PHASE II GROUND INVESTIGATION REPORT FOR A PROPOSED NEW RESIDENTIAL WING AT ST JOSEPH'S HOME, MANCHESTER



Client:	The Little Sisters of the Poor St Joseph's Home 52 Plymouth Grove West Manchester M13 0AR	**Engineer:**	David Symonds Associates 3 Imperial Court 12 Sovereign Road Kings Norton Business Centre Birmingham B30 3FH

Date: 2nd April 2019
Our Ref: KCD/27958 (Revision 1)
Report Status: FINAL

Contents

1.	**Introduction**	**3**
2.	**The Site**	**4**
2.1	Site Location	4
2.2	Site Layout	4
3.	**Fieldwork**	**5**
3.1	General Comments	5
3.2	Windowless Sample Boreholes	5
3.3	Foundation Inspection Pits	5
3.4	Instrumentation and Monitoring	5
3.5	Sampling	5
4.	**Ground Conditions**	**6**
4.1	Recorded Ground Conditions	6
4.2	Encountered Ground Conditions	6
4.3	Groundwater	7
5.	**Comments and Recommendations: Geotechnical Considerations**	**8**
5.1	General Comments	8
5.2	Supplementary Site Investigation	8
5.3	Preliminary Foundation Design	9
5.4	Groundwater Control	9
5.5	Support to Excavations	10
5.6	Additional Comments	10
5.7	Ground Floor Slab	10
5.8	Concrete Classification	11
5.9	Geotechnical Laboratory Tests	11
5.10	Permeability Tests	11
6.	**Comments and Recommendations: Assessment of Contamination**	**12**
6.1	Conceptual Site Model	12
6.2	Potential Sources of Contamination	12
6.3	Potential Contaminants of Concern	14
6.4	Contamination Analyses - Soils	14
6.5	Recommendations for Remediation	17
6.6	Disposal of Excavated Materials	19

7.	**Comments and Recommendations: Ground Gases**	**20**
7.1	General Comments	20
7.2	Environmental Setting	20
7.3	In Situ Gas Concentrations	20
7.4	Recommendations for Remediation	21

Appendices

A. Windowless Sample Borehole Logs
Foundation Pit Logs

B. Falling Head Test Results (Enitial)

C. Geotechnical Test Results (GIP)

D. CLEA Statistical Assessment
Contamination Test Results (CLS)

E. Ground Gas and Groundwater Monitoring (Enitial)

F. Site Plans

G. Notes on Site Investigation Reports

1. Introduction

1.1 it is proposed to demolish an existing wing in the north west of St Joseph's Home in Manchester and replace it with a new residential wing as part of ongoing refurbishment and redevelopment. A proposed layout plan provided by David Symonds Associates is included within the appendix.

1.2 A Phase I report has been carried out by GIP for the site for the Client, The Little Sisters of the Poor, entitled 'Phase I Geo-Environmental & Geotechnical Assessment Report for a Proposed New Residential Wing at St Joseph's Home, Manchester', reference KCD/26875 and dated July 2018.

1.3 GIP were retained by the Client to carry out a Phase II investigation, consisting of the sinking of windowless sample boreholes and excavation of foundation inspection pits in order to assess the prevailing foundation engineering geology with regards to future construction together with assessing the contaminative status of the underlying strata.

1.4 Geotechnical laboratory testing has been undertaken by GIP Limited. The laboratory tests are accredited by the United Kingdom Accreditation Services (UKAS). The laboratory tests, carried out in accordance with BS 1377:1990 where appropriate, are detailed in Table 1 below. Contamination and concrete classification tests on soil samples have been undertaken by Concept Life Sciences (CLS). The testing results are included within the appendix.

1.5 Table 1: Geotechnical Laboratory testing undertaken by GIP.

Test Description	Part	Method	UKAS Accredited Test	Number of Tests
Atterberg Limit	2	4.4	✓	6
Moisture Content	2	3.2	✓	6

1.6 This report contains a description of the site, anticipated geology and strata encountered, together with comments and recommendations upon the foundation engineering geology with respect to the construction of the proposed new building. An assessment of the suitability of a soakaway drainage scheme has been carried out. An environmental risk assessment is provided which includes comments on the potential for contamination to affect Controlled Waters and Human Health (future users). Ground gas monitoring has been carried out over a period of four visits and a summary of the findings is included.

1.7 We are confident that the conclusions drawn from the findings of this investigation are appropriate for the proposed development. However, we cannot guarantee that they would be accepted by regulatory authorities without question. It is recommended that the report is submitted and approval gained from such bodies prior to the undertaking of detailed design, construction work or other irreversible processes.

2. The Site

2.1 Site Location

2.1.1 The area of the proposed wing is currently occupied by the existing building, extending north westwards from the care home, located off Plymouth Grove West in the Longsight area of Manchester. National Grid Reference 385920, 396205 denotes the approximate centre of the new wing.

2.2 Site Layout

2.2.1 At the time of the site walkover, the site comprised the north west residential wing at St Joseph's Home. The wing was of brick construction and three storeys high. Footpaths and soft landscaping surrounded the wing, with the care home situated to the south east. The site was level at surface. The area surrounding the Home was predominantly residentially developed, with a Primary School to the south east.

3. Fieldwork

3.1 General Comments

3.1.1 The prevailing ground conditions were determined with the use of windowless sample boreholes. Two hand dug foundation inspection pits were also undertaken. All the exploratory holes were undertaken, where appropriate, in accordance with BS5930:2015. The locations of the exploratory holes are detailed upon the appended Drawing No. 1.

3.2 Windowless Sample Boreholes

3.2.1 Four windowless sample boreholes were sunk to depths of between 2.34m (WS4) and 5.45m (WS1 and WS3) below ground level to provide geotechnical data and obtain samples for geoenvironmental testing. A diesel engined rig was used to drive plastic lined sampling tubes into the ground with soil being recovered within the tubes. Standard Penetration Tests (SPTs) were carried out in the boreholes to assess the relative density of the granular materials encountered and to assess the consistency of cohesive materials by using published relationships by Stroud (1975). Engineer verified borehole logs are included within the appendix.

3.3 Foundation Inspection Pits

3.3.1 Two hand dug pits were excavated adjacent to the new wing to inspect the existing foundations. Annotated sketches and logs are included within the appendix.

3.4 Instrumentation and Monitoring

3.4.1 Combined gas and groundwater monitoring installations were included within WS3 and WS4. Monitoring of the lower explosive limit, together with total methane, oxygen and carbon dioxide concentrations by percentage volume and levels of carbon monoxide and hydrogen sulphide has been carried out upon four occasions by Enitial. The results are included within the appendix together with details of the barometric pressure, borehole water level and air temperature at the time of each visit. Visits to site were carried out on 31st January and 5th, 12th and 27th February 2019.

3.5 Sampling

3.5.1 During the logging of the boreholes, soil samples were collected for contamination analyses and placed into appropriate sampling containers (plastic tubs, amber jars and vials). The samples were then placed in cool boxes which contained ice packs and collected by courier for delivery to CLS.

4. Ground Conditions

4.1 Recorded Ground Conditions

4.1.1 Within the accuracy of the available geological information (British Geological Survey (BGS) Sheet no. 85 'Manchester' at a scale of 1:50,000) the 'solid' geology beneath the site comprises the Chester Formation of the Triassic Period, described as 'sandstone, red-brown and pinkish red, medium-grained; quartzite pebbles common towards base, moderately cemented'. The BGS sheet indicates this to be overlain by superficial deposits in the form of Glacial Till.

4.2 Encountered Ground Conditions

4.2.1 For full details of the strata encountered reference should be made to the appended engineer verified logs, however, the salient features of the engineering geology can be summarised as follows:

4.2.2 Made Ground: within WS1 and WS3, made ground was encountered at surface to depths of 1.20m (WS1) and 1.30m (WS3) as gravelly clayey sand and gravelly sandy clay. In WS2, made ground was encountered in the form of clayey sand and gravel, gravelly clayey sand and gravelly sandy clay to 2m, terminating on or adjacent to a possible service trench due to the inflow of pea gravel and water back up to 1.50m. WS4 was relocated two meters to the east after encountering dense brick rubble within the service avoidance pit, however, the borehole terminated within brick rubble (suspected historical foundations or demolition rubble) at 2m within clayey sandy gravel and cobbles. Gravel and cobble sized material fragments included demolition rubble (brick, tile, timber, mortar, concrete, metal and glass), industrial by-products (ash and slag), and mudstone and quartzite pebbles. No visual or olfactory evidence of contamination was recorded within any of the recovered soils.

4.2.3 Superficial Deposits: glacial till was recorded beneath the made ground in WS1 and WS3 to the full depth of the boreholes in the form of sandy gravelly clay with rare thin sand lenses containing quartzite, sandstone, mudstone and coal gravel. Hand shear vane tests recorded values of between 152kPa and >240kPa, indicating stiff and very stiff ground conditions. No visual or olfactory evidence of contamination was recorded within any of the recovered soils.

4.3 Groundwater

4.3.1 Groundwater was encountered during the sinking of the WS2 at 1.50m, however, this coincided with the inflow of pea gravel and is likely water contained within the gravels of a service trench. During the monitoring period, groundwater has been recorded in the standpipe installed in WS3 at depths of between 1.20m and 2.40m. No groundwater was recorded within the monitoring standpipe installed in WS4. The groundwater recorded in WS3 likely represents a groundwater body within the superficial soils.

