTS
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Free cyanide in soil	Determination of free 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	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
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.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical 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

Analytical Report Number : 19-35636

Project / Site name: Clifton Slips, Gravesend

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
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
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
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
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 2006 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
Sulphide in leachate	Determination of sulphide in leachate by ion selective electrode.	In-house method	L010-PL	W	NONE
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-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 organic carbon in leachate	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPH Chromatogram in Leachate	TPH Chromatogram in Leachate.	In-house method	L070-PL	W	NONE

Analytical Report Number : 19-35636

Project / Site name: Clifton Slips, Gravesend

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
TPH Chromatogram in Soil	TPH Chromatogram in Soil.	In-house method	L064-PL	D	NONE
TPH7 Ali Aro Sum	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS, speciation by interpretation.	In-house method	L064-PL	D	NONE
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

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

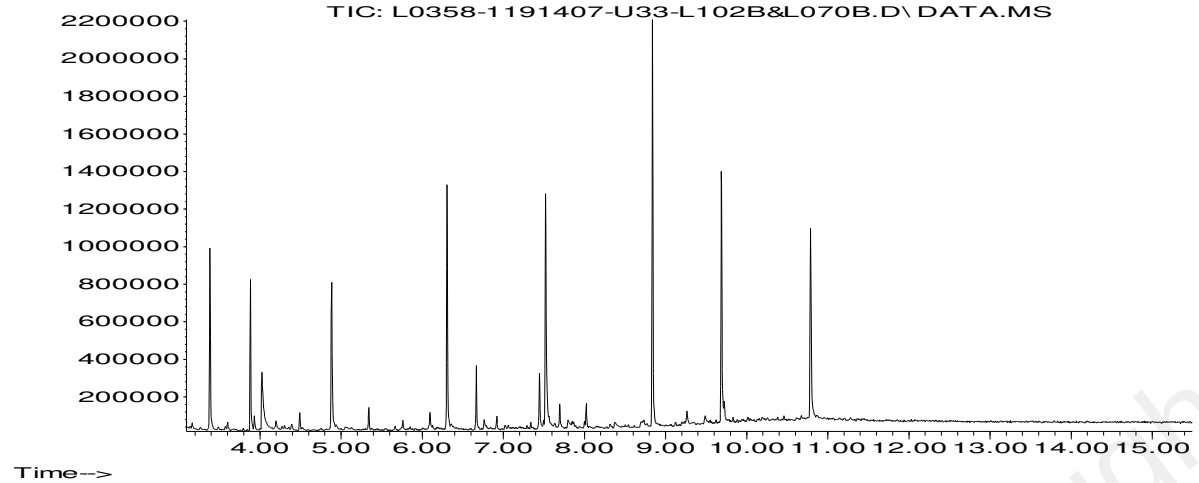
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

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.

Sample ID	Other ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
CP1		S	19-35636	1191406	bc	Free cyanide in soil	L080-PL	c
CP1		S	19-35636	1191406	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
CP1		S	19-35636	1191406	bc	TPHCWG (Soil)	L088/76-PL	b
CP1		S	19-35636	1191406	bc	Total cyanide in soil	L080-PL	c

Abundance

TIC: L0358-1191407-U33-L102B&L070B.D\DATA.MS

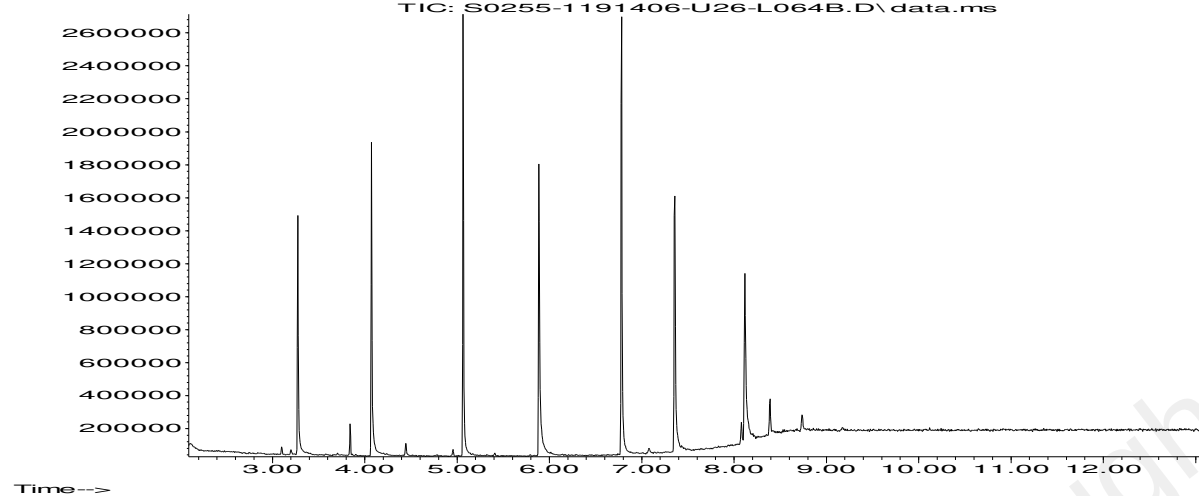


Time-->

Gravesham Borough Council

Abundance

TIC: S0255-1191406-U26-L064B.D\data.ms



Gravesham Borough Council

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Analytical Report Number : 19-36219

Project / Site name: Clifton Slips, Gravesend

Samples received on: 03/04/2019

Your job number: 18.376.3

Samples instructed on: 05/04/2019

Your order number: 69468

Analysis completed by: 12/04/2019

Report Issue Number: 1

Report issued on: 12/04/2019

Samples Analysed: 4 soil samples

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

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

Analytical Report Number: 19-36219

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69468

Lab Sample Number				1194473	1194474	1194475	1194476	
Sample Reference				TP11	TP12	TP13	TP14	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				2.00-2.40	0.50-0.80	0.70-1.00	1.20-1.50	
Date Sampled				03/04/2019	03/04/2019	03/04/2019	03/04/2019	
Time Taken				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	
Moisture Content	%	N/A	NONE	17	15	17	19	
Total mass of sample received	kg	0.001	NONE	2.0	1.7	2.0	1.8	

Asbestos Identification Name	Type	N/A	ISO 17025					
Asbestos in Soil Screen	Type	N/A	ISO 17025	-	Chrysotile	-	-	
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	< 0.001	-	-	
Asbestos Quantification Total	%	0.001	ISO 17025	-	< 0.001	-	-	

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6	8.5	8.1	8.2	
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	
Total Sulphate as SO ₄	mg/kg	50	MCERTS	900	950	660	1200	
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.055	0.054	0.018	0.39	
Sulphide	mg/kg	1	MCERTS	1.5	15	< 1.0	< 1.0	
Elemental Sulphur	mg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	0.0061	0.0051	0.0025	0.0017	

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.41	< 0.05	< 0.05	
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.42	< 0.05	< 0.05	
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.52	< 0.05	< 0.05	
Phenanthrene	mg/kg	0.05	MCERTS	1.3	6.0	< 0.05	< 0.05	
Anthracene	mg/kg	0.05	MCERTS	0.37	1.3	< 0.05	< 0.05	
Fluoranthene	mg/kg	0.05	MCERTS	1.9	7.0	< 0.05	< 0.05	
Pyrene	mg/kg	0.05	MCERTS	1.7	5.6	< 0.05	< 0.05	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.95	2.6	< 0.05	< 0.05	
Chrysene	mg/kg	0.05	MCERTS	0.85	3.0	< 0.05	< 0.05	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.83	2.4	< 0.05	< 0.05	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.47	1.6	< 0.05	< 0.05	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.65	2.4	< 0.05	< 0.05	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.30	1.3	< 0.05	< 0.05	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.36	< 0.05	< 0.05	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.49	1.6	< 0.05	< 0.05	

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	9.83	36.4	< 0.80	< 0.80	
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Analytical Report Number: 19-36219

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69468

Lab Sample Number				1194473	1194474	1194475	1194476
Sample Reference				TP11	TP12	TP13	TP14
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.00-2.40	0.50-0.80	0.70-1.00	1.20-1.50
Date Sampled				03/04/2019	03/04/2019	03/04/2019	03/04/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Unit of detection	Accreditation Status				

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.7	7.3	6.5	< 1.0
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.38	0.63	1.7	0.21
Boron (water soluble)	mg/kg	0.2	MCERTS	0.9	1.3	1.0	0.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.4	< 0.2	0.4
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	31	84	14
Copper (aqua regia extractable)	mg/kg	1	MCERTS	180	28	13	6.1
Lead (aqua regia extractable)	mg/kg	1	MCERTS	99	46	12	5.8
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	12	21	23	8.2
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	2.6	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	20	33	61	13
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	60	61	20

Monoaromatics & Oxygenates

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

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 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
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 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
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 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
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	34	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	41	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 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
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 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
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	6.3	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	20	59	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	30	110	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	50	170	< 10	< 10

TPHCWG - Total C5 - C44 Aliphatic & Aromatic	mg/kg	10	NONE	50	210	< 10	< 10
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Analytical Report Number: 19-36219
Project / Site name: Clifton Slips, Gravesend
Your Order No: 69468

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
1194474	TP12	0.50-0.80	137	Loose Fibres	Chrysotile	< 0.001	< 0.001

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



Analytical Report Number : 19-36219

Project / Site name: Clifton Slips, Gravesend

* 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 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 *
1194473	TP11	None Supplied	2.00-2.40	Brown loam and sand with chalk and gravel
1194474	TP12	None Supplied	0.50-0.80	Brown loam and sand with chalk and gravel
1194475	TP13	None Supplied	0.70-1.00	Brown sandy clay with gravel and vegetation.
1194476	TP14	None Supplied	1.20-1.50	White chalk with gravel and vegetation.

Analytical Report Number : 19-36219

Project / Site name: Clifton Slips, Gravesend

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, 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
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Elemental sulphur in soil	Determination of elemental sulphur in soil by extraction in acetonitrile followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	D	MCERTS
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L009-PL	D	MCERTS
Free cyanide in soil	Determination of free 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	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 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.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
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
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
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

Analytical Report Number : 19-36219

Project / Site name: Clifton Slips, Gravesend

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
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
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	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	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
TPH Chromatogram in Soil	TPH Chromatogram in Soil.	In-house method	L064-PL	D	NONE
TPH7 Ali Aro Sum	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS, speciation by interpretation.	In-house method	L064-PL	D	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-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 30°C.

**Lucy Allen**

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Analytical Report Number : 19-36759

Project / Site name: Clifton Slips, Gravesend

Your job number: 18.376.3

Your order number: 69468

Report Issue Number: 1

Samples Analysed: 1 leachate sample - 1 soil sample

Samples received on: 08/04/2019

Samples instructed on: 08/04/2019

Analysis completed by: 15/04/2019

Report issued on: 15/04/2019

Signed: 

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

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Analytical Report Number: 19-36759

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69468

Lab Sample Number	1197312				
Sample Reference	TP16				
Sample Number	None Supplied				
Depth (m)	2.50-2.70				
Date Sampled	03/04/2019				
Time Taken	None Supplied				

Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1			
Moisture Content	%	N/A	NONE	14			
Total mass of sample received	kg	0.001	NONE	2.0			

Asbestos in Soil Screen	Type	N/A	ISO 17025	Not-detected			
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2			
Total Cyanide	mg/kg	1	MCERTS	< 1			
Free Cyanide	mg/kg	1	MCERTS	< 1			
Total Sulphate as SO ₄	mg/kg	50	MCERTS	810			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.043			
Sulphide	mg/kg	1	MCERTS	< 1.0			
Elemental Sulphur	mg/kg	5	MCERTS	7.8			
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	0.0043			

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05			
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05			
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05			
Fluorene	mg/kg	0.05	MCERTS	< 0.05			
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05			
Anthracene	mg/kg	0.05	MCERTS	< 0.05			
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05			
Pyrene	mg/kg	0.05	MCERTS	< 0.05			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05			
Chrysene	mg/kg	0.05	MCERTS	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80			
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Analytical Report Number: 19-36759

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69468

Lab Sample Number				1197312				
Sample Reference				TP16				
Sample Number				None Supplied				
Depth (m)				2.50-2.70				
Date Sampled				03/04/2019				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.7				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.51				
Boron (water soluble)	mg/kg	0.2	MCERTS	1.1				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.2				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	19				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	24				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	29				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	41				

Analytical Report Number: 19-36759

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69468

Lab Sample Number				1197312				
Sample Reference				TP16				
Sample Number				None Supplied				
Depth (m)				2.50-2.70				
Date Sampled				03/04/2019				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

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

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	4.1				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	8.6				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	18				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	57				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	87				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				

TPHCWG - Total C5 - C44 Aliphatic & Aromatic	mg/kg	10	NONE	87				
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Analytical Report Number: 19-36759

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69468

Lab Sample Number				1197313				
Sample Reference				TP16				
Sample Number				None Supplied				
Depth (m)				2.50-2.70				
Date Sampled				03/04/2019				
Time Taken				None Supplied				
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					
Boron (dissolved)	µg/l	10	ISO 17025	< 10				
Arsenic (dissolved)	µg/l	1.1	ISO 17025	3.0				
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08				
Copper (dissolved)	µg/l	0.7	ISO 17025	13				
Nickel (dissolved)	µg/l	0.3	ISO 17025	0.9				
Lead (dissolved)	µg/l	1	ISO 17025	< 1.0				
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0				
Zinc (dissolved)	µg/l	0.4	ISO 17025	4.3				
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0				
TPH7 - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
Naphthalene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01				
Fluorene	µg/l	0.01	ISO 17025	< 0.01				
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01				
Anthracene	µg/l	0.01	ISO 17025	< 0.01				
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Pyrene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Chrysene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01				
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2				
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10				
Total Cyanide	µg/l	10	ISO 17025	< 10				
Free Cyanide	µg/l	10	ISO 17025	< 10				
Total Organic Carbon (TOC)	mg/l	0.1	NONE	3.26				
Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10				
pH	pH Units	N/A	ISO 17025	8.3				



Analytical Report Number: 19-36759

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69468

Lab Sample Number				1197313				
Sample Reference				TP16				
Sample Number				None Supplied				
Depth (m)				2.50-2.70				
Date Sampled				03/04/2019				
Time Taken				None Supplied				
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

Sulphate as SO ₄	µg/l	100	ISO 17025	2980				
Sulphide	µg/l	5	NONE	< 5.0				

Heavy Metals / Metalloids

Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.5				
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5				
Vanadium (dissolved)	µg/l	1.7	ISO 17025	5.2				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10				



Analytical Report Number : 19-36759

Project / Site name: Clifton Slips, Gravesend

* 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 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 *
1197312	TP16	None Supplied	2.50-2.70	Brown clay and sand with gravel and chalk.

