GeoAssist Limited
Civil, Environmental & Geotechnical

Client:
JDA-Architects
The Warehouse
Saxon Street
Denton
Manchester
M34 3DS

Consultant:
Brennan Consult Ltd
Oak House
2 Gatley Road
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Phase II Contaminated Land Risk Assessment

Hologic, Crewe Road, Wythenshawe

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May 2020 Site Ref: 6041/HOO-CLRA v1.00

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Phase II Contaminated Land Risk Assessment

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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 Brennan Consult Ltd on behalf of their Client JDA-Architects for the development at Hologic, Crewe Road, Wythenshawe.

The work was commissioned following acceptance of the quotation and an instruction to proceed issued by Brennan Consult Ltd on behalf of the Client, JDA-Architects on 11th February 2020.

The purpose of this Phase II investigation is to provide information following the conclusions of the phase I report produced by others to ensure that the site:

- Is assessed in accordance with the methodology outlined in CLR11
- Satisfies the relevant requirements of the National Planning Policy Framework March 2012
- Is suitable for the intended proposed land use. In this case, as a Commercial Development

The approximate grid reference for the centre of the site is 380225, 389920. The particular 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.

2. Description of the Site

2.1 Present

The site is accessed off Crewe Road, Wythenshawe and currently incorporates warehouse/offices with associated hard standing and soft landscaping. The site to be developed forms an irregular shape and is relatively level with the surrounding area. The vast majority of the area for the proposed development is surfaced with grass.

The site is bounded by Wythenshawe Road to the west and north, a wooded area to the north along with residential properties on Wythenshawe Road, existing warehouse and offices to the east, and Crewe Road and commercial premises to the south.

2.2 Proposed

At present the proposed plan for the Site is to construct a warehouse to the west of the existing building together with an extensive hard standing area to the west of the new structure.

3. Review Of Previous Reports

It is understood that a limited contaminated land risk assessment has been undertaken by others some years earlier for a development area considerably smaller that that proposed presently. 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 in the immediate area and the potential for any sources of contamination and ground gas 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, 2011:

- 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 pollutant linkages in accordance with Contaminated Land Report 11 Model Procedures for the Management of Land Contamination, 2004 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.

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

Analytical testing was carried out in an independent UKAS accredited Laboratory.

4.3 Methods Used For Forming Exploratory Holes

The shallow depth exploratory holes undertaken across the site as part of this investigation were established using dynamic windowless sampling methods along with a single light cable tool percussive hole. 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 the positions of proposed hardstanding areas for the final scheme. 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 seven exploratory holes for sample recovery were established across the site. The details of the strata in the exploratory holes were recorded by a suitably qualified Professional Engineer.

Upon completion of the fieldwork gas / groundwater monitoring installations were formed in exploratory holes WS1, WS2 and WS4 incorporating a length of plain pipe with a cement/bentonite surround, connected to a length of slotted pipe with a filter sock and pea gravel surround. The headworks comprised of a gas valve and lockable steel cover set in concrete flush with the surrounding ground.

The remaining exploratory holes were backfilled in accordance with the specification in order to prevent the establishment of any potential pollutant pathways and the surface reinstated.

All intrusive work was carried out generally in accordance with:

- British standard 5930: 2015 Code of Practice for Site Investigations where appropriate
- British Standard 10175: 2011 where applicable

The fieldwork was completed in two stages. The first stage on 25/02/2020 and the second 17/04/2020.

4.5 Field Sampling and Testing

A non-targeted exploratory hole layout was selected as the most appropriate strategy for this site as the Phase I report had highlighted that the precise location and nature of any potential contaminants of concern was unknown. 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.

5. Laboratory Investigation

5.1 Contamination Testing

In total 5 soil samples were collected and subjected to elements of the suite of chemical testing as outlined below. All tests were conducted by Concept Life Sciences Laboratories under UKAS Testing No 1549. 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
Thiocyanate	
Zinc	

6. Subsurface Stratigraphy

The subsoil profile obtained from the exploratory holes consists of made ground to depths between 0.60m to 0.70m over silty sand with fibrous peat horizon over sands and gravels underlain by slightly gravelly sandy very silty clay with siltstone and Mudstone bedrock present at depth.

Further details of the subsurface stratigraphy can be found in the exploratory hole log sheets which form Appendix C1 to this report.

Table 7.0 Subsoil Profile Summary

Strata	Depth of Strata (m) below ground level	
	Top	Base
Made Ground - MG Variable mixed granular	Ground Level	0.30 to 0.70
Upper silty Sand	0.30 to 0.70	1.30 to 1.70
Fibrous Peat	1.30 to 1.70	1.50 to 2.00
Lower silty Sands and Gravels	1.50 to 2.00	3.80 to 4.60
Very silty Clay with gravel	3.80 to 4.60	9.70 to 11.10
Clayey Siltstone and Mudstone	9.70 to 11.10	Not proven

7. Groundwater

Groundwater was encountered at depths between 0.80m and 1.80m during the course of the fieldwork. 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.