5. Comments and Recommendations: Geotechnical Considerations

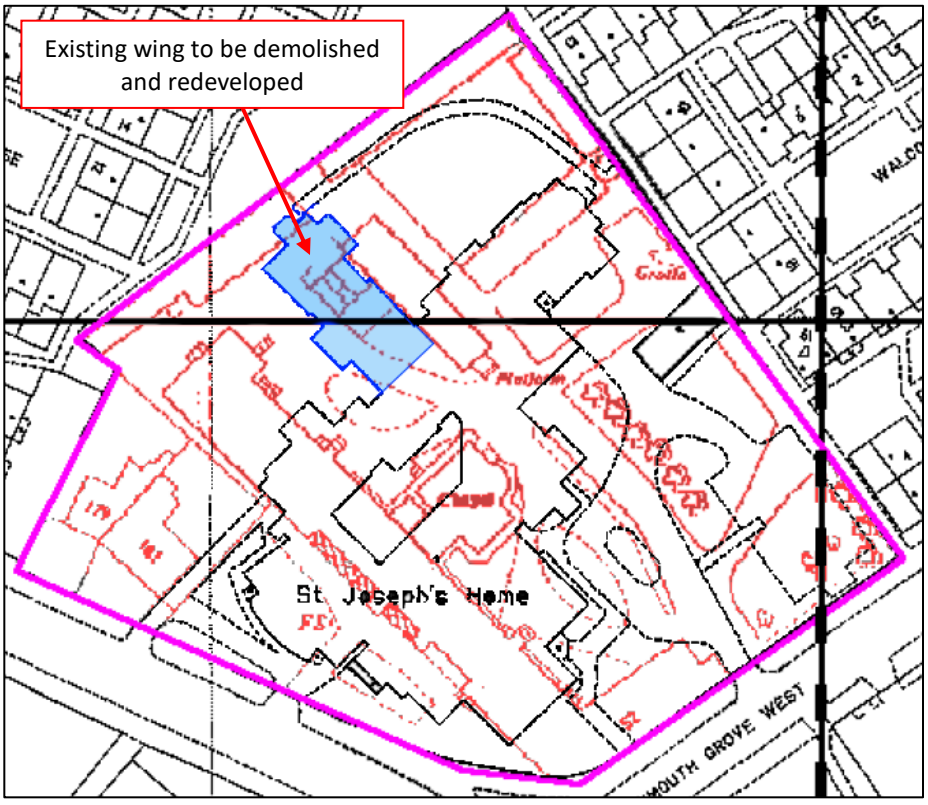
5.1 General Comments

5.1.1 Appropriate comments are presented below upon the prevailing foundation engineering geology revealed by the exploratory holes of this investigation with respect to the construction of new residential wing at St Joseph's Home in Manchester. An indicative proposed site layout plan is included within the appendix.

5.1.2 It should be appreciated that the below comments have not been made in consultation with either the Local Authority or the Environment Agency. Each of these bodies may have additional comments to make in view of the test results and the methods of investigation and their opinions should be sought in this matter.

5.2 Supplementary Site Investigation

5.2.1 Two out of the four boreholes terminated within made ground at 2m. WS2 terminated due to a suspected service trench due to the inflow of water and pea gravel. WS4 terminated in brick rubble at 2m. The overlay below of the 1963-1964 (in red) and 1992 (in black and blue) Ordnance Survey maps obtained as part of the Phase I report shows several features in the area of the proposed new wing which are no longer present at surface.



5.2.2 It is recommended that once the existing wing has been demolished and access is freely available, a series of machine excavated trial pits are undertaken by a Geo-Environmental Engineer to delineate depth and extent of made ground beneath the footprint of the new wing. Dependant on the findings of the supplementary trial pitting, the foundations may need to be deepened to reach competent natural strata.

5.3 Preliminary Foundation Design

5.3.1 Made ground was found to be present in WS1 and WS3 to depths of 1.20m to 1.30m, underlain by stiff and very stiff superficial clays. Deeper made ground to at least 2m was encountered in WS4, which may be as a result of demolition rubble or foundations remaining from historical structures on site.

5.3.2 If the supplementary works detailed above find shallow, competent superficial soils beneath the majority of the building footprint, then standard strip footings could be utilised, deepening where necessary to extend through the made ground as encountered in WS4.

5.3.3 From a visual observation of the underlying natural soils together with the results of the in-situ testing, the natural soils are believed to be sufficiently competent to support traditional style strip foundations, deepened where necessary using mass concrete, for the proposed building. Upon exposure at the time of construction the formation horizon should be carefully inspected by a suitably qualified and experienced engineer to ensure that it is adequately stiff and any soft pockets encountered are excavated and replaced with lean mix concrete or well compacted clean granular materials (e.g. Specification for Highways Series 600 6F1/6F2).

5.3.4 On the basis of the exploratory works carried out to date, upon adequately competent natural strata, a presumed nett design bearing pressure in the order of 150kN/m^2 could be available for standard strip footings up to 1m wide. At such bearing pressures, settlements have been estimated as being less than 25mm. Higher bearing pressures may be available but would need to be reviewed on the basis of the proposed foundation dimensions.

5.4 Groundwater Control

5.4.1 Groundwater was encountered during the sinking of WS2 at 1.50m, however, this is likely as a result of a possible service trench containing pea gravel found within the borehole. During the course of the monitoring period, groundwater has been recorded in the standpipe in WS3 at depths of between 1.20m and 2.40m below ground level. The groundwater recorded is likely a groundwater body present in the superficial deposits.

5.4.2 It is possible that there will be an influx of groundwater into excavations (e.g. for the emplacement of foundations), therefore groundwater control during deeper site excavations may be required. However, it is noted that levels of groundwater can vary seasonally and ingress may be great in volume and shallower in wetter weather. Guidance on groundwater control is given in CIRIA Report c515 (2000).

5.4.3 As part of the supplementary site investigation, groundwater entries can be observed within the trial pits to better assess the potential the influx of groundwater during construction.

5.5 Support to Excavations

5.5.1 It is recommended that excavations below 1.00m should be fully supported throughout, as wholesale collapse in trenches could occur if left open for extended periods. Trench support will be necessary whenever site operatives are working below 1.00m depth (e.g. for the emplacement of foundations and services) and an allowance be made for some over break of unsupported trenches and possible groundwater inflows. It should be noted that it is not possible to anticipate trench side collapse from borehole information alone, however, the supplementary trial pitting could assist with assessing trench side stability. Practical guidance on trench excavation is given in CIRIA Report 97 (1992). Any temporary works should be designed by a suitably qualified engineer or competent person, particularly where personnel access is necessary, in accordance with the requirements of the Construction (Design & Management) Regulations.

5.6 Additional Comments

5.6.1 The site is currently occupied by a residential wing which will be removed to facilitate the proposed redevelopment. The foundations to the new residential wing need to extend though historical foundations or where they have been removed and found within competent natural ground below.

5.7 Ground Floor Slab

5.7.1 Due to the presence of cohesive soils and trees across the site, it is recommended that the floor slab to the proposed residential wing is fully suspended.

5.8 Concrete Classification

5.8.1 Concrete classification tests have been carried out on three soil samples in accordance with those listed in BRE Special Digest 1 (2005) and the results are included within the appendix. These tests determine the class of concrete for any future development and in view of the presence of groundwater which may come into contact with foundations, it is recommended that the ACEC class of AC-1 is adopted for the design of buried concrete structures.

5.9 Geotechnical Laboratory Tests

5.9.1 Index Property Tests

5.9.1.1 The boreholes of this investigation have shown superficial clays to be present beneath the made ground. Six index property tests have been carried out upon samples of the shallow cohesive soils (made ground and superficial soils) and the results are included within the appendix. The majority of results are above the 'A-Line'. The tests classify the cohesive soils as being of low and intermediate plasticity and low and medium volumetric change potential in accordance with NHBC Standards Chapter 4.2 (1995) modified by BRE Digest 240 (1993). Many trees of various species and maturity are present across the site. The NHBC Standards recommend a minimum foundation depth of 0.90m where medium volume change potential soils are present, deepened as necessary due to the presence of trees.

5.10 Permeability Tests

5.10.1 A preliminary assessment of the suitability of a soakaway drainage scheme has been carried out, with a falling head test carried out in the standpipe installed in WS3. The results show a drop in water level of 0.79m was recorded over a test time of 80 minutes. During the last 60 minutes of the test, however, water levels only fell by 0.11m, therefore, the soils are considered to be practically impermeable. The site is underlain by cohesive superficial soils which are characterised by very low permeabilities. An alternative drainage solution should therefore be adopted to deal with surface water runoff.

6. Comments and Recommendations: Assessment of Contamination

6.1 Conceptual Site Model

6.1.1 In accordance with Environment Agency (EA) and DEFRA document CLR11 (2004) the information from the desk study and site investigation have been used to generate a preliminary risk assessment. The purpose of this is to develop an initial Conceptual Site Model (CSM) to establish whether there are any potentially unacceptable risks present and determine the action required to provide further information to refine the model.

6.1.2 On the basis of the information available to date there are a number of contaminant linkages between sources and receptors. These are discussed below.

6.1.3 It should be appreciated that the below comments have not been made in consultation with either the Local Authority or the Environment Agency. Each of these bodies may have additional comments to make in view of the test results and the methods of investigation and their opinions should be sought in this matter.

6.2 Potential Sources of Contamination

6.2.1 Potential on Site Historical Contaminant Sources

6.2.1.1 The available historical mapping information shows the site was occupied by two residential properties and 'Longsight Abbey' with gardens and a 'Conservatory' from the first available maps (1850). By 1891, the Abbey has been extended into a Care Home with a Chapel, with extensions and new buildings shown by 1908 and 1978. The current site layout appears to have replaced the buildings on site by 1985. Materials associated with the demolition of previous buildings and the redevelopment of the site are potential sources for historical contamination on site, therefore contaminants could be present within the underlying soils and the risk of historical contamination is deemed to be 'low'.

6.2.2 Potential on Site Current Contaminant Sources

6.2.2.1 At the time of the investigation, the site was actively being used as a Care Home and there were no obvious contaminative sources. Made ground was found to depths of between 1.20m and at least 2.00m, which is likely the result (in particular in the area of WS4) of the demolition of historical structures. The made ground contained fragments of demolition rubble and industrial by-products. No visual or olfactory evidence of contamination was recorded within any of the recovered soils. On the basis of the observations made to date, there is a 'low' to 'moderate' risk of current on site sources containing contaminants that could pose a risk to Human Health.

6.2.3 Potential off Site Contaminant Sources

6.2.3.1 The available mapping information indicates that the land surrounding the site was historically either a plant 'Nursery', agricultural fields or residential properties. The nearest records from the Envirocheck report of potentially infilled land are located 38m to the north, 42m to the north west, 66m to the north and 120m to the west. There may be made ground in the areas surrounding the site. It would seem therefore that there is a 'low' likelihood that off site land usages could cause significant contamination of the soils and groundwater beneath the site.

