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Phase II Contaminated Land Risk Assessment

Development at Greenhill Road, Middleton

September
2023

Site Ref: 6127/VGH-CLRA v1.01

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Phase II Contaminated Land Risk Assessment

1. Introduction

This report is an account of a Phase II Contaminated Land Risk Assessment carried out by GeoAssist Limited at the request of the Client J Walker Homes Limited for the proposed Development at Greenhill Road, Middleton.

The work was commissioned following acceptance of the quotation and an instruction to proceed issued by the Client J Walker Homes Limited on 09/08/2023.

The purpose of this Phase II investigation is to provide information following the conclusions of the GeoAssist phase I report, referenced 6127VGH PCLRA and dated July 2023, in order to ensure that the site:

- Is assessed in accordance with the UK government methodology outlined online in Land Contamination Risk Management (LCRM)
- Satisfies the relevant requirements of the National Planning Policy Framework July 2021.
- Is suitable for the intended proposed land use. In this case, as a Residential Development of dwelling houses with private gardens and associated off road carparking and access roads.

The approximate grid reference for the centre of the site is 388610, 405180 and the total area of the site is approximately 6,200m². The area of the site scheduled for investigation is outlined with a solid red line on the site plan in Appendix A1. The positions of exploratory holes are also indicated on the plan. The proposed development plan is shown in appendix A2.

2. Description of the Site

2.1 Present

The site is located directly to the south of the Greenhill Road in the Middleton Junction area of Oldham, Greater Manchester. The site forms an irregular L shape and can be accessed from Greenhill Road and Smethurst Street. The topography of the site is relatively level.

At the time of the site visit the site was sub divided into three distinct plots.

1. Area one is the former junction vehicle refuelling garage and associated repair work shop to the rear. There are numerous visual indications refuelling infrastructure including vapour vents, interceptors drains and manholes at Underground Storage Tanks. Four bunded above ground diesel tanks were noted to the rear of the former forecourt building. It was noted that the pump island and any forecourt canopy had been long since decommissioned and the ground cover at the forecourt had been disturbed in places. The building to the rear of the forecourt building had been used for general maintenance and repair work and there were several parts from vehicles noted across the external area including wheels and panels. A large area of open scrubland incorporating brambles and other self establishing undergrowth species is present to the rear.
2. Area two has until recently been used as a plant nursery and consequently there are several poly/mesh tunnels for horticultural purposes and a pair of shipping containers for storage. There was no evidence of the use of pesticides or herbicides and there were no obvious visual or olfactory observations of contaminants noted during the site walkover of this area.
3. Area three is used as a storage yard for an interior decorator/builder and there was evidence of a bonfire and a general builders waste in a skip at the site. Used paint containers had been bagged in special blue Dulux trade waste scheme disposal bags ready for recycling. Storage containers were noted to contain ceramic tiles and other decorating and building materials. Asides from the afore mentioned bonfire and surface waste. There were no other obvious visual or olfactory observations of contaminants noted during the site walkover in this area.

2.2 Proposed

The proposal is to develop the site with 24 residential dwelling houses with associated private gardens and off road residents parking as well as an access road.

3. Review Of Previous Reports

There is no indication that previous subsurface ground investigations have been undertaken on this site. The issues to be covered in the present investigation are to provide information in respect of any potentially unacceptable geo-environmental risks arising from previous land uses both on site and in the immediate area, and the potential for any sources of contamination to impact both present and future receptors, including:

- Human
- Controlled waters via established pathways
- Property
- Adjoining land

4. Intrusive Investigation

4.1 Intrusive Investigation objectives

The objectives of the site investigation are to collect data to confirm whether or not the soils beneath the site in their current state pose a risk by reason of substances within or under the land that;

- Significant harm is being caused or there is significant possibility of such harm being caused; or
- Pollution of controlled waters is being, or is likely to be, caused.

Data to describe the following parameters has been collected at a suitable spatial resolution in accordance with BS10175, 2015:

- Soil Characteristics including type of material
- Chemical profile of the soil.

These data will be used to refine a conceptual site model and confirm the existence of any established contaminant linkage in accordance with the UK government methodology outlined online in Land Contamination Risk Management (LCRM) as well as The Environment Agency Requirements for Land Contamination Reports, 2005.

4.2 Intrusive Investigation Strategy

The ground investigation was carried out in accordance with British Standard 5930: 2015 Code of Practice for Site Investigations and BS BS10175: 2011 Investigation of potentially contaminated sites where relevant.

All fieldwork was supervised by suitably qualified GeoAssist Limited Environmental Engineers.

The analytical testing was carried out in an independent UKAS accredited Laboratory.

4.3 Methods Used For Forming Exploratory Holes

The exploratory holes undertaken across the site as part of this investigation were established using windowless drive sample excavation methods and hand tool excavation. Information obtained from the Phase I Preliminary Contaminated Land Risk Assessment was used to inform a decision on the actual exploratory hole locations whilst

taking account of positions that could be reasonably accessed with minimal preparation works using the drilling and excavation plant available. The location of services was also considered during the positioning of the exploratory holes along with the position of any proposed soft landscaping areas. A plan showing the locations of the exploratory holes established as part of the investigation forms Appendix A1 to this report.

4.4 Exploratory Hole Programme

In total fourteen exploratory holes referenced WS01 to WS12 and TP1 and TP2 were undertaken at the locations indicated on the site plan which forms Appendix A1. Exploratory holes WS01 to WS12 were formed using windowless sampling and dynamic probing techniques. Exploratory holes TP1 and TP2 were excavated in order to undertake infiltration tests.

The details of the strata in the exploratory holes were recorded by a suitably qualified Professional Engineer.

All intrusive work was carried out generally in accordance with British standard 5930: 1999/2015 Code of Practice for Site Investigations and British Standard 10175: 2011 where relevant and applicable.

The fieldwork was completed in two separate visits the first of which was from the 19th to the 26th of July to undertake the Dynamic Drive Sampling. The second visit was undertaken on a single day on the 17th August to undertake trial pits for soakaway testing.

4.5 Field Sampling and Testing

A targeted borehole layout was selected as the most appropriate strategy for this site to aid the reliability of interpretation supplemented by some judgmental/targeted sampling as necessary target locations were guided by:

- The proposed layout plan for the site
- The Phase I report
- The location of recorded vehicle refuelling infrastructure
- Visual & olfactory evidence of made ground containing hydrocarbon odours.

The spacing of exploratory holes conforms with the typical densities for detailed investigation given in BS10175:2011.

Representative samples were taken of all the strata encountered in the exploratory holes. Once exposed samples to be subjected to chemical analysis were immediately placed into a suitable container and stored in a cool dark sample box prior to submission to the laboratory in order to prevent alteration of the composition of the samples. In all cases 500ml wide necked amber glass jars were used with a Teflon faced foamed polyethylene cap liner that offers excellent chemical resistance with the compressibility and sealing properties of polyethylene foam. These containers were filled with sample, sealed and delivered to the laboratory for testing. Samples for volatile compounds were placed into appropriate containers with a screw cap and pierceable septum as supplied by the testing laboratory specifically appropriate to the determinand. These containers were filled with sample, sealed and delivered to the laboratory for testing. Observations of groundwater conditions were recorded throughout the

fieldwork operations. All other samples were stored in airtight containers and returned to the laboratory for examination and geotechnical testing where necessary.

A photo ionisation detector (PID) was used to indicate the likelihood of the presence of volatile organic compounds during the fieldwork and in the laboratory. The results are indicated on the Borehole logs only where readings in excess of 10ppm were Recorded.

5. Laboratory Investigation

5.1 Contamination Testing

In total 18 soil samples were collected and subjected to elements of the suite of chemical testing as outlined below. All tests were conducted by i2 Analytical under UKAS Testing No 4041. The results of all the chemical analysis tests are given in Appendix C1.

Table 5.1 Analytical Determinands

Soils	
Arsenic	Acenaphthene
Boron (water-soluble)	Acenaphthylene
Cadmium	Anthracene
Chromium	Benzo(a)Anthracene
Chromium VI	Benzo(a)Pyrene
Copper	Benzo(b/k)Fluoranthene
Cyanide(Total)	Benzo(ghi)Perylene
Cyanide(free)	Chrysene
Lead	Dibenzo(ah)Anthracene
Mercury	Fluoranthene
Nickel	Fluorene
pH	Indeno(123-cd)Pyrene
Phenols(Mono)	Naphthalene
Selenium	Phenanthrene
SO4(Total)	Pyrene
Sulphide	
Sulphur(Free)	Asbestos screen & ID
Thiocyanate	TPH
Zinc	BTEX

6. Subsurface Stratigraphy

The subsoil profile obtained from the exploratory holes WS01 and WS12 consists of Topsoil/Concrete/Tarmac surface over mainly granular mixed sandy gravel, brick and concrete fragments Made Ground overlying intermixed clays and sands overlying sands with gravel.

The Made Ground varies from very loose to medium dense in state of compaction generally. Very soft to soft organic silty clay Made Ground was present in WS05 to 4.10m depth.

The clay horizons in the intermixed subsoils vary from very soft to soft in consistency with the sand horizons varying from very loose to loose in state of compaction.