Analytical Report Number : 19-36759

Project / Site name: Clifton Slips, Gravesend

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
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 leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
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
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Elemental sulphur in soil	Determination of elemental sulphur in soil by extraction in acetonitrile followed by HPLC.	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021-PL	D	MCERTS
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L009-PL	D	MCERTS
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Free cyanide in soil	Determination of free 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	MCERTS
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
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.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE

Analytical Report Number : 19-36759

Project / Site name: Clifton Slips, Gravesend

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
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
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
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
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 2006 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
Sulphide in leachate	Determination of sulphide in leachate by ion selective electrode.	In-house method	L010-PL	W	NONE
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-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 organic carbon in leachate	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS

Analytical Report Number : 19-36759

Project / Site name: Clifton Slips, Gravesend

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
TPH Chromatogram in Leachate	TPH Chromatogram in Leachate.	In-house method	L070-PL	W	NONE
TPH Chromatogram in Soil	TPH Chromatogram in Soil.	In-house method	L064-PL	D	NONE
TPH7 Ali Aro Sum	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS, speciation by interpretation.	In-house method	L064-PL	D	NONE
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

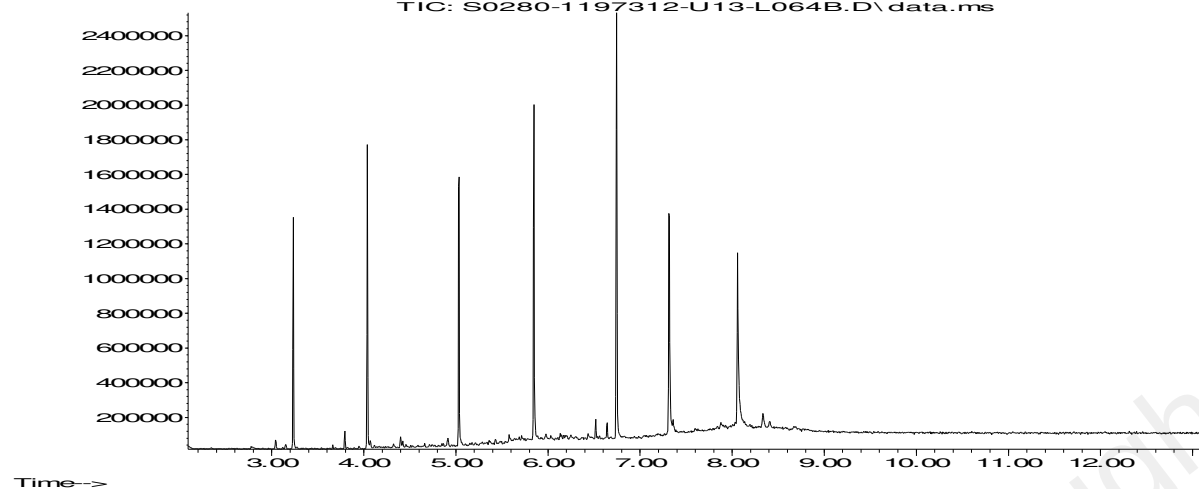
For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

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.

Abundance

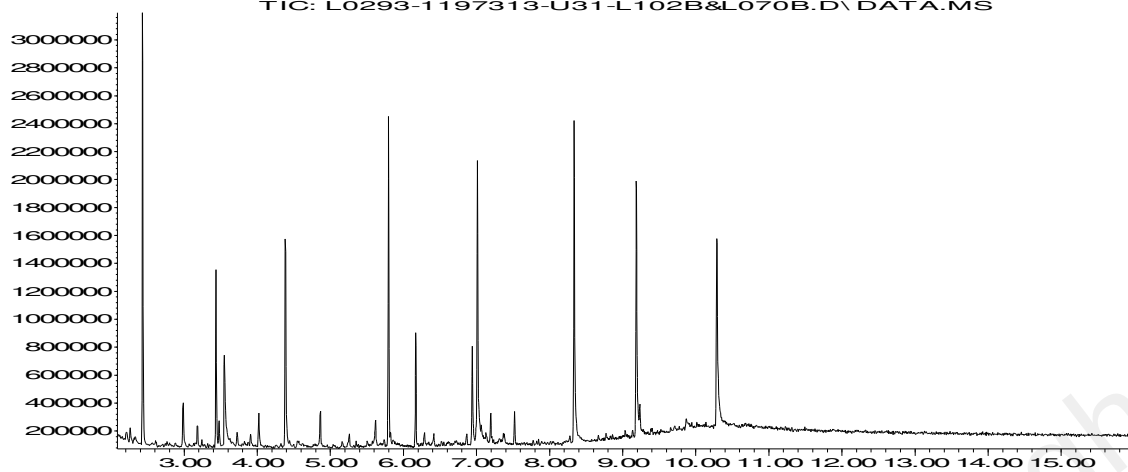
TIC: S0280-1197312-U13-L064B.D\data.ms



Gravesham Borough Council

Abundance

TIC: L0293-1197313-U31-L102B&L070B.D\DATA.MS



Time-->

Gravesham Borough Council

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Analytical Report Number : 19-36780

Replaces Analytical Report Number : 19-36780, issue no. 1

Project / Site name:	Clifton Slips, Gravesend	Samples received on:	09/04/2019
Your job number:	18.376.3	Samples instructed on:	09/04/2019
Your order number:	69468	Analysis completed by:	17/04/2019
Report Issue Number:	2	Report issued on:	17/04/2019
Samples Analysed:	1 leachate sample		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

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Analytical Report Number: 19-36780

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69468

Lab Sample Number				1197391				
Sample Reference				CP3				
Sample Number				None Supplied				
Depth (m)				3.00				
Date Sampled				04/04/2019				
Time Taken				None Supplied				
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					
Boron (dissolved)	µg/l	10	ISO 17025	49				
Arsenic (dissolved)	µg/l	1.1	ISO 17025	2.1				
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08				
Copper (dissolved)	µg/l	0.7	ISO 17025	3.6				
Nickel (dissolved)	µg/l	0.3	ISO 17025	0.8				
Lead (dissolved)	µg/l	1	ISO 17025	5.4				
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0				
Zinc (dissolved)	µg/l	0.4	ISO 17025	0.9				
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0				
TPH7 - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	< 10				
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
Naphthalene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01				
Fluorene	µg/l	0.01	ISO 17025	< 0.01				
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01				
Anthracene	µg/l	0.01	ISO 17025	< 0.01				
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Pyrene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Chrysene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01				
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2				
Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10				
Total Cyanide	µg/l	10	ISO 17025	< 10				
Free Cyanide	µg/l	10	ISO 17025	< 10				
Total Organic Carbon (TOC)	mg/l	0.1	NONE	3.00				
Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10				
pH	pH Units	N/A	ISO 17025	8.8				



Analytical Report Number: 19-36780

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69468

Lab Sample Number				1197391				
Sample Reference				CP3				
Sample Number				None Supplied				
Depth (m)				3.00				
Date Sampled				04/04/2019				
Time Taken				None Supplied				
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

Sulphate as SO ₄	µg/l	100	ISO 17025	60100				
Sulphide	µg/l	5	NONE	< 5.0				

Heavy Metals / Metalloids

Beryllium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.4				
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5				
Vanadium (dissolved)	µg/l	1.7	ISO 17025	5.3				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10				



Analytical Report Number : 19-36780

Project / Site name: Clifton Slips, Gravesend

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
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
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Free cyanide in leachate	Determination of free cyanide by distillation followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
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
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
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
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
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
Sulphate in leachates	Determination of sulphate 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
Sulphide in leachate	Determination of sulphide in leachate by ion selective electrode.	In-house method	L010-PL	W	NONE
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 organic carbon in leachate	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE
TPH Chromatogram in Leachate	TPH Chromatogram in Leachate.	In-house method	L070-PL	W	NONE
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE



Analytical Report Number : 19-36780

Project / Site name: Clifton Slips, Gravesend

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

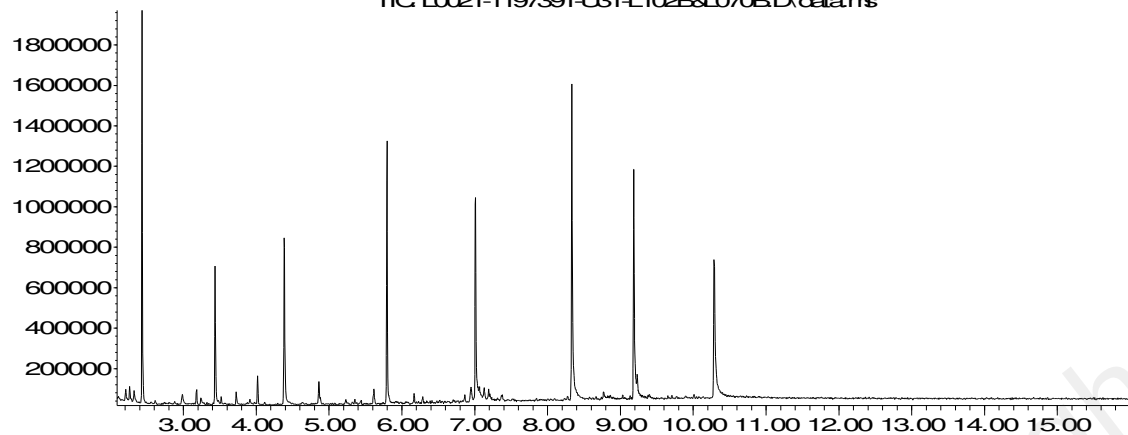
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

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.

Gravesend Borough Council

Abundance

TIG L0021-1197391-U31-L102B8L070B.D\data.ms



Time-->



TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Ecologia Environmental Solutions Ltd
Client Address: Building 711/712, Kent Science Park,
Sittingbourne, Kent,
ME9 8BZ
Contact: Lucy Allen
Site Name: Clifton Slips, Gravesend
Site Address: Not Given

Client Reference: 18.376.3
Job Number: 19-35620
Date Sampled: Not Given
Date Received: 29/03/2019
Date Tested: 05/04/2019
Sampled By: DH

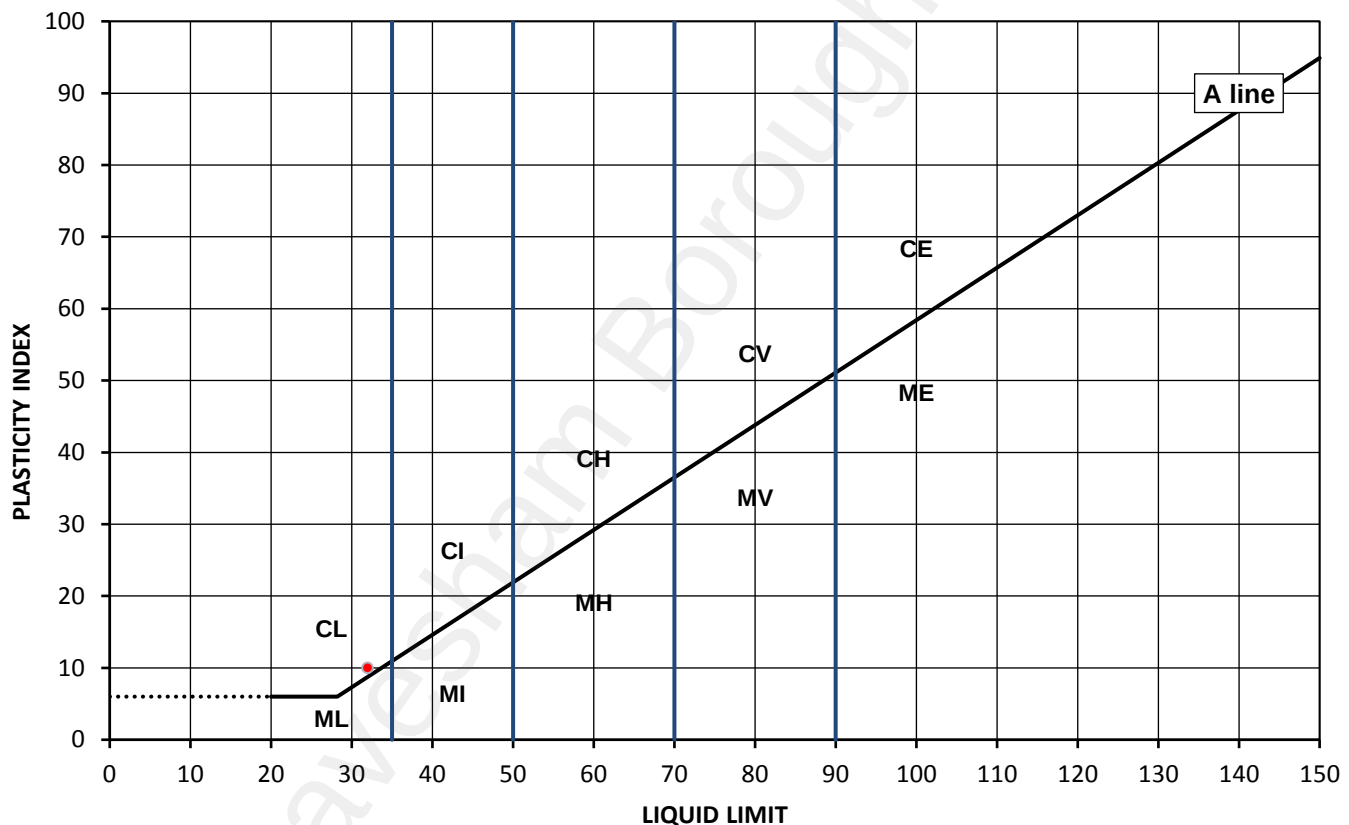
Test Results:

Laboratory Reference: 1191303
Hole No.: CP1
Sample Reference: Not Given
Soil Description: White slightly gravelly clayey CHALK with flintstone

Depth Top [m]: 5.00
Depth Base [m]: 5.50
Sample Type: B

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
21	32	22	10	76



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
		O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 11/04/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 236.5

*Opinions and interpretations expressed here in are outside of the scope of the UKAS Accreditation.
This report may not be reproduced other than in full without the prior written approval of the issuing laboratory.
The results included within the report are representative of the samples submitted for analysis.
The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland.*



TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



Environmental Science

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Ecologia Environmental Solutions Ltd
Client Address: Building 711/712, Kent Science Park,
Sittingbourne, Kent,
ME9 8BZ
Contact: Lucy Allen
Site Name: Clifton Slips, Gravesend
Site Address: Not Given

Client Reference: 18.376.3
Job Number: 19-35620
Date Sampled: Not Given
Date Received: 29/03/2019
Date Tested: 05/04/2019
Sampled By: DH