6.2.4 Potential Receptors

6.2.4.1 Human Health:

- Humans including construction workers and future occupiers of the proposed residential wing.

6.2.4.2 Controlled Waters:

- Groundwater beneath the site.

6.2.4.3 Other Receptors:

- Building Substructures.

6.2.5 Potential Pathways

6.2.5.1 Human Health:

- Skin / eye contact, ingestion and inhalation during site development and by contact / inhalation from future occupiers.

6.2.5.2 Controlled Waters:

- Percolating water may act to mobilise contaminants and transport them downwards under gravity towards the water table.

6.3 Potential Contaminants of Concern

6.3.1 The contamination testing has included a range of common contaminants in accordance with the Conceptual Site Model, including the following:

- Arsenic
- Cadmium
- Chromium (hexavalent)
- Copper
- Lead
- Mercury
- Nickel
- Selenium
- Vanadium
- Zinc
- Cyanide
- Phenols
- Petroleum Hydrocarbons
- Benzene, Toluene, Ethylbenzene and Xylenes
- MTBE
- Polycyclic Aromatic Hydrocarbons (PAHs, speciated)
- Asbestos Fibres
- Polychlorinated Biphenyls (PCB) (as part of WAC testing)

6.4 Contamination Analyses - Soils

6.4.1 In order to assess the potential for contamination, samples of the near surface soils were forwarded to CLS for analysis for a range of contaminants in accordance with the Conceptual Site Model. The samples tested appeared to be representative of the soils present upon the site. It should be appreciated that there remains the potential for unidentified areas of contamination to exist. Suspect areas as may be identified in the future would have to be further investigated / assessed. Risk assessment work has its limitations and uncertainties ranging from those introduced by the type and quality of the data, analytical methods through to the model chosen.

6.4.2 Soils Analysis: Assessment of Risk to Human Health

6.4.2.1 The CLEA (Contaminated Land Exposure Assessment) model combines information on the toxicity of soil contaminants with estimates of potential exposure by adults and children living, working and/or playing on land affected by contamination over long periods of time. It predicts the amount of contaminant to which they might be exposed based on a given soil contaminant concentration. By comparing predicted exposure with health criteria values on tolerable or acceptable contaminant intakes the model can be used to generate Critical Concentrations (Cc) (CL:AIRE and CIEH 'Guidance on Comparing Soil Contamination Data with a Critical Concentration' 2008).

6.4.2.2 The soils analytical data is compared to the Cc using the statistical methods outlined in 'Guidance on Comparing Soil Contamination Data with a Critical Concentration'. The results from this investigation are incorporated within the Excel CLEA statistical assessment sheets which are included within the appendix, along with the results from CLS.

6.4.2.3 The aim of the assessment is to prove, or otherwise, that the land under investigation is suitable for the intended use in that the level of contamination is low compared to an appropriate measure of risk. In statistical terms this question is assessed using formal hypotheses. These are known as the Null Hypothesis (whereby the true mean concentration of a given contaminant is greater than or equal to the Cc [H0 $\mu \geq Cc$]), and the Alternative Hypothesis (whereby the true mean is less than the critical value [H1 $\mu \leq Cc$]). If the Null Hypothesis is rejected (i.e. the Alternative Hypothesis is proven correct) then the land is deemed suitable for the intended use. If the Null Hypothesis is proven correct then the land is deemed unsuitable for the intended use or remediation is necessary to render it suitable for the intended use.

6.4.2.4 Generic Cc have been used as a screening process adopting Soil Screening Values (SSVs) produced by Atkins Consultants and available from the ATRiskSoil website (www.atrisksoil.co.uk). As the proposals are for a residential wing in a Care Home surrounded by footpaths and soft landscaping, threshold values for a *Public Open Spaces (Residential, 6% SOM)* end usage have been adopted for the assessment.

6.4.3 Results

6.4.3.1 Metals, Cyanide and Phenols: testing has been carried out upon five samples of the shallow soils and the results are included within the appendix. The analytical data has been reviewed and no statistical outliers have been recorded. As detailed upon the appended statistical analysis excel spreadsheet, the Null Hypothesis has been rejected for all determinants.

6.4.3.2 Polycyclic Aromatic Hydrocarbons (PAHs): SSVs have been derived for 14 out of the 16 United States Environmental Protection Agency (US EPA) list of priority contaminants. Testing has been carried out upon six samples of the shallow soils and the results are included within the appendix. The analytical data has been reviewed and statistical outliers have been recorded in two of the samples tested (WS3 at 0.10m and WS4 at 0.10m), as shown in Table 2 below. The Null Hypothesis has been accepted for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(ah)anthracene. As detailed upon the appended statistical analysis excel spreadsheet, the Null Hypothesis has been rejected for all other determinants.

6.4.3.3 Petroleum Hydrocarbons, BTEX and MTBE: SSVs are available for the fractionated analysis of hydrocarbons in accordance with those outlined by the Total Petroleum Hydrocarbon Criteria Working Group (TPH CWG) and are recorded as aliphatic and aromatic carbon bandings. SSVs are also available for BTEX and MTBE. Testing has been carried out upon five samples of the shallow soils and the results are included within the appendix. While no visual or olfactory evidence of contamination was recorded during the logging of the soils, the analytical data has been reviewed and a statistical outlier has been recorded, as shown in Table 2 below. The Null Hypothesis has been accepted for aromatic band C21-C35. As detailed upon the appended statistical analysis excel spreadsheet, the Null Hypothesis has been rejected for all other determinants.

Table 2: Results above Critical Concentration.

Exploratory Position	Sample Depth (m)	Determinant	Critical Concentration (mg/kg)	Result (mg/kg)
WS3	0.10	Benzo(a)anthracene	9.04	100
		Benzo(a)pyrene	2.21	86
		Benzo(b)fluoranthene	10.3	70
		Dibenzo(ah)anthracene	1.03	20
		Indeno(123cd)pyrene	10.3	40
		Aromatic C21-C35	1930	6500
WS4	0.10	Benzo(a)pyrene	2.21	4.1

6.4.3.4 Asbestos: Testing has been carried out upon three soil samples to determine if any asbestos fibres were present and the results are included within the appendix. No asbestos fibres were detected.

6.4.3.5 Polychlorinated Biphenyls (PCB): as part of the Waste Acceptance Criteria suite, testing has been carried out on the sample (0.10m in WS1) and the results are included within the appendix. None of the seven PCB congeners tested were found to be at concentrations above the limit of detection.

6.5 Recommendations for Remediation

6.5.1 Assessment of Risk to Human Health

6.5.1.1 The testing carried out as part of this site investigation continues to suggest that there is a risk from contaminants present within the shallow soils which could impact Human Health, which include some PAHs and petroleum hydrocarbons.

6.5.1.2 The proposed development comprises a residential wing surrounded by footpaths, areas of hardstanding and areas of soft landscaping in the communal gardens, therefore some remedial measures will need to be carried out to protect the end users. It is recommended that the source-pathway-receptor linkage is broken in areas of soft landscaping with the use of 300mm thickness of imported clean cover in areas where the existing soft landscaping is altered as part of these works. The ground floor slabs and external hardstanding will break the source – pathway – receptor pollutant linkage and protect Human Health.

6.5.1.3 Imported soils should be from a licensed source and be accompanied with appropriate documentation to confirm the soils are not waste or have a waste exemption. Agreement on the source of the imported materials would ideally be made with the appropriate Statutory Authorities before importation. The topsoil part of the Capping Layer should conform to the requirements of British Standards 3882:2015, or as agreed by the Client. Topsoil and subsoil should be free of deleterious fragments such as concrete, brick, glass and metal or other potentially hazardous fragments which could cause injury. In addition, all imported materials must be free from invasive plant species (e.g. Japanese Knotweed).

6.5.1.4 All remediation works should be supervised by the contractor and monitored by a suitably qualified and experienced geo-environmental on a visiting basis. The thickness of the capping layer should be verified and determined by the excavation of hand pits. The pits should be verified by a geo-environmental engineer.

6.5.1.5 As will be required in accordance with a Health and Safety Plan which should be prepared for the project, personnel involved in site development works should observe a high standard of personal hygiene. For example, gloves, boots and overalls should be worn and washing facilities should be provided.

6.5.2 Assessment of Risk to Controlled Waters

6.5.2.1 It is the remit of the Environment Agency to protect Controlled Waters which includes groundwater and surface waters. The Environment Agency are also statutory consultees in the planning process.

6.5.2.2 In assessing the risk that the site could pose to Controlled Waters, the hydrogeological and hydrological conditions can be summaries as follows:

- In terms of Groundwater Vulnerability, the Chester Formation is classed as a 'Principal Aquifer' which is overlain by Glacial Till which is designated as a 'Secondary Aquifer'.
- The nearest groundwater abstraction license is 572m to the north.
- There are no recorded surface water features within 250m.
- The site is not within a Source Protection Zone.
- The site is not within a designated floodplain.
- Groundwater was recorded in the standpipe installed in WS3 at depths of between 1.20m and 2.40m over the course of four monitoring visits.

6.5.2.3 In view of the past history of the site ('Longsight Abbey', a conservatory, residential houses and gardens, and a care home with a Chapel which was later redeveloped into its current layout) and environmental setting the sensitivity of the site is believed to be 'low'. It is thought unlikely that the Environment Agency will require further sampling and testing to determine the extent of the risk that the site poses to 'Controlled Waters' (groundwater and nearby surface water courses).

6.6 Disposal of Excavated Materials

6.6.1 If excavated materials are to be removed for disposal off site, in accordance with the EU Landfill Directive (England and Wales) Regulations 2002 there are three main categories; Inert, Non-Hazardous and Hazardous Waste. Each category is defined by individual parameters which govern the types of waste accepted for classification. A Waste Acceptance Criteria (WAC) test has been carried out on a sample of soil (WS1 at 0.10m) and the results are included within the appendix.

7. Comments and Recommendations: Ground Gases

7.1 General Comments

7.1.1 During the course of the investigation, ground atmosphere monitoring standpipes were installed in WS3 and WS4 to permit the recording of gas concentrations. Monitoring of the lower explosive limit, together with total methane, oxygen and carbon dioxide concentrations by percentage volume as well as levels of carbon monoxide and hydrogen sulphide has been carried out upon four occasions. The results are included within the appendix together with details of the barometric pressure, borehole water level and air temperature at the time of each visit.