Subsequent monitoring of groundwater levels spanning a period from 28th February to 1st of May 2020 in the standpipe installations at WS1, WS2 and WS4, indicate the groundwater depths range between 1.25m and 2.00m. The indications are that there is an upper groundwater at shallow depth (0.80 to 1.00m) perched on the fibrous peat which inhibits and slows the flow of water to the silty sands and gravels present directly beneath the peat.

8. 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.

8.1 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 Commercial 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.

8.2 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 Commercial 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.

8.3 Subsoil Deposits

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

Table 8.3 Summary identified impacts.

Determinand	GAC (mg/kg) Comm.	No of tests	No of samples exceeding SGV/GAC/ C4SL	Max Value (mg/kg)	Treat as a Hotspot	US95 Value or Geometric Mean (for Lead)	Further action required
Non-Identified							

The assessment of chemical analysis summarised in table 8.3 has not identified any potential risks to end users of the site from elevated levels of anthropogenic contamination within the soils on the site.

Abestos fibres have not been detected in any of the samples of made ground submitted for testing.

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.

8.4 Discussion

The assessment of the chemical laboratory analytical tests has identified that the soils on this site pose a low risk to end users when assessed in accordance with the current UK methodology. Consequently, the risk to end user receptors from ground contamination is classified as low given a commercial end use scenario.

Construction Workers

The risk to construction workers and site users during the construction phase is assessed to be low as a consequence of the age class of such receptors. Standard PPE & RPE precautions should be employed at the site strip stage including the use of disposable coveralls, particulate masks and damping down to supress airborne dust where conditions dictate.

Groundwater

The results of the soils chemical analysis also indicate that the underlying aquifer beneath the site or any close by controlled waters are highly unlikely to be at risk from the passage of water through the site. especially given the clay aquiclude layer underlying the site.

Water Supply Pipes

The risk to building and 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 proposed service routes and locations are known.

9. 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 9.0 Amended Conceptual Site Model based on information as presented within this report.

Potential Source /Hazard	Nature of Hazard (Risk Level to site given a commercial end use)	Contaminants Associated with Source	Potential Pathway	Potential Receptor
		Previous ON SITE Land uses:		
1. Previous: Greenfield Site Possible infilled pond features	Ground contamination Low Risk Given proposed development	None Identified	~~Dermal Contact~~ ~~Ingestion~~ ~~Inhalation~~	Site Users Construction workers
	Gas from in-filled ground See Gas Risk Assessment	See Gas Risk Assessment	See Gas Risk Assessment	Site Users Future Buildings & Services
2. Current: Factory warehouse and Yard	Ground contamination Low Risk Given proposed development	None Identified	~~Dermal Contact~~ ~~Ingestion~~ ~~Inhalation~~	Site Users Construction workers
	Gas from in-filled ground See Gas Risk Assessment	See Gas Risk Assessment	See Gas Risk Assessment	Site Users Future Buildings & Services
		Previous OFF SITE land uses within 250m as indicated by Historical Plans Including:		
3. Infilled Pond	Ground contamination Low Risk	None Identified	Dermal Contact Inhalation	Site Users Construction workers
	Gas from in-filled ground See Gas Risk Assessment	See Gas Risk Assessment	Vertical and Lateral Migration	Site Users Future Buildings & Services
4. Coal Workings & Mineral Extraction	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 Low Risk	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.

10. Conclusions

Evidence presented elsewhere within this report indicates that the ground on this site presents a Low risk to end user receptors given a commercial end use scenario.

Elsewhere,

- The controlled waters (groundwater) beneath the site are unlikely to become impacted by the passage of water through the soils on site.
- 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 is unlikely to become an environmental liability in the future.
- The risk to building and 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.

10.1 Supplementary Recommendations

None.