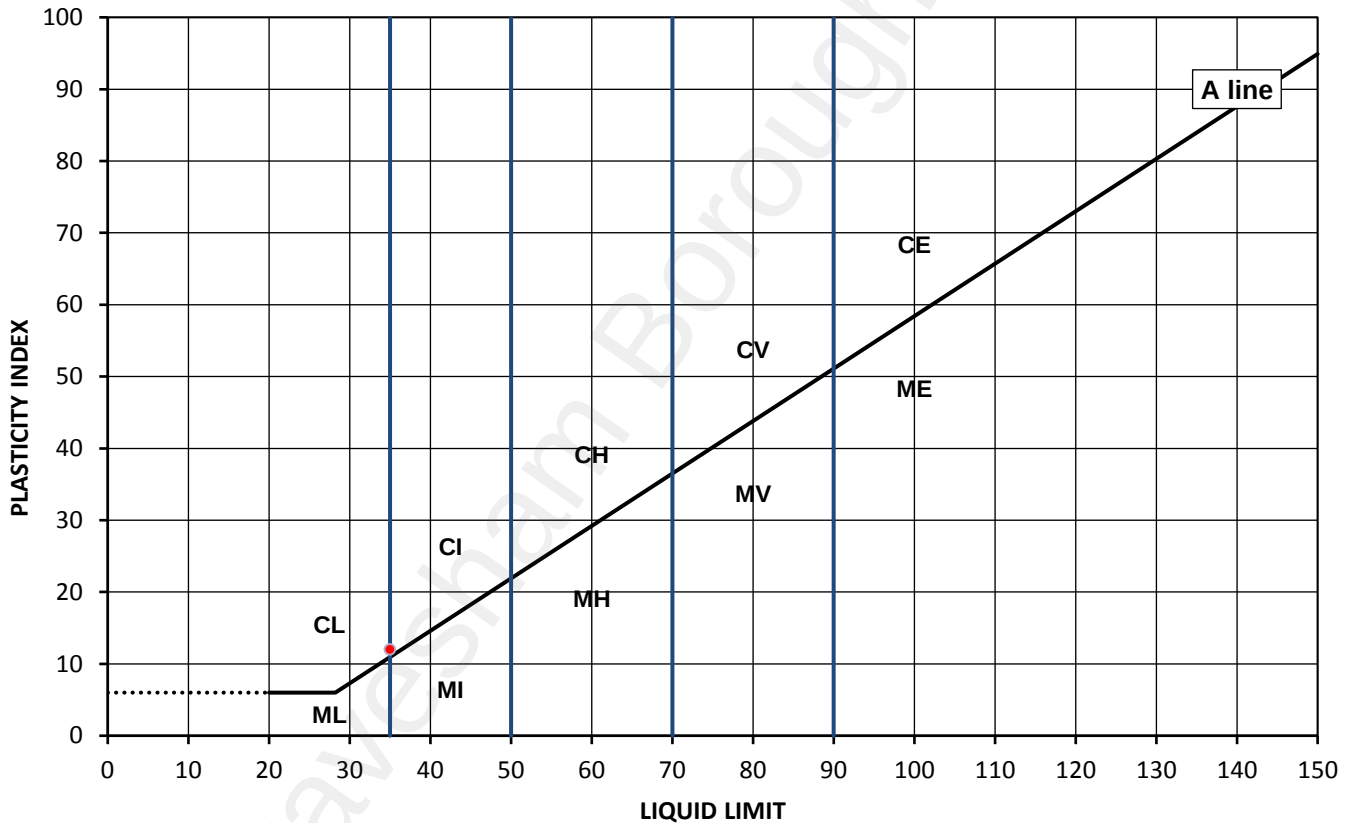
Test Results:

Laboratory Reference: 1191309
Hole No.: CP2
Sample Reference: Not Given
Soil Description: White slightly gravelly clayey CHALK with flintstone

Depth Top [m]: 6.00
Depth Base [m]: 6.50
Sample Type: B

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
24	35	23	12	69



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
		O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Caluse 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 11/04/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 236.5

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The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland.*

Any assessment of compliance with specifications based the analytical results in a report take in to account 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.



4041

Client: Ecologia Environmental Solutions Ltd
 Client Address: Building 711/712, Kent Science Park,
 Sittingbourne, Kent,
 ME9 8BZ
 Contact: Lucy Allen
 Site Name: Clifton Slips, Gravesend
 Site Address: Not Given

SUMMARY REPORT

Summary of Classification Test Results

Tested in Accordance with:

MC by BS 1377-2: 1990: Clause 3.2; WC by BS EN 17892-1: 2014; Atterberg
 by BS 1377-2: 1990: Clause 4.3, Clause 4.4 and 5; PD by BS 1377-2: 1990:
 Clause 8.2

i2 Analytical Ltd
 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



Client Reference: 18.376.3
 Job Number: 19-35620
 Date Sampled: Not Given
 Date Received: 29/03/2019
 Date Tested: 05/04/2019
 Sampled By: DH

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	MC	WC	Atterberg				Density			Total Porosity#		
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um	LL	PL	PI	bulk Mg/m3	dry Mg/m3	PD Mg/m3			
1191303	CP1	Not Given	5.00	5.50	B	White slightly gravelly clayey CHALK with flintstone	Atterberg 4 Point	21		76	32	22	10						
1191309	CP2	Not Given	6.00	6.50	B	White slightly gravelly clayey CHALK with flintstone	Atterberg 4 Point	24		69	35	23	12						

Note: # Non accredited; NP - Non plastic

Comments:

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
 Date Reported: 11/04/2019

Signed: Darren Berrill
 Geotechnical General Manager
 for and on behalf of i2 Analytical Ltd GF 238.7

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 The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland."



4041

Client: Ecologia Environmental Solutions Ltd
 Client Address: Building 711/712, Kent Science Park,
 Sittingbourne, Kent,
 ME9 8BZ
 Contact: Lucy Allen
 Site Name: Clifton Slips, Gravesend
 Site Address: Not Given

SUMMARY REPORT

Summary of Saturation Moisture Content Test Results

Tested in Accordance with: BS 1377-2: 1990: Clause 3.3

i2 Analytical Ltd
 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



Environmental Science

Client Reference: 18.376.3
 Job Number: 19-35620
 Date Sampled: Not Given
 Date Received: 29/03/2019
 Date Tested: 08/04/2019
 Sampled By: DH

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	SMC	Bulk density	Dry density	MC								
		Reference	Depth Top	Depth Base	Type														
			m	m				%	Mg/m3	Mg/m3	%								
1191303	CP1	Not Given	5.00	5.50	B	White clayey CHALK with flintstones	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	25	2.03	1.60	27								
1191304	CP1	Not Given	9.00	9.50	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	30	1.97	1.50	32								
1191305	CP1	Not Given	13.00	13.50	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	29	1.94	1.51	29								
1191306	CP1	Not Given	17.00	17.50	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	30	1.95	1.49	31								
1191307	CP1	Not Given	21.00	21.50	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	31	1.93	1.47	31								
1191308	CP1	Not Given	25.00	Not Given	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	30	1.94	1.49	30								
1191310	CP2	Not Given	8.00	8.50	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	31	1.90	1.46	30								
1191311	CP2	Not Given	12.00	12.50	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	32	1.89	1.44	31								
1191312	CP2	Not Given	16.00	16.50	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	32	1.94	1.45	33								
1191313	CP2	Not Given	20.00	Not Given	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	32	1.91	1.44	33								

Note: SMC - Saturation Moisture Content; MC - Moisture Content

Comments:

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
 Date Reported: 11/04/2019

Signed: Darren Berrill
 Geotechnical General Manager
 for and on behalf of i2 Analytical Ltd GF 132.9

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Lucy Allen

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e: reception@i2analytical.com

Analytical Report Number : 19-35615

Project / Site name: Clifton Slips, Gravesend

Samples received on: 29/03/2019

Your job number: 18.376.3

Samples instructed on: 29/03/2019

Your order number: 69393

Analysis completed by: 12/04/2019

Report Issue Number: 1

Report issued on: 12/04/2019

Samples Analysed: 1 soil sample

Signed: 

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

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Analytical Report Number: 19-35615

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69393

Lab Sample Number				1191277				
Sample Reference				CP1				
Sample Number				None Supplied				
Depth (m)				5.00-5.50				
Date Sampled				Deviating				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	20				
Total mass of sample received	kg	0.001	NONE	0.39				

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.5				
Total Sulphate as SO ₄	%	0.005	MCERTS	0.042				
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.049				
Total Sulphur	%	0.005	MCERTS	0.015				
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0				

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	17				
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Analytical Report Number : 19-35615

Project / Site name: Clifton Slips, Gravesend

* 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 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 *
1191277	CP1	None Supplied	5.00-5.50	Beige chalk.**

Analytical Report Number : 19-35615

Project / Site name: Clifton Slips, Gravesend

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
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests. 2:1 extraction.	L082-PL	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
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
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, 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 Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L038	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE

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 30°C.

Sample ID	Other ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
CP1		S	19-35615	1191277	a			



4041

Lucy Allen

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t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 19-36800

Replaces Analytical Report Number : 19-36800, issue no. 1

Project / Site name:	Clifton Slips, Gravesend	Samples received on:	09/04/2019
Your job number:	18.376.3	Samples instructed on:	09/04/2019
Your order number:	69468	Analysis completed by:	31/05/2019
Report Issue Number:	2	Report issued on:	31/05/2019
Samples Analysed:	2 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

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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 19-36800-2 Clifton Slips, Gravesend 18.376.3

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

Page 1 of 4



Environmental Science

4041
Analytical Report Number: 19-36800
Project / Site name: Clifton Slips, Gravesend
Your Order No: 69468

Lab Sample Number				1197501	1197502			
Sample Reference				CP3	CP4			
Sample Number				None Supplied	None Supplied			
Depth (m)				15.00	4.00			
Date Sampled				04/04/2019	03/04/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)								
	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	25	22			
Total mass of sample received	kg	0.001	NONE	0.37	0.40			

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6	8.2			
Total Sulphate as SO ₄	%	0.005	MCERTS	0.057	0.087			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.071	0.16			
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	25	51			
Total Sulphur	%	0.005	MCERTS	0.022	0.031			
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0			

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	11	11			
Magnesium (leachate equivalent)	mg/l	2.5	NONE	5.2	5.4			



Analytical Report Number : 19-36800

Project / Site name: Clifton Slips, Gravesend

* 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 *
1197501	CP3	None Supplied	15.00	Beige clay with chalk.
1197502	CP4	None Supplied	4.00	Beige clay with chalk.

Gravesend Borough Council



4041

Analytical Report Number : 19-36800

Project / Site name: Clifton Slips, Gravesend

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
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests. 2:1 extraction.	L082-PL	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
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
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, 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 Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests ^{***}	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE

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 30°C.



SUMMARY REPORT

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



Summary of Saturation Moisture Content Test Results

Tested in Accordance with: BS 1377-2: 1990: Clause 3.3

Client: Ecologia Environmental Solutions Ltd
Client Address: Building 711/712, Kent Science Park,
Sittingbourne, Kent,
ME9 8BZ
Contact: Lucy Allen
Site Name: Clifton Slips, Gravesend
Site Address: Not Given

Client Reference: 18.376.3
Job Number: 19-36803
Date Sampled: 03/04 - 04/04/2019
Date Received: 09/04/2019
Date Tested: 15/04/2019
Sampled By: RW

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	SMC %	Bulk density Mg/m3	Dry density Mg/m3	MC %								
		Reference	Depth Top m	Depth Base m	Type														
1197508	CP3	Not Given	7.00	Not Given	B	White clayey CHALK with flintstones	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	27	1.93	1.55	24								
1197509	CP3	Not Given	11.00	Not Given	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	32	1.94	1.45	34								
1197507	CP3	Not Given	15.00	Not Given	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	33	1.92	1.42	36								
1197510	CP3	Not Given	19.00	Not Given	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	35	1.91	1.39	38								
1197511	CP4	Not Given	4.00	Not Given	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	31	1.91	1.47	30								
1197512	CP4	Not Given	10.00	Not Given	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	32	1.94	1.45	34								
1197514	CP4	Not Given	12.00	Not Given	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	34	1.91	1.42	35								
1197513	CP4	Not Given	16.00	Not Given	B	White very stiff CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	19	1.94	1.47	32								
1197515	CP4	Not Given	20.00	Not Given	B	White clayey CHALK	Supplied lump of chalk fails to comply with volume requirements as per BS1377:2 Clause 3.3.5.1	38	1.88	1.34	40								

Note: SMC - Saturation Moisture Content; MC - Moisture Content

Comments: Re-issue 1: Hole No. amended as per client request

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 30/05/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 132.9

"Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report are representative of the samples submitted for analysis. The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland."

**Lucy Allen**

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WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 19-37087

Project / Site name: Clifton Slips, Gravesend

Samples received on: 11/04/2019

Your job number: 18.376.3

Samples instructed on: 11/04/2019

Your order number: 69509

Analysis completed by: 18/04/2019

Report Issue Number: 1

Report issued on: 18/04/2019

Samples Analysed: 4 water samples

Signed: 

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

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Analytical Report Number: 19-37087

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69509

Lab Sample Number				1199015	1199016	1199017	1199018	
Sample Reference				CP1	CP2	CP3	CP4	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	
Date Sampled				10/04/2019	10/04/2019	10/04/2019	10/04/2019	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.5	7.3	7.3	7.3	
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	
Sulphate as SO ₄	µg/l	45	ISO 17025	50600	72100	75100	84400	
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	1.50	3.49	1.77	3.19	
Alkalinity	mgCaCO ₃ /l	3	ISO 17025	470	540	500	260	

Total Phenols

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

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16	< 0.16	< 0.16	
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Environmental Science

Analytical Report Number: 19-37087

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69509

Lab Sample Number				1199015	1199016	1199017	1199018	
Sample Reference				CP1	CP2	CP3	CP4	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	
Date Sampled				10/04/2019	10/04/2019	10/04/2019	10/04/2019	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.36	0.28	< 0.15	0.20	
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1	< 0.1	
Boron (dissolved)	µg/l	10	ISO 17025	75	110	110	130	
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02	< 0.02	< 0.02	
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.3	0.3	0.3	< 0.2	
Copper (dissolved)	µg/l	0.5	ISO 17025	7.8	3.0	1.2	2.8	
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	
Nickel (dissolved)	µg/l	0.5	ISO 17025	< 0.5	1.7	2.1	3.3	
Selenium (dissolved)	µg/l	0.6	ISO 17025	7.4	6.2	4.9	4.9	
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.6	0.3	0.3	< 0.2	
Zinc (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	5.0	12	

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	

Petroleum Hydrocarbons

TPH7 - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	

TPH7 - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 19-37087

Project / Site name: Clifton Slips, Gravesend

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
Alkalinity in Water (by discrete analyser)	Determination of Alkalinity by discrete analyser (colorimetry). Accredited matrices: SW, PW, GW.	In house method based on MEWAM & USEPA Method 310.2.	L082-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Free cyanide in water	Determination of free cyanide by distillation followed by colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPH Chromatogram in Water	TPH Chromatogram in Water.	In-house method	L070-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE

Iss No 19-37087-1 Clifton Slips, Gravesend 18.376.3

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

Page 4 of 9



Analytical Report Number : 19-37087

Project / Site name: Clifton Slips, Gravesend

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

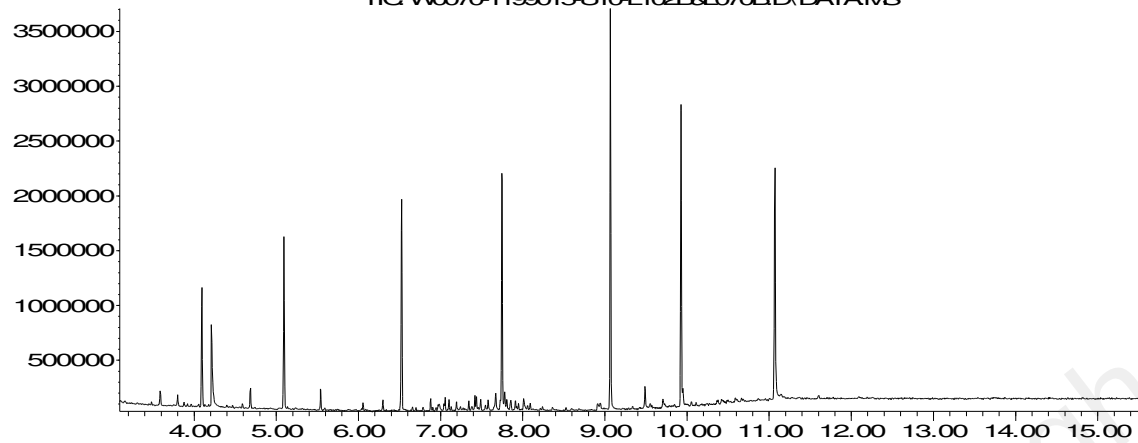
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

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.

