GeoAssist Limited
Civil, Environmental & Geotechnical

Client:
Towerhouse Systems Limited
7 Leegate Close
Heaton Moor
Stockport
SK4 3NN

Architect/Consultant
SWF Consultants Limited
Suite 1, Ground Floor
Marwood House
Riverside Park
Sothwood Road
Bromborough
Wirral
CH62 3QX

Phase II Contaminated Land Risk Assessment

Former Green End Public House, Mauldeth Road, Burnage, Manchester

Unit 4
Sheffield Street
Heaton Norris
Stockport
Cheshire
SK4 1RU
Telephone : 0161 480 8885
e-mail : info@geoassist.co.uk

Nov 2016 **Site Ref: 5812/GEP-CLRA**
v1.00

Client:
Towerhouse Systems Limited7 Leegate Close
Heaton Moor
Stockport
SK4 3NN

Architect/Consultant
SWF Consultants Limited
Suite 1, Ground Floor
Marwood House
Riverside Park
Sothwood Road
Bromborough
Wirral
CH62 3QX

Phase II Contaminated Land Risk Assessment

1. Introduction 3
2. Description of the Site 3
3. Review Of Previous Reports 4
4. Intrusive Investigation 4
    4.1 Intrusive Investigation objectives 4
    4.2 Intrusive Investigation Strategy 4
    4.3 Methods Used For Forming Exploratory Holes 4
    4.4 Exploratory Hole Programme 5
    4.5 Field Sampling and Testing 5
5. Laboratory Investigation 6
    5.1 Contamination Testing 6
6. Subsurface Stratigraphy 7
7. Groundwater 7
8. Ground Gas 7
9. Part IIA Legislation 7
    9.1 Assessment Methodology 8
    9.2 Soils 8
    9.3 Subsoil Deposits 9
    9.4 Discussion 10
10. Conceptual Model 11
11. Conclusions 12
    11.1 Supplementary Recommendations 12

Appendices

A1. Site Plan with Exploratory Hole Locations
A2. Proposed Site Plan & Remediation Area
B1. Exploratory Hole Logs
C1. SAL Chemical Test Results
C2. Analysis of Results with Assessment Criteria

Client:
Towerhouse Systems Limited7 Leegate Close
Heaton Moor
Stockport
SK4 3NN

Architect/Consultant
SWF Consultants Limited
Suite 1, Ground Floor
Marwood House
Riverside Park
Sothwood Road
Bromborough
Wirral
CH62 3QX

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 Towerhouse Systems Limited as owners and developers of site at Former Green End Public House, Mauldeth Road, Burnage, Manchester.

The work was commissioned following acceptance of the quotation and an instruction to proceed issued by the Client on 04th June 2016.

The purpose of this Phase II investigation is to provide information following the conclusions of the phase I report produced dated June 2016 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 Residential Development

The approximate grid reference for the centre of the site is 386680, 391970 and the total area of the site is approximately 3,800m^2. 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 indicted on the plan.

2. Description of the Site

The site is located on Mauldeth Road in a residential area and is currently a disused public house with a large walled garden area and bowling green to the rear.

The site forms a rectangular shape with a relatively level topography.

The site is bounded by residential property in all directions.

At the time of the site work no visual or olfactory observations of contaminants were noted.

3. Review Of Previous Reports

It is understood that previous intrusive investigations have not 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 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 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: 1999 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.
The contamination 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. 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 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 twelve 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, WS3 and WS4 with 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 and the surface reinstated.

All intrusive work was carried out in accordance with:

British standard 5930: 1999 Code of Practice for Site Investigations

- British Standard 10175: 2011 where applicable

The fieldwork was completed on the 22/07/2016 in mixed weather conditions.

4.5 Field Sampling and Testing

A non-targeted borehole 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 12 soil samples were collected and subjected to elements of the suite of chemical testing as outlined below. All tests were conducted by Scientific Analysis 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 Identification
Thiocyanate	
Zinc	

6. Subsurface Stratigraphy

The subsoil profile obtained from the exploratory holes consists of Made ground overlying a generally firm to stiff becoming very stiff with depth slightly sandy silty clay of intermediate to high plasticity. The clay contained organic inclusions to 2.00m and 1.00m depth respectively in WS11 and WS12. Made ground consisting of clayey sandy gravel with brick and concrete generally in a very loose state of compaction was shown to be of the order of 2.00m thick in exploratory holes WS2 and WS5. A layer 0.20m to 0.30m thick of sandy gravel, cinders and ash made ground was penetrated beneath the grass and topsoil of the bowling green. The bedrock was not proved during the investigation.

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

Table 6.0 Subsoil Profile Summary

Strata	Depth of Strata (m) below ground level	
	Top	Base
Topsoil and Made Ground Variable mixed granular and cohesive	Ground Level	0.30 to >2.00
Superficial Natural Deposits Firm to stiff becoming very stiff gravelly sandy silty Clay	0.30 to >2.00	>6.0

7. Groundwater

Seepage groundwater was not encountered in any of the exploratory holes during the course of the field work. 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. It should be noted that 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

An intrusive ground gas investigation and associated gas risk assessment is ongoing, the results of which will form a separate 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

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 identified impacts.

Determinand	GAC (mg/kg) Residential	No of tests In Critical Strata	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
Arsenic	37	7	3	330	Yes	182.9	Yes
Lead	200	7	2	310	No	108	No
Nickel	130	7	1	150	Yes	101	No

The assessment has identified potential risks to end users of the site from elevated levels of anthropogenic contamination within the made ground deposits on the site. In order to fully assess the risks posed by the contaminants of concern (CoC herein) an analysis of the statistical significance of the CoC at the 95th percentile confidence level has been undertaken. All of the CoC were associated with the shallow Made Ground/Clay present in the exploratory holes. The statistical analysis indicated that for lead, the geometric mean is less than the category 4 screening value and hence no further action is required. For nickel the 95th percentile was calculated to be less than the category 4 screening value and hence no further action is required.

The statistical analysis for arsenic the 95th percentile was calculated to be greater than the category 4 screening value. Therefore, there is a requirement for further action.

The presence of asbestos fibre was not detected in any of the samples submitted for analysis.

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.