The majority of the WS holes terminated in medium dense silty sands. WS05 and WS11 terminated in firm to stiff gravelly sandy silty clay. Firm to stiff clay was present at irregular horizons in WS01, WS02, WS06 and WS07. The clay fraction is generally of low plasticity. Very soft organic clay and peat was penetrated in WS 11 from 2.80m to 4.00 depth

Table 6.0 Subsoil Profile Summary

Strata	Depth of Strata (m) below ground level	
	Top	Base
Topsoil/concrete/tarmac over Made Ground Variable mixed granular over cohesive	Ground Level	1.00 to 4.10
Intermixed very soft to soft very low to low strength gravelly sandy silty to very silty Clay and Very loose to loose clayey silty Sand	1.00 to 3.00	2.20 to 5.20
Medium dense clayey silty Sand with gravel	2.20 to 5.20	>6.00

Further details of the subsurface stratigraphy can be found in the exploratory hole log sheets which form Appendix B1 to this report.

7. Groundwater

Seepage groundwater was recorded between 2.00m and 5.60m depth in the majority of the WS holes during the course of the fieldwork. Seepage groundwater was not recorded in WS06 and WS07. The groundwater conditions entered on the exploratory hole logs are those observed at the time of the investigation and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken.

Groundwater levels associated with the ground gas monitoring in the standpipes installed on this site indicate that over the monitoring period to date, ground water has been recorded as being present at depths between 2.35m and 3.75m.

Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.

8. Ground Gas

A ground gas risk assessment report is being prepared for the site and will form a separate report upon completion of presently ongoing gas readings.

The requirements for any Radon gas measures are discussed in the Preliminary Contaminated Land Risk Assessment report.

9. Part IIA Legislation

Part IIA of the Environmental Protection Act 1990 (inserted by Section 57 of the Environment Act 1995) provides a new regime for the control of specific threats to health or the environment from existing land contamination. In accordance with the Act and the statutory guidance document on The Contaminated Land (England) Regulations 2000, the definition of contaminated land is intended to embody the concept of risk assessment. Within the meaning of the Act, land is only “contaminated land” where it appears to the regulatory authority, by reason of substances within or under the land that:

- § Significant harm is being caused or there is significant possibility of such harm being caused; or
- § Pollution of controlled waters is being, or is likely to be, caused.

The guidance defines “risk” as the combination of

- § The probability, or frequency, of occurrence of a defined hazard (for example, exposure of a property to a substance with the potential to cause harm); and
- § The magnitude (including the seriousness) of the consequences.

For a risk of pollution or environmental harm to occur as a result of ground contamination, all of the following elements must be present:

- § A source, i.e. a substance that is capable of causing pollution or harm;
- § A receptor (or target). i.e. something which could be adversely affected by the contaminant; and
- § A pathway, i.e. a route by which the contaminant can reach the receptor.

If one of these elements is missing, there can be no significant risk. If all are present then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

9.1 Assessment Methodology

In order to assess the environmental risk posed by potential contaminants within the near surface soils considering the final levels of the scheme, GeoAssist Limited undertook an initial screen of the laboratory results using GeoAssist Limited Generic Assessment Criteria (GACs) and where applicable Category 4 Screening Levels or Suitable 4 Use Levels as given as part of Appendix C2.

The GeoAssist Limited GACs and Category 4 Screening levels (C4SLs and S4UL herein) are generated in consideration of the proposed end use of the site, in this case as Residential land. Contaminant concentrations below the GACs and or C4SLs levels are considered not to warrant further risk assessment. Concentrations of potential contaminants above the GACs and C4SLs levels require further consideration of the potential pollutant linkages. It should be noted that exceedance of the GACs and or C4SLs levels does not necessarily mean that the site requires remediation, although this is dependent on the nature, type and depth of the contaminant and further justification may be required.

9.2 Soils

For assessment of the soil analysis results with regard to potential human health risks, GeoAssist Limited GACs are selected from the following sources which represent minimal risk to site users:

CLEA Soil Guideline Values (SGVs). These values have been developed by the Department of the Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA) using the Contaminated Land Exposure Assessment (CLEA) Model, and are considered to be protective of human health (considered to be a potential receptor on site). To date, SGVs have been published for only a limited suite of contaminants, with SGVs derived for each contaminant for three different land use scenarios namely:

- § residential
- § allotments
- § commercial and industrial.

The proposed assessment of this site is as Residential land as this is considered to be the most appropriate land use scenario for the current and proposed situation on site.

Chartered Institute of Environmental Health Generic Assessment Criteria (LQM CIEH GAC) have been used where available and where CLEA SGVs have not yet been published.

Where CLEA or LQIM CIEH GAC values are not available, Atkins at Risk GAC values have been selected as appropriate all of which represent a minimal risk to receptors.

C4SLs have been used in conjunction with the above GAC and these represent a Low Level of Toxicological Concern (LLTC herein). LLTC represent an intake of low concern that remains suitably protective of health, and definitely does not approach an intake level that could be defined as Significant Possibility of Significant Harm.

The CLEA guidelines state that for each contaminant, apart from lead, the upper 95th percentile of the mean measured concentration should be calculated where appropriate and this value should be compared to the applicable screening value (defined here as the GeoAssist Limited GACs). For Lead impacts the geometric mean should be calculated and compared to the GAC or C4SL.

The CLEA model states that, 'the contamination is assumed to be at or within 1 m of the surface (CLR10 page 10 now withdrawn).' It is considered that at depths greater than 1m, the probability of human exposure via the direct contact pathways are significantly reduced, leaving inhalation of volatile compounds as the dominant pathway. Typically, volatile compounds only significantly affect the indoor inhalation pathway.

9.3 Subsoil Deposits & Discussion

The contaminants that were identified above the GeoAssist Limited GACs, SGVs or C4SLs for a Residential end use from the GeoAssist Limited investigations are summarized below:

Table 9.3 Summary of identified impacts.

Determinand	GAC (mg/kg) Residential	Total tests / No. of impacted strata (Made Ground)	No. of samples exceeding SGV/GAC/ C4SL	Max Value (mg/kg)	Treat as Hotspot	US95 Value	Further action required
Arsenic	27	16/3	3	90		38	Yes
Lead	200	16/7	7	520		337	Yes
PAH Compounds							
Benzo(a)Pyrene	5	16/1	1	5.7		2.7	No
Total Petroleum Hydrocarbon Compounds							
TPH C8 – C10 Aliphatic	150	7/1	1	170		NA	No
TPH C10 – C12 Aliphatic	760	7/1	1	910		NA	No
TPH C12 – C16 Aliphatic	4300	7/1	1	5800		NA	No
TPH C12 – C16 Aromatic	660	7/1	1	1900		NA	No
TPH C16 – C21 Aromatic	930	7/2	2	4500		NA	No

The analytical laboratory test results and analysis are presented in appendix C1 & C2 and have identified moderate risks to end users of the Site from elevated levels of anthropogenic contamination within the near surface soils on the Site. Namley; Arsenic, Lead, Benzo(a)pyrene SM approach and TPH C21 to C35. Tier one stratified statistical analysis of the Arsenic, Lead and Benzo(a)Pyrene results have confirmed that the 95 percentiles for Arsenic and Lead exceed the GAC and the upper shallow made ground across the site will require remedial action.

It has not been possible to undertake statistical analysis of the TPH results. However TPH analysis has only been targeted on samples where PID readings indicated a requirement. Elevated levels of total petroleum hydrocarbons were noted in WS2 at 3.90m. The magnitude of the exceedance and the limited geographical extent of the exceedance indicate at present that the source is not likely to be from a significant tank breach or spill and does not appear to represent a wider plume. The depth of this source indicates that the only viable pathway is vapour generation affecting indoor inhalation.

Asbestos fibre was noted to be present within a sample from WS11. The samples contained chrysotile fibre or debris. However, this does not preclude the possibility that further occurrences of Asbestos or ACM could occur within the made ground on site. There is no immediate risk from this issue provided the current use remains the same. Earth works contractors are those most at risk and it is the duty of the principal contractor to apply appropriate measures under the Health & Safety at Work Act 1974 and the Control of Asbestos Regulations 2012. The developer and the contractor should be aware that any excavations will need a specific and detailed method statement and they should satisfy themselves that where applicable the CAR 2012 regulations have been

adhered to. The soils samples submitted to the laboratory are likely to be representative of those found on site. However, this does not preclude the possibility that further occurrences or pockets of Asbestos or ACM could occur within the made ground on site and the contractor should put in place a CAR 2012 method statement to deal with any out of specification materials should they be encountered.

The results of all the chemical laboratory analytical tests form appendix C1 to this report and the analysis of the results forms appendix C2 to this report.

The assessment of the chemical laboratory analytical tests has identified that the upper made ground soils on this site pose a moderate risk to end users by the presence of Arsenic and Lead elevated above the generic assessment criteria when assessed in accordance with the current UK methodology and consequently remedial action will be required to mitigate the risks.

There is still much evidence that points to the past use of the site as a vehicle repair & refuelling station and this infrastructure will need to be made safe and removed as part of the demolition and site preparation. A watching brief should be maintained by a geo-environmental engineer during the removal of both above and below ground storage tanks as well as other refuelling infrastructure and in the area of TP1. Further details will be provided in the Remediation Strategy.