Gravesend Borough Council

Abundance

TIC: W0070-1199015-U10-L102-BL070B.D\\DATA\\MS

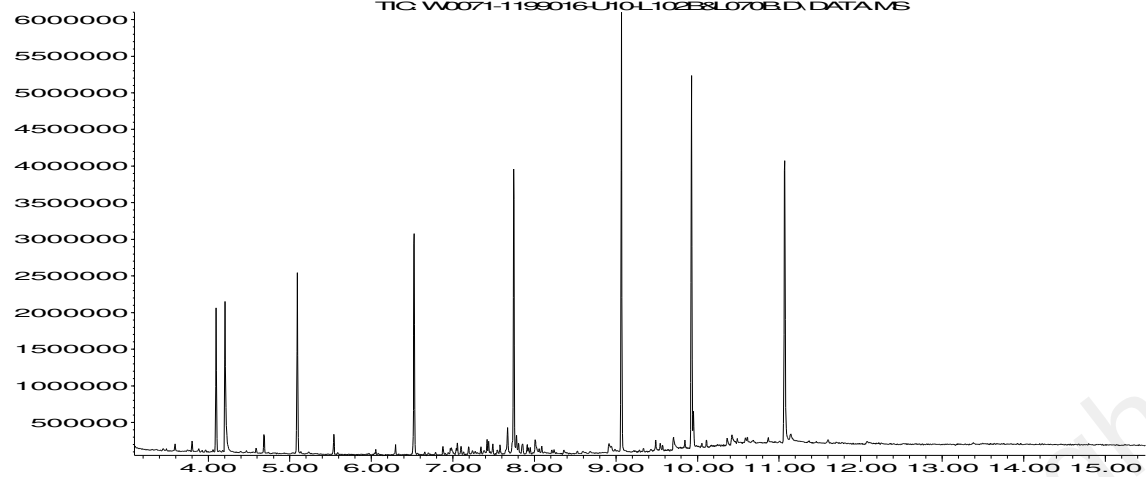


Time-->

Gravesham Borough Council

Abundance

TIC: W0071-1199016-U10-L102B8L070BD.D\\ATMS

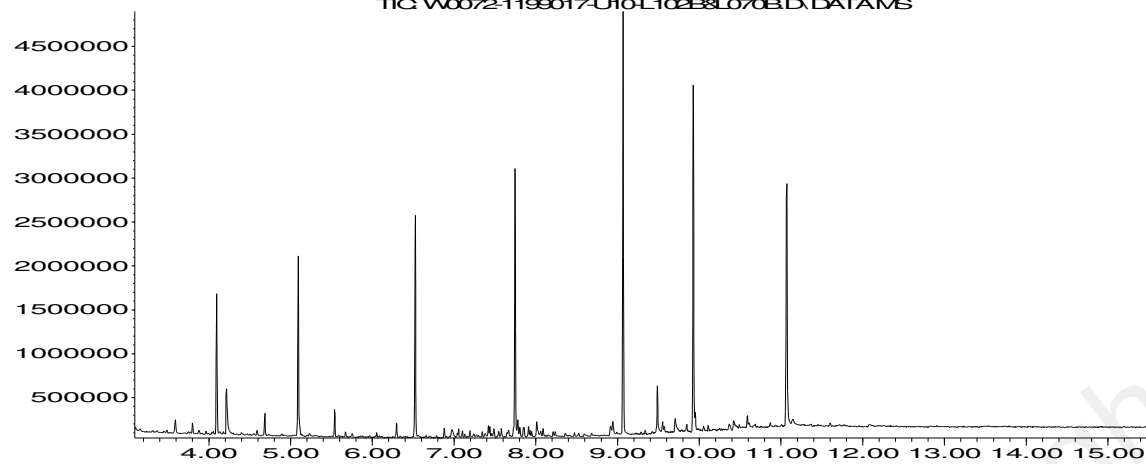


Time-->

Gravesham Borough Council

Abundance

TIC: W0072-1199017-U10-L102B8-L070B.D.DATAMS

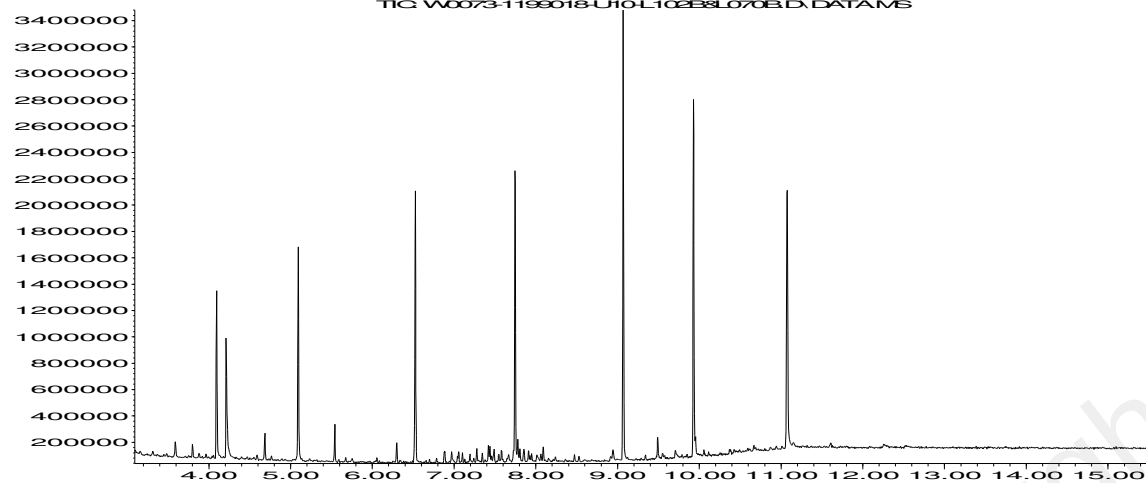


Time-->

Gravesham Borough Council

Abundance

TIC: W0073-1199018-U10-L102B8-L070B.D.DATAMS



Time-->

Gravesham Borough Council

**Lucy Allen**

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e: reception@i2analytical.com

Analytical Report Number : 19-37917

Project / Site name: Clifton Slips, Gravesend

Samples received on: 17/04/2019

Your job number: 18.376.3

Samples instructed on: 17/04/2019

Your order number: 69571

Analysis completed by: 25/04/2019

Report Issue Number: 1

Report issued on: 25/04/2019

Samples Analysed: 4 water samples

Signed:

Rexona Rahman
Head of Customer Services
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

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 19-37917-1 Clifton Slips, Gravesend 18.376.3

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

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



Environmental Science

Analytical Report Number: 19-37917

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69571

Lab Sample Number				1203492	1203493	1203494	1203495	
Sample Reference				CP1	CP2	CP3	CP4	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	
Date Sampled				16/04/2019	16/04/2019	16/04/2019	16/04/2019	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.4	7.3	7.3	7.3	
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	
Sulphate as SO ₄	µg/l	45	ISO 17025	97100	64400	77200	73000	
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	2.56	2.79	2.43	1.75	
Alkalinity	mgCaCO ₃ /l	3	ISO 17025	400	370	460	400	

Total Phenols

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

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16	< 0.16	< 0.16	
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.67	0.42	< 0.15	0.17	
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1	< 0.1	
Boron (dissolved)	µg/l	10	ISO 17025	170	100	120	140	
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02	< 0.02	< 0.02	
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.3	0.4	0.4	0.3	
Copper (dissolved)	µg/l	0.5	ISO 17025	1.5	3.1	2.6	7.0	
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	0.3	0.4	
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	
Nickel (dissolved)	µg/l	0.5	ISO 17025	< 0.5	1.5	2.6	3.2	
Selenium (dissolved)	µg/l	0.6	ISO 17025	11	4.6	3.8	4.0	
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.7	0.6	0.3	0.2	
Zinc (dissolved)	µg/l	0.5	ISO 17025	< 0.5	1.0	7.4	8.4	



Analytical Report Number: 19-37917

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69571

Lab Sample Number				1203492	1203493	1203494	1203495	
Sample Reference				CP1	CP2	CP3	CP4	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	
Date Sampled				16/04/2019	16/04/2019	16/04/2019	16/04/2019	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	

Petroleum Hydrocarbons

TPH7 - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	

TPH7 - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 19-37917

Project / Site name: Clifton Slips, Gravesend

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
Alkalinity in Water (by discrete analyser)	Determination of Alkalinity by discrete analyser (colorimetry). Accredited matrices: SW, PW, GW.	In house method based on MEWAM & USEPA Method 310.2.	L082-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Free cyanide in water	Determination of free cyanide by distillation followed by colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPH Chromatogram in Water	TPH Chromatogram in Water.	In-house method	L070-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE

Iss No 19-37917-1 Clifton Slips, Gravesend 18.376.3

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

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Analytical Report Number : 19-37917

Project / Site name: Clifton Slips, Gravesend

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

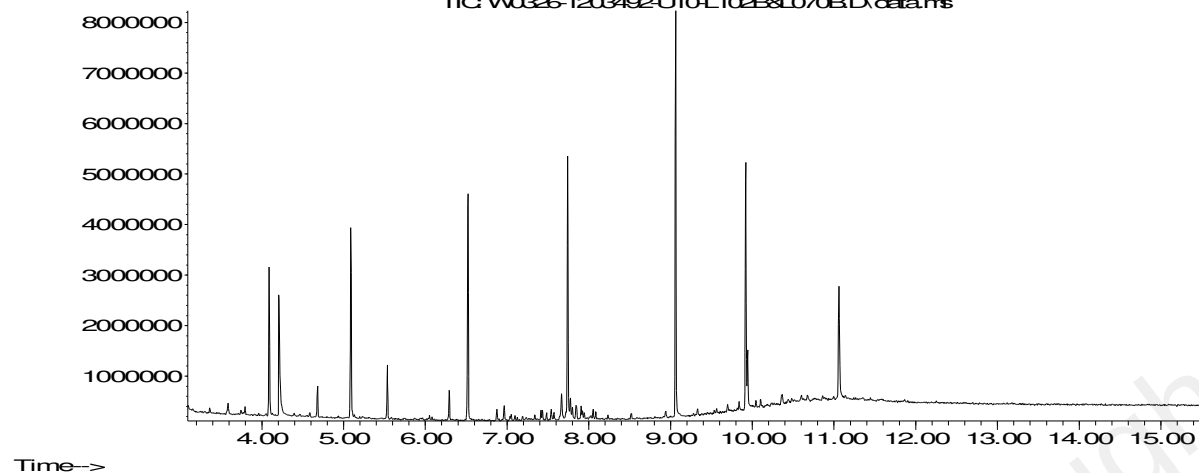
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

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.

Gravesend Borough Council

Abundance

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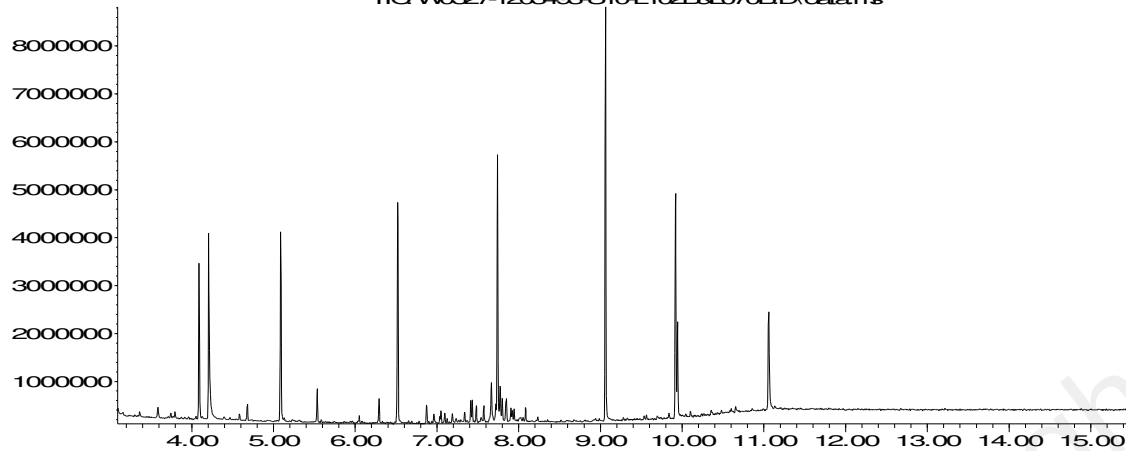


Time-->

Gravesham Borough Council

Abundance

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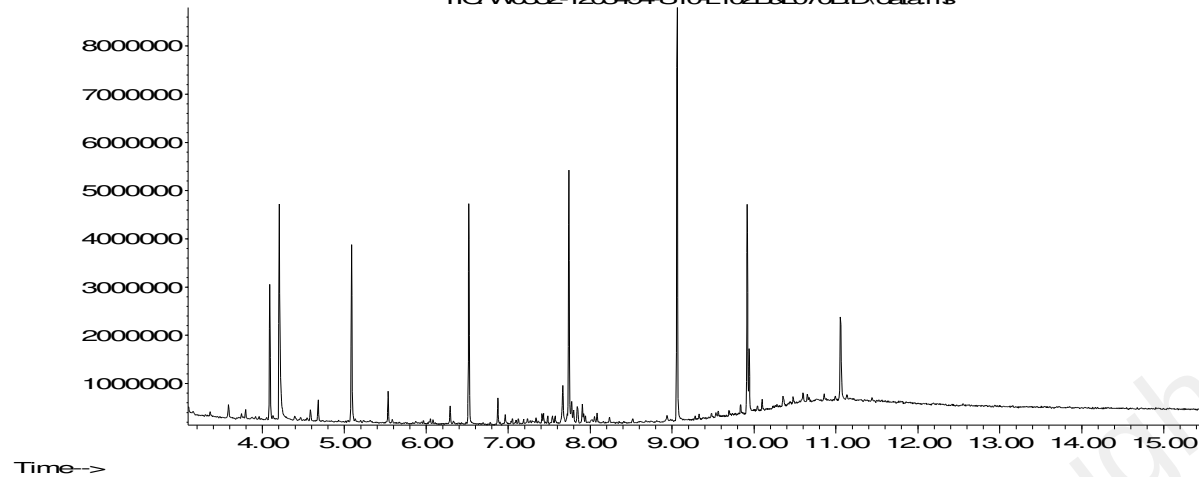


Time-->

Gravesham Borough Council

Abundance

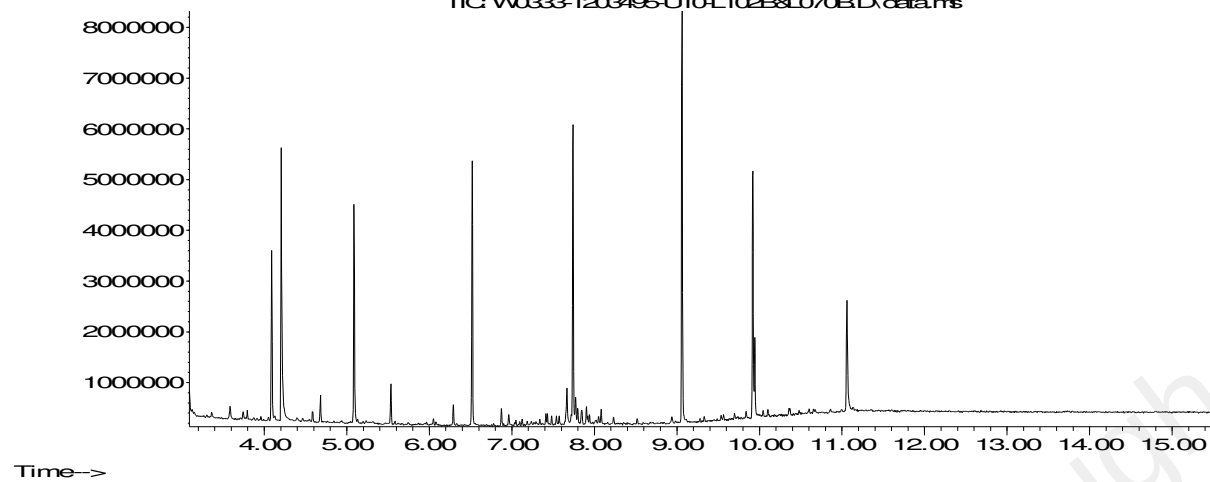
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Gravesham Borough Council

Abundance

TIC: W0333-1203495-U10-L102B8L070B.D\data.ms



Gravesham Borough Council

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Analytical Report Number : 19-38710

Project / Site name: Clifton Slips, Gravesend

Samples received on: 25/04/2019

Your job number: 18.376.3

Samples instructed on: 25/04/2019

Your order number: 69619

Analysis completed by: 02/05/2019

Report Issue Number: 1

Report issued on: 02/05/2019

Samples Analysed: 4 water samples

Signed: 

Rexona Rahman
Head of Customer Services
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

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

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.