9.4 Discussion

The assessment of the chemical laboratory analytical tests has identified that the mage ground soils associated with the bowling green on this site pose a low to moderate 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 to moderate given a Residential end use scenario. It is therefore recommended that the made ground to a maximum depth of 600mm and including the top 100mm of the natural clay deposits (intermixed zone) where encountered are removed in the areas of soft landscaping covering the former bowling green area (depicted in green on the plan in appendix A2). The removed subsoils will need to be replaced with a suitable chemically inert subsoil / fill which will need to be tested to confirm suitability for use. The results shall be presented in a validation report. Undertaking the recommended remedial action should suffice to reduce the risk to site occupants to an acceptably low level.

- The risk to construction workers and site users during the construction phase is assessed to be low if standard PPE & RPE precautions are employed at the site strip stage including the use of disposable coveralls, particulate masks and damping down to supress airborne dust where conditions dictate.
- The results of the 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.

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
Previous ON SITE Land uses:				
1. Previous and Current Land Use Public House, Bowling Green	Ground contamination **Low to Moderate Risk**	Arsenic in made Ground	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground			Site Users Future Buildings & Services
Previous OFF SITE land uses within 250m as indicated by Historical Plans Including:				
2. Tan Yard	Ground contamination **Low Risk**	None	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground			Site Users Future Buildings & Services
3. Pond Features	Ground contamination **Low Risk**	None	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground			Site Users Future Buildings & Services
4. Coal Workings & Brine 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.

11. Conclusions

Evidence presented elsewhere within this report indicates that the ground on this site presents a Low to moderate risk to end user receptors and will not be regarded as fit for pupose until the remedial actions recommended herein are undertaken to the satisfaction of the LPA.

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.
- An intrusive ground gas investigation and associated gas risk assessment is ongoing, the results of which will form a separate report.

11.1 Supplementary Recommendations

None

Matthew Benson BSc
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 Towerhouse Systems Limited. The report is confidential to Towerhouse Systems 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. Towerhouse Systems Limited may use the report for their/her/his own purposes.

Appendix A

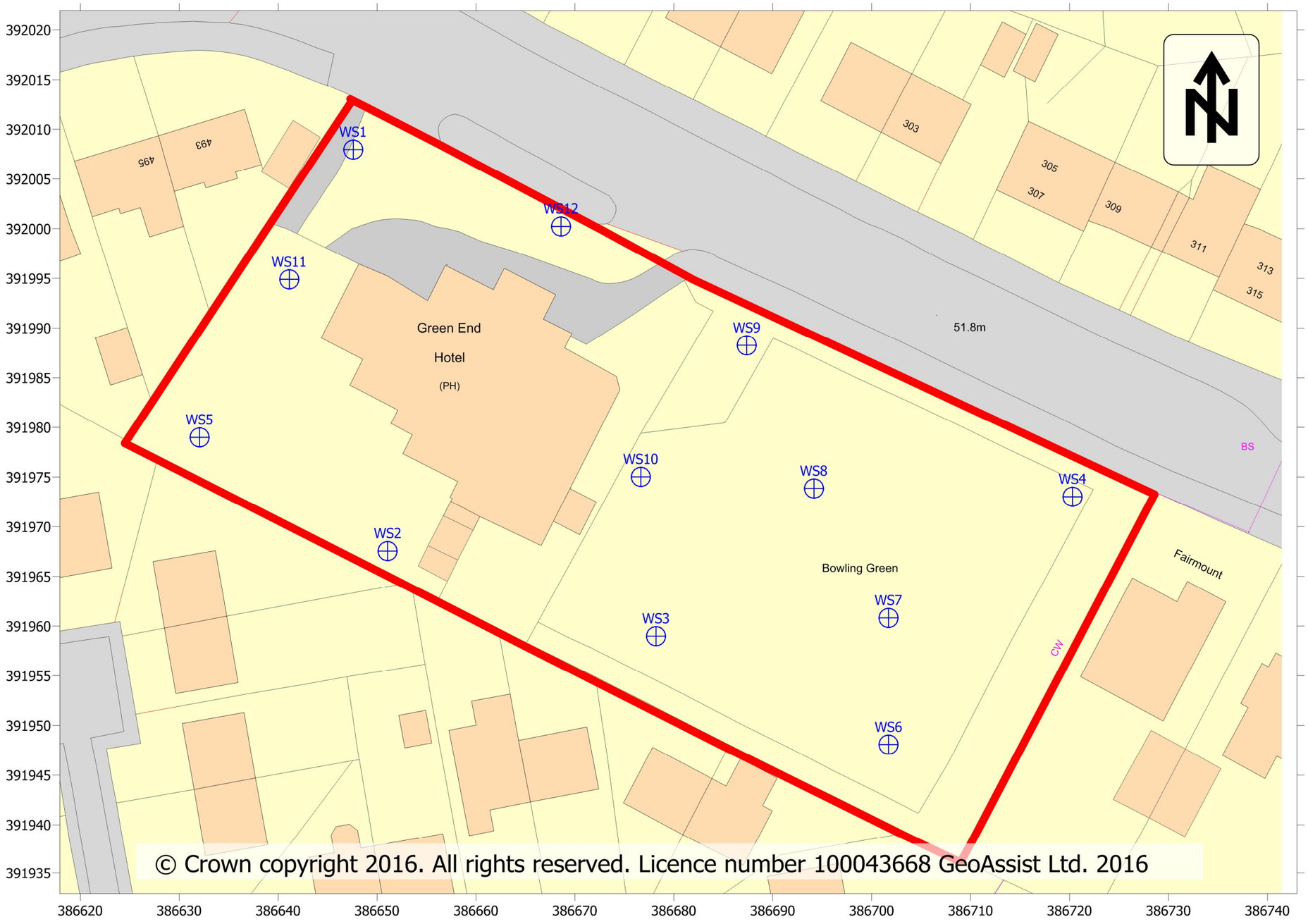
A1 Site Plan & Exploratory Hole Locations

A2 Proposed Site Plan & Remediation Area

GeoAssist Limited
Civil, Environmental & Geotechnical
Telephone: +44 (0) 161 480 8885 e-mail : info@geoassist.co.uk

A1 Site Plan

5812GALv1.00



© Crown copyright 2016. All rights reserved. Licence number 100043668 GeoAssist Ltd. 2016