Construction Workers

The risk to construction workers and site users during the construction phase is assessed to be low. Regardless of the low risks good working practice should be maintained as a matter of course. Standard PPE & RPE precautions should be adopted at the site strip stage including the use of disposable coveralls, particulate masks and damping down to suppress airborne dust where conditions dictate.

Site Users

At present the site has a commercial use and it is unlikely that continued commercial use of the site will present a significant risk to commercial site users. However, the site must be subject to an approved remediation program in accordance with best practice to ensure that the site does not pose a risk to residential site users once redeveloped. Full details of the proposed remediation will be provided in a site remediation strategy and will require approval from the LPA prior to implementation.

10. Conceptual Model

The updated conceptual model based on the information and test results presented in this report including contamination sources, pathways and receptors is presented below.

Table 10.0 Amended Conceptual Site Model based on information as presented within this report.

Potential Source /Hazard	Nature of Hazard (Risk Level to site given a Residential end use)	Contaminants Associated with Source	Potential Pathway	Potential Receptor
<i>Previous ON SITE Land uses:</i>				
1. Garage Vehicle Refuelling & Repair UST petrol AST Diesel Oils	Ground contamination Moderate Risk	Arsenic Lead TPH	Dermal Contact Ingestion Inhalation	Site Users Construction workers Future Buildings & Services Groundwater
	Gas from in-filled ground See Gas Risk Assessment	Methane Carbon Dioxide	Vertical and Lateral Migration	Site Users Future Buildings & Services
2. Builders Merchant Allotment gardens	Ground contamination Moderate Risk	Arsenic Lead Asbestos Fibres	Dermal Contact Ingestion Inhalation	Site Users Construction workers Future Buildings & Services Groundwater
	Gas from in-filled ground See Gas Risk Assessment	None	Vertical and Lateral Migration	Site Users Future Buildings & Services
3. Railway Land	Ground contamination Moderate Risk	Arsenic Lead Asbestos Fibres	Dermal Contact Ingestion Inhalation	Site Users Construction workers Future Buildings & Services Groundwater
	Gas from in-filled ground See Gas Risk Assessment	None	Vertical and Lateral Migration	Site Users Future Buildings & Services
<i>Previous OFF SITE land uses within 250m as indicated by Historical Plans Including:</i>				
4. Cotton Mills Associated Chimneys Boilers	Ground contamination Low Risk	None Identified	Inhalation of soil dust	Site Users Construction workers
	Gas from in-filled ground See Gas Risk Assessment	Methane, Carbon Dioxide	Vertical and Lateral Migration	Site Users Future Buildings & Services
5. works / warehouse	Ground contamination Low Risk	None Identified	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground See Gas Risk Assessment	None	None	Site Users Future Buildings & Services
6. Coal Workings	Geotechnical Hazard Low Risk	None	Ground Collapse Subsidence	Humans (site users) Future Buildings & Services
	Ground contamination Low Risk	None	None	Site Users Services
	Mine Gas See Gas Risk Assessment	None	None	Humans (site users) Future Buildings & Services

Only sources that have not been present on site in the past or currently are considered within the off site category. Unless the information is deemed to be pertinent to the analysis.

11. Conclusions

Evidence presented elsewhere within this report indicates that the site presents a Moderate Risk to end user receptors in its present state and will only be regarded as fit for purpose from a ground contamination perspective following the implementation of an approved remedial action plan.

A Remediation Strategy will need to be prepared, submitted to, and approved by the LPA prior to implementation. Upon completion of remedial work a verification report will be required to demonstrate the approved remedial works have been implemented and successful prior to occupation of any new dwelling houses.

Elsewhere,

- § The site is unlikely to be defined as contaminated land within the context of part IIA.
- § The site, in its present condition, does not represent a significant risk to the environment and the environmental liability associated with the site is likely to be negligible following implementation of an approved remediation strategy as part of the redevelopment of the site for residential purposes.
- § The Appointed Principal Contactor will need to address the issues relating to the presence of ACM within the made ground at the site.
- § The risk to building services from chemical attack is likely to be negligible and as such no special precautions are required to protect the building fabric or services entering the buildings. However, this should be confirmed by a competent person once service routes and locations have been decided

11.1 Supplementary Recommendations

None



Matthew Benson MSc. GMICE
Geotechnical/Environmental Engineer



Mark Richardson MSc CEng MICE
Technical Director

Field investigations have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions are, and can be, variable and have only been tested at isolated locations across the site. Therefore, the potential exists for ground conditions to be encountered which are different to those considered in this report. Chemical analysis was conducted for a number of parameters based on an expert understanding of the historical and operational data available at the time and it should not be inferred or otherwise, that other chemical species are not present.

This report has been prepared by GeoAssist Limited with all reasonable professional skill, care and diligence within the terms of the contract with J Walker Homes Limited. The report is confidential to J Walker Homes Limited, their/the named persons, advisors and bankers, and GeoAssist Limited accepts no responsibility of whatever nature to third parties to whom this report may be divulged. GeoAssist Limited owns the copyright in this report. All rights are reserved and unauthorised use is prohibited. J Walker Homes Limited may use the report for their/her/his own purposes.

Appendix A

- A1 Site Plan & Exploratory Hole Locations
- A2 Proposed Site Plan



A1 Site Plan

Site Name	Development at Greenhill Road
Location	Middleton
GeoAssist Ref	6127VGH
Client	J Walker Homes Limited
	Joshua House 35 Joshua Lane Middleton Manchester M24 2AY
Planning Consultant	Trevena Blake & Associates
NGR (centre of site)	388610,405180
Production Date	September 2023
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36



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A2 Proposed Plan

Site Name	Development at Greenhill Road
Location	Middleton
GeoAssist Ref	6127VGH
Client	J Walker Homes Limited
	Joshua House 35 Joshua Lane Middleton Manchester M24 2AY
Planning Consultant	Trevena Blake & Associates
NGR (centre of site)	388610,405180
Production Date	September 2023
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36

Appendix B

B1 Exploratory Hole Logs

GeoAssist Limited		Exploratory Hole Record Sheet				Ref: WS02		
Consultant: Trevena Blake & Associates		Project: Development at Greenhill Road Location: Middleton				Sheet: 1		
Client: J Walker Homes Limited		Equipment: Archway Dart Rig				Ground Level: 103.85 m.AOD Co-ordinates: Easting: 388604.2(m) Northing: 405238.3(m) Dates: 20/07/2023 to 20/07/2023		
Drilling Foreman: M Walton STRATUM DESCRIPTION Engineer/Geologist: M Benson		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests Depth (m) from to		Blow Count N/(U)	Field Records
0	TARMAC	0.05	103.80					
	Brown/grey sandy gravel with brick and concrete fragments - MADE GROUND	(1.15)						
-1		1.20	102.65		0.80	1.00	C1 CP1	3
	Firm brown with grey slightly gravelly sandy silty clay - MADE GROUND	(0.50)	102.15					
	Dark grey sandy gravel, cinders and ash - MADE GROUND	1.70	101.95		1.70	1.80	D1	
-2	Firm brown gravelly sandy silty clay - MADE GROUND	(0.40)	101.55				CP2	2
	Dark grey organic very sandy silty CLAY	2.30	101.35				CP3	6
	Loose brown/grey silty fine to medium SAND - Hydrocarbon Odour	2.50						PID at 2.50m - 101ppm
-3		(1.00)					CP4	7
		3.50	100.35				CP5	24
	Medium dense to dense light grey silty fine to medium SAND - Hydrocarbon Odour	(0.70)					C2 CP6	31
-4		4.20	99.65					PID at 3.90m - 696ppm PID at 4.10m - 426ppm
	Firm brown/grey gravelly sandy to very sandy silty CLAY	(1.00)			4.50	4.70	CP7 D2	7
-5		5.20	98.65				CP8	12
	Medium dense brown with occasional black slightly silty fine to medium SAND	(0.80)						PID at 4.90m - 106ppm PID at 5.10m - 67ppm Wet from 5.20m depth
-6		6.00	97.85		5.70	5.80	D3 CP9	19
	Exploratory Hole complete at 6.00m				5.90			
-7								
-8								
-9								
-10								
Remarks: 20/07/2023: Inspection pit excavated to 1.00m to avoid services The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.								Logged: M Benson Date: 26/07/2023 Checked: M Richardson Date: 14/08/2023 Site Ref: 6127/VGH Scale 1:50