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



Environmental Science

Analytical Report Number: 19-38710

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69619

Lab Sample Number				1208162	1208163	1208164	1208165	
Sample Reference				CP1	CP2	CP3	CP4	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	
Date Sampled				24/04/2019	24/04/2019	24/04/2019	24/04/2019	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.3	7.3	7.2	7.2	
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	
Free Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	
Sulphate as SO ₄	µg/l	45	ISO 17025	61500	79900	78900	98800	
Sulphide	µg/l	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	0.68	1.84	0.88	2.22	
Alkalinity	mgCaCO ₃ /l	3	ISO 17025	450	430	410	450	

Total Phenols

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

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16	< 0.16	< 0.16	
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.75	0.27	0.25	0.18	
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1	< 0.1	
Boron (dissolved)	µg/l	10	ISO 17025	83	110	110	120	
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02	< 0.02	< 0.02	
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.3	0.3	0.3	0.3	
Copper (dissolved)	µg/l	0.5	ISO 17025	0.6	0.8	< 0.5	1.5	
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	
Nickel (dissolved)	µg/l	0.5	ISO 17025	0.8	1.5	2.1	3.0	
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	< 0.6	< 0.6	< 0.6	
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.5	0.3	0.3	< 0.2	
Zinc (dissolved)	µg/l	0.5	ISO 17025	1.8	1.8	5.4	9.2	



Analytical Report Number: 19-38710

Project / Site name: Clifton Slips, Gravesend

Your Order No: 69619

Lab Sample Number				1208162	1208163	1208164	1208165	
Sample Reference				CP1	CP2	CP3	CP4	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	
Date Sampled				24/04/2019	24/04/2019	24/04/2019	24/04/2019	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	

Petroleum Hydrocarbons

TPH7 - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	

TPH7 - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	
TPH7 - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	
TPH7 - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 19-38710

Project / Site name: Clifton Slips, Gravesend

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
Alkalinity in Water (by discrete analyser)	Determination of Alkalinity by discrete analyser (colorimetry). Accredited matrices: SW, PW, GW.	In house method based on MEWAM & USEPA Method 310.2.	L082-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Free cyanide in water	Determination of free cyanide by distillation followed by colorimetry. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW, PrW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Sulphide in water	Determination of sulphide in water by ion selective electrode.	In-house method	L029-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total organic carbon in water	Determination of dissolved organic carbon in water by TOC/DOC NDIR analyser. Accredited matrices: SW PW GW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPH Chromatogram in Water	TPH Chromatogram in Water.	In-house method	L070-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE

Iss No 19-38710-1 Clifton Slips, Gravesend 18.376.3

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

Page 4 of 5



Analytical Report Number : 19-38710

Project / Site name: Clifton Slips, Gravesend

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
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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.

Gravesend Borough Council

PRELIMINARY WASTE CLASSIFICATION ASSESSMENT

Gravesham Borough Council

Waste Classification Report



J32CJ-AQH5-2WJT6

Job name

Clifton Slipways

Description/Comments

Project

18.376.3

Site

Clifton Slips

Related Documents

#	Name	Description
None		

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name:
Leigh Anne Cammack
Date:
13 Jun 2019 13:07 GMT
Telephone:
01795 471611

Company:
Ecologia
Building 711 & 712
Kent Science Park
Sittingbourne
ME9 8BZ

Report

Created by: Leigh Anne Cammack
Created date: 13 Jun 2019 13:07 GMT

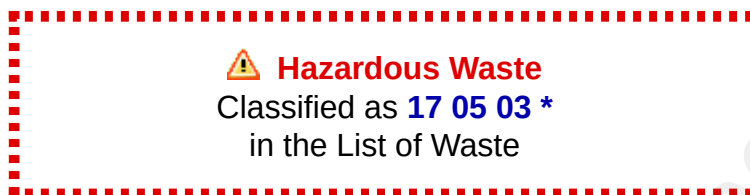
Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	TP1	0.40-0.60	Hazardous	HP 2, HP 3(i), HP 7, HP 14	3
2	TP3	1.50-2.00	Hazardous	HP 2, HP 3(i), HP 7, HP 10, HP 14	6
3	TP4	0.30-0.50	Hazardous	HP 2, HP 3(i), HP 7, HP 14	9
4	TP8	1.50-2.00	Potentially Hazardous	HP 2, HP 3(i)	12
5	CP1	1.00	Potentially Hazardous	HP 2, HP 3(i)	15
6	TP11	2.00-2.40	Potentially Hazardous	HP 2, HP 3(i)	18
7	TP12	0.50-0.80	Potentially Hazardous	HP 2, HP 3(i)	21
8	TP13	0.70-1.00	Potentially Hazardous	HP 2, HP 3(i)	24
9	TP14	1.20-1.50	Potentially Hazardous	HP 2, HP 3(i)	27
10	TP16	2.50-2.70	Potentially Hazardous	HP 2, HP 3(i)	30

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	33
Appendix B: Rationale for selection of metal species	34
Appendix C: Version	35

Gravesham Borough Council

Classification of sample: TP1



Sample details

Sample Name:	LoW Code:	
TP1	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 03 * (Soil and stones containing hazardous substances)
0.40-0.60 m		
Moisture content:		
19%		
(dry weight correction)		

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1A; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

zinc chromate: (compound conc.: 0.466%)

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Hazard Statements hit:

Aquatic Chronic 1; H410 "Very toxic to aquatic life with long lasting effects."

Because of determinands:

dicopper oxide; copper (I) oxide: (compound conc.: 0.492%)

zinc chromate: (compound conc.: 0.466%)

Hazard properties (substances considered hazardous until shown otherwise)

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials"

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00064%)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.00008%)

benzene: (conc.: 0.00008%)

toluene: (conc.: 0.00008%)

ethylbenzene: (conc.: 0.00008%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.0807%)

xylene: (conc.: 0.00008%)

Determinands

Moisture content: 19% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				53	mg/kg	1.32	58.804	mg/kg	0.00588 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		beryllium { beryllium oxide }				1	mg/kg	2.775	2.332	mg/kg	0.000233 %	✓	
		004-003-00-8	215-133-1	1304-56-9									
3		boron { diboron trioxide; boric oxide }				6.3	mg/kg	3.22	17.046	mg/kg	0.0017 %	✓	
		005-008-00-8	215-125-8	1303-86-2									
4		cadmium { cadmium oxide }				6	mg/kg	1.142	5.76	mg/kg	0.000576 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
5		chromium in chromium(III) compounds { chromium(III) oxide }				110	mg/kg	1.462	135.102	mg/kg	0.0135 %	✓	
			215-160-9	1308-38-9									
6		chromium in chromium(VI) compounds { chromium(VI) oxide }				4	mg/kg	1.923	6.464	mg/kg	0.000646 %	✓	
		024-001-00-0	215-607-8	1333-82-0									
7		copper { dicopper oxide; copper (I) oxide }				5200	mg/kg	1.126	4919.848	mg/kg	0.492 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
8		lead { lead chromate }			1	770	mg/kg	1.56	1009.292	mg/kg	0.0647 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
9		mercury { mercury dichloride }				0.3	mg/kg	1.353	0.341	mg/kg	0.0000341 %	✓	
		080-010-00-X	231-299-8	7487-94-7									
10		nickel { nickel chromate }				160	mg/kg	2.976	400.17	mg/kg	0.04 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.146	mg/kg	0.000215 %	✓	
		034-002-00-8											
12		zinc { zinc chromate }				2000	mg/kg	2.774	4662.431	mg/kg	0.466 %	✓	
		024-007-00-3											
13		TPH (C6 to C40) petroleum group				960	mg/kg		806.723	mg/kg	0.0807 %	✓	
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				1	mg/kg		0.84	mg/kg	0.000084 %	✓	
		603-181-00-X	216-653-1	1634-04-4									
15		benzene				1	mg/kg		0.84	mg/kg	0.000084 %	✓	
		601-020-00-8	200-753-7	71-43-2									
16		toluene				1	mg/kg		0.84	mg/kg	0.000084 %	✓	
		601-021-00-3	203-625-9	108-88-3									
17		ethylbenzene				1	mg/kg		0.84	mg/kg	0.000084 %	✓	
		601-023-00-4	202-849-4	100-41-4									
18		xylene				1	mg/kg		0.84	mg/kg	0.000084 %	✓	
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				2	mg/kg	1.884	3.166	mg/kg	0.000317 %	✓	
		006-007-00-5											
20		pH				7.9	pH		7.9	pH	7.9 pH		
				PH									
21		naphthalene				0.6	mg/kg		0.504	mg/kg	0.0000504 %	✓	
		601-052-00-2	202-049-5	91-20-3									
22		acenaphthylene				0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
			205-917-1	208-96-8									

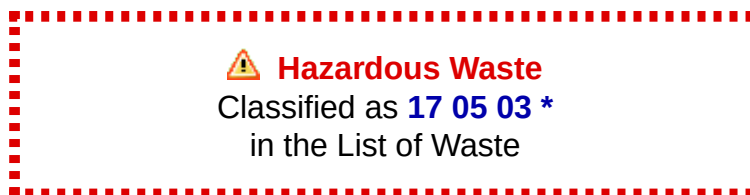
#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
23	acenaphthene	201-469-6	83-32-9		0.27 mg/kg		0.227 mg/kg	0.0000227 %	✓	
24	fluorene	201-695-5	86-73-7		0.3 mg/kg		0.252 mg/kg	0.0000252 %	✓	
25	phenanthrene	201-581-5	85-01-8		5.3 mg/kg		4.454 mg/kg	0.000445 %	✓	
26	anthracene	204-371-1	120-12-7		0.98 mg/kg		0.824 mg/kg	0.0000824 %	✓	
27	fluoranthene	205-912-4	206-44-0		10 mg/kg		8.403 mg/kg	0.00084 %	✓	
28	pyrene	204-927-3	129-00-0		8.7 mg/kg		7.311 mg/kg	0.000731 %	✓	
29	benzo[a]anthracene	601-033-00-9	200-280-6		5.6 mg/kg		4.706 mg/kg	0.000471 %	✓	
30	chrysene	601-048-00-0	205-923-4		5.2 mg/kg		4.37 mg/kg	0.000437 %	✓	
31	benzo[b]fluoranthene	601-034-00-4	205-911-9		6.4 mg/kg		5.378 mg/kg	0.000538 %	✓	
32	benzo[k]fluoranthene	601-036-00-5	205-916-6		2.8 mg/kg		2.353 mg/kg	0.000235 %	✓	
33	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		5.4 mg/kg		4.538 mg/kg	0.000454 %	✓	
34	indeno[123-cd]pyrene	205-893-2	193-39-5		2.7 mg/kg		2.269 mg/kg	0.000227 %	✓	
35	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.54 mg/kg		0.454 mg/kg	0.0000454 %	✓	
36	benzo[ghi]perylene	205-883-8	191-24-2		3.5 mg/kg		2.941 mg/kg	0.000294 %	✓	
37	phenol	604-001-00-2	203-632-7		1 mg/kg		0.84 mg/kg	0.000084 %	✓	
Total:								1.172 %		

Key

	User supplied data
	Hazardous result
	Potentially Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration

CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP3



Sample details

Sample Name:	LoW Code:	
TP3	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 03 * (Soil and stones containing hazardous substances)
1.50-2.00 m		
Moisture content:		
15%		
(dry weight correction)		

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1A; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

zinc chromate: (compound conc.: 0.917%)

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

lead chromate: (Note 1 conc.: 0.33%)

HP 10: Toxic for reproduction "waste which has adverse effects on sexual function and fertility in adult males and females, as well as developmental toxicity in the offspring"

Hazard Statements hit:

Repr. 1A; H360Df "May damage the unborn child. Suspected of damaging fertility."

Because of determinand:

lead chromate: (Note 1 conc.: 0.33%)

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Hazard Statements hit:

Aquatic Chronic 1; H410 "Very toxic to aquatic life with long lasting effects."