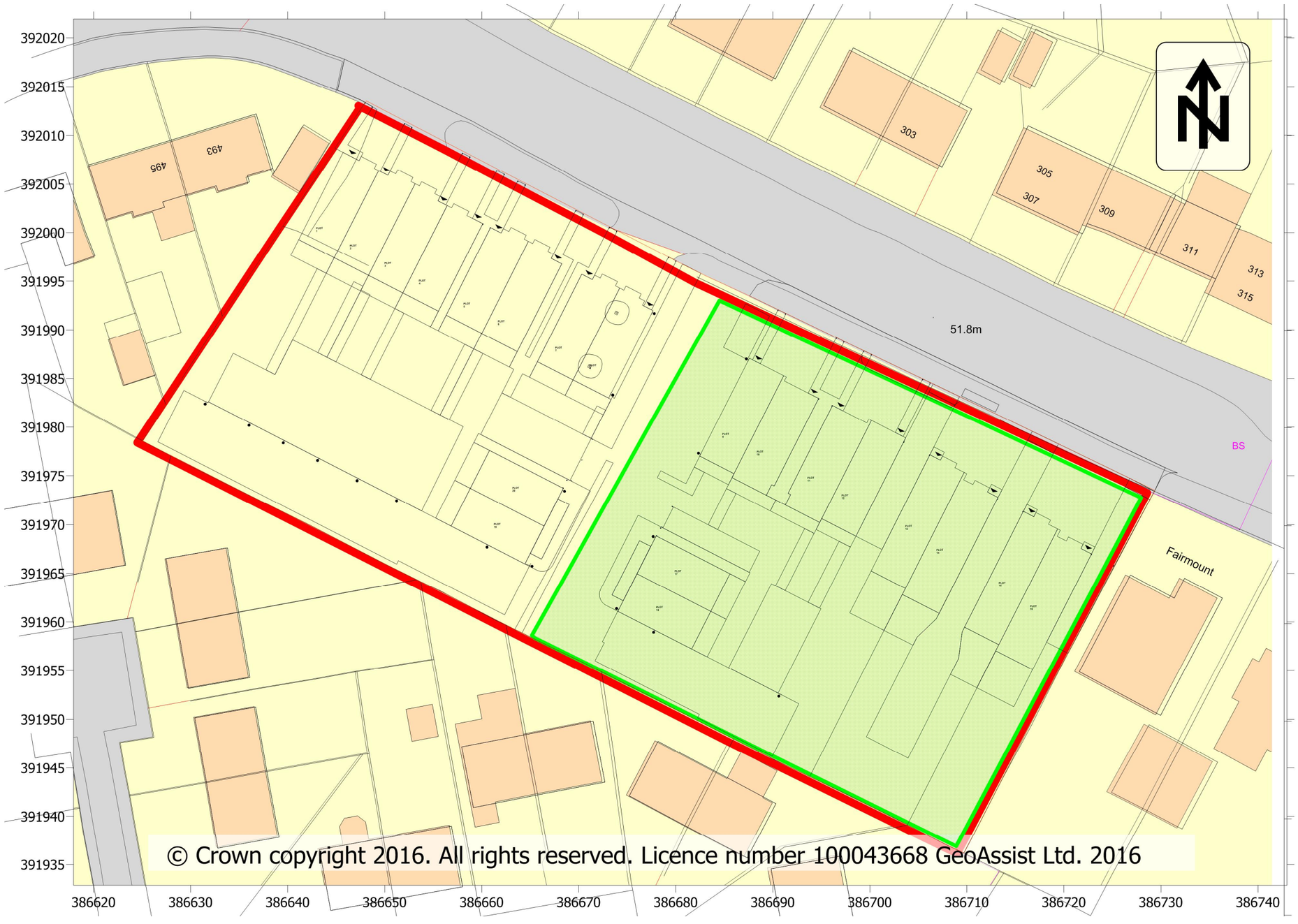
Site Name	Former Green End Public House
Location	Mauldeth Road, Burnage, Manchester
GeoAssist Ref	5812GEP
Client	Towerhouse Systems Limited
	7 Leegate Close Heaton Moor Stockport SK4 3NN
Planning Consultant	SWF Consultants Limited
NGR (centre of site)	386680,391970
Production Date	June 2016
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36

ace
consultancy engineering business environment

GeoAssist Limited
Civil, Environmental & Geotechnical
Telephone: +44 (0) 161 480 8885 e-mail : info@geoassist.co.uk

5812GALv1.00

A2 Proposed Site Plan



© Crown copyright 2016. All rights reserved. Licence number 100043668 GeoAssist Ltd. 2016

Site Name	Former Green End Public House
Location	Mauldeth Road, Burnage, Manchester
GeoAssist Ref	5812GEP
Client	Towerhouse Systems Limited
	7 Leegate Close Heaton Moor Stockport SK4 3NN
Planning Consultant	SWF Consultants Limited
NGR (centre of site)	386680,391970
Production Date	June 2016
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36

ace
consultancy engineering business environment

Appendix B

B1 Exploratory Hole Logs

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS1

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm) 100, Depth (m) 1.00

Ground Level : 51.10 m. AOD
Co-ordinates E 386647.6 (m)
N 392008.0 (m)
Dates 22/07/2016 to 22/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests Depth from (m)	to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					TARMAC 50mm over CONCRETE	(0.10)		
					Brown/grey sand and gravel and brick rubble - MADE GROUND	0.10	51.00	
						(0.30)		
					Dark grey sandy gravel with cinders and brick fragments - MADE GROUND	0.40	50.70	
	0.80	0.90	C1			(0.30)		
					Firm grey/brown medium strength sandy silty CLAY	0.70	50.40	
	1.00		CP1	(3)		(0.40)		
	1.10	1.20	D1			1.10	50.00	
Hand Vane at 1.40 - 89kPa	1.40	1.50	D2		Firm to stiff brown with light grey medium to high strength slightly gravelly sandy silty CLAY	(0.70)		
Hand Vane at 1.80 - 159kPa						1.80	49.30	
	2.00		CP2	(15)	Very stiff brown very high strength gravelly sandy silty CLAY			
						(1.20)		
	3.00		CP3	(15)		3.00	48.10	
					Very stiff gravelly sandy silty CLAY - Interpreted Stratum			
	4.00		CP4	(12)				
						(3.00)		
	5.00		CP5	(15)				
	5.90		CP6	(39)				
22/07/2016: On completion of exploratory hole at 6.00m. Casing at 2.00m. Standing water level Nil. On withdrawal of casing groundwater monitoring standpipe installed to 3.00m with response zone from 1.00m to 3.00m.					Borehole complete	6.00	45.10	