7.1.2 It should be appreciated that the above comments have not been made in consultation with either the Local Authority or the Environment Agency. Each of these bodies may have additional comments to make in view of the test results and the methods of investigation and their opinions should be sought in this matter.

7.2 Environmental Setting

7.2.1 From the first available historical maps, the site is shown to have been occupied 'Longsight Abbey' and a conservatory, with residential properties and gardens, followed by a care home and Chapel which was later redeveloped in the 1980s into the current layout. The area surrounding the site is characterised firstly by agricultural land and some large residential properties, which are gradually replaced by residential housing estates until the surrounding area is predominantly residentially developed. Made ground has been recorded on site to at least 2m depth, which contains elevated levels of some metals, PAHs and petroleum hydrocarbons. No putrescible materials were recorded. No landfill sites are located within 250m of the site. The site is not within a Radon Affected Area, therefore no radon protection measures are required for the construction of new buildings.

7.3 In Situ Gas Concentrations

7.3.1 The results of the gas monitoring visits can be summarised as follows:

7.3.2 Methane: was not recorded within the standpipes during the monitoring visits.

7.3.3 Carbon Dioxide: was recorded at concentrations of between 0.0% and 1.5% over the monitoring period.

7.3.4 Oxygen: concentrations of oxygen fluctuated between 19.0% and 21.0% over the monitoring period.

7.3.5 Hydrogen Sulphide: was not recorded within the standpipes during this investigation.

7.3.6 Carbon Monoxide: was not recorded within the standpipes during this investigation.

7.4 Recommendations for Remediation

7.4.1 In accordance with British Standards Institution BS8485:2015 the highest recorded methane and carbon dioxide levels together with the maximum gas flow rate give the site a 'Characteristic Gas Situation' of '1' defined as a 'very low' hazard potential (Table 2 of BS8485), however some contamination was found to be present within the soils. Some PAHs and petroleum hydrocarbons as found within the shallow soils of this investigation pose a long-term risk of volatilisation, therefore, it is recommended that an appropriate vapour impermeable membrane is installed within the floor slab of the proposed new wing as a precautionary measure to protect Human Health.

FOR AND ON BEHALF OF

GIP LIMITED



K. C. Davis BSc (Hons), FGS.

GEO-ENVIRONMENTAL ENGINEER

Author Contact Details: kate.davis@gipuk.com



J. P. Hughes BSc, MSc, C Geol, FGS, C SCi

MANAGING DIRECTOR

APPENDIX A



GIP Ltd. Ground Investigation & Piling Limited
Devonshire House
Ettingshall Road
Wolverhampton
WV2 2JT
Tel: 01902 459558
Email: info@gipuk.com
www.gipuk.com

Windowless Sampler Borehole Log

Borehole:	WS1
Sheet 1 of 1	
Logged By:	KCD
Checked By:	
Drilled By:	GH

Project Number: 27958
Project Name: St Joseph's Home, Manchester
Client: Little Sisters of the Poor
Engineer:
Date Drilled: 22/01/2019
Diameter: 100mm
Depth Cased: 1.00m
National Grid:
Ground Level:
Final Depth: 5.45m

Description of Strata	Legend	Depth (m bgl)	Level (mAD)	Water Level (m bgl)	Samples/Tests Depth (m bgl)	Samples/Tests Type	SPT 'N' Value [U100 Blows] Hand Vane	Installation /Backfill
MADE GROUND. Dark brown very clayey gravelly SAND. Gravel is angular to subrounded quartzite, brick and tile.					0.10	B		
MADE GROUND. Soft dark grey brown gravelly slightly sandy CLAY with a high cobble content. Gravel is angular to subrounded quartzite, brick, timber, ash and mudstone. Cobbles are brick.		0.70			0.70	B		
Stiff becoming very stiff brown slightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded quartzite, sandstone, mudstone and rare coal. (Superficial Deposits).		1.20			1.20	S	9 (1,1,2,3,2,2)	
					1.20	B		
- some grey and yellow grey mottling to 2.00m.					1.80	HV	156kPa	
					2.00	S	19 (2,3,3,5,5,6)	
					2.00	B		
- rare thin sand lenses from 2.50m to 3.20m.					2.70	HV	218kPa	
					3.00	B	36 (4,6,7,9,9,11)	
					3.00	S		
					3.70	HV	236kPa	
					4.00	B	28 (4,4,6,6,8,8)	
					4.00	S		
					4.60	HV	240kPa	
					5.00	S	35 (4,5,8,8,9,10)	
Borehole Complete at 5.45m		5.45						

Samples/Tests
- U Undisturbed
- D Disturbed
- B Bulk
- W Water
- S/C SPT/CPT
- ES Environmental Sample
- HV Hand Shear Vane
- NR No Recovery
- Water Strike
- Water Level

Other Information:
1. Hand excavated service avoidance pit to 1.20m.
2. No groundwater encountered.
3. Borehole backfilled upon completion.

GIP Ltd. Ground Investigation & Piling Limited
Devonshire House
Ettingshall Road
Wolverhampton
WV2 2JT
Tel: 01902 459558
Email: info@gipuk.com
www.gipuk.com

Windowless Sampler Borehole Log

Borehole:	WS2
Sheet 1 of 1	
Logged By:	KCD
Checked By:	
Drilled By:	GH

Project Number: 27958
Project Name: St Joseph's Home, Manchester
Client: Little Sisters of the Poor
Engineer:
Date Drilled: 22/01/2019
Diameter: 100mm
Depth Cased: 1.00m
National Grid:
Ground Level:
Final Depth: 2.45m

Description of Strata	Legend	Depth (m bgl)	Level (mAD)	Water Level (m bgl)	Samples/Tests Depth (m bgl)	Samples/Tests Type	SPT 'N' Value [U100 Blows] Hand Vane	Installation /Backfill
MADE GROUND. Grey brown and orange red clayey SAND and GRAVEL with a moderate cobble content. Gravel is angular to subrounded brick, quartzite, mortar, concrete, tile and glass. Cobbles are brick.					0.10	B		
MADE GROUND. Grey and grey brown very gravelly clayey SAND with some clay pockets and a low cobble content. Gravel is angular to subrounded quartzite, brick, tile and mortar. Cobbles are brick.		0.60			0.60	B		
MADE GROUND. Soft and firm grey, yellow brown and brown gravelly slightly sandy CLAY. Gravel is angular to subrounded brick, tile and quartzite. - 30% sample recovery from 1.20m.		1.20		▼ 1.50	1.20 1.20	S B	13 (1,2,2,4,4,3)	
- no SPT sample recovery.		2.00			2.00	S	23 (2,3,4,6,6,7) NR	
Borehole Complete at 2.45m		2.45						

Samples/Tests
- U Undisturbed
- D Disturbed
- B Bulk
- W Water
- S/C SPT/CPT
- ES Environmental Sample
- HV Hand Shear Vane
- NR No Recovery
- ▽ Water Strike
- ▼ Water Level

Document 4.144

Other Information:
1. Hand excavated service avoidance pit to 1.20m.
2. Groundwater encountered at 1.50m, collapsing borehole to 1.50m with inflow of pea gravel - suspected service to side of borehole. Borehole aborted.
3. Borehole backfilled upon completion.

GIP Ltd. Ground Investigation & Piling Limited
Devonshire House
Ettingshall Road
Wolverhampton
WV2 2JT
Tel: 01902 459558
Email: info@gipuk.com
www.gipuk.com

Windowless Sampler Borehole Log

Borehole:	WS3
Sheet 1 of 1	
Logged By:	KCD
Checked By:	
Drilled By:	GH

Project Number: 27958
Project Name: St Joseph's Home, Manchester
Client: Little Sisters of the Poor
Engineer:
Date Drilled: 22/01/2019
Diameter: 100mm
Depth Cased: 1.00m
National Grid:
Ground Level:
Final Depth: 5.45m

Description of Strata	Legend	Depth (m bgl)	Level (mAD)	Water Level (m bgl)	Samples/Tests Depth (m bgl)	Samples/Tests Type	SPT 'N' Value [U100 Blows] Hand Vane	Installation /Backfill
MADE GROUND. Dark brown very gravelly clayey SAND with many soft clay pockets. Gravel is angular to subrounded brick, tile, glass, slag, quartzite, metal and ash.					0.10	B		
					1.20	S	10 (1,1,2,2,2,4)	
Stiff, in parts very stiff, brown slightly sandy slightly gravelly CLAY. Gravel is subrounded to rounded quartzite, mudstone and sandstone. (Superficial Deposits). - some blue grey mottling to 2.00m.		1.30			1.20	D		
					1.30	B		
					1.70	HV	170kPa	
					1.90	HV	186kPa	
					2.00	S	16 (1,2,2,4,6,4)	
					2.00	B		
					2.60	HV	240kPa	
					3.00	B	28 (3,4,6,6,8,8)	
					3.00	S		
					3.60	HV	162kPa	
					4.00	B	28 (3,5,7,6,6,9)	
					4.00	S		
					4.70	HV	152kPa	
					5.00	S	31 (3,5,6,7,9,9)	
Borehole Complete at 5.45m		5.45						

Samples/Tests
- U Undisturbed
- D Disturbed
- B Bulk
- W Water
- S/C SPT/CPT
- ES Environmental Sample
- HV Hand Shear Vane
- NR No Recovery
- Water Strike
- Water Level

Other Information:
1. Hand excavated service avoidance pit to 1.20m.
2. No groundwater encountered.
3. 50mm ID HDPE monitoring standpipe installed to 5.00m (slotted from 5.00m to 1.00m) within a gravel filter, bentonite seal from 1.00m to 0.10m, concrete to ground level with a flush cover fitted.