Because of determinands:

dicopper oxide; copper (I) oxide: (compound conc.: 1.273%)

lead chromate: (Note 1 conc.: 0.33%)

zinc chromate: (compound conc.: 0.917%)

Hazard properties (substances considered hazardous until shown otherwise)

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials"

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00066%)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.00008%)
benzene: (conc.: 0.00008%)
toluene: (conc.: 0.00008%)
ethylbenzene: (conc.: 0.00008%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.0652%)
xylene: (conc.: 0.00008%)

Determinands

Moisture content: 15% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				110	mg/kg	1.32	126.292	mg/kg	0.0126 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				3.1	mg/kg	2.775	7.481	mg/kg	0.000748 %	✓	
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				7.2	mg/kg	3.22	20.159	mg/kg	0.00202 %	✓	
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				8.4	mg/kg	1.142	8.344	mg/kg	0.000834 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
5	chromium in chromium(III) compounds { chromium(III) oxide }				95	mg/kg	1.462	120.737	mg/kg	0.0121 %	✓	
		215-160-9	1308-38-9									
6	chromium in chromium(VI) compounds { chromium(VI) oxide }				4	mg/kg	1.923	6.689	mg/kg	0.000669 %	✓	
	024-001-00-0	215-607-8	1333-82-0									
7	copper { dicopper oxide; copper (I) oxide }				13000	mg/kg	1.126	12727.433	mg/kg	1.273 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
8	lead { lead chromate }			1	3800	mg/kg	1.56	5154.172	mg/kg	0.33 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
9	mercury { mercury dichloride }				0.3	mg/kg	1.353	0.353	mg/kg	0.0000353 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
10	nickel { nickel chromate }				220	mg/kg	2.976	569.372	mg/kg	0.0569 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.221	mg/kg	0.000222 %	✓	
	034-002-00-8											
12	zinc { zinc chromate }				3800	mg/kg	2.774	9166.745	mg/kg	0.917 %	✓	
	024-007-00-3											
13	TPH (C6 to C40) petroleum group				750	mg/kg		652.174	mg/kg	0.0652 %	✓	
			TPH									
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				1	mg/kg		0.87	mg/kg	0.000087 %	✓	
	603-181-00-X	216-653-1	1634-04-4									
15	benzene				1	mg/kg		0.87	mg/kg	0.000087 %	✓	
	601-020-00-8	200-753-7	71-43-2									
16	toluene				1	mg/kg		0.87	mg/kg	0.000087 %	✓	
	601-021-00-3	203-625-9	108-88-3									
17	ethylbenzene				1	mg/kg		0.87	mg/kg	0.000087 %	✓	
	601-023-00-4	202-849-4	100-41-4									

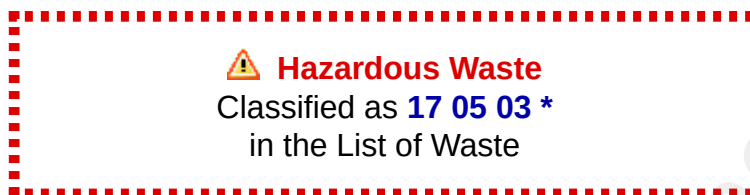
#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
18	xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		1 mg/kg		0.87 mg/kg		0.000087 %	✓	
19	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				3 mg/kg	1.884	4.915 mg/kg		0.000491 %	✓	
20	pH PH				7.7 pH		7.7 pH		7.7 pH		
21	naphthalene 601-052-00-2	202-049-5	91-20-3		0.28 mg/kg		0.243 mg/kg		0.0000243 %	✓	
22	acenaphthylene 205-917-1	208-96-8			0.05 mg/kg		0.0435 mg/kg		0.00000435 %	✓	
23	acenaphthene 201-469-6	83-32-9			0.05 mg/kg		0.0435 mg/kg		0.00000435 %	✓	
24	fluorene 201-695-5	86-73-7			0.19 mg/kg		0.165 mg/kg		0.0000165 %	✓	
25	phenanthrene 201-581-5	85-01-8			3.9 mg/kg		3.391 mg/kg		0.000339 %	✓	
26	anthracene 204-371-1	120-12-7			0.66 mg/kg		0.574 mg/kg		0.0000574 %	✓	
27	fluoranthene 205-912-4	206-44-0			7.2 mg/kg		6.261 mg/kg		0.000626 %	✓	
28	pyrene 204-927-3	129-00-0			6.5 mg/kg		5.652 mg/kg		0.000565 %	✓	
29	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		4.6 mg/kg		4 mg/kg		0.0004 %	✓	
30	chrysene 601-048-00-0	205-923-4	218-01-9		3.8 mg/kg		3.304 mg/kg		0.00033 %	✓	
31	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		5.3 mg/kg		4.609 mg/kg		0.000461 %	✓	
32	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		2.4 mg/kg		2.087 mg/kg		0.000209 %	✓	
33	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		4.4 mg/kg		3.826 mg/kg		0.000383 %	✓	
34	indeno[123-cd]pyrene 205-893-2	193-39-5			2.4 mg/kg		2.087 mg/kg		0.000209 %	✓	
35	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		0.53 mg/kg		0.461 mg/kg		0.0000461 %	✓	
36	benzo[ghi]perylene 205-883-8	191-24-2			3 mg/kg		2.609 mg/kg		0.000261 %	✓	
37	phenol 604-001-00-2	203-632-7	108-95-2		1 mg/kg		0.87 mg/kg		0.000087 %	✓	
Total:									2.676 %		

Key

	User supplied data
	Hazardous result
	Potentially Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration

CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP4



Sample details

Sample Name:	TP4	LoW Code:	
Sample Depth:	0.30-0.50 m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	13%	Entry:	17 05 03 * (Soil and stones containing hazardous substances)
(dry weight correction)			

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1A; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

zinc chromate: (compound conc.: 0.194%)

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

lead chromate: (Note 1 conc.: 0.106%)

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Hazard Statements hit:

Aquatic Chronic 1; H410 "Very toxic to aquatic life with long lasting effects."

Because of determinands:

lead chromate: (Note 1 conc.: 0.106%)

zinc chromate: (compound conc.: 0.194%)

Hazard properties (substances considered hazardous until shown otherwise)

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials"

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00068%)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.00008%)

benzene: (conc.: 0.00008%)

toluene: (conc.: 0.00008%)

ethylbenzene: (conc.: 0.00008%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.0584%)

xylene: (conc.: 0.00008%)

Determinands

Moisture content: 13% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				28	mg/kg	1.32	32.716	mg/kg	0.00327 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				0.5	mg/kg	2.775	1.228	mg/kg	0.000123 %	✓	
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				2.1	mg/kg	3.22	5.984	mg/kg	0.000598 %	✓	
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				0.9	mg/kg	1.142	0.91	mg/kg	0.000091 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
5	chromium in chromium(III) compounds { chromium(III) oxide }				36	mg/kg	1.462	46.563	mg/kg	0.00466 %	✓	
		215-160-9	1308-38-9									
6	chromium in chromium(VI) compounds { chromium(VI) oxide }				4	mg/kg	1.923	6.807	mg/kg	0.000681 %	✓	
	024-001-00-0	215-607-8	1333-82-0									
7	copper { dicopper oxide; copper (I) oxide }				370	mg/kg	1.126	368.654	mg/kg	0.0369 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
8	lead { lead chromate }			1	1200	mg/kg	1.56	1656.441	mg/kg	0.106 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
9	mercury { mercury dichloride }				0.3	mg/kg	1.353	0.359	mg/kg	0.0000359 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
10	nickel { nickel chromate }				42	mg/kg	2.976	110.622	mg/kg	0.0111 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
11	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.26	mg/kg	0.000226 %	✓	
	034-002-00-8											
12	zinc { zinc chromate }				790	mg/kg	2.774	1939.448	mg/kg	0.194 %	✓	
	024-007-00-3											
13	TPH (C6 to C40) petroleum group		TPH		660	mg/kg		584.071	mg/kg	0.0584 %	✓	
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				1	mg/kg		0.885	mg/kg	0.0000885 %	✓	
	603-181-00-X	216-653-1	1634-04-4									
15	benzene				1	mg/kg		0.885	mg/kg	0.0000885 %	✓	
	601-020-00-8	200-753-7	71-43-2									
16	toluene				1	mg/kg		0.885	mg/kg	0.0000885 %	✓	
	601-021-00-3	203-625-9	108-88-3									
17	ethylbenzene				1	mg/kg		0.885	mg/kg	0.0000885 %	✓	
	601-023-00-4	202-849-4	100-41-4									
18	xylene				1	mg/kg		0.885	mg/kg	0.0000885 %	✓	
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				2	mg/kg	1.884	3.335	mg/kg	0.000333 %	✓	
	006-007-00-5											
20	pH				10.8	pH		10.8	pH	10.8 pH		
			pH									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
21	naphthalene				0.27 mg/kg		0.239 mg/kg	0.0000239 %	✓	
	601-052-00-2	202-049-5	91-20-3							
22	acenaphthylene				0.05 mg/kg		0.0442 mg/kg	0.00000442 %	✓	
		205-917-1	208-96-8							
23	acenaphthene				0.37 mg/kg		0.327 mg/kg	0.0000327 %	✓	
		201-469-6	83-32-9							
24	fluorene				0.32 mg/kg		0.283 mg/kg	0.0000283 %	✓	
		201-695-5	86-73-7							
25	phenanthrene				4.3 mg/kg		3.805 mg/kg	0.000381 %	✓	
		201-581-5	85-01-8							
26	anthracene				0.83 mg/kg		0.735 mg/kg	0.0000735 %	✓	
		204-371-1	120-12-7							
27	fluoranthene				8 mg/kg		7.08 mg/kg	0.000708 %	✓	
		205-912-4	206-44-0							
28	pyrene				6.9 mg/kg		6.106 mg/kg	0.000611 %	✓	
		204-927-3	129-00-0							
29	benzo[a]anthracene				4.1 mg/kg		3.628 mg/kg	0.000363 %	✓	
	601-033-00-9	200-280-6	56-55-3							
30	chrysene				4 mg/kg		3.54 mg/kg	0.000354 %	✓	
	601-048-00-0	205-923-4	218-01-9							
31	benzo[b]fluoranthene				5.6 mg/kg		4.956 mg/kg	0.000496 %	✓	
	601-034-00-4	205-911-9	205-99-2							
32	benzo[k]fluoranthene				2.2 mg/kg		1.947 mg/kg	0.000195 %	✓	
	601-036-00-5	205-916-6	207-08-9							
33	benzo[a]pyrene; benzo[def]chrysene				4.5 mg/kg		3.982 mg/kg	0.000398 %	✓	
	601-032-00-3	200-028-5	50-32-8							
34	indeno[123-cd]pyrene				2.3 mg/kg		2.035 mg/kg	0.000204 %	✓	
		205-893-2	193-39-5							
35	dibenz[a,h]anthracene				0.43 mg/kg		0.381 mg/kg	0.0000381 %	✓	
	601-041-00-2	200-181-8	53-70-3							
36	benzo[ghi]perylene				2.9 mg/kg		2.566 mg/kg	0.000257 %	✓	
		205-883-8	191-24-2							
37	phenol				1 mg/kg		0.885 mg/kg	0.0000885 %	✓	
	604-001-00-2	203-632-7	108-95-2							
Total:								0.421 %		

Key

	User supplied data
	Hazardous result
	Potentially Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration

CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP8

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP8	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.50-2.00 m	Entry:
Moisture content:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)
23%	
(dry weight correction)	

Hazard properties (substances considered hazardous until shown otherwise)

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials"

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00062%)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.00008%)

benzene: (conc.: 0.00008%)

toluene: (conc.: 0.00008%)

ethylbenzene: (conc.: 0.00008%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.00081%)

xylene: (conc.: 0.00008%)

Determinands

Moisture content: 23% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				2.6	mg/kg	1.32	2.791	mg/kg	0.000279 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				0.06	mg/kg	2.775	0.135	mg/kg	0.0000135 %	✓	
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				0.9	mg/kg	3.22	2.356	mg/kg	0.000236 %	✓	
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				0.4	mg/kg	1.142	0.371	mg/kg	0.0000371 %	✓	
	048-002-00-0	215-146-2	1306-19-0									

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
5	chromium in chromium(III) compounds { chromium(III) oxide }				3.6	mg/kg	1.462	4.278	mg/kg	0.000428 %	✓	
		215-160-9	1308-38-9									
6	chromium in chromium(VI) compounds { chromium(VI) oxide }				4	mg/kg	1.923	6.254	mg/kg	0.000625 %	✓	
		024-001-00-0	215-607-8									
			1333-82-0									
7	copper { dicopper oxide; copper (I) oxide }				23	mg/kg	1.126	21.053	mg/kg	0.00211 %	✓	
		029-002-00-X	215-270-7									
			1317-39-1									
8	lead { lead chromate }			1	21	mg/kg	1.56	26.631	mg/kg	0.00171 %	✓	
		082-004-00-2	231-846-0									
			7758-97-6									
9	mercury { mercury dichloride }				0.3	mg/kg	1.353	0.33	mg/kg	0.000033 %	✓	
		080-010-00-X	231-299-8									
			7487-94-7									
10	nickel { nickel chromate }				5.8	mg/kg	2.976	14.034	mg/kg	0.0014 %	✓	
		028-035-00-7	238-766-5									
			14721-18-7									
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.076	mg/kg	0.000208 %	✓	
		034-002-00-8										
12	zinc { zinc chromate }				24	mg/kg	2.774	54.13	mg/kg	0.00541 %	✓	
		024-007-00-3										
13	TPH (C6 to C40) petroleum group				10	mg/kg		8.13	mg/kg	0.000813 %	✓	
			TPH									
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				1	mg/kg		0.813	mg/kg	0.0000813 %	✓	
		603-181-00-X	216-653-1									
			1634-04-4									
15	benzene				1	mg/kg		0.813	mg/kg	0.0000813 %	✓	
		601-020-00-8	200-753-7									
			71-43-2									
16	toluene				1	mg/kg		0.813	mg/kg	0.0000813 %	✓	
		601-021-00-3	203-625-9									
			108-88-3									
17	ethylbenzene				1	mg/kg		0.813	mg/kg	0.0000813 %	✓	
		601-023-00-4	202-849-4									
			100-41-4									
18	xylene				1	mg/kg		0.813	mg/kg	0.0000813 %	✓	
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]									
			95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				2	mg/kg	1.884	3.063	mg/kg	0.000306 %	✓	
		006-007-00-5										
20	pH				8.9	pH		8.9	pH	8.9 pH		
			PH									
21	naphthalene				0.05	mg/kg		0.0407	mg/kg	0.00000407 %	✓	
		601-052-00-2	202-049-5									
			91-20-3									
22	acenaphthylene				0.05	mg/kg		0.0407	mg/kg	0.00000407 %	✓	
			205-917-1									
			208-96-8									
23	acenaphthene				0.05	mg/kg		0.0407	mg/kg	0.00000407 %	✓	
			201-469-6									
			83-32-9									
24	fluorene				0.05	mg/kg		0.0407	mg/kg	0.00000407 %	✓	
			201-695-5									
			86-73-7									
25	phenanthrene				0.05	mg/kg		0.0407	mg/kg	0.00000407 %	✓	
			201-581-5									
			85-01-8									
26	anthracene				0.05	mg/kg		0.0407	mg/kg	0.00000407 %	✓	
			204-371-1									
			120-12-7									
27	fluoranthene				0.05	mg/kg		0.0407	mg/kg	0.00000407 %	✓	
			205-912-4									
			206-44-0									
28	pyrene				0.05	mg/kg		0.0407	mg/kg	0.00000407 %	✓	
			204-927-3									
			129-00-0									
29	benzo[a]anthracene				0.05	mg/kg		0.0407	mg/kg	0.00000407 %	✓	
		601-033-00-9	200-280-6									
			56-55-3									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
30	chrysene				0.05 mg/kg		0.0407 mg/kg	0.00000407 %	✓	
	601-048-00-0	205-923-4	218-01-9							
31	benzo[b]fluoranthene				0.05 mg/kg		0.0407 mg/kg	0.00000407 %	✓	
	601-034-00-4	205-911-9	205-99-2							
32	benzo[k]fluoranthene				0.05 mg/kg		0.0407 mg/kg	0.00000407 %	✓	
	601-036-00-5	205-916-6	207-08-9							
33	benzo[a]pyrene; benzo[def]chrysene				0.05 mg/kg		0.0407 mg/kg	0.00000407 %	✓	
	601-032-00-3	200-028-5	50-32-8							
34	indeno[123-cd]pyrene				0.05 mg/kg		0.0407 mg/kg	0.00000407 %	✓	
		205-893-2	193-39-5							
35	dibenz[a,h]anthracene				0.05 mg/kg		0.0407 mg/kg	0.00000407 %	✓	
	601-041-00-2	200-181-8	53-70-3							
36	benzo[ghi]perylene				0.05 mg/kg		0.0407 mg/kg	0.00000407 %	✓	
		205-883-8	191-24-2							
37	phenol				1 mg/kg		0.813 mg/kg	0.0000813 %	✓	
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0142 %		

Key

- User supplied data
- Potentially Hazardous result
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: CP1

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample Name:	LoW Code:	
CP1	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)
1.00 m		
Moisture content:		
19%		
(dry weight correction)		

Hazard properties (substances considered hazardous until shown otherwise)

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials"

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00064%)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.00008%)

benzene: (conc.: 0.00008%)

toluene: (conc.: 0.00008%)

ethylbenzene: (conc.: 0.00008%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.00084%)

xylene: (conc.: 0.00008%)