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS2

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm) 100, Depth (m) 3.00

Ground Level : 51.59 m. AOD
Co-ordinates E 386651.1 (m)
N 391967.6 (m)
Dates 21/07/2016 to 21/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests Depth from	Depth to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					CONCRETE	(0.20)		
						0.20	51.39	
					Brown/grey sandy gravel with brick fragments - MADE GROUND	(0.80)		
	0.90	1.00	C1					
	1.00		CP1	(2)		1.00	50.59	
					Brown/grey clayey sandy gravel with brick fragments - MADE GROUND	(1.00)		
	1.80	1.90	D1					
	2.00		CP2	(12)		2.00	49.59	
Hand Vane at 2.20 >194kPa	2.20	2.30	D2		Stiff to very stiff brown with light grey high to very high strength slightly gravelly sandy very silty CLAY			
	3.00		CP3	(18)		(1.70)		
						3.70	47.89	
	4.00		CP4	(15)	Very stiff slightly gravelly sandy very silty CLAY - Interpreted Stratum			
	5.00		CP5	(21)		(2.30)		
	5.90		CP6	(41)				
21/07/2016: On completion of exploratory hole at 6.00m. Casing at 3.00m. Standing water level Nil. On withdrawal of casing groundwater monitoring standpipe installed to 3.70m with response zone from 1.00m to 3.70m.					Borehole complete	6.00	45.59	

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS3

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm) 100, Depth (m) 1.00

Ground Level : 51.54 m. AOD
Co-ordinates E 386678.2 (m)
N 391959.0 (m)
Dates 22/07/2016 to 22/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests Depth from (m)	to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					Grass over brown clayey TOPSOIL	(0.20)		
						0.20	51.34	
	0.40	0.50	C1		Dark grey sandy gravel with cinders and ash - MADE GROUND	(0.20)		
					Soft to firm grey/brown slightly gravelly sandy silty CLAY	0.40	51.14	
						(0.30)		
					Firm brown with light brown iron stained sandy silty CLAY	0.70	50.84	
	1.00		CP1	(3)		(0.30)		
	1.00	1.10	D1		Firm to stiff brown with occassional grey medium to high strength slightly gravelly sandy silty CLAY with sand inclusion at 1.80m	1.00	50.54	
Hand Vane at 1.30 - 144kPa	1.30	1.40	D2					
						(1.00)		
	2.00		CP2	(15)		2.00	49.54	
					Stiff brown with occassional grey high strngth slightly gravelly sandy silty CLAY with occassional cobbles and sand inclusions			
						(1.00)		
	3.00		CP3	(12)		3.00	48.54	
					Very stiff gravelly sandy silty CLAY with occassional cobbles - Interpreted Stratum			
	4.00		CP4	(12)				
						(3.00)		
	5.00		CP5	(15)				
	5.90		CP6	(18)				
22/07/2016: On completion of exploratory hole at 6.00m. Casing at 2.00m. Standing water level Nil. On withdrawal of casing groundwater monitoring standpipe installed to 3.00m with response zone from 1.00m to 3.00m.					Borehole complete	6.00	45.54	

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS4

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm) 100, Depth (m) 1.00

Ground Level : 51.53 m. AOD
Co-ordinates E 386720.3 (m)
N 391973.0 (m)
Dates 22/07/2016 to 22/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests Depth from (m)	to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					Brown sandy TOPSOIL	(0.30)		
	0.30	0.40	C1			0.30	51.23	
					Grey/brown gravelly sandy silty CLAY with roots	(0.20)		
					Stiff brown with light grey gravelly sandy silty CLAY with fine rootlets	0.50	51.03	
						(0.50)		
	0.90	1.00	D1					
	1.00		CP1	(9)		1.00	50.53	
Hand Vane at 1.20 >194kPa	1.20	1.30	D2		Stiff to very stiff brown with light grey high to very high strength gravelly sandy silty CLAY			
	2.00		CP2	(15)		(1.80)		
						2.80	48.73	
	3.00		CP3	(9)	Stiff to very stiff gravelly sandy silty CLAY- Interpreted Stratum			
	4.00		CP4	(9)				
						(3.20)		
	5.00		CP5	(21)				
	5.90		CP6	(24)				
22/07/2016: On completion of exploratory hole at 6.00m. Casing at 2.00m. Standing water level Nil. On withdrawal of casing groundwater monitoring standpipe installed to 2.80m with response zone from 1.00m to 2.80m.					Borehole complete	6.00	45.53	

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS5

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm) 100 Depth (m)

Ground Level : 51.57 m. AOD
Co-ordinates E 386632.1 (m)
N 391979.0 (m)
Dates 21/07/2016 to 21/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests Depth (m) from	to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					TARMAC	(0.10)		
					Grey/brown sandy gravel with brick and concrete fragments - MADE GROUND	0.10	51.47	
						(0.40)		
					Grey/brown sandy silty clay with gravel and brick fragments - MADE GROUND	0.50	51.07	
	0.80	0.90	C1			(1.50)		
21/07/2016: On completion of exploratory hole at 2.00m. Casing at 1.00m. Standing water level Nil. On withdrawal of casing exploratory hole backfilled and reinstated.					Borehole complete	2.00	49.57	

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS6

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm) 100 Depth (m)

Ground Level : 51.62 m. AOD
Co-ordinates E 386701.7 (m)
N 391948.1 (m)
Dates 22/07/2016 to 22/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests Depth (m) from	to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					Grass over brown clayey TOPSOIL	(0.20)		
						0.20	51.42	
					Dark grey sandy gravel, cinders and ash - MADE GROUND	(0.20)		
	0.50	0.60	C1		Firm to stiff brown gravelly sandy silty CLAY	0.40	51.22	
						(1.60)		
22/07/2016: On completion of exploratory hole at 2.00m. Casing at 1.00m. Standing water level Nil. On withdrawal of casing exploratory hole backfilled and reinstated.					Borehole complete	2.00	49.62	

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS7

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm) 100 Depth (m)

Ground Level : 51.67 m. AOD
Co-ordinates E 386701.7 (m)
N 391960.8 (m)
Dates 22/07/2016 to 22/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests Depth (m) from	to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					Grass over brown clayey TOPSOIL	(0.20)		
	0.30	0.40	C1		Dark grey sandy gravel, cinders and ash - MADE GROUND	0.20	51.47	
						(0.20)		
					Firm to stiff brown gravelly sandy silty CLAY	0.40	51.27	
						(1.60)		
22/07/2016: On completion of exploratory hole at 2.00m. Casing at 1.00m. Standing water level Nil. On withdrawal of casing exploratory hole backfilled and reinstated.					Borehole complete	2.00	49.67	