GIP Ltd. Ground Investigation & Piling Limited
Devonshire House
Ettingshall Road
Wolverhampton
WV2 2JT
Tel: 01902 459558
Email: info@gipuk.com
www.gipuk.com

Windowless Sampler Borehole Log

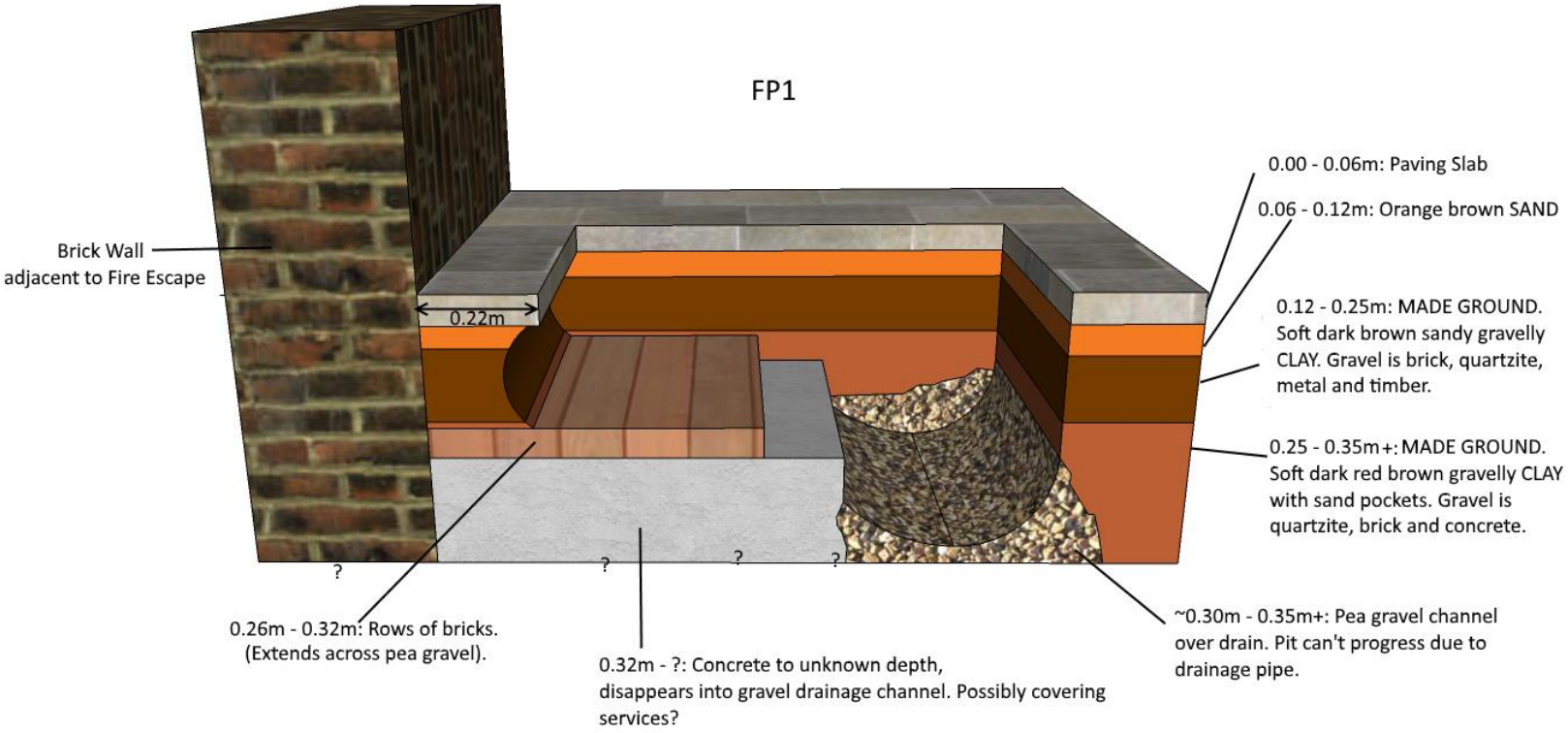
Borehole:	WS4
Sheet 1 of 1	
Logged By:	KCD
Checked By:	
Drilled By:	GH

Project Number: 27958
Project Name: St Joseph's Home, Manchester
Client: Little Sisters of the Poor
Engineer:
Date Drilled: 22/01/2019
Diameter: 100mm
Depth Cased: 1.00m
National Grid:
Ground Level:
Final Depth: 2.34m

Description of Strata	Legend	Depth (m bgl)	Level (mAD)	Water Level (m bgl)	Samples/Tests Depth (m bgl)	Samples/Tests Type	SPT 'N' Value [U100 Blows] Hand Vane	Installation /Backfill
MADE GROUND. Dark brown very clayey very gravelly SAND with a low cobble content. Gravel is angular to subrounded brick, quartzite, glass, concrete and tile. Cobbles are brick and concrete.					0.10	B		
MADE GROUND. Medium dense grey brown, orange brown and black clayey very sandy GRAVEL with a moderate cobble content. Gravel is angular to subrounded quartzite, tile, brick, ash and concrete. Cobbles are brick and concrete. 40% sample recovery from 1.20m.		1.20			1.20 1.20	S B	17 (1,2,2,4,4,7)	
CPT at 2.00m, no sample, suspected termination in very dense brick rubble.		2.00			2.00	C	50 for 190mm	
Borehole Complete at 2.34m		2.34						

Samples/Tests
- U Undisturbed
- D Disturbed
- B Bulk
- W Water
- S/C SPT/CPT
- ES Environmental Sample
- HV Hand Shear Vane
- NR No Recovery
- Water Strike
- Water Level

Other Information:
1. Hand excavated service avoidance pit to 1.20m. Encountered concrete in three positions before sinking borehole.
2. No groundwater encountered.
3. 50mm ID HDPE monitoring standpipe installed to 2.00m (slotted from 2.00m to 1.00m) within a gravel filter, bentonite from 1.00m to 0.10m, concrete to ground level with a flush cover fitted.



CLIENT: The Little Sisters of the Poor

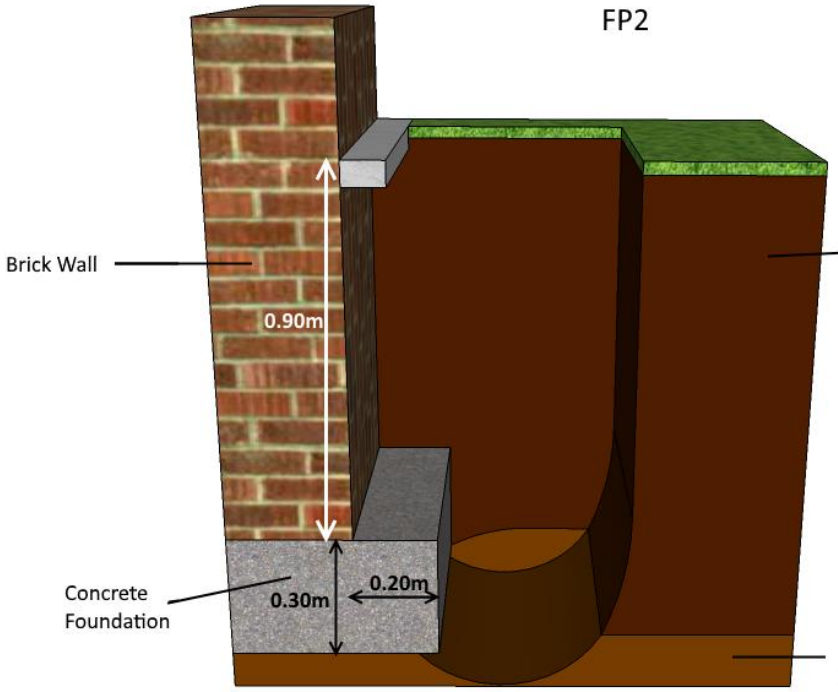
ENGINEER: David Symonds Associates

Devonshire House, Ettingshall Road,
Wolverhampton. WV2 2JT.
Tel : 01902 459558
www.gipuk.com
info@gipuk.com

TITLE: Ground Investigation at St Joseph's Home, Manchester

CONTRACT: 27958	**Foundation Pit:** 1	**DATE:** January 2019

FP2



0 - 1.20m: MADE GROUND.
Grass onto dark brown very gravelly very clayey SAND with many clay pockets and a low cobble content. Gravel is brick, timber, quartzite, plastic, tile and glass. Cobbles are brick.

1.20 - 1.30m: Stiff brown mottled grey and yellow brown slightly sandy slightly gravelly CLAY. Gravel is quartzite and mudstone. (Superficial Deposits).

CLIENT: The Little Sisters of the Poor

ENGINEER: David Symonds Associates

GIP Ltd. Ground Investigation & Piling Limited
Devonshire House, Ettingshall Road,
Wolverhampton. WV2 2JT.
Tel : 01902 459558
www.gipuk.com
info@gipuk.com

TITLE: Ground Investigation at St Joseph's Home, Manchester

CONTRACT: 27958	**Foundation Pit:** 2	**DATE:** January 2019

APPENDIX B



In-situ Permeability Test Record | Test No : WS3

Contract No: 27958
Site: St Joseph's Home, Manchester
Client: Little Sisters of the Poor
Date: 05/02/2019

Type of Test: Falling Head
Diameter of Hole (m): 0.10
Depth of Hole Below Ground Level (m): 4.79
Standing Water Level Prior to Test (m above base): 2.87
Water Level From Top of Casing at T=0 (m): 0.10
Depth of Casing Below Ground Level (m): 1.00
Height of Casing Above Ground Level (m): 0.00

Water Level Records

Time (mins)	Depth to Water (m.b.c.l.)
0	0.100
0.5	0.260
1	0.320
1.5	0.380
2	0.410
3	0.480
4	0.510
5	0.540
6	0.560
7	0.580

Time (mins)	Depth to Water (m.b.c.l.)
8	0.610
9	0.620
10	0.640
15	0.740
20	0.780
25	0.810
30	0.830
40	0.860
50	0.870
60	0.870

Time (mins)	Depth to Water (m.b.c.l.)
70	0.880
80	0.890

NOTES

Negligible fall in water level - soil considered to be practically impermeable.

GIP Ltd. Ground Investigation & Piling Limited
Devonshire House, Ettingshall Road,
Wolverhampton. WV2 2JT.
Tel. 01902 459558
www.gipuk.com
info@gipuk.com

APPENDIX C



LABORATORY REPORT FOR INDEX PROPERTY AND CHEMICAL TESTING

Contract: St Josephs Home, Manchester.