Determinands

Moisture content: 19% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				1	mg/kg	1.32	1.11	mg/kg	0.000111 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				0.06	mg/kg	2.775	0.14	mg/kg	0.000014 %	✓	
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				0.4	mg/kg	3.22	1.082	mg/kg	0.000108 %	✓	
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				0.3	mg/kg	1.142	0.288	mg/kg	0.0000288 %	✓	
	048-002-00-0	215-146-2	1306-19-0									

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
5	chromium in chromium(III) compounds { chromium(III) oxide }	215-160-9	1308-38-9		2.9	mg/kg	1.462	3.562	mg/kg	0.000356 %	✓	
6	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	4	mg/kg	1.923	6.464	mg/kg	0.000646 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	5.9	mg/kg	1.126	5.582	mg/kg	0.000558 %	✓	
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	4.2	mg/kg	1.56	5.505	mg/kg	0.000353 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7	0.3	mg/kg	1.353	0.341	mg/kg	0.0000341 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	2.9	mg/kg	2.976	7.253	mg/kg	0.000725 %	✓	
11	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }	034-002-00-8			1	mg/kg	2.554	2.146	mg/kg	0.000215 %	✓	
12	zinc { zinc chromate }	024-007-00-3			19	mg/kg	2.774	44.293	mg/kg	0.00443 %	✓	
13	TPH (C6 to C40) petroleum group		TPH		10	mg/kg		8.403	mg/kg	0.00084 %	✓	
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	1	mg/kg		0.84	mg/kg	0.000084 %	✓	
15	benzene	601-020-00-8	200-753-7	71-43-2	1	mg/kg		0.84	mg/kg	0.000084 %	✓	
16	toluene	601-021-00-3	203-625-9	108-88-3	1	mg/kg		0.84	mg/kg	0.000084 %	✓	
17	ethylbenzene	601-023-00-4	202-849-4	100-41-4	1	mg/kg		0.84	mg/kg	0.000084 %	✓	
18	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	1	mg/kg		0.84	mg/kg	0.000084 %	✓	
19	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			2	mg/kg	1.884	3.166	mg/kg	0.000317 %	✓	
20	pH		PH		8.5	pH		8.5	pH	8.5 pH		
21	naphthalene	601-052-00-2	202-049-5	91-20-3	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
22	acenaphthylene		205-917-1	208-96-8	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
23	acenaphthene		201-469-6	83-32-9	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
24	fluorene		201-695-5	86-73-7	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
25	phenanthrene		201-581-5	85-01-8	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
26	anthracene		204-371-1	120-12-7	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
27	fluoranthene		205-912-4	206-44-0	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
28	pyrene		204-927-3	129-00-0	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
29	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
30	chrysene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
	601-048-00-0	205-923-4	218-01-9							
31	benzo[b]fluoranthene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
	601-034-00-4	205-911-9	205-99-2							
32	benzo[k]fluoranthene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
	601-036-00-5	205-916-6	207-08-9							
33	benzo[a]pyrene; benzo[def]chrysene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
	601-032-00-3	200-028-5	50-32-8							
34	indeno[123-cd]pyrene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
		205-893-2	193-39-5							
35	dibenz[a,h]anthracene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
	601-041-00-2	200-181-8	53-70-3							
36	benzo[ghi]perylene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
		205-883-8	191-24-2							
37	phenol				1 mg/kg		0.84 mg/kg	0.000084 %	✓	
	604-001-00-2	203-632-7	108-95-2							
Total:								0.00931 %		

Key

- User supplied data
- Potentially Hazardous result
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP11

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP11	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
2.00-2.40 m	Entry:
Moisture content:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)
17%	
(dry weight correction)	

Hazard properties (substances considered hazardous until shown otherwise)

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials"

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00065%)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.00008%)

benzene: (conc.: 0.00008%)

toluene: (conc.: 0.00008%)

ethylbenzene: (conc.: 0.00008%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.00427%)

xylene: (conc.: 0.00008%)

Determinands

Moisture content: 17% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				5.7 mg/kg	1.32	6.432 mg/kg	0.000643 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	beryllium { beryllium oxide }				0.38 mg/kg	2.775	0.901 mg/kg	0.0000901 %	✓	
	004-003-00-8	215-133-1	1304-56-9							
3	boron { diboron trioxide; boric oxide }				0.9 mg/kg	3.22	2.477 mg/kg	0.000248 %	✓	
	005-008-00-8	215-125-8	1303-86-2							
4	cadmium { cadmium oxide }				0.3 mg/kg	1.142	0.293 mg/kg	0.0000293 %	✓	
	048-002-00-0	215-146-2	1306-19-0							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value		MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number										
5		chromium in chromium(III) compounds {  chromium(III) oxide }				16	mg/kg	1.462	19.987	mg/kg	0.002 %		✓	
		215-160-9	1308-38-9											
6		chromium in chromium(VI) compounds { chromium(VI) oxide }				4	mg/kg	1.923	6.575	mg/kg	0.000657 %		✓	
		024-001-00-0	215-607-8	1333-82-0										
7		copper { dicopper oxide; copper (I) oxide }				180	mg/kg	1.126	173.214	mg/kg	0.0173 %		✓	
		029-002-00-X	215-270-7	1317-39-1										
8		lead { lead chromate }			1	99	mg/kg	1.56	131.984	mg/kg	0.00846 %		✓	
		082-004-00-2	231-846-0	7758-97-6										
9		mercury { mercury dichloride }				0.3	mg/kg	1.353	0.347	mg/kg	0.0000347 %		✓	
		080-010-00-X	231-299-8	7487-94-7										
10		nickel { nickel chromate }				12	mg/kg	2.976	30.526	mg/kg	0.00305 %		✓	
		028-035-00-7	238-766-5	14721-18-7										
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				2.6	mg/kg	2.554	5.675	mg/kg	0.000567 %		✓	
		034-002-00-8												
12		zinc { zinc chromate }				110	mg/kg	2.774	260.817	mg/kg	0.0261 %		✓	
		024-007-00-3												
13		TPH (C6 to C40) petroleum group				50	mg/kg		42.735	mg/kg	0.00427 %		✓	
				TPH										
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				1	mg/kg		0.855	mg/kg	0.0000855 %		✓	
		603-181-00-X	216-653-1	1634-04-4										
15		benzene				1	mg/kg		0.855	mg/kg	0.0000855 %		✓	
		601-020-00-8	200-753-7	71-43-2										
16		toluene				1	mg/kg		0.855	mg/kg	0.0000855 %		✓	
		601-021-00-3	203-625-9	108-88-3										
17		ethylbenzene				1	mg/kg		0.855	mg/kg	0.0000855 %		✓	
		601-023-00-4	202-849-4	100-41-4										
18		xylene				1	mg/kg		0.855	mg/kg	0.0000855 %		✓	
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]										
19		cyanides {  salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				2	mg/kg	1.884	3.221	mg/kg	0.000322 %		✓	
		006-007-00-5												
20		pH				8.6	pH		8.6	pH	8.6 pH			
				PH										
21		naphthalene				0.05	mg/kg		0.0427	mg/kg	0.00000427 %		✓	
		601-052-00-2	202-049-5	91-20-3										
22		acenaphthylene				0.05	mg/kg		0.0427	mg/kg	0.00000427 %		✓	
			205-917-1	208-96-8										
23		acenaphthene				0.05	mg/kg		0.0427	mg/kg	0.00000427 %		✓	
			201-469-6	83-32-9										
24		fluorene				0.05	mg/kg		0.0427	mg/kg	0.00000427 %		✓	
			201-695-5	86-73-7										
25		phenanthrene				1.3	mg/kg		1.111	mg/kg	0.000111 %		✓	
			201-581-5	85-01-8										
26		anthracene				0.37	mg/kg		0.316	mg/kg	0.0000316 %		✓	
			204-371-1	120-12-7										
27		fluoranthene				1.9	mg/kg		1.624	mg/kg	0.000162 %		✓	
			205-912-4	206-44-0										
28		pyrene				1.7	mg/kg		1.453	mg/kg	0.000145 %		✓	
			204-927-3	129-00-0										
29		benzo[a]anthracene				0.95	mg/kg		0.812	mg/kg	0.0000812 %		✓	
		601-033-00-9	200-280-6	56-55-3										

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
30	chrysene				0.85 mg/kg		0.726 mg/kg	0.0000726 %	✓	
	601-048-00-0	205-923-4	218-01-9							
31	benzo[b]fluoranthene				0.83 mg/kg		0.709 mg/kg	0.0000709 %	✓	
	601-034-00-4	205-911-9	205-99-2							
32	benzo[k]fluoranthene				0.47 mg/kg		0.402 mg/kg	0.0000402 %	✓	
	601-036-00-5	205-916-6	207-08-9							
33	benzo[a]pyrene; benzo[def]chrysene				0.65 mg/kg		0.556 mg/kg	0.0000556 %	✓	
	601-032-00-3	200-028-5	50-32-8							
34	indeno[123-cd]pyrene				0.3 mg/kg		0.256 mg/kg	0.0000256 %	✓	
		205-893-2	193-39-5							
35	dibenz[a,h]anthracene				0.05 mg/kg		0.0427 mg/kg	0.00000427 %	✓	
	601-041-00-2	200-181-8	53-70-3							
36	benzo[ghi]perylene				0.49 mg/kg		0.419 mg/kg	0.0000419 %	✓	
		205-883-8	191-24-2							
37	phenol				1 mg/kg		0.855 mg/kg	0.0000855 %	✓	
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0652 %		

Key

- User supplied data
- Potentially Hazardous result
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP12

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample Name:	LoW Code:	
TP12	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)
0.50-0.80 m		
Moisture content:		
15%		
(dry weight correction)		

Hazard properties (substances considered hazardous until shown otherwise)

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials"

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00066%)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.00008%)

benzene: (conc.: 0.00008%)

toluene: (conc.: 0.00008%)

ethylbenzene: (conc.: 0.00008%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.0183%)

xylene: (conc.: 0.00008%)

Determinands

Moisture content: 15% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				7.3	mg/kg	1.32	8.381	mg/kg	0.000838 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				0.63	mg/kg	2.775	1.52	mg/kg	0.000152 %	✓	
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				1.3	mg/kg	3.22	3.64	mg/kg	0.000364 %	✓	
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				0.4	mg/kg	1.142	0.397	mg/kg	0.0000397 %	✓	
	048-002-00-0	215-146-2	1306-19-0									

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
5	chromium in chromium(III) compounds { chromium(III) oxide }				31	mg/kg	1.462	39.398	mg/kg	0.00394 %	✓	
		215-160-9	1308-38-9									
6	chromium in chromium(VI) compounds { chromium(VI) oxide }				4	mg/kg	1.923	6.689	mg/kg	0.000669 %	✓	
		024-001-00-0	215-607-8									
7	copper { dicopper oxide; copper (I) oxide }				28	mg/kg	1.126	27.413	mg/kg	0.00274 %	✓	
		029-002-00-X	215-270-7									
8	lead { lead chromate }			1	46	mg/kg	1.56	62.393	mg/kg	0.004 %	✓	
		082-004-00-2	231-846-0									
9	mercury { mercury dichloride }				0.3	mg/kg	1.353	0.353	mg/kg	0.0000353 %	✓	
		080-010-00-X	231-299-8									
10	nickel { nickel chromate }				21	mg/kg	2.976	54.349	mg/kg	0.00543 %	✓	
		028-035-00-7	238-766-5									
11	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.221	mg/kg	0.000222 %	✓	
		034-002-00-8										
12	zinc { zinc chromate }				60	mg/kg	2.774	144.738	mg/kg	0.0145 %	✓	
		024-007-00-3										
13	TPH (C6 to C40) petroleum group		TPH		210	mg/kg		182.609	mg/kg	0.0183 %	✓	
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				1	mg/kg		0.87	mg/kg	0.000087 %	✓	
		603-181-00-X	216-653-1									
15	benzene				1	mg/kg		0.87	mg/kg	0.000087 %	✓	
		601-020-00-8	200-753-7									
16	toluene				1	mg/kg		0.87	mg/kg	0.000087 %	✓	
		601-021-00-3	203-625-9									
17	ethylbenzene				1	mg/kg		0.87	mg/kg	0.000087 %	✓	
		601-023-00-4	202-849-4									
18	xylene				1	mg/kg		0.87	mg/kg	0.000087 %	✓	
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]									
19	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				2	mg/kg	1.884	3.277	mg/kg	0.000328 %	✓	
		006-007-00-5										
20	pH		PH		8.5	pH		8.5	pH	8.5 pH		
21	naphthalene				0.41	mg/kg		0.357	mg/kg	0.0000357 %	✓	
		601-052-00-2	202-049-5									
22	acenaphthylene				0.05	mg/kg		0.0435	mg/kg	0.00000435 %	✓	
			205-917-1									
23	acenaphthene				0.42	mg/kg		0.365	mg/kg	0.0000365 %	✓	
			201-469-6									
24	fluorene				0.52	mg/kg		0.452	mg/kg	0.0000452 %	✓	
			201-695-5									
25	phenanthrene				6	mg/kg		5.217	mg/kg	0.000522 %	✓	
			201-581-5									
26	anthracene				1.3	mg/kg		1.13	mg/kg	0.000113 %	✓	
			204-371-1									
27	fluoranthene				7	mg/kg		6.087	mg/kg	0.000609 %	✓	
			205-912-4									
28	pyrene				5.6	mg/kg		4.87	mg/kg	0.000487 %	✓	
			204-927-3									
29	benzo[a]anthracene				2.6	mg/kg		2.261	mg/kg	0.000226 %	✓	
		601-033-00-9	200-280-6									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
30	chrysene									
	601-048-00-0	205-923-4	218-01-9		3 mg/kg		2.609 mg/kg	0.000261 %	✓	
31	benzo[b]fluoranthene									
	601-034-00-4	205-911-9	205-99-2		2.4 mg/kg		2.087 mg/kg	0.000209 %	✓	
32	benzo[k]fluoranthene									
	601-036-00-5	205-916-6	207-08-9		1.6 mg/kg		1.391 mg/kg	0.000139 %	✓	
33	benzo[a]pyrene; benzo[def]chrysene									
	601-032-00-3	200-028-5	50-32-8		2.4 mg/kg		2.087 mg/kg	0.000209 %	✓	
34	indeno[123-cd]pyrene									
		205-893-2	193-39-5		1.3 mg/kg		1.13 mg/kg	0.000113 %	✓	
35	dibenz[a,h]anthracene									
	601-041-00-2	200-181-8	53-70-3		0.36 mg/kg		0.313 mg/kg	0.0000313 %	✓	
36	benzo[ghi]perylene									
		205-883-8	191-24-2		1.6 mg/kg		1.391 mg/kg	0.000139 %	✓	
37	phenol									
	604-001-00-2	203-632-7	108-95-2		1 mg/kg		0.87 mg/kg	0.000087 %	✓	
Total:								0.0552 %		

Key

- User supplied data
 - Potentially Hazardous result
 - Determinand defined or amended by HazWasteOnline (see Appendix A)
 - Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP13

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP13	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.70-1.00 m	Entry:
Moisture content:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)
17%	
(dry weight correction)	

Hazard properties (substances considered hazardous until shown otherwise)

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials"

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00065%)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.00008%)

benzene: (conc.: 0.00008%)

toluene: (conc.: 0.00008%)

ethylbenzene: (conc.: 0.00008%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.00085%)

xylene: (conc.: 0.00008%)