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS8

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm) 100 Depth (m)

Ground Level : 51.74 m. AOD
Co-ordinates E 386694.2 (m)
N 391973.8 (m)
Dates 22/07/2016 to 22/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests Depth (m) from	to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					Grass over brown clayey TOPSOIL	(0.20)		
						0.20	51.54	
					Dark grey sandy gravel, cinders and ash - MADE GROUND	(0.30)		
	0.60	0.70	C1			0.50	51.24	
					Firm to stiff brown with light grey gravelly sandy silty CLAY	(1.50)		
22/07/2016: On completion of exploratory hole at 2.00m. Casing at 1.00m. Standing water level Nil. On withdrawal of casing exploratory hole backfilled and reinstated.						2.00	49.74	
					Borehole complete			

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS9

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm) 100 — Depth (m)

Ground Level : 51.56 m. AOD
Co-ordinates E 386687.4 (m)
N 391988.3 (m)
Dates 22/07/2016 to 22/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests: Depth (m) from	to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					Grass over grey/brown clayey TOPSOIL	(0.20)		
						0.20	51.36	
	0.40	0.50	C1		Dark grey sandy gravel, cinders and ash - MADE GROUND	(0.30)		
						0.50	51.06	
					Dark grey sandy silty clay with gravel and roots - MADE GROUND	(0.30)		
						0.80	50.76	
					Orange/brown with light grey sandy silty CLAY	(0.40)		
						1.20	50.36	
					Stiff brown gravelly sandy silty CLAY	(0.80)		
22/07/2016: On completion of exploratory hole at 2.00m. Casing at 1.00m. Standing water level Nil. On withdrawal of casing exploratory hole backfilled and reinstated.					Borehole complete	2.00	49.56	

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS10

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm) 100 Depth (m)

Ground Level : 51.55 m. AOD
Co-ordinates E 386676.7 (m)
N 391975.0 (m)
Dates 21/07/2016 to 21/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests: Depth (m) from	to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					Grass over brown clayey TOPSOIL	(0.20)		
						0.20	51.35	
					Dark grey sandy gravel, cinders and ash - MADE GROUND	(0.10)		
					Dark grey/brown sandy silty CLAY with organic inclusions	0.30	51.25	
	0.80	0.90	C1			(0.50)		
						0.80	50.75	
					Stiff brown with dark grey sandy silty CLAY			
						(1.20)		
21/07/2016: On completion of exploratory hole at 2.00m. Casing at 1.00m. Standing water level Nil. On withdrawal of casing exploratory hole backfilled and reinstated.						2.00	49.55	
					Borehole complete			

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS11

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm)	Casing Depth (m)
100	

Ground Level : 51.58 m. AOD
Co-ordinates E 386641.1 (m)
N 391994.9 (m)
Dates 21/07/2016 to 21/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests: Depth (m) from	to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					TARMAC 50mm over CONCRETE	(0.10)		
					Red/brown with grey sandy gravel and brick fragments - MADE GROUND	0.10	51.48	
						(0.30)		
	0.60	0.70	C1		Grey organic gravelly sandy silty clay with brick fragments - MADE GROUND	0.40	51.18	
						(0.30)		
					Firm orange/brown with grey sandy silty CLAY with organic inclusions	0.70	50.88	
						(1.30)		
21/07/2016: On completion of exploratory hole at 2.00m. Casing at 1.00m. Standing water level Nil. On withdrawal of casing exploratory hole backfilled and reinstated.					Borehole complete	2.00	49.58	

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

GeoAssist Limited

EXPLORATORY HOLE RECORD SHEET

Ref No. WS12

Sheet 1 of 1

PROJECT : Former Green End Public House
LOCATION : Mauldeth Road, Burnage

Consultant: SWF Consultants Ltd

Client: TowerhouseSystems Limited

EQUIPMENT: Archway Dart Rig

Casing Dia. (mm) 100 Depth (m)

Ground Level : 51.80 m. AOD
Co-ordinates E 386668.6 (m)
N 392000.2 (m)
Dates 21/07/2016 to 21/07/2016

Drilling Foreman : M Walton
Engineer/Geologist : M Benson

Field Records	Samples/Tests Depth (m) from	to	Sample Type & No	Blow Count (N)/U	STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (m AOD)	Strata Legend
					TARMAC 50mm over CONCRETE	(0.10)		
					Orange/brown sandy gravel and brick fragments - MADE GROUND	0.10	51.70	
						(0.50)		
						0.60	51.20	
					Grey/brown sandy silty CLAY with organic inclusions	(0.40)		
	0.90	1.00	C1			1.00	50.80	
					Stiff brown with light grey slightly gravelly sandy silty CLAY			
						(1.00)		
21/07/2016: On completion of exploratory hole at 2.00m. Casing at 1.00m. Standing water level Nil. On withdrawal of casing exploratory hole backfilled and reinstated.						2.00	49.80	
					Borehole complete			

REMARKS :

Logged : M Benson
Date : 25/07/2016
Checked : M Richardson
Date : 29/07/2016

Scale 1:25

Site Ref : 5812 GEP

AGAS10 - /2006

GEO (c) 2001 GeoAssist, Stockport. Tele. No. 0161 480 8885

Appendix C

C1 SAL Chemical Test Results

C2 Analysis of Results with Assessment Criteria

SCIENTIFIC ANALYSIS LABORATORIES
DELIVERING SCIENCE

Scientific Analysis Laboratories is a limited company registered in England and Wales (No 2514788) whose address is at Hadfield House, Hadfield Street, Manchester M16 9FE

Scientific Analysis Laboratories Ltd

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: 592953-1

Date of Report: 01-Sep-2016

Customer: Geoassist Ltd
Unit 4
Sheffield Street
Heaton Norris
Stockport
SK4 1RU

Customer Contact: Mr Mark Richardson

Customer Job Reference: 5812 GEP
Customer Site Reference: Green end pub, Mauldeth, Burnage, Manchester
Date Job Received at SAL: 15-Aug-2016
Date Analysis Started: 16-Aug-2016
Date Analysis Completed: 01-Sep-2016

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with Section 25 of the SAL Quality Manual