GeoAssist Limited		Exploratory Hole Record Sheet					Ref: WS04		
Consultant: Trevena Blake & Associates		Project: Development at Greenhill Road Location: Middleton					Sheet: 1		
Client: J Walker Homes Limited		Equipment: Archway Dart Rig				Ground Level: 104.91 m.AOD Co-ordinates: Easting: 388607.4(m) Northing: 405211.6(m) Dates: 20/07/2023 to 20/07/2023			
Drilling Foreman: M Walton Engineer/Geologist: M Benson		STRATUM DESCRIPTION		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests		Field Records
						Depth (m) from to	Sample Type/No	Blow Count N/(U)	
0	CONCRETE	0.05	104.86						
	Dark brown/grey sandy gravel and brick fragments with occasional rootlets - MADE GROUND	(0.95)							
1	Dark grey/brown gravelly sandy silty clay with brick and concrete fragments - MADE GROUND	1.00	103.91			0.80 1.00	C1 CP1	8	
						1.50 1.60	D1		
2		(2.00)				2.00	CP2	1	
3	Grey organic silty fine to medium SAND	3.00	101.91			3.00	CP3	2	
	Loose to medium dense brown with grey slightly clayey silty fine to medium SAND	3.20	101.71						
		(0.80)				3.50	CP4	10	
4	Medium dense brown slightly silty fine to medium SAND	4.00	100.91			4.00	CP5	13	
		(0.70)				4.50 4.60	D2		
		4.70	100.21						
5	Medium dense brown with black silty fine to medium SAND with black coal fragments					5.00	CP6	17	Wet from 5.00m depth
		(1.30)							
6	Exploratory Hole complete at 6.00m	6.00	98.91			5.90	CP7	19	20/07/2023: On completion of exploratory hole at 6.00m. Casing at 4.00m. Standing water level at 4.90m with casing. On withdrawal of casing exploratory hole backfilled and reinstated.
7									
8									
9									
10									
Remarks: 20/07/2023: Inspection pit excavated to 1.00m to avoid services								Logged: M Benson Date: 26/07/2023	
The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.								Checked: M Richardson Date: 14/08/2023 Site Ref: 6127/VGH Scale 1:50	

[illegible]

GeoAssist Limited		Exploratory Hole Record Sheet					Ref: WS06		
Consultant: Trevena Blake & Associates		Project: Development at Greenhill Road Location: Middleton					Sheet: 1		
Client: J Walker Homes Limited		Equipment: Archway Dart Rig				Ground Level: 105.17 m.AOD Co-ordinates: Easting: 388568.4(m) Northing: 405179.5(m) Dates: 21/07/2023 to 21/07/2023			
Drilling Foreman: M Walton Engineer/Geologist: M Benson		STRATUM DESCRIPTION		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests		Field Records
						Depth (m) from to	Sample Type/No	Blow Count N/(U)	
0	Dark brown/grey clayey silty sand with brick, glass, pottery and metal fragments - MADE GROUND	(0.70)				0.40	C1		7
		0.70	104.47						
1	Brown sandy silty clay with gravel, brick and concrete fragments - MADE GROUND	1.00	104.17			1.00	CP1		
	Dark brown/grey sandy gravel and brick fragments and rubble - MADE GROUND					1.50 1.60	D1		
2		(1.30)				2.00	CP2	3	
		2.30	102.87						
	Dark grey silty sand with ash - MADE GROUND	2.50	102.67						
	Brown silty fine to medium SAND	2.70	102.47						
3	Firm to stiff brown medium to high strength gravelly sandy silty CLAY	(1.00)				2.80 2.90	D2		
		3.70	101.47			3.00	CP3	6	
4	Medium dense brown/light brown with black slightly silty fine to medium SAND	(1.30)				4.00	CP4	23	
		5.00	100.17			4.50 4.60	D3		
5	Medium dense light brown with dark brown silty fine to medium SAND	(0.80)				5.00	CP5	24	
		5.80	99.37						
6	Black/ironstained silty fine to medium SAND	6.00	99.17			5.90	CP6	26	
	Exploratory Hole complete at 6.00m								
7									
8									
9									
10									
Remarks: 21/07/2023: Inspection pit excavated to 1.00m to avoid services The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.							Logged: M Benson Date: 26/07/2023 Checked: M Richardson Date: 14/08/2023 Site Ref: 6127/VGH Scale 1:50		

Remarks: The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 26/07/2023 Checked: M Richardson Date: 14/08/2023 Site Ref: 6127/VGH Scale 1:50
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Remarks: The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 26/07/2023 Checked: M Richardson Date: 14/08/2023 Site Ref: 6127/VGH Scale 1:50
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Logged: M Benson
 Date: 26/07/2023
 Checked: M Richardson
 Date: 14/08/2023
 Site Ref: **6127/VGH**
 Scale 1:50

GeoAssist Limited		Exploratory Hole Record Sheet					Ref: WS09		
Consultant: Trevena Blake & Associates		Project: Development at Greenhill Road Location: Middleton					Sheet: 1		
Client: J Walker Homes Limited		Equipment: Archway Dart Rig					Ground Level: 101.51 m.AOD Co-ordinates: Easting: 388655.8(m) Northing: 405190.1(m) Dates: 25/07/2023 to 25/07/2023		
Drilling Foreman: M Walton STRATUM DESCRIPTION Engineer/Geologist: M Benson		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests Depth (m) from to		Sample Type/No	Blow Count N/(U)	Field Records
0 Grey/brown clayey sand and gravel with brick fragments - MADE GROUND 0.10 101.41 0.40 101.11 Brown with dark grey gravelly sandy silty clay - MADE GROUND Dark brown/grey sandy gravel with brick and concrete fragments - MADE GROUND (0.60) 1.00 100.51					0.40	C1			
1 Very loose grey organic silty fine to medium SAND with occasional rootlets (0.50) 1.50 100.01 Light brown/brown with dark grey silty fine to medium SAND (0.50) 2.00 99.51 2 Soft light grey sandy very silty CLAY 2.20 99.31 Medium dense brown/grey silty to very silty fine to medium SAND with occasional coal fragments					1.00 1.50 1.40 1.50 1.90 2.00 2.00	CP1 D1 D2 CP2	2 5		Wet at 2.00m depth
3 (1.80) 4 4.00 97.51 (1.00) 5.00 96.51 (1.00) 6.00 95.51 6 Exploratory Hole complete at 6.00m					2.50 2.90 2.80 2.90 3.00 3.90 5.00 5.90	CP3 D3 CP4 CP5 CP6 CP7	14 26 10 16 6		Wet from 5.00m depth 25/07/2023: On completion of exploratory hole at 6.00m. Casing at 5.00m. Standing water level at 3.90m with casing. On withdrawal of casing groundwater/gas monitoring standpipe installed to 5.00m with response zone from 1.00m to 5.00m.
7 8 9 10									
Remarks: The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.							Logged: M Benson Date: 26/07/2023 Checked: M Richardson Date: 14/08/2023 Site Ref: 6127/VGH Scale 1:50		

GeoAssist Limited		Exploratory Hole Record Sheet				Ref: WS10			
Consultant: Trevena Blake & Associates		Project: Development at Greenhill Road				Sheet: 1			
Client: J Walker Homes Limited		Location: Middleton			Equipment: Archway Dart Rig				
					Ground Level: 102.69 m.AOD				
					Co-ordinates: Easting: 388629.2(m) Northing: 405203.5(m)				
					Dates: 25/07/2023 to 25/07/2023				
Drilling Foreman: M Walton		STRATUM DESCRIPTION		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests	Blow Count N/(U)	Field Records
Engineer/Geologist: M Benson									
		0 Poor vegetation over brown gravel with roots - MADE GROUND		0.10	102.59				
		Sandstone/concrete cobble - MADE GROUND		0.30	102.39				
		Grey/brown sandy gravel, cinders, ash and concrete fragments - MADE GROUND		(0.90)			0.50	C1	
-1		Grey clayey silty SAND with gravel		1.20	101.49		1.00	CP1	8
				1.50	101.19		1.30 1.40	D1	
		Soft to firm brown with light brown and grey low to medium strength very silty CLAY with organic inclusions		(0.70)			1.90 2.00	D2	
-2		Dark grey gravelly very silty SAND		2.20	100.49		2.00 2.30	CP2	4
		Soft to firm dark brown organic very sandy CLAY		2.40	100.29			D3	
		Brown/light brown silty fine to medium SAND with organic inclusions		(0.40) 2.80	99.89				
-3		Medium dense dark grey/brown SAND and GRAVEL with cobbles		3.00	99.69		3.00	CP3	21
				(1.00)					
-4		Exploratory Hole complete at 4.00m		4.00	98.69		3.90	CP4	29
-5									
-6									
-7									
-8									
-9									
-10									
Remarks: The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.									
Logged: M Benson Date: 26/07/2023 Checked: M Richardson Date: 14/08/2023 Site Ref: 6127/VGH Scale 1:50									

GeoAssist Limited		Exploratory Hole Record Sheet					Ref: WS11				
Consultant: Trevena Blake & Associates		Project: Development at Greenhill Road					Sheet: 1				
Client: J Walker Homes Limited		Equipment: Archway Dart Rig				Ground Level: 102.79 m.AOD					
						Co-ordinates: Easting: 388621.9(m) Northing: 405183.2(m)					
						Dates: 25/07/2023 to 25/07/2023					
Drilling Foreman: M Walton		Depth (Thick) (m)		Reduced Level (mAOD)		Strata Legend/ Standpipe Backfill		Samples/Tests		Field Records	
Engineer/Geologist: M Benson								Depth (m) from to		Sample Type/No	
								Blow Count N/(U)			
0 Dark brown and light grey sandy gravel with brick and concrete fragments - MADE GROUND		(0.40) 0.40		102.39				0.50		C1	
Dark brown and grey clayey silty sand with occasional gravel and fine fibres - MADE GROUND		(0.80)						1.00 1.10		D1	
1 Firm to stiff brown with grey gravelly sandy silty CLAY		1.20		101.59				1.00		CP1	
Very loose dark grey organic slightly gravelly silty fine to medium SAND with fine rootlets		1.50		101.29				1.50		CP2	
2 Very loose brown with light grey gravelly clayey silty to very silty fine SAND		(0.90)						2.00		CP3	
Very loose brown with light grey gravelly clayey silty to very silty fine SAND		2.40		100.39				2.50		CP4	
Dark grey/brown very silty CLAY with organic inclusions		(0.40) 2.80		99.99				3.00		CP5	
3 Very soft clayey fine fibrous PEAT with silty clay inclusions		(1.00)						3.00		3	
4 Firm to stiff grey/brown medium strength slightly gravelly very silty CLAY		4.00		98.79				4.00		CP6	
5		(2.00)						4.50 4.60		D2	
								5.00		CP7	
6 Exploratory Hole complete at 6.00m		6.00		96.79				5.90		CP8	
7										24	
8											
9											
10											

Remarks:

The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken.
Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.