Matthew Benson MSc GMICE
Geotechnical/Environmental Engineer

Mark Richardson MSc CEng MICE
Technical Director

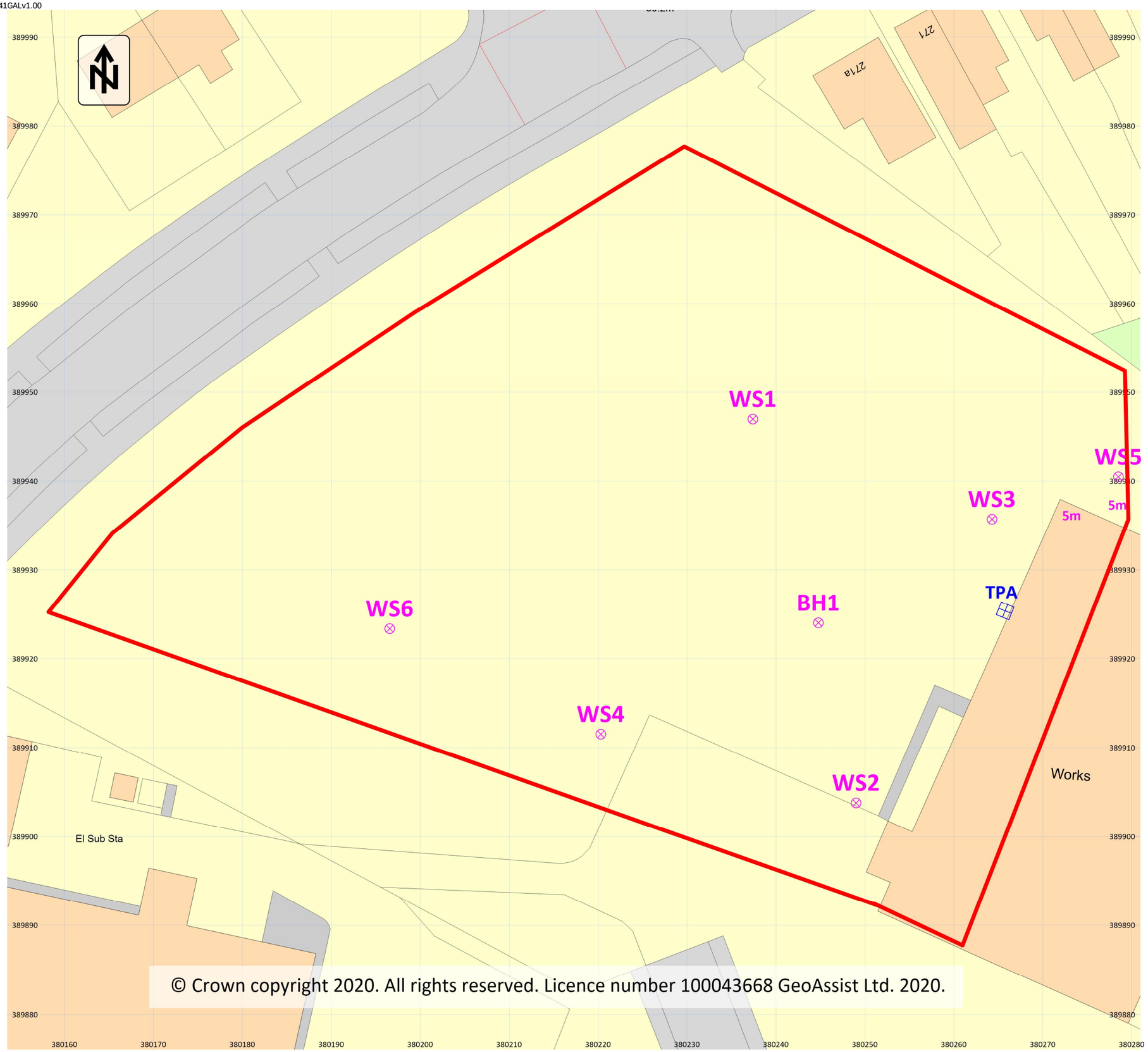
Field investigations have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions are, and can be, variable and have only been tested at isolated locations across the site. Therefore the potential exists for ground conditions to be encountered which 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 JDA-Architects. The report is confidential to JDA-Architects, 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. JDA-Architects may use the report for their/her/his own purposes.

Appendix A

A1 Site Plan with Exploratory Hole Locations

6041GALv1.00



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A1 Site Plan

Site Name	Hologic
Location	Crewe Road, Wythenshawe
GeoAssist Ref	6041HOO
Client	JDA-Architects
	The Warehouse Saxon Street Denton Manchester M34 3DS
Planning Consultant	Brennan Consult Ltd
NGR (centre of site)	380225,389920
Production Date	April 2020
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36

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consultancy engineering business environment

Appendix B

B1 Exploratory Hole Logs

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: BH1

Sheet: 1

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Light Cable Percussive Rig

Ground Level: 30.17 m.AOD

Co-ordinates: Easting: 380244.8(m) Northing: 389924(m)

Dates: 24/02/2020 to 24/02/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION

Stratum Description	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
Grey/dark brown gravel - MADE GROUND	0.20	29.97						
Brown silty fine to medium sand with brick and sandstone fragments - MADE GROUND	(0.50) 0.70	29.47		0.30	0.40	C1		
				0.70	0.80	C2		Standing water in insepction pit at 0.80m depth
Medium dense brown with dark grey bands silty fine to medium SAND	(1.00) 1.70	28.47		1.00	1.45	P1	15	P1 at 1.00m - 2,4/3,4,4,4
				1.50	1.60	D1		
				1.70	1.80	D2		
Dark grey/black sandy clayey fine fibrous PEAT	2.00	28.17						
Loose grey silty fine to medium SAND	(1.00) 3.00	27.17		2.00	2.45	P2	5	P2 at 2.00m - 1,2/1,2,1,1
				2.50	2.60	D3		
				3.00	3.45	CP1	17	CP1 at 3.00m - 3,3/3,4,4,6
Medium dense grey slightly silty very sandy rounded to subrounded GRAVEL	(1.10) 4.10	26.07		3.00	3.10	D4		
				3.50	3.60	D5		
				4.00	4.45	P3	9	P3 at 4.00m - 1,1/2,2,2,3
Firm brown medium strength silty CLAY with silt partings	(1.40) 5.50	24.67		4.50	4.60	D6		
				5.00	5.45	U1	(17)	Hand vane at 5.00m - 79kPa
				5.50	5.60	D7		Hand vane at 5.40m - 71kPa Hand vane at 5.50m - 69kPa
Firm to stiff medium to high strength brown very silty CLAY	(4.30) 9.80	20.37		6.00	6.10	D8		
				6.50	6.95	P4	13	P4 at 6.50m 2,2/3,3,3,4
				7.00	7.10	D9		
				8.00	8.45	U2	(22)	Hand vane at 8.00m - 63kPa
				8.50	8.60	D10		Hand vane at 8.40m - 81kPa
				9.80	10.25	P5	28	P5 at 9.80m - 2,2/4,6,8,10
Stiff to very stiff high to very high strength brown very silty CLAY								