UKAS TESTING
1549

Report checked and authorised by :
Mr Richard Wong
Project Manager

Issued by :
Mr Richard Wong
Project Manager

This document has been printed from a digitally signed master copy

SAL Reference: 592953
Project Site: Green end pub, Mauldeth, Burnage, Manchester
Customer Reference: 5812 GEP

Soil Analysed as Soil
ICRCL (Maxi)

				SAL Reference	**592953 001**	**592953 002**	**592953 003**	**592953 004**	**592953 005**	**592953 006**
				Customer Sample Reference	**WS1 C1**	**WS2 C1**	**WS3 C1**	**WS4 C1**	**WS5 C1**	**WS6 C1**
				Depth	**0.80**	**0.90**	**0.40**	**0.30**	**0.80**	**0.50**
				Date Sampled	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**						
Arsenic	T6	A40	1	mg/kg	**19**	**3**	**330**	**29**	**17**	**9**
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1	<1	<1	<1
Cadmium	T6	A40	1	mg/kg	<1	<1	**2**	<1	<1	<1
Chromium	T6	A40	1	mg/kg	**16**	**17**	**47**	**22**	**18**	**30**
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1	<1	<1	<1
Copper	T6	A40	1	mg/kg	**41**	**10**	**250**	**41**	**68**	**18**
Lead	T6	A40	1	mg/kg	**96**	**16**	**310**	**61**	**160**	**22**
Mercury	T6	A40	1	mg/kg	<1	<1	<1	<1	<1	<1
Nickel	T6	A40	1	mg/kg	**16**	**16**	**150**	**45**	**24**	**17**
Selenium	T6	A40	3	mg/kg	**14**	**10**	<3	**10**	**11**	**11**
Zinc	T6	A40	1	mg/kg	**70**	**47**	**290**	**64**	**77**	**35**
Cyanide(Total)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1	<1
Cyanide(free)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1	<1
Thiocyanate	T4	AR	10	mg/kg	<10	<10	<10	<10	<10	<10
Phenols(Mono)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1	<1
Sulphur(Free)	T2	AR	500	mg/kg	<500	<500	<500	<500	<500	<500
SO4(Total)	T6	A40	0.01	%	**0.11**	**0.03**	**0.40**	**0.03**	**0.06**	<0.01
Sulphide	T4	AR	10	mg/kg	<10	<10	<10	<10	<10	<10
pH	T7	AR			**7.1**	**7.3**	**7.1**	**5.9**	**6.0**	**6.0**

SAL Reference: 592953
Project Site: Green end pub, Mauldeth, Burnage, Manchester
Customer Reference: 5812 GEP

Soil Analysed as Soil
ICRCL (Maxi)

				SAL Reference	**592953 007**	**592953 008**	**592953 009**	**592953 010**	**592953 011**	**592953 012**
				Customer Sample Reference	**WS7 C1**	**WS8 C1**	**WS9 C1**	**WS10 C1**	**WS11 C1**	**WS12 C1**
				Depth	**0.30**	**0.60**	**0.40**	**0.80**	**0.60**	**0.90**
				Date Sampled	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**						
Arsenic	T6	A40	1	mg/kg	**120**	**10**	**150**	**16**	**19**	**9**
Boron (water-soluble)	T6	AR	1	mg/kg	<1	<1	<1	<1	<1	<1
Cadmium	T6	A40	1	mg/kg	<1	<1	<1	<1	<1	<1
Chromium	T6	A40	1	mg/kg	**36**	**16**	**33**	**18**	**19**	**31**
Chromium VI	T6	AR	1	mg/kg	<1	<1	<1	<1	<1	<1
Copper	T6	A40	1	mg/kg	**200**	**43**	**160**	**47**	**58**	**10**
Lead	T6	A40	1	mg/kg	**270**	**43**	**150**	**93**	**88**	**12**
Mercury	T6	A40	1	mg/kg	<1	<1	<1	**2**	<1	<1
Nickel	T6	A40	1	mg/kg	**100**	**15**	**93**	**16**	**20**	**15**
Selenium	T6	A40	3	mg/kg	<3	**15**	**5**	**15**	**14**	**10**
Zinc	T6	A40	1	mg/kg	**550**	**35**	**180**	**59**	**59**	**42**
Cyanide(Total)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1	<1
Cyanide(free)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1	<1
Thiocyanate	T4	AR	10	mg/kg	<10	<10	<10	<10	<10	<10
Phenols(Mono)	T4	AR	1	mg/kg	<1	<1	<1	<1	<1	<1
Sulphur(Free)	T2	AR	500	mg/kg	<500	<500	<500	<500	<500	<500
SO4(Total)	T6	A40	0.01	%	**0.22**	**0.02**	**0.27**	**0.14**	**0.06**	**0.02**
Sulphide	T4	AR	10	mg/kg	<10	<10	<10	<10	<10	<10
pH	T7	AR			**6.0**	**7.0**	**7.1**	**6.4**	**6.5**	**6.9**

SAL Reference: 592953
Project Site: Green end pub, Mauldeth, Burnage, Manchester
Customer Reference: 5812 GEP

Soil Analysed as Soil
Miscellaneous

				SAL Reference	**592953 001**	**592953 002**	**592953 003**	**592953 005**	**592953 007**	**592953 009**	**592953 010**	**592953 011**
				Customer Sample Reference	**WS1 C1**	**WS2 C1**	**WS3 C1**	**WS5 C1**	**WS7 C1**	**WS9 C1**	**WS10 C1**	**WS11 C1**
				Depth	**0.80**	**0.90**	**0.40**	**0.80**	**0.30**	**0.40**	**0.80**	**0.60**
				Date Sampled	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**								
Soil Organic Matter	T287	AR	0.1	%	**23**	-	-	**8.4**	-	-	**9.0**	**8.2**
Asbestos ID	T27	AR			-	N.D.	N.D.	-	N.D.	N.D.	-	-

SAL Reference: 592953
Project Site: Green end pub, Mauldeth, Burnage, Manchester
Customer Reference: 5812 GEP