Logged: M Benson

Date: 26/07/2023

Checked: M Richardson

Date: 14/08/2023

Site Ref: 6127/VGH

Scale 1:50

GeoAssist Limited		Exploratory Hole Record Sheet				Ref: WS12			
Consultant: Trevena Blake & Associates		Project: Development at Greenhill Road				Sheet: 1			
Client: J Walker Homes Limited		Location: Middleton				Ground Level: 103.63 m.AOD			
		Equipment: Archway Dart Rig				Co-ordinates: Easting: 388657.5(m) Northing: 405149.6(m)			
						Dates: 26/07/2023 to 26/07/2023			
Drilling Foreman: M Walton		STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests		Field Records	
Engineer/Geologist: M Benson						Depth (m) from to	Sample Type/No		Blow Count N/(U)
0 Grass over dark grey clayey TOPSOIL			0.10	103.53					
Dark grey with brown sandy gravel, cinders and ash with brick and concrete fragments - MADE GROUND									
1			(1.20)			0.50	C1		
2			1.30	102.33		1.00	CP1	11	
Brown/light brown silty fine to medium sand with roots and occasional - MADE GROUND						1.30 1.40	D1		
			(1.10)			1.70 1.80	D2		
3			2.40	101.23		2.00	CP2	8	
Brown brick rubble/cobble - MADE GROUND			2.60	101.03					
Medium dense brown with dark grey inclusions slightly gravelly slightly silty fine to medium SAND with black coal fragments									
			(1.40)			3.00	CP3	22	
			4.00	99.63		3.40 3.50	D3		
4						4.00	CP4	20	
Medium dense brown/grey silty fine to medium SAND			(1.00)						
			5.00	98.63		4.90	CP5	13	
5									
Exploratory Hole complete at 5.00m									
6									
7									
8									
9									
10									
Remarks:								Logged: M Benson	
The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken.								Date: 26/07/2023	
Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.								Checked: M Richardson	
								Date: 14/08/2023	
								Site Ref: 6127/VGH	
								Scale 1:50	

GeoAssist Limited		Exploratory Hole Record Sheet					Ref: TP1		
Consultant: Trevena Blake & Associates		Project: Development at Greenhill Road Location: Middleton					Sheet: 1		
Client: J Walker Homes Limited		Equipment: Archway Dart Rig				Ground Level: 104.18 m.AOD Co-ordinates: Easting: 388581.7(m) Northing: 405189.6(m) Dates: 17/08/2023 to 17/08/2023			
Drilling Foreman: M Walton Engineer/Geologist: M Benson		STRATUM DESCRIPTION		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests		Field Records
						Depth (m) from to	Sample Type/No	Blow Count N/(U)	
0 Daek brown/black sandy gravel, cinders and ash with metal fragments - MADE GROUND - strong odour		(0.70)				0.40	0.50	C1	17/08/2023: On competeion of exploratory hole at 2.30m. Seepage water at 2.20m. Trial pit sides collapsing from 1.50m depth. Trial pit terminated and backfilled with arisings.
Grey/brown silty SAND with gravel - strong odour		0.70	103.48						
-1		(0.80)							
Brown/grey slightly sandy clayey SILT - strong odour		1.50	102.68						
-2		(0.80)				2.20	2.30	C2	
Exploratory Hole complete at 2.30m		2.30	101.88						
-3									
-4									
5									
Remarks: The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.								Logged: M Benson Date: 17/08/2023 Checked: M Richardson Date: 17/08/2023 Site Ref: 6127/VGH Scale 1:25	

GeoAssist Limited		Exploratory Hole Record Sheet					Ref: TP2		
Consultant: Trevena Blake & Associates		Project: Development at Greenhill Road Location: Middleton					Sheet: 1		
Client: J Walker Homes Limited		Equipment: Archway Dart Rig				Ground Level: 104.38 m.AOD Co-ordinates: Easting: 388598.1(m) Northing: 405165.6(m) Dates: 17/08/2023 to 17/08/2023			
Drilling Foreman: M Walton Engineer/Geologist: M Benson		STRATUM DESCRIPTION		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests		Field Records
						Depth (m) from to	Sample Type/No	Blow Count N/(U)	
0 Brown silty sandy gravel with brick fragments - MADE GROUND									17/08/2023: On completion of exploratory hole at 2.30m. Water Nil. Infiltration test undertaken. Trial pit terminated and backfilled with arisings.
		(1.10)							
1 Dark grey/black sand, cinders and ash - MADE GROUND		1.10	103.28						
Orange/brown very silty SAND with rare gravel		1.30	103.08						
		(1.00)							
2									
		2.30	102.08						
Exploratory Hole complete at 2.30m									
3									
4									
5									
Remarks: The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.								Logged: M Benson Date: 17/08/2023 Checked: M Richardson Date: 17/08/2023 Site Ref: 6127/VGH Scale 1:25	

Appendix C

- C1 i2 Analytical Laboratory Test Results
- C2 Analysis of Results with Assessment Criteria



Matthew Benson
GeoAssist Ltd
Unit 4, Sheffield Street
Heaton Norris
Stockport
Cheshire
SK4 1RU

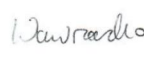
i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

e: info@geoassist.co.uk

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

Analytical Report Number : 23-47010

Project / Site name:	Greenhill Road, Middleton	Samples received on:	25/07/2023
Your job number:	6127 VGH	Samples instructed on/ Analysis started on:	25/07/2023
Your order number:	2230724	Analysis completed by:	07/08/2023
Report Issue Number:	1	Report issued on:	07/08/2023
Samples Analysed:	12 soil samples		


Signed:

Joanna Wawrzeczko
Reporting 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.

Analytical Report Number: 23-47010
Project / Site name: Greenhill Road, Middleton
Your Order No: 2230724

Lab Sample Number				2759751	2759752	2759753	2759754	2759755
Sample Reference				WS01	WS01	WS02	WS02	WS03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80	4.50	0.80	3.90	0.80
Date Sampled				24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	23	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	10	10	12	10	11
Total mass of sample received	kg	0.001	NONE	0.6	0.3	0.5	0.3	0.6

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	Not-detected	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	EC	N/A	EC	N/A	EC

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.4	6.2	7.5	7.4	8.8
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	%	0.005	MCERTS	0.063	0.009	0.028	0.006	0.176
Sulphide	mg/kg	1	MCERTS	1.8	8.8	< 1.0	< 1.0	19
Total Sulphur	%	0.005	MCERTS	0.041	0.033	0.024	< 0.005	0.129

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	0.06	< 0.05	< 0.05	4.1	0.49
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.07
Acenaphthene	mg/kg	0.05	MCERTS	0.06	< 0.05	< 0.05	< 0.05	0.71
Fluorene	mg/kg	0.05	MCERTS	0.06	< 0.05	< 0.05	3.4	0.72
Phenanthrene	mg/kg	0.05	MCERTS	0.79	0.14	0.56	4.3	6.6
Anthracene	mg/kg	0.05	MCERTS	0.16	< 0.05	0.07	< 0.05	1.4
Fluoranthene	mg/kg	0.05	MCERTS	1.8	< 0.05	1.3	< 0.05	9.3
Pyrene	mg/kg	0.05	MCERTS	1.7	< 0.05	1.4	< 0.05	8.5
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.88	< 0.05	0.73	< 0.05	4.1
Chrysene	mg/kg	0.05	MCERTS	1.1	< 0.05	0.83	< 0.05	3.8
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.1	< 0.05	0.85	< 0.05	4.3
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.45	< 0.05	0.3	< 0.05	1.7
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.94	< 0.05	0.71	< 0.05	3.6
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.47	< 0.05	0.3	< 0.05	1.8
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.13	< 0.05	0.07	< 0.05	0.46
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.54	< 0.05	0.34	< 0.05	2

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	10.2	< 0.80	7.37	11.8	49.6
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Analytical Report Number: 23-47010
Project / Site name: Greenhill Road, Middleton
Your Order No: 2230724