Customer: Little Sisters of the Poor.

GIP Ltd. Ground Investigation & Piling Limited
Devonshire House, Ettingshall Road,
Wolverhampton. WV2 2JT
Phone 01902 459558, Fax 01902 459085, email paul.smart@gipuk.com

Job No:- 27958 | Page No:- 1 of 1

Date Received:- 28.01.19 | Date Issued:- 12.02.19

SAMPLE DETAILS			TEST DATE	CLASSIFICATION						CHEMICAL				% PASSING BS SIEVE SIZE		SAMPLE DESCRIPTION	COMMENTS
				Index Properties													
SAMPLE No.	DEPTH m	SAMPLE TYPE		W %	W_L %	W_P %	I_P %	PD (Gas Jar) Mg/m^3	WC %	Soluble SO_4 g/L	pH Value	*L.O.I. %	*Total SO_4 %	2.00 mm	0.425 mm	See Exploratory Log	
WS1	0.70	B	31.01.19	21	40	21	19								66		
WS1	1.20	B	31.01.19	18	39	18	21								78		
WS1	2.00	B	31.01.19	15	37	16	21								91		
WS2	1.20	B	31.01.19	28	50	21	29								85		
WS3	1.30	B	31.01.19	20	47	20	27								96		
WS3	2.00	B	31.01.19	17	42	18	24								88		

Sample type		Test abbreviations		Test methods - Unless otherwise stated.	
D	Disturbed	W	Moisture Content	W%	BS1377:Part 2:1990:3.2
B	Bulk disturbed	W_L	Liquid limit	W_L	BS1377:Part 2:1990:4.4
U	Undisturbed	W_P	Plastic limit	W_P	BS1377:Part 2:1990:5.3
S	SPT split spoon	I_P	Index property	I_P	BS1377:Part 2:1990:5.4
W	Ground water	PD	Particle Density	PD	BS1377:Part 2:1990:8.2
T	Tub	L.O.I	Loss on ignition	L.O.I	BS1377:Part 3:1990:4
J	Jar	WC	Water Content	WC%	BS EN ISO 17892-1:2014

Sol SO_4	BS1377:Part 3:1990:5.5
pH Value	BS1377:Part 3:1990:9
Total SO_4	BS1377:Part 3:1990:5.5

Approved signatory:-

Paul Smart, Laboratory Manager.....

ilac-MRA UKAS TESTING 1897

Tests marked * are not UKAS accredited.

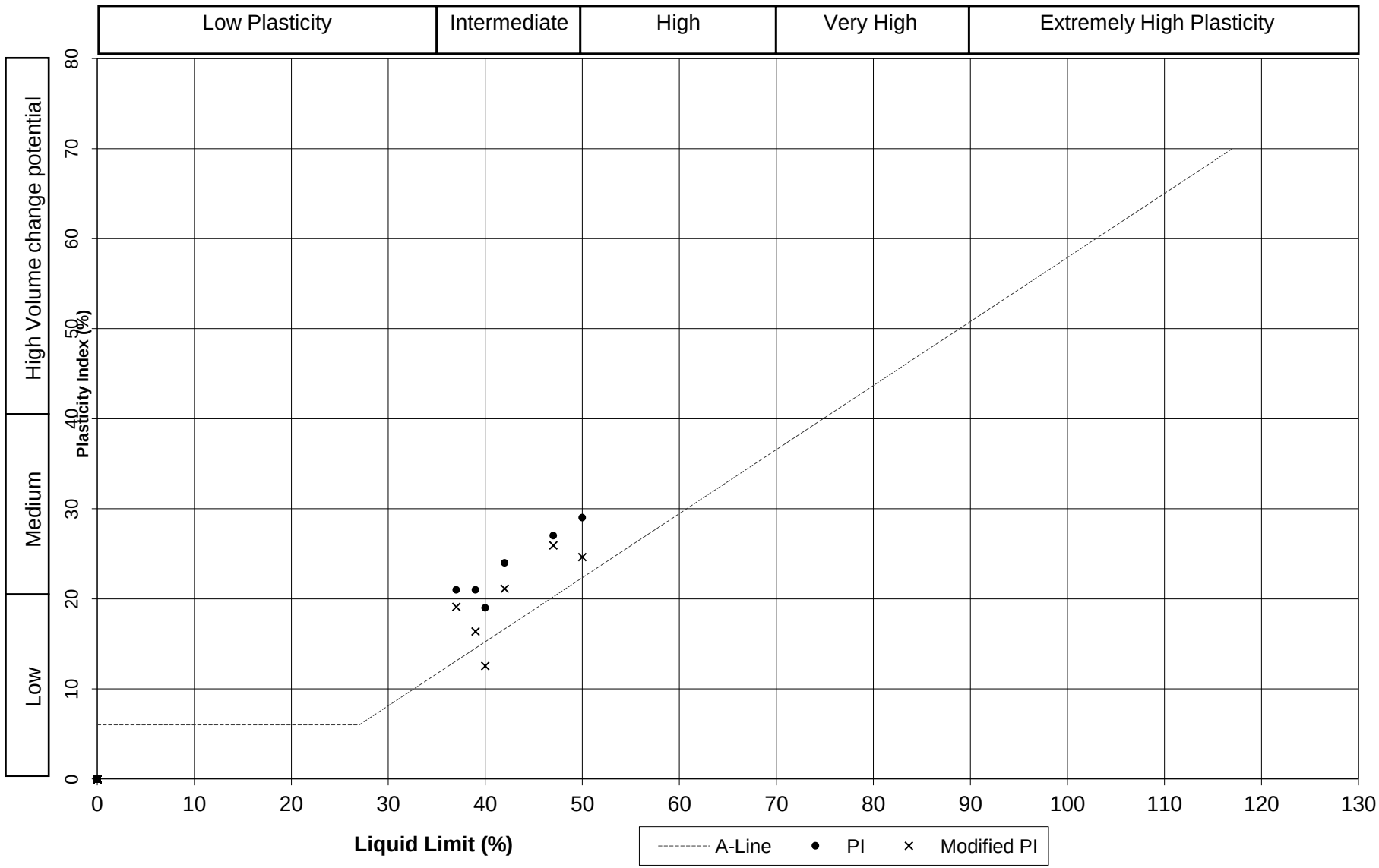
The reported results relate only to samples received.

 # = Sample mass smaller than BS1377 requirements.

Opinions and interpretations are outside the scope of UKAS accreditation

This test report shall not be reproduced except in full without written approval by the laboratory.

A-Line Plot


Low Plasticity
Intermediate
High
Very High
Extremely High Plasticity
High Volume change potential
Medium
Low
Plasticity Index (%)
Liquid Limit (%)
A-Line
PI
Modified PI

APPENDIX D



Project Number	27958
Project Name	St Joseph's Home, Manchester
Client	The Little Sisters of the Poor
Engineer	David Symonds Associates
Notes	Using SSVs where no free phase hydrocarbons have been observed.

GIP Ltd. Ground Investigation & Piling Limited

Devonshire House, Ettingshall Road,
Wolverhampton.
WV2 2JT

Tel 01902 459558
Fax 01902 459085
www.gipuk.com

C_c Values Used Public Open Space (Resi) (6% SOM)

Enter Analytical Data in Columns. Formulae only calculate cells with values (i.e. blank cells not = 0) NOTE Data can only be entered in white cells

Hide Extra Rows

Show Extra Rows

			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg								
	Hole ID	Depth (m)	Arsenic	Cadmium	Chromium VI	Copper	Lead	Inorganic Mercury	Nickel	Selenium	Vanadium	Zinc	Free Cyanide	Phenols								
	WS1	0.70	19	1	1	70	230	1	23	3	35	150	1	1								
	WS2	0.10	16	8	1	55	250	1	22	3	35	1400	1	1								
	WS2	0.60	24	1	1	100	300	1	30	3	34	170	1	1								
	WS3	0.10	58	2	1	150	540	1	38	3	43	310	1	1								
	WS4	0.10	37	2	1	120	600	1	30	3	36	480	1	1								
Number of Samples (n)			5	5	5	5	5	5	5	5	5	5	5	5								
$\bar{x}$			30.80	2.80	1.00	99.00	384.00	1.00	28.60	3.00	36.60	502.00	1.00	1.00								
Is $\bar{x}>C_c$			No	No	No	No	No	No	No	No	No	No	No	No								
s			17.20	2.95	0.00	38.14	173.00	0.00	6.47	0.00	3.65	519.10	0.00	0.00								
Maximum Value			58.00	8.00	1.00	150.00	600.00	1.00	38.00	3.00	43.00	1400.00	1.00	1.00								
Level of Significance α			0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Grubb Outlier Test			No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers								
Level of Significance for Shapiro-Wilks Normality Test			0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Shapiro-Wilks Normality Test			Normal	Non-normal	Same Value	Normal	Normal	Same Value	Normal	Same Value	Non-normal	Non-normal	Same Value	Same Value								
US_{95} Calculation Method			T-Test	Chebychev	Chebychev	T-Test	T-Test	Chebychev	T-Test	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev
Override Recommended Method			No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
US_{95}			47.196	8.551	1.000	135.369	548.951	1.000	34.764	3.000	43.711	1514.178	1.000	1.000								
C_c			79.1	219	26.1	16400	625	474	347	1370	818	93700	34	3170								
C_c Source			ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	-	-	-	-	-	-	-	-
H_0 $\mu \geq C_c$			Reject	Reject	Same Value	Reject	Reject	Same Value	Reject	Same Value	Reject	Reject	Same Value	Same Value								
H_1 $\mu < C_c$			True	True	Same Value	True	True	Same Value	True	Same Value	True	True	Same Value	Same Value								
Level of evidence against H_0			99%	99%	Same Value	99%	97.5%	Same Value	99%	Same Value	99%	99%	Same Value	Same Value								
Is C_c Exceeded ?			No	No	No	No	No	No	No	No	No	No	No	No								

Null Hypothesis = H_0 $\mu \geq C_c$ (True mean is greater than or equal to the critical value)
Alternative Hypothesis = H_1 $\mu < C_c$ (True mean is less than the critical value)

Project Number	27958
Project Name	St Joseph's Home, Manchester
Client	The Little Sisters of the Poor
Engineer	David Symonds Associates
Notes	Using SSVs where no free phase hydrocarbons have been observed.