Soil Analysed as Soil
Total and Speciated USEPA16 PAH

				SAL Reference	**592953 001**	**592953 002**	**592953 003**	**592953 004**	**592953 005**	**592953 006**
				Customer Sample Reference	**WS1 C1**	**WS2 C1**	**WS3 C1**	**WS4 C1**	**WS5 C1**	**WS6 C1**
				Depth	**0.80**	**0.90**	**0.40**	**0.30**	**0.80**	**0.50**
				Date Sampled	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**						
Naphthalene	T149	AR	0.01	mg/kg	**0.21**	**0.01**	**0.23**	**0.01**	**0.04**	<0.01
Acenaphthylene	T149	AR	0.01	mg/kg	**0.02**	<0.01	<0.01	<0.01	**0.13**	<0.01
Acenaphthene	T149	AR	0.01	mg/kg	**0.04**	<0.01	<0.01	<0.01	**0.04**	**0.01**
Fluorene	T149	AR	0.01	mg/kg	**0.03**	<0.01	**0.01**	<0.01	**0.09**	**0.01**
Phenanthrene	T149	AR	0.01	mg/kg	**0.32**	**0.02**	**0.12**	**0.24**	**1.1**	**0.08**
Anthracene	T149	AR	0.01	mg/kg	**0.08**	**0.02**	**0.01**	**0.07**	**0.29**	**0.02**
Fluoranthene	T149	AR	0.01	mg/kg	**0.89**	**0.01**	**0.07**	**0.50**	**2.2**	**0.11**
Pyrene	T149	AR	0.01	mg/kg	**0.86**	**0.01**	**0.07**	**0.45**	**1.9**	**0.10**
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	**0.45**	**0.02**	**0.06**	**0.22**	**0.90**	**0.06**
Chrysene	T149	AR	0.01	mg/kg	**0.46**	**0.02**	**0.06**	**0.22**	**0.86**	**0.05**
Benzo(b/k)Fluoranthene	T149	AR	0.01	mg/kg	**0.76**	**0.04**	**0.12**	**0.31**	**1.5**	**0.09**
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	**0.44**	**0.02**	**0.06**	**0.17**	**0.85**	**0.05**
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	**0.21**	**0.01**	**0.03**	**0.09**	**0.42**	**0.03**
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	**0.06**	<0.01	**0.01**	**0.02**	**0.11**	**0.01**
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	**0.25**	**0.01**	**0.04**	**0.10**	**0.48**	**0.03**
PAH(total)	T149	AR	0.01	mg/kg	**5.1**	**0.19**	**0.89**	**2.4**	**11**	**0.65**

SAL Reference: 592953
Project Site: Green end pub, Mauldeth, Burnage, Manchester
Customer Reference: 5812 GEP

Soil Analysed as Soil
Total and Speciated USEPA16 PAH

				SAL Reference	**592953 007**	**592953 008**	**592953 009**	**592953 010**	**592953 011**	**592953 012**
				Customer Sample Reference	**WS7 C1**	**WS8 C1**	**WS9 C1**	**WS10 C1**	**WS11 C1**	**WS12 C1**
				Depth	**0.30**	**0.60**	**0.40**	**0.80**	**0.60**	**0.90**
				Date Sampled	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**	**08-AUG-2016**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**						
Naphthalene	T149	AR	0.01	mg/kg	**0.05**	<0.01	**0.09**	**0.03**	**0.03**	<0.01
Acenaphthylene	T149	AR	0.01	mg/kg	<0.01	<0.01	**0.01**	**0.01**	**0.01**	<0.01
Acenaphthene	T149	AR	0.01	mg/kg	<0.01	<0.01	**0.02**	**0.09**	**0.02**	<0.01
Fluorene	T149	AR	0.01	mg/kg	<0.01	<0.01	**0.01**	**0.08**	**0.03**	<0.01
Phenanthrene	T149	AR	0.01	mg/kg	**0.03**	**0.01**	**0.16**	**0.77**	**0.20**	**0.01**
Anthracene	T149	AR	0.01	mg/kg	<0.01	<0.01	**0.03**	**0.20**	**0.04**	<0.01
Fluoranthene	T149	AR	0.01	mg/kg	**0.02**	**0.01**	**0.25**	**1.3**	**0.21**	**0.01**
Pyrene	T149	AR	0.01	mg/kg	**0.02**	**0.01**	**0.24**	**1.3**	**0.22**	**0.01**
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	**0.02**	**0.02**	**0.12**	**0.53**	**0.10**	**0.01**
Chrysene	T149	AR	0.01	mg/kg	**0.02**	**0.01**	**0.12**	**0.53**	**0.10**	**0.01**
Benzo(b/k)Fluoranthene	T149	AR	0.01	mg/kg	**0.04**	**0.03**	**0.19**	**0.77**	**0.15**	**0.02**
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	**0.02**	**0.02**	**0.11**	**0.49**	**0.09**	**0.01**
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	**0.01**	**0.01**	**0.06**	**0.23**	**0.05**	**0.01**
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	<0.01	<0.01	**0.02**	**0.06**	**0.01**	<0.01
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	**0.01**	**0.01**	**0.07**	**0.29**	**0.05**	**0.01**
PAH(total)	T149	AR	0.01	mg/kg	**0.24**	**0.13**	**1.5**	**6.7**	**1.3**	**0.10**

Index to symbols used in 592953-1

Value	Description
AR	As Received
A40	Assisted dried < 40C
N.D.	Not Detected
S	Analysis was subcontracted
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Asbestos ID performed at REC Asbestos

Method Index

Value	Description
T4	Colorimetry
T2	Grav
T7	Probe
T6	ICP/OES
T27	PLM
T149	GC/MS (SIR)
T287	Calc TOC/0.58

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Soil Organic Matter	T287	AR	0.1	%	N	001,005,010-011
Asbestos ID	T27	AR			SU	002-003,007,009
Arsenic	T6	A40	1	mg/kg	U	001-012
Boron (water-soluble)	T6	AR	1	mg/kg	N	001-012
Cadmium	T6	A40	1	mg/kg	U	001-012
Chromium	T6	A40	1	mg/kg	U	001-012
Chromium VI	T6	AR	1	mg/kg	N	001-012
Copper	T6	A40	1	mg/kg	U	001-012
Lead	T6	A40	1	mg/kg	U	001-012