Lab Sample Number				2759751	2759752	2759753	2759754	2759755
Sample Reference				WS01	WS01	WS02	WS02	WS03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80	4.50	0.80	3.90	0.80
Date Sampled				24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	17	4.3	13	1.1	27
Barium (aqua regia extractable)	mg/kg	1	MCERTS	110	7.7	94	7	350
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	0.25	0.88	0.17	1.9
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	0.2	0.5	< 0.2	1.9
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	4	14	5.2	19
Copper (aqua regia extractable)	mg/kg	1	MCERTS	49	5.9	62	22	120
Lead (aqua regia extractable)	mg/kg	1	MCERTS	82	3	81	3.7	250
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.3	< 0.3	< 0.3	< 0.3	0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	2.4	17	6.9	30
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	30	7.5	25	5.3	47
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	58	10	140	17	170

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	-	< 5.0	-	< 5.0	-
Toluene	µg/kg	5	MCERTS	-	< 5.0	-	< 5.0	-
Ethylbenzene	µg/kg	5	MCERTS	-	< 5.0	-	< 5.0	-
p & m-xylene	µg/kg	5	MCERTS	-	< 5.0	-	14000	-
o-xylene	µg/kg	5	MCERTS	-	< 5.0	-	< 5.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-	< 5.0	-	< 5.0	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS_ID_AL	mg/kg	0.1	NONE	-	< 0.10	-	< 0.10	-
TPH-CWG - Aliphatic >EC6 - EC8 HS_ID_AL	mg/kg	0.1	NONE	-	< 0.10	-	< 0.10	-
TPH-CWG - Aliphatic >EC8 - EC10 HS_ID_AL	mg/kg	0.1	NONE	-	< 0.10	-	170\$	-
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_ID_AL	mg/kg	1	MCERTS	-	1.4	-	910	-
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_ID_AL	mg/kg	2	MCERTS	-	56	-	5800	-
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_ID_AL	mg/kg	8	MCERTS	-	130	-	6100	-
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_ID_AL	mg/kg	8	MCERTS	-	26	-	1300	-
TPH-CWG - Aliphatic >EC35 - EC40 EH_CU_ID_AL	mg/kg	10	NONE	-	< 10	-	< 10	-

TPH-CWG - Aromatic >EC5 - EC7 HS_ID_AR	mg/kg	0.1	NONE	-	< 0.10	-	< 0.10	-
TPH-CWG - Aromatic >EC7 - EC8 HS_ID_AR	mg/kg	0.1	NONE	-	< 0.10	-	< 0.10	-
TPH-CWG - Aromatic >EC8 - EC10 HS_ID_AR	mg/kg	0.1	NONE	-	< 0.10	-	40	-
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_ID_AR	mg/kg	1	MCERTS	-	< 1.0	-	270	-
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_ID_AR	mg/kg	2	MCERTS	-	23	-	1900	-
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_ID_AR	mg/kg	10	MCERTS	-	54	-	1900	-
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_ID_AR	mg/kg	10	MCERTS	-	17	-	580	-
TPH-CWG - Aromatic >EC35 - EC40 EH_CU_ID_AR	mg/kg	10	NONE	-	< 10	-	41	-
TPH Total C5 - C40 EH_CU+HS_ID_TOTAL	mg/kg	10	NONE	-	310	-	19000	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-47010
Project / Site name: Greenhill Road, Middleton
Your Order No: 2230724

Lab Sample Number				2759756	2759757	2759758	2759759	2759760
Sample Reference				WS03	WS03	WS04	WS05	WS06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	2.50	0.80	0.30	0.40
Date Sampled				24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	23	11	11	8.4
Total mass of sample received	kg	0.001	NONE	0.4	0.4	0.5	0.6	0.3

Asbestos in Soil	Type	N/A	ISO 17025	-	-	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	N/A	EC	JSW	JSW

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6	5.8	8.1	8.8	7.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	%	0.005	MCERTS	0.051	0.054	0.105	0.104	0.051
Sulphide	mg/kg	1	MCERTS	5.9	34	2.8	15	10
Total Sulphur	%	0.005	MCERTS	0.051	0.197	0.067	0.07	0.055

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	0.08	< 0.05	0.23	0.12	0.14
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.12	0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.11	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.05	< 0.05	0.09	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.22	< 0.05	1.4	0.56	0.49
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.39	0.15	0.13
Fluoranthene	mg/kg	0.05	MCERTS	0.33	< 0.05	3.7	1.6	1.4
Pyrene	mg/kg	0.05	MCERTS	0.34	< 0.05	3.6	1.7	1.4
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.19	< 0.05	2	0.98	0.77
Chrysene	mg/kg	0.05	MCERTS	0.25	< 0.05	1.8	0.92	0.72
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.32	< 0.05	2.5	1.1	0.99
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.1	< 0.05	1	0.46	0.49
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.22	< 0.05	2.1	0.96	0.88
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.14	< 0.05	1.2	0.51	0.46
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.29	0.12	0.13
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.16	< 0.05	1.3	0.6	0.57

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	2.4	< 0.80	21.8	9.83	8.62
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Analytical Report Number: 23-47010
Project / Site name: Greenhill Road, Middleton
Your Order No: 2230724

Lab Sample Number				2759756	2759757	2759758	2759759	2759760
Sample Reference				WS03	WS03	WS04	WS05	WS06
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	2.50	0.80	0.30	0.40
Date Sampled				24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	18	29	14	16
Barium (aqua regia extractable)	mg/kg	1	MCERTS	68	49	330	440	190
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.86	0.54	2.3	2.2	0.87
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	2.6	0.9	1.3	1.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	2.9	0.7
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	14	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	10	21	17	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	46	29	100	110	63
Lead (aqua regia extractable)	mg/kg	1	MCERTS	54	59	150	340	240
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	0.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	9.4	36	28	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	27	18	53	49	32
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	51	18	150	230	240

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	-	-	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	-	-	< 5.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS_ID_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	-	-	< 0.10
TPH-CWG - Aliphatic >EC6 - EC8 HS_ID_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	-	-	< 0.10
TPH-CWG - Aliphatic >EC8 - EC10 HS_ID_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	-	-	< 0.10
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_ID_AL	mg/kg	1	MCERTS	< 1.0	1.3	-	-	1.6
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_ID_AL	mg/kg	2	MCERTS	< 2.0	2.4	-	-	13
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_ID_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	-	-	25
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_ID_AL	mg/kg	8	MCERTS	16	11	-	-	120
TPH-CWG - Aliphatic >EC35 - EC40 EH_CU_ID_AL	mg/kg	10	NONE	< 10	< 10	-	-	59

TPH-CWG - Aromatic >EC5 - EC7 HS_ID_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	-	-	< 0.10
TPH-CWG - Aromatic >EC7 - EC9 HS_ID_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	-	-	< 0.10
TPH-CWG - Aromatic >EC8 - EC10 HS_ID_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	-	-	< 0.10
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_ID_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_ID_AR	mg/kg	2	MCERTS	< 2.0	3.7	-	-	11
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_ID_AR	mg/kg	10	MCERTS	< 10	< 10	-	-	26
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_ID_AR	mg/kg	10	MCERTS	< 10	19	-	-	220
TPH-CWG - Aromatic >EC35 - EC40 EH_CU_ID_AR	mg/kg	10	NONE	< 10	< 10	-	-	200
TPH Total C5 - C40 EH_CU+HS_ID_TOTAL	mg/kg	10	NONE	28	48	-	-	670

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 23-47010
Project / Site name: Greenhill Road, Middleton
Your Order No: 2230724

Lab Sample Number				2759761	2759762
Sample Reference				WS07	WS08
Sample Number				None Supplied	None Supplied
Depth (m)				0.60	0.80
Date Sampled				24/07/2023	24/07/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Stone Content	%	0.1	NONE	< 0.1	26
Moisture Content	%	0.01	NONE	10	10
Total mass of sample received	kg	0.001	NONE	0.4	0.5

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	JSW	JSW

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8	8
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Total Sulphate as SO ₄	%	0.005	MCERTS	0.052	0.055
Sulphide	mg/kg	1	MCERTS	1.4	1.9
Total Sulphur	%	0.005	MCERTS	0.031	0.031

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	0.06	0.08
Acenaphthylene	mg/kg	0.05	MCERTS	0.05	0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.08	0.14
Fluorene	mg/kg	0.05	MCERTS	0.06	0.09
Phenanthrene	mg/kg	0.05	MCERTS	0.99	1.2
Anthracene	mg/kg	0.05	MCERTS	0.26	0.28
Fluoranthene	mg/kg	0.05	MCERTS	2.2	2.2
Pyrene	mg/kg	0.05	MCERTS	2.2	2.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.2	1.1
Chrysene	mg/kg	0.05	MCERTS	1.1	1
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.5	1.6
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.6	0.59
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.3	1.4
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.6	0.79
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.16	0.17
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.67	0.9

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	12.9	13.8
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Analytical Report Number: 23-47010
Project / Site name: Greenhill Road, Middleton
Your Order No: 2230724

Lab Sample Number				2759761	2759762
Sample Reference				WS07	WS08
Sample Number				None Supplied	None Supplied
Depth (m)				0.60	0.80
Date Sampled				24/07/2023	24/07/2023
Time Taken				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	22	14
Barium (aqua regia extractable)	mg/kg	1	MCERTS	250	180
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	0.78
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.6
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	15
Copper (aqua regia extractable)	mg/kg	1	MCERTS	64	93
Lead (aqua regia extractable)	mg/kg	1	MCERTS	410	310
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	8.4	0.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	30	23
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	200	140