Remarks: 24/01/2020: Inspection pit excavated to 1.00m depth to avoid services.
Hard Boring form 11.10m to 11.70m - 30 minutes

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: 26/02/2020
Checked: M Richardson
Date: 28/02/2020
Site Ref: 6041/HOO
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: **BH1**

Sheet: 2

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Light Cable Percussive Rig

Ground Level: 30.17 m.AOD

Co-ordinates: Easting: 380244.8(m) Northing: 389924(m)

Dates: 24/02/2020 to 24/02/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION	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
10								
	(1.00)			10.50	10.60	D11		Hand penetrometer at 10.50m - 172kPa
	10.80	19.37						
Stiff to very stiff high to very high strength brown and redbrown gravelly sandy silty CLAY	11.10	19.07		11.00	11.45	P6	68	P6 at 11.00m - 4,7/12,15,16,25
11 Brown/grey clayey SILTSTONE and MUDSTONE with sandstone								
	(1.05)			11.70	12.15	P7	88	P7 at 11.70m - 7,11/21,15,19,33
12	12.15	18.02						

Exploratory Hole termineted at 12.15m

24/02/2020: On completion of exploratory hole at 12.15m. Casing at 4.50m. Standing water level Nil. On withdrawal of casing exploratory hole backfilled and reinstated.

13

14

15

16

17

18

19

20

Remarks: 24/01/2020: Inspection pit excavated to 1.00m depth to avoid services.
Hard Boring form 11.10m to 11.70m - 30 minutes

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: 26/02/2020
Checked: M Richardson
Date: 28/02/2020
Site Ref: **6041/HOO**
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: **WS1**

Sheet: 1

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Archway Dart Rig and Dynamic Probing

Ground Level: 30.08 m.AOD

Co-ordinates: Easting: 380237.4(m) Northing: 389947(m)

Dates: 25/02/2020 to 25/02/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION

Stratum Description	Depth (Thick) (m)	Reduced Level (mAOD)	Samples/Tests Depth (m) from	to	Sample Type/No	Blow Count N/(U)	Field Records
0 Grass over dark grey sandy TOPSOIL	0.20	29.88					
Dark grey gravelly silty sandy clay - MADE GROUND	(0.40) 0.60	29.48					
Loose to medium dense brown ironstained slightly silty fine to medium SAND			0.70	0.80	D1		Damp at 0.60m depth
			0.90	1.00	D2		
1	(1.00)		1.00		CP1	10	
	1.60	28.48	1.60	1.80	U1		
Brown clayey fine fibrous PEAT	1.80	28.28					
Grey gravelly silty SAND	2.00	28.08					Wet from 1.90m depth
2 Loose to medium dense grey/brown silty SAND and GRAVEL			2.00		CP2	10	
	(1.00)						
	3.00	27.08	3.00		CP3	11	
3 Medium dense grey slightly silty SAND and GRAVEL							
	(1.00)		3.50	3.60	D3		
	4.00	26.08	4.00		CP4	10	
4 Medium dense brown silty SAND							
	(0.60)						
	4.60	25.48					
Firm brown very silty CLAY - Interpreted Stratum			4.80	4.90	D4		Hand vane at 4.80m - 55kPa
5 **Dynamic Probing from 5.00m depth**			5.00		CP5	8	
Interpreted Strata from from 5.00m depth							
	(2.60)						
6			6.00		CP6	14	
7	7.20	22.88	7.00		CP7	23	
Firm to stiff very silty CLAY - Interpreted Stratum							
8			8.00		CP8	26	
	(2.00)						
9	9.20	20.88	9.00		CP9	52	
Stiff to very stiff very silty CLAY - Interpreted Stratum							
	(0.80)						
10	10.00	20.08					

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: 26/02/2020
Checked: M Richardson
Date: 28/02/2020
Site Ref: **6041/HOO**
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: **WS1**

Sheet: 2

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Archway Dart Rig and Dynamic Probing

Ground Level: 30.08 m.AOD

Co-ordinates: Easting: 380237.4(m) Northing: 389947(m)