GIP Ltd. Ground Investigation & Piling Limited

Devonshire House, Ettingshall Road,
Wolverhampton.
WV2 2JT

Tel 01902 459558
Fax 01902 459085
www.gipuk.com

C_c Values Used Public Open Space (Resi) (6% SOM)

Enter Analytical Data in Columns. Formulae only calculate cells with values (i.e. blank cells not = 0) NOTE Data can only be entered in white cells

Hide Extra Rows

Show Extra Rows

			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg						
Hole ID	**Depth (m)**		**Acenaphthene**	**Anthracene**	**Benz (a) anthracene**	**Benzo(a) pyrene**	**Benzo(b) fluoranthene**	**Benzo(ghi) perylene**	**Benzo(k) fluoranthene**	**Chrysene**	**Dibenzo(ah) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno(123cd) pyrene**	**Naphthalene**	**Pyrene**						
WS1	**0.10**		0.1	1.6	3.3	2.4	4.5	1.2	4.5	3.5	0.3	5.8	0.7	1.1	0.4	5						
WS1	**0.70**		0.6	1	2.1	1.8	1.5	1.1	1.5	2	0.5	4.2	0.5	1	0.2	3.7						
WS2	**0.10**		0.6	1	3.1	2.7	2.8	1.6	1.5	2.9	0.7	5.3	0.4	1.5	0.2	4.8						
WS2	**0.60**		0.2	0.4	1.5	1.3	1.1	0.8	1	1.4	0.3	2.4	0.2	0.7	0.2	2.2						
WS3	**0.10**		25	51	100	86	70	48	65	95	20	190	33	40	76	180						
WS4	**0.10**		1	1.3	4.6	4.1	3.7	2.6	3.5	4.8	1.1	9.7	1	2.3	1	8.9						
Number of Samples (n)			6	6	6	6	6	6	6	6	6	6	6	6	6	6						
$\bar{x}$			4.58	9.38	19.10	16.38	13.93	9.22	12.83	18.27	3.82	36.23	5.97	7.77	13.00	34.10						
Is $\bar{x}>C_c$			No	No	No	Yes	No	No	No	No	No	No	No	No	No	No						
s			10.01	20.39	39.65	34.12	27.50	19.01	25.59	37.61	7.93	75.37	13.25	15.80	30.87	71.51						
Maximum Value			25.00	51.00	100.00	86.00	70.00	48.00	65.00	95.00	20.00	190.00	33.00	40.00	76.00	180.00						
Level of Significance α			0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Grubb Outlier Test			No Outliers	No Outliers	100.000	86.000	70.000	No Outliers	No Outliers	No Outliers	20.000	No Outliers	No Outliers	40.000	No Outliers	No Outliers						
Level of Significance for Shapiro-Wilks Normality Test			0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Shapiro-Wilks Normality Test			Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal						
US_{95} Calculation Method			Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev
Override Recommended Method			No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
US_{95}			22.396	45.680	89.670	77.113	62.877	43.054	58.387	85.211	17.939	170.387	29.545	35.891	67.939	161.386						
C_c			14800	74100	37.7	4.04	40.7	490	430	3570	4.48	9870	9870	39.6	4230	7400						
C_c Source			ATRISK June 2017	ATRISK June 2017	ATRISK 31/03/11	ATRISK 6/17 (MRL)	ATRISK 31/03/11	ATRISK 31/03/11	ATRISK 31/03/11	ATRISK 31/03/11	ATRISK 31/03/11	ATRISK June 2017	ATRISK June 2017	ATRISK 31/03/11	ATRISK June 2017	ATRISK June 2017	-	-	-	-	-	-
H_0 $\mu \geq C_c$			Reject	Reject	Accept	Accept	Accept	Reject	Reject	Reject	Accept	Reject	Reject	Reject	Reject	Reject						
H_1 $\mu < C_c$			True	True	False	False	False	True	True	True	False	True	True	True	True	True						
Level of evidence against H_0			99%	99%	H0 Accepted	H0 Accepted	H0 Accepted	99%	99%	99%	H0 Accepted	99%	99%	96%	99%	99%						
Is C_c Exceeded ?			No	No	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No	No						

Null Hypothesis = H_0 $\mu \geq C_c$ (True mean is greater than or equal to the critical value)
Alternative Hypothesis = H_1 $\mu < C_c$ (True mean is less than the critical value)

Project Number	27958
Project Name	St Joseph's Home, Manchester
Client	The Little Sisters of the Poor
Engineer	David Symonds Associates
Notes	Using SSVs where no free phase hydrocarbons have been observed.

GIP Ltd. Ground Investigation & Piling Limited

Devonshire House, Ettingshall Road,
Wolverhampton.
WV2 2JT

Tel 01902 459558
Fax 01902 459085
www.gipuk.com

C_c Values Used Public Open Space (Resi) (6% SOM)

Enter Analytical Data in Columns. Formulae only calculate cells with values (i.e. blank cells not = 0) NOTE Data can only be entered in white cells

Hide Extra Rows

Show Extra Rows

Hole ID	Depth (m)	mg/kg Aliphatic C5-C6	mg/kg Aliphatic C6-C8	mg/kg Aliphatic C8-C10	mg/kg Aliphatic C10-C12	mg/kg Aliphatic C12-C16	mg/kg Aliphatic C16-C35	mg/kg Aromatic C5-C7	mg/kg Aromatic C7-C8	mg/kg Aromatic C8-C10	mg/kg Aromatic C10-C12	mg/kg Aromatic C12-C16	mg/kg Aromatic C16-C21	mg/kg Aromatic C21-C35	mg/kg Benzene	mg/kg Toluene	mg/kg Ethylbenzene	mg/kg m-Xylene	mg/kg o-Xylene	mg/kg p-Xylene	mg/kg MTBE
WS1	0.70	0.1	0.1	0.1	1	2	8	0.1	0.1	0.1	1	7	56	180	0.01	0.01	0.01	0.01	0.01	0.01	0.01
WS2	0.10	0.1	0.1	0.1	1	2	3	0.1	0.1	0.1	1	2	16	46	0.01	0.01	0.01	0.01	0.01	0.01	0.01
WS2	0.60	0.1	0.1	0.1	1	2	4	0.1	0.1	0.1	1	3	15	61	0.01	0.01	0.01	0.01	0.01	0.01	0.01
WS3	0.10	0.1	0.1	0.1	16	49	260	0.1	0.1	0.1	76	890	3200	6500	0.01	0.01	0.01	0.33	0.52	0.33	0.01
WS4	0.10	0.1	0.1	0.1	1	2	16	0.1	0.1	0.1	1	17	120	310	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Number of Samples (n)		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
?		0.10	0.10	0.10	4.00	11.40	58.20	0.10	0.10	0.10	16.00	183.80	681.40	1419.40	0.01	0.01	0.01	0.07	0.11	0.07	0.01
Is ?>C_c		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
s		0.00	0.00	0.00	6.71	21.02	112.93	0.00	0.00	0.00	33.54	394.82	1408.59	2842.13	0.00	0.00	0.00	0.14	0.23	0.14	0.00
Maximum Value		0.10	0.10	0.10	16.00	49.00	260.00	0.10	0.10	0.10	76.00	890.00	3200.00	6500.00	0.01	0.01	0.01	0.33	0.52	0.33	0.01
Level of Significance α		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Grubb Outlier Test		No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	6500.000	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers	No Outliers
Level of Significance for Shapiro-Wilks Normality Test		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Shapiro-Wilks Normality Test		Same Value	Same Value	Same Value	Non-normal	Non-normal	Non-normal	Same Value	Same Value	Same Value	Non-normal	Non-normal	Non-normal	Non-normal	Same Value	Same Value	Same Value	Non-normal	Non-normal	Non-normal	Same Value
US_{95} Calculation Method		Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev	Chebychev
Override Recommended Method		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
US_{95}		0.100	0.100	0.100	17.080	52.384	278.388	0.100	0.100	0.100	81.400	953.645	3427.938	6961.135	0.010	0.010	0.010	0.353	0.557	0.353	0.010
C_c		847000	886000	18600	18700	18700	445000	142	55900	7460	7490	7500	3770	3770	142	55900	24900	43100	43100	43100	75000
C_c Source		ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017	ATRISK June 2017
H_0 μ≥C_c		Same Value	Same Value	Same Value	Reject	Reject	Reject	Same Value	Same Value	Same Value	Reject	Reject	Reject	Accept	Same Value	Same Value	Same Value	Reject	Reject	Reject	Same Value
H_1 μ<C_c		Same Value	Same Value	Same Value	True	True	True	Same Value	Same Value	Same Value	True	True	True	False	Same Value	Same Value	Same Value	True	True	True	Same Value
Level of evidence against H_0		Same Value	Same Value	Same Value	99%	99%	99%	Same Value	Same Value	Same Value	99%	99%	96%	H0 Accepted	Same Value	Same Value	Same Value	99%	99%	99%	Same Value
Is C_c Exceeded ?		No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No

Null Hypothesis = H_0 μ≥C_c (True mean is greater than or equal to the critical value)
Alternative Hypothesis = H_1 μ<C_c (True mean is less than the critical value)

Ground Investigation & Piling Limited Ltd.

Devonshire House, Ettingshall Road,
Wolverhampton. WV2 2JT
Tel 01902 459558 Fax 01902 459085

Notes on the Statistical Calculations for Use With the CLEA Model

The preceding tables are from a spreadsheet which takes the analytical data from chemical analyses of soils and compares them with a critical concentration (C_c) using a number of statistical methods. The spreadsheet has been written using the methodology described in "Guidance on Comparing Soil Contamination Data with a Critical Concentration" – May 2008 (The Chartered Institute of Environmental Health and CL:AIRE with support from The Soil and Groundwater Technology Association)

The aim of the assessment is to prove, or otherwise, that the land under investigation is fit for purpose in that the level of contamination is low compared to an appropriate measure of risk. In statistical terms this question is handled using formal hypotheses. These are:-

The **Null Hypothesis** = H_0 $\mu \geq C_c$ (or the true mean is greater than or equal to the critical value)

and

The **Alternative Hypothesis** = H_1 $\mu < C_c$ (or the true mean is less than the critical value)

If the Null Hypothesis is proven incorrect then the land is deemed fit for purpose and the Alternative Hypotheis is true. If the Null Hypothesis is proven correct then the land is deemed unfit for purpose or remediation is necessary to render it fit for purpose.