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	-	-
Toluene	µg/kg	5	MCERTS	-	-
Ethylbenzene	µg/kg	5	MCERTS	-	-
p & m-xylene	µg/kg	5	MCERTS	-	-
o-xylene	µg/kg	5	MCERTS	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 HS_ID_AL	mg/kg	0.1	NONE	-	-
TPH-CWG - Aliphatic >EC6 - EC8 HS_ID_AL	mg/kg	0.1	NONE	-	-
TPH-CWG - Aliphatic >EC8 - EC10 HS_ID_AL	mg/kg	0.1	NONE	-	-
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_ID_AL	mg/kg	1	MCERTS	-	-
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_ID_AL	mg/kg	2	MCERTS	-	-
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_ID_AL	mg/kg	8	MCERTS	-	-
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_ID_AL	mg/kg	8	MCERTS	-	-
TPH-CWG - Aliphatic >EC35 - EC40 EH_CU_ID_AL	mg/kg	10	NONE	-	-

TPH-CWG - Aromatic >EC5 - EC7 HS_ID_AR	mg/kg	0.1	NONE	-	-
TPH-CWG - Aromatic >EC7 - EC8 HS_ID_AR	mg/kg	0.1	NONE	-	-
TPH-CWG - Aromatic >EC8 - EC10 HS_ID_AR	mg/kg	0.1	NONE	-	-
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_ID_AR	mg/kg	1	MCERTS	-	-
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_ID_AR	mg/kg	2	MCERTS	-	-
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_ID_AR	mg/kg	10	MCERTS	-	-
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_ID_AR	mg/kg	10	MCERTS	-	-
TPH-CWG - Aromatic >EC35 - EC40 EH_CU_ID_AR	mg/kg	10	NONE	-	-
TPH Total C5 - C40 EH_CU+HS_ID_TOTAL	mg/kg	10	NONE	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-47010

Project / Site name: Greenhill Road, Middleton

* 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 *
2759751	WS01	None Supplied	0.8	Brown loam and sand with gravel and stones.
2759752	WS01	None Supplied	4.5	Brown sand.
2759753	WS02	None Supplied	0.8	Brown clay and sand with gravel and vegetation.
2759754	WS02	None Supplied	3.9	Brown sand.
2759755	WS03	None Supplied	0.8	Brown loam and sand with gravel.
2759756	WS03	None Supplied	1.5	Brown clay and sand.
2759757	WS03	None Supplied	2.5	Brown clay and sand.
2759758	WS04	None Supplied	0.8	Brown loam and sand with gravel and vegetation.
2759759	WS05	None Supplied	0.3	Brown loam and sand with gravel.
2759760	WS06	None Supplied	0.4	Brown clay and sand with gravel and vegetation.
2759761	WS07	None Supplied	0.6	Brown clay and sand with gravel and vegetation.
2759762	WS08	None Supplied	0.8	Brown loam and sand with gravel and brick.

Analytical Report Number : 23-47010
Project / Site name: Greenhill Road, Middleton

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-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
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
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	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
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
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-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
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
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
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-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
Hexavalent chromium in soil (Lower Level)	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	NONE
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS

Analytical Report Number : 23-47010
Project / Site name: Greenhill Road, Middleton

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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.	L039-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' 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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

\$- Data reported unaccredited due to result over calibration range despite high dilution, concentration determined by extrapolated calibration. The result should be interpreted with caution.



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Analytical Report Number : 23-47927

Project / Site name:	Greenhil Road, Middleton	Samples received on:	28/07/2023
Your job number:	6127 VGH	Samples instructed on/ Analysis started on:	28/07/2023
Your order number:	22030728	Analysis completed by:	08/08/2023
Report Issue Number:	1	Report issued on:	08/08/2023
Samples Analysed:	4 soil samples		

Signed:

Anna Goc
PL Head of Reporting Team
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.

Analytical Report Number: 23-47927
Project / Site name: Greenhil Road, Middleton
Your Order No: 22030728

Lab Sample Number	2764950	2764951	2764952	2764953
Sample Reference	WS09	WS10	WS11	WS12
Sample Number	C1	C1	C1	C1
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	27/07/2023	27/07/2023	27/07/2023	27/07/2023
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
Moisture Content	%	0.01	NONE	11
Total mass of sample received	kg	0.001	NONE	0.5

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	Chrysotile- Loose Fibres	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	MLO	MLO	MLO	MLO

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.1	8.6	7.7	7.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	1.6	5.8
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	1.2	< 1.0
Total Sulphate as SO4	%	0.005	MCERTS	0.037	0.473	0.063	0.098
Sulphide	mg/kg	1	MCERTS	1.7	< 1.0	1.3	3
Total Sulphur	%	0.005	MCERTS	0.039	0.227	0.05	0.098

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	0.09	1.1	0.46	0.55
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.33	0.15
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.48	2	0.34
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.3	1.4	0.25
Phenanthrene	mg/kg	0.05	MCERTS	0.13	2.9	14	3.4
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.66	2.9	0.77
Fluoranthene	mg/kg	0.05	MCERTS	0.18	4.3	16	6.6
Pyrene	mg/kg	0.05	MCERTS	0.19	3.7	14	6
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.09	1.8	5.5	2.7
Chrysene	mg/kg	0.05	MCERTS	0.1	1.9	6.3	3.1
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	2.5	6.7	3.7
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.82	2.5	1.3
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	1.9	5.7	2.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.95	2.6	1.4
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.29	0.75	0.43
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	1	2.8	1.5

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	24.7	84.5	35
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Analytical Report Number: 23-47927
 Project / Site name: Greenhil Road, Middleton
 Your Order No: 22030728

Lab Sample Number	2764950	2764951	2764952	2764953
Sample Reference	WS09	WS10	WS11	WS12
Sample Number	C1	C1	C1	C1
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	27/07/2023	27/07/2023	27/07/2023	27/07/2023
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	24	90	20	39
Barium (aqua regia extractable)	mg/kg	1	MCERTS	100	320	360	680
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	1.5	1.1	2.7
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.3	0.4	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	16	20	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	47	81	63	160
Lead (aqua regia extractable)	mg/kg	1	MCERTS	75	54	520	500
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	< 0.3	< 0.3	0.9
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	37	23	36
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	45	54	29	50
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	47	45	480	570

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



Analytical Report Number : 23-47927

Project / Site name: Greenhil Road, Middleton

* 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 *
2764950	WS09	C1	None Supplied	Brown sand with gravel.
2764951	WS10	C1	None Supplied	Brown sandy loam with gravel and vegetation.
2764952	WS11	C1	None Supplied	Brown loam and sand with gravel and vegetation.
2764953	WS12	C1	None Supplied	Brown sandy loam with gravel and vegetation.

Analytical Report Number : 23-47927
Project / Site name: Greenhil Road, Middleton

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-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
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
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	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
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
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-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
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
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
Hexavalent chromium in soil (Lower Level)	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	NONE
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	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.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' 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.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.



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Analytical Report Number : 23-52724

Project / Site name:	Greenhill Road, Middleton	Samples received on:	23/08/2023
Your job number:	6127 VGH	Samples instructed on/ Analysis started on:	23/08/2023
Your order number:	2230822	Analysis completed by:	02/09/2023
Report Issue Number:	1	Report issued on:	04/09/2023
Samples Analysed:	2 soil samples		

Signed:

Dominika Liana
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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

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

Analytical Report Number: 23-52724
Project / Site name: Greenhill Road, Middleton
Your Order No: 2230822

Lab Sample Number				2790578	2790579
Sample Reference				TP1	TP1
Sample Number				C1	C2
Depth (m)				0.40	2.20
Date Sampled				22/08/2023	22/08/2023
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	%	0.01	NONE	13	23
Total mass of sample received	kg	0.001	NONE	0.7	0.3

Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.1	NONE	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.1	NONE	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.1	NONE	< 0.10	0.42
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	110	27
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	420	75
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	960	140
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	11000	2400
TPH-CWG - Aliphatic >EC35 - EC40 _{EH_CU_1D_AL}	mg/kg	10	NONE	3700	860

TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.1	NONE	< 0.10	< 0.10
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.1	NONE	< 0.10	< 0.10
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.1	NONE	< 0.10	< 0.10
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	28	24
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	170	61
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	650	110
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	4500	940
TPH-CWG - Aromatic >EC35 - EC40 _{EH_CU_1D_AR}	mg/kg	10	NONE	1900	360
TPH Total C5 - C40 _{EH_CU+HS_1D_TOTAL}	mg/kg	10	NONE	24000	5000

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



Analytical Report Number : 23-52724

Project / Site name: Greenhill Road, Middleton

* 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 *
2790578	TP1	C1	0.4	Brown sand with gravel.
2790579	TP1	C2	2.2	Brown silt.**

Analytical Report Number : 23-52724
Project / Site name: Greenhill Road, Middleton

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
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
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-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 or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' 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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