Dates: 25/02/2020 to 25/02/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION	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
10 Clayey SILTSTONE and MUDSTONE - Interpreted Stratum	(0.40) 10.40	19.68		10.10	CP10	94	25/02/2020: On completion of exploratory hole at 10.40m. Casing at 4.00m. Standing water level at 1.70m depth. On withdrawal of casing groundwater/gas monitoring standpipe installed to 4.00m depth with response zone from 1.00m to 4.00m.
Exploratory Hole complete at 10.40m							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

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: 26/02/2020
Checked: M Richardson
Date: 28/02/2020
Site Ref: **6041/HOO**
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: WS2

Sheet: 1

Project: Hologic

Location: Crewe Road, Wythenshawe

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Equipment: Archway Dart Rig and Dynamic Probing

Ground Level: 30.14 m.AOD

Co-ordinates: Easting: 380249(m) Northing: 389903.8(m)

Dates: 25/02/2020 to 25/02/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION	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
Grey/brown sandy gravel and brick - MADE GROUND	(0.70) 0.70	29.44		0.70	0.80	D1		Damp at 0.70m depth
Medium dense brown ironstained slightly silty fine to medium SAND	(0.70) 1.40	28.74		0.90 1.00	1.00	D2 CP1	14	
Brown clayey fine fibrous PEAT	1.60	28.54		1.50	1.60	D3		Wet from 1.60m depth
Grey gravelly silty SAND	(0.40) 2.00	28.14		2.00		CP2	21	
Medium dense grey/brown silty SAND and GRAVEL	(1.80) 3.80	26.34		2.50 3.00	2.60	D4 CP3	23	
Firm to stiff brown very silty CLAY	(2.20) 6.00	24.14		3.90 4.00 5.00	4.00	D5 CP4 CP5	10 14	Hand vane at 3.90m - 98kPa
Dynamic Probing from 5.00m depth **Interpreted Strata from from 5.00m depth**								
Stiff brown very silty CLAY - Interpreted Stratum	(2.50) 8.50	21.64		6.00 7.00 8.00		CP6 CP7 CP8	26 32 36	
Stiff to very stiff brown very silty CLAY - Interpreted Stratum	(1.50) 10.00	20.14		9.00		CP9	43	

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: 26/02/2020
Checked: M Richardson
Date: 28/02/2020
Site Ref: 6041/HOO
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: **WS2**

Sheet: 2

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Archway Dart Rig and Dynamic Probing

Ground Level: 30.14 m.AOD

Co-ordinates: Easting: 380249(m) Northing: 389903.8(m)

Dates: 25/02/2020 to 25/02/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION	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
10 Clayey SILTSTONE and MUDSTONE - Interpreted Stratum	(0.35) 10.35	19.79		10.00	CP10	79	
Exploratory Hole complete at 10.35m							25/02/2020: On completion of exploratory hole at 10.35m. Casing at 4.00m. Standing water level at 2.20m depth. On withdrawal of casing groundwater/gas monitoring standpipe installed to 4.00m depth with response zone from 1.00m to 4.00m.

11

12

13

14

15

16

17

18

19

20

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: 26/02/2020
Checked: M Richardson
Date: 28/02/2020
Site Ref: **6041/HOO**
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: WS3

Sheet: 1

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Archway Dart Rig and Dynamic Probing

Ground Level: 30.21 m.AOD

Co-ordinates: Easting: 380264.3(m) Northing: 389935.7(m)

Dates: 25/02/2020 to 25/02/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION	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 sandy gravel with brick fragments - MADE GROUND	0.30	29.91						
Brown silty sand and brick fragments - MADE GROUND	(0.40) 0.70	29.51		0.70	0.80	D1		Damp at 0.70m depth
Medium dense brown ironstained silty fine to medium SAND 1	(0.90) 1.60	28.61						
Brown clayey fine fibrous PEAT	1.80	28.41		1.70	1.80	D2		Wet from 1.80m depth
Grey gravelly silty SAND	2.00	28.21						
2 Medum dense grey/brown silty SAND and GRAVEL	(1.00) 3.00	27.21						
3 Medium dense grey slightly silty SAND and GRAVEL	(1.00) 4.00	26.21						
4 Grey gravelly slightly silty SAND	(0.60) 4.60	25.61						
Firm brown very silty CLAY - Interpreted Stratum 5 **Dynamic Probing from 5.00m depth** **Interpreted Strata from from 5.00m depth**	(1.40) 6.00	24.21						Hand vane at 4.80m - 55kPa
6 Firm to stiff very silty CLAY - Interpreted Stratum	(1.20) 7.20	23.01		6.00		CP1	7	
7				7.00		CP2	21	
Stiff to very stiff very silty CLAY - Interpreted Stratum 8	(2.50) 9.70	20.51		8.00		CP3	40	25/02/2020: On completion of exploratory hole at 9.97m. Casing at 4.00m depth. Standing water level at 1.10m depth. On withdrawal of casing exploratory hole backfilled and reinstated.
9				9.00		CP4	50	
Clayey SILTSTONE and MUDSTONE - Interpreted Stratum 10 **Exploratory Hole complete at 9.97m**	9.97	20.24		9.70		CP5	112	