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Mercury	T6	A40	1	mg/kg	U	001-012
Nickel	T6	A40	1	mg/kg	U	001-012
Selenium	T6	A40	3	mg/kg	U	001-012
Zinc	T6	A40	1	mg/kg	U	001-012
Cyanide(Total)	T4	AR	1	mg/kg	U	001-012
Cyanide(free)	T4	AR	1	mg/kg	U	001-012
Thiocyanate	T4	AR	10	mg/kg	N	001-012
Phenols(Mono)	T4	AR	1	mg/kg	U	001-012
Sulphur(Free)	T2	AR	500	mg/kg	N	001-012
SO4(Total)	T6	A40	0.01	%	N	001-012
Sulphide	T4	AR	10	mg/kg	N	001-012
pH	T7	AR			U	001-012
Naphthalene	T149	AR	0.01	mg/kg	U	001-012
Acenaphthylene	T149	AR	0.01	mg/kg	U	001-012
Acenaphthene	T149	AR	0.01	mg/kg	U	001-012
Fluorene	T149	AR	0.01	mg/kg	U	001-012
Phenanthrene	T149	AR	0.01	mg/kg	U	001-012
Anthracene	T149	AR	0.01	mg/kg	U	001-012
Fluoranthene	T149	AR	0.01	mg/kg	U	001-012
Pyrene	T149	AR	0.01	mg/kg	U	001-012
Benzo(a)Anthracene	T149	AR	0.01	mg/kg	U	001-012
Chrysene	T149	AR	0.01	mg/kg	U	001-012
Benzo(b/k)Fluoranthene	T149	AR	0.01	mg/kg	U	001-012
Benzo(a)Pyrene	T149	AR	0.01	mg/kg	U	001-012
Indeno(123-cd)Pyrene	T149	AR	0.01	mg/kg	U	001-012
Dibenzo(ah)Anthracene	T149	AR	0.01	mg/kg	U	001-012
Benzo(ghi)Perylene	T149	AR	0.01	mg/kg	U	001-012
PAH(total)	T149	AR	0.01	mg/kg	U	001-012

Soils Risk Assessment

Site Reference: 5812 GEP
Project Site: Former Green End Public House
Project Location: Mauldeth Road, Burnage, Manchester
Client: TowerhouseSystems Limited

SAL Reference	**Residential**	592953 001	592953 002	592953 003	592953 004	592953 005	592953 006	592953 007	592953 008	592953 009	592953 010	592953 011	592953 012
Customer Sample Ref:	**C4SL / S4UL**	WS1 C1	WS2 C1	WS3 C1	WS4 C1	WS5 C1	WS6 C1	WS7 C1	WS8 C1	WS9 C1	WS10 C1	WS11 C1	WS12 C1
	SOM 1%	0.80	0.90	0.40	0.30	0.80	0.50	0.30	0.60	0.40	0.80	0.60	0.90
Determinand	**GAC LQM II**												
Arsenic	37	19	3	330	29	17	9	120	10	150	16	19	9
Boron (water-soluble)	291	1	1	1	1	1	1	1	1	1	1	1	1
Cadmium	26	1	1	2	1	1	1	1	1	1	1	1	1
Chromium	3000	16	17	47	22	18	30	36	16	33	18	19	31
Chromium VI	21	1	1	1	1	1	1	1	1	1	1	1	1
Copper	2330	41	10	250	41	68	18	200	43	160	47	58	10
Cyanide(Total)	-	1	1	1	1	1	1	1	1	1	1	1	1
Cyanide(free)	34	1	1	1	1	1	1	1	1	1	1	1	1
Lead	200	96	16	310	61	160	22	270	43	150	93	88	12
Mercury	170	1	1	1	1	1	1	1	1	1	2	1	1
Nickel	130	16	16	150	45	24	17	100	15	93	16	20	15
pH	-	7.1	7.3	7.1	5.9	6	6	6	7	7.1	6.4	6.5	6.9
Phenols(Mono)	780	1	1	1	1	1	1	1	1	1	1	1	1
Selenium	350	14	10	3	10	11	11	3	15	5	15	14	10
SO4(Total)	-	0.11	0.03	0.4	0.03	0.06	0.01	0.22	0.02	0.27	0.14	0.06	0.02
Sulphide	-	10	10	10	10	10	10	10	10	10	10	10	10
Sulphur(Free)	-	500	500	500	500	500	500	500	500	500	500	500	500
Thiocyanate	-	10	10	10	10	10	10	10	10	10	10	10	10
Zinc	3750	70	47	290	64	77	35	550	35	180	59	59	42
Acenaphthene	1000	0.04	0.01	0.01	0.01	0.04	0.01	0.01	0.01	0.02	0.09	0.02	0.01
Acenaphthylene	850	0.02	0.01	0.01	0.01	0.13	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Anthracene	9200	0.08	0.02	0.01	0.07	0.29	0.02	0.01	0.01	0.03	0.2	0.04	0.01
Benzo(a)Anthracene	5.9	0.45	0.02	0.06	0.22	0.9	0.06	0.02	0.02	0.12	0.53	0.1	0.01
Benzo(a)Pyrene	5	0.44	0.02	0.06	0.17	0.85	0.05	0.02	0.02	0.11	0.49	0.09	0.01
Benzo(b/k)Fluoranthene	10	0.76	0.04	0.12	0.31	1.5	0.09	0.04	0.03	0.19	0.77	0.15	0.02
Benzo(ghi)Perylene	47	0.25	0.01	0.04	0.1	0.48	0.03	0.01	0.01	0.07	0.29	0.05	0.01
Chrysene	9.3	0.46	0.02	0.06	0.22	0.86	0.05	0.02	0.01	0.12	0.53	0.1	0.01
Dibenzo(ah)Anthracene	0.9	0.06	0.01	0.01	0.02	0.11	0.01	0.01	0.01	0.02	0.06	0.01	0.01
Fluoranthene	670	0.89	0.01	0.07	0.5	2.2	0.11	0.02	0.01	0.25	1.3	0.21	0.01
Fluorene	780	0.03	0.01	0.01	0.01	0.09	0.01	0.01	0.01	0.01	0.08	0.03	0.01
Indeno(123-cd)Pyrene	4.2	0.21	0.01	0.03	0.09	0.42	0.03	0.01	0.01	0.06	0.23	0.05	0.01
Naphthalene	8.7	0.21	0.01	0.23	0.01	0.04	0.01	0.05	0.01	0.09	0.03	0.03	0.01
Phenanthrene	380	0.32	0.02	0.12	0.24	1.1	0.08	0.03	0.01	0.16	0.77	0.2	0.01
Pyrene	1600	0.86	0.01	0.07	0.45	1.9	0.1	0.02	0.01	0.24	1.3	0.22	0.01
PAH(total)	500	5.1	0.19	0.89	2.4	11	0.65	0.24	0.13	1.5	6.7	1.3	0.1
Asbestos	N.D	-	N.D.	N.D.	-	-	-	N.D.	-	-	-	-	

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

Copyright 2016 ***GeoAssist Ltd***