Determinands

Moisture content: 17% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				6.5	mg/kg	1.32	7.335	mg/kg	0.000734 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				1.7	mg/kg	2.775	4.033	mg/kg	0.000403 %	✓	
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				1	mg/kg	3.22	2.752	mg/kg	0.000275 %	✓	
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.195	mg/kg	0.0000195 %	✓	
	048-002-00-0	215-146-2	1306-19-0									

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#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
30	chrysene				0.05 mg/kg		0.0427 mg/kg	0.00000427 %	✓	
	601-048-00-0	205-923-4	218-01-9							
31	benzo[b]fluoranthene				0.05 mg/kg		0.0427 mg/kg	0.00000427 %	✓	
	601-034-00-4	205-911-9	205-99-2							
32	benzo[k]fluoranthene				0.05 mg/kg		0.0427 mg/kg	0.00000427 %	✓	
	601-036-00-5	205-916-6	207-08-9							
33	benzo[a]pyrene; benzo[def]chrysene				0.05 mg/kg		0.0427 mg/kg	0.00000427 %	✓	
	601-032-00-3	200-028-5	50-32-8							
34	indeno[123-cd]pyrene				0.05 mg/kg		0.0427 mg/kg	0.00000427 %	✓	
		205-893-2	193-39-5							
35	dibenz[a,h]anthracene				0.05 mg/kg		0.0427 mg/kg	0.00000427 %	✓	
	601-041-00-2	200-181-8	53-70-3							
36	benzo[ghi]perylene				0.05 mg/kg		0.0427 mg/kg	0.00000427 %	✓	
		205-883-8	191-24-2							
37	phenol				1 mg/kg		0.855 mg/kg	0.0000855 %	✓	
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0372 %		

Key

- User supplied data
- Potentially Hazardous result
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP14

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample Name:	LoW Code:	
TP14	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)
1.20-1.50 m		
Moisture content:		
19%		
(dry weight correction)		

Hazard properties (substances considered hazardous until shown otherwise)

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials"

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00064%)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.00008%)

benzene: (conc.: 0.00008%)

toluene: (conc.: 0.00008%)

ethylbenzene: (conc.: 0.00008%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.00084%)

xylene: (conc.: 0.00008%)

Determinands

Moisture content: 19% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				1	mg/kg	1.32	1.11	mg/kg	0.000111 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				0.21	mg/kg	2.775	0.49	mg/kg	0.000049 %	✓	
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				0.9	mg/kg	3.22	2.435	mg/kg	0.000244 %	✓	
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				0.4	mg/kg	1.142	0.384	mg/kg	0.0000384 %	✓	
	048-002-00-0	215-146-2	1306-19-0									

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
5	chromium in chromium(III) compounds { chromium(III) oxide }	215-160-9	1308-38-9		14	mg/kg	1.462	17.195	mg/kg	0.00172 %	✓	
6	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	4	mg/kg	1.923	6.464	mg/kg	0.000646 %	✓	
7	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	6.1	mg/kg	1.126	5.771	mg/kg	0.000577 %	✓	
8	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	5.8	mg/kg	1.56	7.602	mg/kg	0.000487 %	✓	
9	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7	0.3	mg/kg	1.353	0.341	mg/kg	0.0000341 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	8.2	mg/kg	2.976	20.509	mg/kg	0.00205 %	✓	
11	selenium { selenium compounds with the exception of cadmium selenosulfide and those specified elsewhere in this Annex }	034-002-00-8			1	mg/kg	2.554	2.146	mg/kg	0.000215 %	✓	
12	zinc { zinc chromate }	024-007-00-3			20	mg/kg	2.774	46.624	mg/kg	0.00466 %	✓	
13	TPH (C6 to C40) petroleum group		TPH		10	mg/kg		8.403	mg/kg	0.00084 %	✓	
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	1	mg/kg		0.84	mg/kg	0.000084 %	✓	
15	benzene	601-020-00-8	200-753-7	71-43-2	1	mg/kg		0.84	mg/kg	0.000084 %	✓	
16	toluene	601-021-00-3	203-625-9	108-88-3	1	mg/kg		0.84	mg/kg	0.000084 %	✓	
17	ethylbenzene	601-023-00-4	202-849-4	100-41-4	1	mg/kg		0.84	mg/kg	0.000084 %	✓	
18	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	1	mg/kg		0.84	mg/kg	0.000084 %	✓	
19	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			2	mg/kg	1.884	3.166	mg/kg	0.000317 %	✓	
20	pH		PH		8.2	pH		8.2	pH	8.2 pH		
21	naphthalene	601-052-00-2	202-049-5	91-20-3	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
22	acenaphthylene		205-917-1	208-96-8	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
23	acenaphthene		201-469-6	83-32-9	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
24	fluorene		201-695-5	86-73-7	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
25	phenanthrene		201-581-5	85-01-8	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
26	anthracene		204-371-1	120-12-7	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
27	fluoranthene		205-912-4	206-44-0	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
28	pyrene		204-927-3	129-00-0	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
29	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
30	chrysene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
	601-048-00-0	205-923-4	218-01-9							
31	benzo[b]fluoranthene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
	601-034-00-4	205-911-9	205-99-2							
32	benzo[k]fluoranthene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
	601-036-00-5	205-916-6	207-08-9							
33	benzo[a]pyrene; benzo[def]chrysene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
	601-032-00-3	200-028-5	50-32-8							
34	indeno[123-cd]pyrene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
		205-893-2	193-39-5							
35	dibenz[a,h]anthracene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
	601-041-00-2	200-181-8	53-70-3							
36	benzo[ghi]perylene				0.05 mg/kg		0.042 mg/kg	0.0000042 %	✓	
		205-883-8	191-24-2							
37	phenol				1 mg/kg		0.84 mg/kg	0.000084 %	✓	
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0126 %		

Key

- User supplied data
- Potentially Hazardous result
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP16

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample Name:	LoW Code:
TP16	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
2.50-2.70 m	Entry:
Moisture content:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)
14%	
(dry weight correction)	

Hazard properties (substances considered hazardous until shown otherwise)

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials"

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00067%)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinands:

tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane: (conc.: 0.00008%)

benzene: (conc.: 0.00008%)

toluene: (conc.: 0.00008%)

ethylbenzene: (conc.: 0.00008%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.00763%)

xylene: (conc.: 0.00008%)

Determinands

Moisture content: 14% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				6.7	mg/kg	1.32	7.76	mg/kg	0.000776 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	beryllium { beryllium oxide }				0.51	mg/kg	2.775	1.242	mg/kg	0.000124 %	✓	
	004-003-00-8	215-133-1	1304-56-9									
3	boron { diboron trioxide; boric oxide }				1.1	mg/kg	3.22	3.107	mg/kg	0.000311 %	✓	
	005-008-00-8	215-125-8	1303-86-2									
4	cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.2	mg/kg	0.00002 %	✓	
	048-002-00-0	215-146-2	1306-19-0									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value		MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number										
5	 chromium in chromium(III) compounds {  chromium(III) oxide }				1	19	mg/kg	1.462	24.359	mg/kg	0.00244 %	✓		
		215-160-9	1308-38-9											
6	 chromium in chromium(VI) compounds { chromium(VI) oxide }				1	4	mg/kg	1.923	6.748	mg/kg	0.000675 %	✓		
		024-001-00-0	215-607-8	1333-82-0										
7	 copper { dicopper oxide; copper (I) oxide }				1	19	mg/kg	1.126	18.765	mg/kg	0.00188 %	✓		
		029-002-00-X	215-270-7	1317-39-1										
8	 lead { lead chromate }				1	24	mg/kg	1.56	32.838	mg/kg	0.00211 %	✓		
		082-004-00-2	231-846-0	7758-97-6										
9	 mercury { mercury dichloride }				1	0.3	mg/kg	1.353	0.356	mg/kg	0.0000356 %	✓		
		080-010-00-X	231-299-8	7487-94-7										
10	 nickel { nickel chromate }				1	14	mg/kg	2.976	36.551	mg/kg	0.00366 %	✓		
			028-035-00-7	238-766-5										14721-18-7
11	 selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	1	mg/kg	2.554	2.24	mg/kg	0.000224 %	✓		
			034-002-00-8											
12	 zinc { zinc chromate }				1	41	mg/kg	2.774	99.772	mg/kg	0.00998 %	✓		
			024-007-00-3											
13	 TPH (C6 to C40) petroleum group				1	87	mg/kg		76.316	mg/kg	0.00763 %	✓		
				TPH										
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				1	1	mg/kg		0.877	mg/kg	0.0000877 %	✓		
			603-181-00-X	216-653-1										1634-04-4
15	benzene				1	1	mg/kg		0.877	mg/kg	0.0000877 %	✓		
			601-020-00-8	200-753-7										71-43-2
16	toluene				1	1	mg/kg		0.877	mg/kg	0.0000877 %	✓		
			601-021-00-3	203-625-9										108-88-3
17	 ethylbenzene				1	1	mg/kg		0.877	mg/kg	0.0000877 %	✓		
			601-023-00-4	202-849-4										100-41-4
18	xylene				1	1	mg/kg		0.877	mg/kg	0.0000877 %	✓		
			601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]										95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]
19	 cyanides {  salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				1	2	mg/kg	1.884	3.305	mg/kg	0.000331 %	✓		
			006-007-00-5											
20	 pH				1	8.2	pH		8.2	pH	8.2 pH			
				PH										
21	naphthalene				1	0.05	mg/kg		0.0439	mg/kg	0.00000439 %	✓		
			601-052-00-2	202-049-5										91-20-3
22	 acenaphthylene				1	0.05	mg/kg		0.0439	mg/kg	0.00000439 %	✓		
				205-917-1										208-96-8
23	 acenaphthene				1	0.05	mg/kg		0.0439	mg/kg	0.00000439 %	✓		
				201-469-6										83-32-9
24	 fluorene				1	0.05	mg/kg		0.0439	mg/kg	0.00000439 %	✓		
				201-695-5										86-73-7
25	 phenanthrene				1	0.05	mg/kg		0.0439	mg/kg	0.00000439 %	✓		
				201-581-5										85-01-8
26	 anthracene				1	0.05	mg/kg		0.0439	mg/kg	0.00000439 %	✓		
				204-371-1										120-12-7
27	 fluoranthene				1	0.05	mg/kg		0.0439	mg/kg	0.00000439 %	✓		
				205-912-4										206-44-0
28	 pyrene				1	0.05	mg/kg		0.0439	mg/kg	0.00000439 %	✓		
				204-927-3										129-00-0
29	benzo[a]anthracene				1	0.05	mg/kg		0.0439	mg/kg	0.00000439 %	✓		
			601-033-00-9	200-280-6										56-55-3

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
30	chrysene				0.05 mg/kg		0.0439 mg/kg	0.00000439 %	✓	
	601-048-00-0	205-923-4	218-01-9							
31	benzo[b]fluoranthene				0.05 mg/kg		0.0439 mg/kg	0.00000439 %	✓	
	601-034-00-4	205-911-9	205-99-2							
32	benzo[k]fluoranthene				0.05 mg/kg		0.0439 mg/kg	0.00000439 %	✓	
	601-036-00-5	205-916-6	207-08-9							
33	benzo[a]pyrene; benzo[def]chrysene				0.05 mg/kg		0.0439 mg/kg	0.00000439 %	✓	
	601-032-00-3	200-028-5	50-32-8							
34	indeno[123-cd]pyrene				0.05 mg/kg		0.0439 mg/kg	0.00000439 %	✓	
		205-893-2	193-39-5							
35	dibenz[a,h]anthracene				0.05 mg/kg		0.0439 mg/kg	0.00000439 %	✓	
	601-041-00-2	200-181-8	53-70-3							
36	benzo[ghi]perylene				0.05 mg/kg		0.0439 mg/kg	0.00000439 %	✓	
		205-883-8	191-24-2							
37	phenol				1 mg/kg		0.877 mg/kg	0.0000877 %	✓	
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0308 %		

Key

- User supplied data
- Potentially Hazardous result
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- CLP: Note 1 Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4

Description/Comments:

Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)

Additional Hazard Statement(s): Carc. 2 H351

Reason for additional Hazards Statement(s)/Risk Phrase(s):

03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

CLP index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s)/Risk Phrase(s):

14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

pH (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

• **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

• **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

• **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

• **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

• **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Carc. 2 H351

• **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

beryllium {beryllium oxide}

Reasonable case CLP species based on hazard statements/molecular weight. Industrial sources include: most common (non alloy) form, used in ceramics (edit as required)

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulposelenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulposelenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide] (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.1, May 2018**

HazWasteOnline Classification Engine Version: 2019.163.3889.7904 (12 Jun 2019)

HazWasteOnline Database: 2019.163.3889.7904 (12 Jun 2019)

This classification utilises the following guidance and legislation:

WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

QUALITATIVE RISK ASSESSMENT METHODOLOGY

Gravesham Borough Council

Qualitative risk assessment is calculated from looking at the magnitude of an identified hazard and the probability the hazard will occur.

Below is presented the magnitude and probabilities of risks occurring from contamination.

Classification of Consequence (Severity)				
Severe	Medium	Mild	Minor	
Short term (acute) risk to human health likely to result in 'significant harm' ¹ . Pollution of sensitive water resources (controlled waters). Catastrophic damage to crops, buildings or property. A significant change in a particular ecosystem, or organism forming part of the ecosystem (death of species in nature reserves).	Chronic damage to Human Health ('significant harm') ² . Short term risk of pollution to water resources (controlled waters). Significant damage to crops, buildings or property. A short term risk to a particular ecosystem or organism forming part of such an ecosystem ³ .	Exposure to human health unlikely to lead to "significant harm". Pollution of non-sensitive water resources (non-classified aquifers). Minor damage to crops, buildings or property. Minor or short-lived damage to aquatic or other ecosystems. Unlikely for substantial ecological harm.	No measurable effects on humans. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Easily repairable effects of damage to buildings, structures and services.	
Very High Risk	High Risk	Moderate Risk	Low Risk	
High Risk	Moderate Risk	Moderate / Low Risk	Low Risk	
Moderate Risk	Moderate / Low Risk	Low Risk	Very Low Risk	
Moderate / Low Risk	Low Risk	Very Low Risk	Very Low Risk	
Probability				
High Likelihood Evident pollution linkage. Very likely in short term and inevitable in long term. Evidence of harm at the receptor.	Likely There is a pollution linkage and it's probable an event will occur. Event is not inevitable, but possible in the short term and likely in the long term.	Low Likelihood There is a pollutant linkage and circumstances are possible under which an event could occur. It is by no means certain that even over a longer period such an event would take place.	Unlikely There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.	

Notes.

¹ Environmental Protection Act 1990

² DEFRA circular 01/2006

³ DEFRA circular 01/2006 Annex 3

Severe and medium classification may result in death. However, severe relates to short term risk, while medium relates to long-term risk. Severe will require urgent action, medium may require urgent action but usually long term action is sufficient.

The action required for each risk classification is shown below.

Risk Category	Action Required
Very High Risk	If this risk is realised it is likely to result in substantial liability. Urgent investigation and/or remediation are likely to be required.
High Risk	If this risk is realised it is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over longer term.
Moderate Risk	It is possible that harm could arise to a designated receptor from an identified hazard. It is unlikely such harm would be severe and any such harm would be relatively mild. Investigation is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst be normally mild.
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.



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experts on the ground