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: 26/02/2020
Checked: M Richardson
Date: 28/02/2020
Site Ref: 6041/HOO
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: WS4

Sheet: 1

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Archway Dart Rig and Dynamic Probing

Ground Level: 30.12 m.AOD

Co-ordinates: Easting: 380220.3(m) Northing: 389911.5(m)

Dates: 25/02/2020 to 25/02/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION

STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (mAOD)	Samples/Tests Depth (m) from	to	Sample Type/No	Blow Count N/(U)	Field Records
0 Grass over grey brown sandy TOPSOIL	0.20	29.92					
Grey/brown silty sand - POSSIBLE MADE GROUND	(0.40) 0.60	29.52					
Loose to medium dense brown/dark brown ironstained slightly silty fine to medium SAND	(0.70) 1.30	28.82	0.70	0.80	D1		Damp at 0.60m depth
			1.30	1.40	U1		
Brown clayey fine fibrous PEAT	1.50	28.62					
Medium dense brown gravelly silty fine to medium SAND	(0.90) 2.40	27.72					Wet from 1.60m depth
Medium dense grey slightly silty SAND and GRAVEL	(2.20) 4.60	25.52					
Firm brown very silty CLAY - Interpreted Stratum							Hand vane at 4.70m - 59kPa
Dynamic Probing from 5.00m depth **Interpreted Strata from from 5.00m depth**			6.00		CP1	6	
	(3.40)		7.00		CP2	10	
	8.00	22.12	8.00		CP3	17	
Firm to stiff very silty CLAY - Interpreted Stratum	(1.00) 9.00	21.12	9.00		CP4	33	
Stiff to very stiff very silty CLAY - Interpreted Stratum	(1.00) 10.00	20.12					

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: 26/02/2020
Checked: M Richardson
Date: 28/02/2020
Site Ref: 6041/HOO
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: WS4

Sheet: 2

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Archway Dart Rig and Dynamic Probing

Ground Level: 30.12 m.AOD

Co-ordinates: Easting: 380220.3(m) Northing: 389911.5(m)

Dates: 25/02/2020 to 25/02/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION	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
10 Clayey SILTSTONE and MUDSTONE - Interpreted Stratum	(0.56) 10.56	19.56		10.10	CP5	85	25/02/2020: On completion of exploratory hole at 10.56m. Casing at 4.00m. Standing water level at 1.80m depth. On withdrawal of casing groundwater/gas monitoring standpipe installed to 5.00m depth with response zone from 1.00m to 5.00m.
Exploratory Hole complete at 10.56m							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

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: 26/02/2020
Checked: M Richardson
Date: 28/02/2020
Site Ref: 6041/HOO
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: WS5

Sheet: 1

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Archway Dart Rig and Dynamic Probing

Ground Level: 30.27 m.AOD

Co-ordinates: Easting: 380278.5(m) Northing: 389940.5(m)

Dates: 17/04/2020 to 17/04/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION

Stratum Description	Depth (Thick) (m)	Reduced Level (mAOD)	Samples/Tests Depth (m) from	to	Sample Type/No	Blow Count N/(U)	Field Records
Grass over dark grey sandy TOPSOIL	0.30	29.97					
Dark brown silty fine to medium SAND	(0.70) 1.00	29.27	0.50	0.60	D1		
			1.00		CP1	12	
Loose to medium dense brown silty fine to medium SAND	(0.60) 1.60	28.67	1.30	1.40	D2		
Dark brown clayey fine fibrous PEAT	(0.40) 2.00	28.27	1.80	1.90	D3		
			2.00		CP2	10	Wet from 2.00m depth
Loose to medium dense grey/brown silty SAND and GRAVEL	(1.80) 3.80	26.47	3.00		CP3	9	
							Hand vane at 3.80m - 65kPa
Firm to stiff brown very silty CLAY	(0.70) 4.50	25.77	4.00		CP4	6	
							Hand vane at 4.50m - 86kPa
Firm to stiff brown very silty CLAY - Interpreted Stratum							Hand vane at 4.80m - 97kPa
Dynamic Probing from 5.00m depth **Interpreted Strata from from 5.00m depth**			5.00		CP5	11	
	(3.00) 7.50	22.77	6.00		CP6	17	
			7.00		CP7	27	
Stiff very silty CLAY - Interpreted Stratum	(1.70) 9.20	21.07	8.00		CP8	36	
			9.00		CP9	53	
Stiff to very stiff very silty CLAY - Interpreted Stratum	(0.80) 10.00	20.27					

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: 20/04/2020
Checked: M Richardson
Date: 20/04/2020
Site Ref: 6041/HOO
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: WS5

Sheet: 2

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Archway Dart Rig and Dynamic Probing

Ground Level: 30.27 m.AOD

Co-ordinates: Easting: 380278.5(m) Northing: 389940.5(m)

Dates: 17/04/2020 to 17/04/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION	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
Clayey SILTSTONE and MUDSTONE - Interpreted Stratum	10.33	19.94		10.00	CP10	71	17/04/2020: On completion of exploratory hole at 11.00m. Casing at 4.00m depth. Standing water level at 2.50m depth. On withdrawal of casing exploratory hole backfilled and reinstated.