**Unaccredited sample matrix.

Soils Risk Assessment

Site Reference: 6127 VGH
Project Site: Development at Greenhill Road
Project Location: Middleton
Client: J Walker Homes Limited

i2 Reference	Residential	WS01	WS01	WS02	WS02	WS03	WS03	WS03	WS04	WS05	WS06	WS07	WS08	WS09	WS10	WS11	WS12	TP1	TP1
Customer Sample Ref:	C4SL / S4UL	0.8	4.5	0.8	3.9	0.8	1.5	2.5	0.8	0.3	0.4	0.6	0.8	None Supplied	None Supplied	None Supplied	None Supplied	0.4	2.2
	SOM 1% GAC	24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023	24/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023	22/08/2023	22/08/2023
Determinand	LQM II																		
Arsenic	27	17	4.3	13	1.1	27	16	18	29	14	16	22	14	24	90	20	39	-	-
Boron (water-soluble)	290	0.6	0.2	0.5	0.2	1.9	0.6	2.6	0.9	1.3	1.2	0.7	0.5	0.4	0.3	0.4	0.5	-	-
Cadmium	22	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.9	0.7	0.2	0.6	0.2	0.2	0.2	0.2	-	-
Chromium*	910	16	4	14	5.2	19	13	10	21	17	20	16	15	18	16	20	22	-	-
Chromium VI	21	1.2	1.2	1.2	1.2	1.2	1.2	1.2	14	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	-	-
Copper	2400	49	5.9	62	22	120	46	29	100	110	63	64	93	47	81	63	160	-	-
Cyanide(Total)	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1	-	-
Cyanide(free)**	34	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.6	5.8	-	-
Lead	200	82	3	81	3.7	250	54	59	150	340	240	410	310	75	54	520	500	-	-
Mercury	40	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	8.4	0.4	0.4	0.3	0.3	0.9	-	-
Nickel	130	19	2.4	17	6.9	30	18	9.4	36	28	23	20	18	23	37	23	36	-	-
pH	-	7.4	6.2	7.5	7.4	8.8	6	5.8	8.1	8.8	7.3	8	8	8.1	8.6	7.7	7.3	-	-
Phenols(Mono)	1100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-
Selenium	250	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-
SO4(Total)	-	0.063	0.009	0.028	0.006	0.176	0.051	0.054	0.105	0.104	0.051	0.052	0.055	0.037	0.473	0.063	0.098	-	-
Sulphide	-	1.8	8.8	1	1	19	5.9	34	2.8	15	10	1.4	1.9	1.7	1	1.3	3	-	-
Sulphur(Free)	-	0.041	0.033	0.024	0.005	0.129	0.051	0.197	0.067	0.07	0.055	0.031	0.031	0.039	0.227	0.05	0.098	-	-
Thiocyanate	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zinc	3700	58	10	140	17	170	51	18	150	230	240	200	140	47	45	480	570	-	-
Acenaphthene	1100	0.06	0.05	0.05	0.05	0.71	0.05	0.05	0.11	0.05	0.05	0.08	0.14	0.05	0.48	2	0.34	-	-
Acenaphthylene	920	0.05	0.05	0.05	0.05	0.07	0.05	0.05	0.12	0.05	0.05	0.05	0.05	0.05	0.05	0.33	0.15	-	-
Anthracene	11000	0.16	0.05	0.07	0.05	1.4	0.05	0.05	0.39	0.15	0.13	0.26	0.28	0.05	0.66	2.9	0.77	-	-
Benzo(a)Anthracene	-	0.88	0.05	0.73	0.05	4.1	0.19	0.05	2	0.98	0.77	1.2	1.1	0.09	1.8	5.5	2.7	-	-
Benzo(a)Pyrene SM	5	0.94	0.05	0.71	0.05	3.6	0.22	0.05	2.1	0.96	0.88	1.3	1.4	0.05	1.9	5.7	2.9	-	-
Benzo(b)Fluoranthene	-	1.1	0.05	0.85	0.05	4.3	0.32	0.05	2.5	1.1	0.99	1.5	1.6	0.05	2.5	6.7	3.7	-	-
Benzo(ghi)Perylene	-	0.54	0.05	0.34	0.05	2	0.16	0.05	1.3	0.6	0.57	0.67	0.9	0.05	1	2.8	1.5	-	-
Benzo(k)Fluoranthene	-	0.45	0.05	0.3	0.05	1.7	0.1	0.05	1	0.46	0.49	0.6	0.59	0.05	0.82	2.5	1.3	-	-
Chrysene	-	1.1	0.05	0.83	0.05	3.8	0.25	0.05	1.8	0.92	0.72	1.1	1	0.1	1.9	6.3	3.1	-	-
Dibenzo(ah)Anthracene	-	0.13	0.05	0.07	0.05	0.46	0.05	0.05	0.29	0.12	0.13	0.16	0.17	0.05	0.29	0.75	0.43	-	-
Fluoranthene	890	1.8	0.05	1.3	0.05	9.3	0.33	0.05	3.7	1.6	1.4	2.2	2.2	0.18	4.3	16	6.6	-	-
Fluorene	860	0.06	0.05	0.05	3.4	0.72	0.05	0.05	0.09	0.05	0.05	0.06	0.09	0.05	0.3	1.4	0.25	-	-
Indeno(123-cd)Pyrene	-	0.47	0.05	0.3	0.05	1.8	0.14	0.05	1.2	0.51	0.46	0.6	0.79	0.05	0.95	2.6	1.4	-	-
Naphthalene	13	0.06	0.05	0.05	4.1	0.49	0.08	0.05	0.23	0.12	0.14	0.06	0.08	0.09	1.1	0.46	0.55	-	-
Phenanthrene	440	0.79	0.14	0.56	4.3	6.6	0.22	0.05	1.4	0.56	0.49	0.99	1.2	0.13	2.9	14	3.4	-	-
Pyrene	2000	1.7	0.05	1.4	0.05	8.5	0.34	0.05	3.6	1.7	1.4	2.2	2.1	0.19	3.7	14	6	-	-
PAH(total)	500	10.2	0.8	7.37	11.8	49.6	2.4	0.8	21.8	9.83	8.62	12.9	13.8	0.8	24.7	84.5	35	-	-
Asbestos	Not-detected	Not-detected	-	Not-detected	-	Not-detected	-	-	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	-	-	Chrysotile- Loose Fibres			
TPH (C6-C8 aliphatic)	530	-	0.1	-	0.1	-	0.1	0.1	-	-	0.1	-	-	-	-	-	-	0.1	0.1
TPH (C8-C10 aliphatic)	150	-	0.1	-	170	-	0.1	0.1	-	-	0.1	-	-	-	-	-	-	0.1	0.42
TPH (C10-C12 aliphatic)	760	-	1.4	-	910	-	1	1.3	-	-	1.6	-	-	-	-	-	-	110	27
TPH (C12-C16 aliphatic)	4300	-	56	-	5800	-	2	2.4	-	-	13	-	-	-	-	-	-	420	75
TPH (C16-C21 aliphatic)	110000	-	130	-	6100	-	8	8	-	-	25	-	-	-	-	-	-	960	140
TPH (C21-C35 aliphatic)	110000	-	26	-	1300	-	16	11	-	-	120	-	-	-	-	-	-	11000	2400
TPH (C5-C7 aromatic)	300	-	0.1	-	0.1	-	0.1	0.1	-	-	0.1	-	-	-	-	-	-	0.1	0.1
TPH (C7-C8 aromatic)	660	-	0.1	-	0.1	-	0.1	0.1	-	-	0.1	-	-	-	-	-	-	0.1	0.1
TPH (C8-C10 aromatic)	190	-	0.1	-	40	-	0.1	0.1	-	-	0.1	-	-	-	-	-	-	0.1	0.1
TPH (C10-C12 aromatic)	380	-	1	-	270	-	1	1	-	-	1	-	-	-	-	-	-	28	24
TPH (C12-C16 aromatic)	660	-	23	-	1900	-	2	3.7	-	-	11	-	-	-	-	-	-	170	61
TPH (C16-C21 aromatic)	930	-	54	-	1900	-	10	10	-	-	26	-	-	-	-	-	-	650	110
TPH (C21-C35 aromatic)	1700	-	17	-	580	-	10	19	-	-	220	-	-	-	-	-	-	4500	940
Benzene	2.4	-	0.005	-	0.005	-	0.005	0.005	-	-	0.005	-	-	-	-	-	-	0.005	0.005
Toluene	7.5	-	0.005	-	0.005	-	0.005	0.005	-	-	0.005	-	-	-	-	-	-	0.005	0.005
EthylBenzene	260	-	0.005	-	0.005	-	0.005	0.005	-	-	0.005	-	-	-	-	-	-	0.005	0.005
M/P Xylene	310	-	0.005	-	14	-	0.005	0.005	-	-	0.005	-	-	-	-	-	-	0.005	0.005
O Xylene	330	-	0.005	-	0.005	-	0.005	0.005	-	-	0.005	-	-	-	-	-	-	0.005	0.005

All Units mg/kg unless otherwise stated Indicates Exceedance of Applicable Level

*Criteria Assumes Chromium III

**Criteria is derived considering acute effects on 1-2yo Female Receptor ingesting a single dose of 3g of soil

**Criteria is derived considering Total TPH (C10 to C35) is formed entirety of a 50:50 Aliphatic and Aromatic Split C8-C10 range

Basis of Assessment Criteria:	EA 2005 WAC (Human Health Value)	C4SL
	LQM S4UL	Atrisk 06