Exploratory Hole complete at 10.33m

10 11 12 13 14 15 16 17 18 19 20

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: 20/04/2020
Checked: M Richardson
Date: 20/04/2020
Site Ref: 6041/HOO
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: WS6

Sheet: 1

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Archway Dart Rig and Dynamic Probing

Ground Level: 29.71 m.AOD

Co-ordinates: Easting: 380196.6(m) Northing: 389923.4(m)

Dates: 17/04/2020 to 17/04/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION	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 Grass over dark grey sandy TOPSOIL	0.30	29.41						
Medium dense dark brown/light brown silty fine to medium SAND	(1.20)			0.50	0.60	D1		
1				1.00		CP1	11	
	1.50	28.21						
Dark brown clayey fine fibrous PEAT	1.70	28.01		1.60	1.70	D2		Wet from 1.70m depth
Medium dense grey/brown silty SAND and GRAVEL	(2.70)							
2				2.00		CP2	14	
3				3.00		CP3	10	
4				4.00		CP4	28	
	4.40	25.31						
Firm to stiff brown very silty CLAY	(0.60)							Hand vane at 4.50m - 102kPa Hand vane at 4.80m - 110kPa
	5.00	24.71						
5 Stiff very silty CLAY - Interpreted Stratum **Dynamic Probing from 5.00m depth** **Interpreted Strata from from 5.00m depth**	(2.00)			5.00		CP5	8	
6				6.00		CP6	14	
	7.00	22.71						
7 Stiff to very stiff very silty CLAY - Interpreted Stratum	(3.00)			7.00		CP7	19	
8				8.00		CP8	31	
9				9.00		CP9	38	
10	10.00	19.71						

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: 20/04/2020
Checked: M Richardson
Date: 20/04/2020
Site Ref: 6041/HOO
Scale 1:50

GeoAssist Limited

Exploratory Hole Record Sheet

Ref: WS6

Sheet: 2

Consultant: Brennan Consult Ltd

Client: JDA-Architects

Project: Hologic

Location: Crewe Road, Wythenshawe

Equipment: Archway Dart Rig and Dynamic Probing

Ground Level: 29.71 m.AOD

Co-ordinates: Easting: 380196.6(m) Northing: 389923.4(m)

Dates: 17/04/2020 to 17/04/2020

Drilling Foreman: M Walton

Engineer/Geologist: M Benson

STRATUM DESCRIPTION	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
Very stiff very silty CLAY - Interpreted Stratum	(0.50) 10.50	19.21		10.10	CP10	50	
Clayey SILTSTONE and MUDSTONE - Interpreted Stratum	(0.66) 11.16	18.55		10.50	CP11	62	17/04/2020: On completion of exploratory hole at 11.16m. Casing at 4.00m depth. Standing water level at 2.50m depth. On withdrawal of casing exploratory hole backfilled and reinstated.

Exploratory Hole complete at 11.16m

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: 20/04/2020
Checked: M Richardson
Date: 20/04/2020
Site Ref: 6041/HOO
Scale 1:50

Appendix C

C1 SAL Chemical Test Results

C2 Analysis of Results with Assessment Criteria

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

e: info@geoassist.co.uk

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

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

Analytical Report Number : 20-89572

Project / Site name:	Hologic, Crewe Road, Wythenshawe	**Samples received on:**	27/02/2020
Your job number:	6041-HOO	**Samples instructed on:**	27/02/2020
Your order number:	2200227	**Analysis completed by:**	09/03/2020
Report Issue Number:	1	**Report issued on:**	09/03/2020
Samples Analysed:	5 soil samples		

Signed:

Zina Abdul Razzak
Senior Quality Specialist

For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 20-89572

Project / Site name: Hologic, Crewe Road, Wythenshawe

Your Order No: 2200227

Lab Sample Number				1456382	1456383	1456384	1456385	1456386
Sample Reference				BH1-C1	WS1-C1	WS2-C1	WS3-C1	WS4-C1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.50	0.50	0.40	0.50
Date Sampled				26/02/2020	26/02/2020	26/02/2020	26/02/2020	26/02/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	15	14	16	8.6
Total mass of sample received	kg	0.001	NONE	0.60	0.54	0.56	0.48	0.51
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.5	5.7	10.9	6.8	7.0
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Thiocyanate as SCN	mg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Sulphate as SO_4	%	0.005	MCERTS	0.015	0.027	0.096	0.039	0.020
Sulphide	mg/kg	1	MCERTS	2.6	< 1.0	4.6	6.7	1.0
Total Sulphur	%	0.005	MCERTS	0.014	0.011	0.046	0.035	0.009
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.4	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.81	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	3.7	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	3.1	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.7	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.5	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.5	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.57	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.3	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.54	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.20	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.54	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	16.9	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	1.8	5.8	2.8	12	1.9
Barium (aqua regia extractable)	mg/kg	1	MCERTS	13	23	33	39	12
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.11	0.32	0.25	0.52	0.09
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	0.4	0.2	0.3	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	0.3	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	1.9
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	3.4	5.7	7.6	9.3	1.1
Copper (aqua regia extractable)	mg/kg	1	MCERTS	19	16	9.6	25	21
Lead (aqua regia extractable)	mg/kg	1	MCERTS	17	26	25	47	7.0
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	3.6	6.9	6.2	12	2.7
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	4.7	8.1	9.0	15	2.2
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	19	21	23	31	23

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

Analytical Report Number : 20-89572

Project / Site name: Hologic, Crewe Road, Wythenshawe

* 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 *
1456382	BH1-C1	None Supplied	0.30	Brown clay and loam with gravel.
1456383	WS1-C1	None Supplied	0.50	Brown clay and loam with gravel.
1456384	WS2-C1	None Supplied	0.50	Brown clay and loam with gravel.
1456385	WS3-C1	None Supplied	0.40	Brown clay and loam.
1456386	WS4-C1	None Supplied	0.50	Brown clay and loam.

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Analytical Report Number : 20-89572

Project / Site name: Hologic, Crewe Road, Wythenshawe

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Boron, 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
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	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (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
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
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
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
Thiocyanate in soil	Determination of thiocyanate in soil by extraction in water followed by acidification followed by addition of ferric nitrate followed by discrete analyser (spectrophotometer).	In-house method	L082-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
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' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Soils Risk Assessment

Site Reference:	6041	HOO
Project Site:	Hologic	
Project Location:	Crewe Road, Wythenshawe	
Client:	JDA-Architects	

i2 Reference	Commercial	BH1-C1	WS1-C1	WS2-C1	WS3-C1	WS4-C1
Customer Sample Ref:	C4SL / S4UL	26/02/2020	26/02/2020	26/02/2020	26/02/2020	26/02/2020
	SOM 1% GAC	0.30	0.50	0.50	0.40	0.50
Determinand	LQM II					
Arsenic	640	1.8	5.8	2.8	12	1.9
Boron (water-soluble)	240000	0.3	0.4	0.2	0.3	0.3
Cadmium	410	0.2	0.2	0.3	0.2	0.2
Chromium*	8600	3.4	5.7	7.6	9.3	1.1
Chromium VI	49	1.2	1.2	1.2	1.2	1.9
Copper	68000	19	16	9.6	25	21
Cyanide(Total)	-	1	1	1	1	1
Cyanide(free)**	34	1	1	1	1	1
Lead	2300	17	26	25	47	7
Mercury	58	0.3	0.3	0.3	0.3	0.3
Nickel	980	3.6	6.9	6.2	12	2.7
pH	-	7.5	5.7	10.9	6.8	7
Phenols(Mono)	3200	1	1	1	1	1
Selenium	12000	1	1	1	1	1
SO4(Total)	-	2.6	1	4.6	6.7	1
Sulphide	-	5	5	5	5	5
Sulphur(Free)	-	0.015	0.027	0.096	0.039	0.02
Thiocyanate	-	0.014	0.011	0.046	0.035	0.009
Zinc	730000	19	21	23	31	23
Acenaphthene	100000	0.05	0.05	0.05	0.05	0.05
Acenaphthylene	100000	0.05	0.05	0.05	0.05	0.05
Anthracene	540000	0.05	0.05	0.05	0.81	0.05
Benzo(a)Anthracene	-	0.05	0.05	0.05	1.7	0.05
Benzo(a)Pyrene SM	10	0.05	0.05	0.05	1.3	0.05
Benzo(b)Fluoranthene	-	0.05	0.05	0.05	1.5	0.05
Benzo(ghi)Perylene	-	0.05	0.05	0.05	0.54	0.05
Benzo(k)Fluoranthene	-	0.05	0.05	0.05	0.57	0.05
Chrysene	-	0.05	0.05	0.05	1.5	0.05
Dibenzo(ah)Anthracene	-	0.05	0.05	0.05	0.2	0.05
Fluoranthene	23000	0.05	0.05	0.05	3.7	0.05
Fluorene	71000	0.05	0.05	0.05	0.05	0.05
Indeno(123-cd)Pyrene	-	0.05	0.05	0.05	0.54	0.05
Naphthalene	1100	0.05	0.05	0.05	0.05	0.05
Phenanthrene	23000	0.05	0.05	0.05	1.4	0.05
Pyrene	54000	0.05	0.05	0.05	3.1	0.05
PAH(total)	500	0.8	0.8	0.8	16.9	0.8

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

*Criteria Assumes Chromium III

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

**Criteria is derrived considering Total TPH (C10 to C35) is formed entirley 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

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