Following verification of the data a process of statistical methods is used.

• Firstly the Grubbs Outlier test is used to determine the presence of any anomalously high values in the data. These may either be "hot spots" of contamination or possibly erroneous results.

• Accounting for any outliers using the above method the data is tested to determine whether it falls within a normal distribution using the Shapiro-Wilks normality test.

• If the data does not deviate from normality then the 95% confidence limit is calculated using the one-sample t-test. Otherwise the 95% Upper confidence limit is calculated using the one-sided Chebychev Theorem.

• The Upper 95% confidence limit is then compared to the C_c

The critical concentrations (C_c) used in this assessment are the Soil Screening Values (SSV) from the ATRISKSOIL website www.atrisksoil.co.uk. These are generated by Atkins Consultants.

If the Null Hypothesis is rejected then there is an at least 95% confidence level that the true mean concentration of the site is less than the critical concentration and no further action is required. If the Null Hypothesis is accepted then the true mean concentration is deemed to be greater than the critical concentration and the land is unsuitable for its proposed end use or requires remediation to render it suitable.

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

Concept Life Sciences is a trading name of Concept Life Sciences Analytical & Development Services Limited registered in England and Wales (No 2514788)

Concept Life Sciences

Certificate of Analysis

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

Report Number: 800092-1

Date of Report: 13-Feb-2019

Customer: Ground Investigation & Piling Ltd
Devonshire House
Ettingshall Road
Wolverhampton
WV2 2JT

Customer Contact: Ms Kate Davis

Customer Job Reference: 27958
Customer Purchase Order: 45358
Customer Site Reference: St Joseph's Home, Manchester
Date Job Received at Concept: 04-Feb-2019
Date Analysis Started: 05-Feb-2019
Date Analysis Completed: 13-Feb-2019

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 Concept Life Sciences SOPs

All results have been reviewed in accordance with Section 25 of the Concept Life Sciences, Analytical Services Quality Manual

UKAS TESTING
1549

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked and authorised by :
Aleksandra Pacula
Senior Customer Service Advisor

Issued by :
Aleksandra Pacula
Senior Customer Service Advisor

Waste Acceptance Criteria

Customer Sample Reference : WS1
Our Sample Reference : 800092 001
Project Site : St Joseph's Home, Manchester
Customer Reference : 27958
Top Depth : 0.1
Empty Dish Weight : 0
Sample in Dish @ 105C : 79.2
Wet Sample in Dish Weight : 100
Test Portion Mass (g) : 175
Date Sampled : 28-JAN-2019
Matrix Class : Topsoil

Soil					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Organic Carbon	OX/IR	0.1	%	N	**4.4**	**3.0**	5.0	6.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**37**	100.0		
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	**1500**	**500.0**		
pH	Probe			M	**8.0**		> 6.0	

Data for BS EN 12457-2 (10:1)					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.019**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.039**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.13**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	<10	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.013**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.045**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**170**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**10**	**10.0**	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.013**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.099**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0086**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**31**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	<1000	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

Following the recommendation from the Environment Agency (England and Wales)*, the leachate preparation in this report has been carried out to BS EN 12457-2 : One Stage batch test at a liquid to solid ratio of 10 l/kg. This is also compliant with Schedule 10 of the Environmental Permitting Regulations 2010.

Note : This is the minimum amount of testing which is required.

Further testing may be required if :

- evidence of immediately leachable parameters becomes available.
- evidence to indicate that the sample could be classified as hazardous under H1-H14 of the Waste(England and Wales) Regulations 2011(as amended) becomes available.

Acceptance of waste at landfill is always at the discretion of the Landfill Operator.

*** Waste Sampling and Testing for Disposal at Landfill, EBPRI 11507B, Environment Agency (England and Wales) March 2013**

As detailed in- Waste Classification. Guidance on the classification and assessment of waste. Technical Guidance WM3:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf

Landfill WAC analysis (specifically leaching test results) should not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
MCERTS Preparation

				Concept Reference	**800092 001**	**800092 002**	**800092 003**	**800092 004**	**800092 005**
				Customer Sample Reference	**WS1**	**WS1**	**WS2**	**WS2**	**WS3**
				Test Sample	**AR**	**AR**	**AR**	**AR**	**AR**
				Top Depth	**0.1**	**0.7**	**0.1**	**0.6**	**0.1**
				Date Sampled	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	**21**	**20**	**15**	**18**	**13**

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
MCERTS Preparation

				Concept Reference	**800092 006**	**800092 007**
				Customer Sample Reference	**WS3**	**WS4**
				Test Sample	**AR**	**AR**
				Top Depth	**1.3**	**0.1**
				Date Sampled	**28-JAN-2019**	**28-JAN-2019**
				Matrix Class	**Clay**	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	**14**	**22**

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
MCERTS Preparation

				Concept Reference	**800092 001**	**800092 002**	**800092 003**	**800092 004**	**800092 005**
				Customer Sample Reference	**WS1**	**WS1**	**WS2**	**WS2**	**WS3**
				Test Sample	**M40**	**M40**	**M40**	**M40**	**M40**
				Top Depth	**0.1**	**0.7**	**0.1**	**0.6**	**0.1**
				Date Sampled	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Retained on 10mm sieve	Grav	0.1	%	N	**30.1**	**36.4**	**29.6**	**33.6**	**34.0**

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
MCERTS Preparation

				Concept Reference	**800092 006**	**800092 007**
				Customer Sample Reference	**WS3**	**WS4**
				Test Sample	**M40**	**M40**
				Top Depth	**1.3**	**0.1**
				Date Sampled	**28-JAN-2019**	**28-JAN-2019**
				Matrix Class	**Clay**	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Retained on 10mm sieve	Grav	0.1	%	N	**28.7**	**36.5**

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
GIP2

				Concept Reference	**800092 002**	**800092 003**	**800092 004**	**800092 005**	**800092 007**
				Customer Sample Reference	**WS1**	**WS2**	**WS2**	**WS3**	**WS4**
				Test Sample	**A40**	**A40**	**A40**	**A40**	**A40**
				Top Depth	**0.7**	**0.1**	**0.6**	**0.1**	**0.1**
				Date Sampled	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Chromium VI	ICP/OES	1	mg/kg	N	<1	<1	<1	<1	<1
Organic Matter	Grav	0.1	%	N	**6.3**	**5.8**	**7.2**	**11.2**	**9.9**
pH	Probe			M	**8.2**	**9.7**	**7.6**	**8.2**	**8.0**

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
GIP2

				Concept Reference	**800092 002**	**800092 003**	**800092 004**	**800092 005**	**800092 007**
				Customer Sample Reference	**WS1**	**WS2**	**WS2**	**WS3**	**WS4**
				Test Sample	**AR**	**AR**	**AR**	**AR**	**AR**
				Top Depth	**0.7**	**0.1**	**0.6**	**0.1**	**0.1**
				Date Sampled	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Cyanide (Total)	Colorimetry (CF)	1	mg/kg	M	<1	<1	<1	<1	<1
Phenols (Total-Mono)	Colorimetry (CF)	1	mg/kg	M	<1	<1	<1	<1	<1

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
GIP2

				Concept Reference	**800092 002**	**800092 003**	**800092 004**	**800092 005**	**800092 007**
				Customer Sample Reference	**WS1**	**WS2**	**WS2**	**WS3**	**WS4**
				Test Sample	**M40**	**M40**	**M40**	**M40**	**M40**
				Top Depth	**0.7**	**0.1**	**0.6**	**0.1**	**0.1**
				Date Sampled	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Chromium	ICP/OES	1	mg/kg	M	**23**	**21**	**23**	**24**	**34**
Cadmium	ICP/OES	1	mg/kg	M	<1	**8**	<1	**2**	**2**
Lead	ICP/OES	1	mg/kg	M	**230**	**250**	**300**	**540**	**600**
Arsenic	ICP/OES	2	mg/kg	M	**19**	**16**	**24**	**58**	**37**
Selenium	ICP/OES	3	mg/kg	M	<3	<3	<3	<3	<3
Copper	ICP/OES	1	mg/kg	M	**70**	**55**	**100**	**150**	**120**
Mercury	ICP/OES	1	mg/kg	M	<1	<1	<1	<1	<1
Vanadium	ICP/OES	1	mg/kg	M	**35**	**35**	**34**	**43**	**36**
Nickel	ICP/OES	1	mg/kg	M	**23**	**22**	**30**	**38**	**30**
Zinc	ICP/OES	1	mg/kg	M	**150**	**1400**	**170**	**310**	**480**

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
GIP5

					Concept Reference	**800092 002**	**800092 003**	**800092 006**
					Customer Sample Reference	**WS1**	**WS2**	**WS3**
					Test Sample	**A40**	**A40**	**A40**
					Top Depth	**0.7**	**0.1**	**1.3**
					Date Sampled	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**
					Matrix Class	**Topsoil**	**Topsoil**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**				
pH	Probe			U		**8.2**	**9.7**	**8.7**
(Water Soluble) Sulphate expressed as SO4	2:1 Extraction/ICP/OES (TRL 447 T1)	0.05	g/l	U		<0.05	**0.19**	<0.05
(Acid Soluble) Sulphate	HCl Extraction/ICP/OES (TRL 447 T2)	0.02	%	U		**0.12**	**0.29**	**0.03**
Sulphur (total)	ICP/OES (TRL 447 T4)	0.01	%	U		**0.05**	**0.17**	**0.02**
(Total Potential) Sulphate (Total) Expressed as SO4	Calc (TRL 447 T4.13 ICP/OES)	0.03	%	U		**0.15**	**0.51**	**0.06**
(Oxidisable) Sulphide Expressed as SO4	Calc (TRL 447 T 4.11)	0.03	%	U		**0.03**	**0.22**	**0.03**

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
BTEX

					Concept Reference	**800092 001**
					Customer Sample Reference	**WS1**
					Test Sample	**M105**
					Top Depth	**0.1**
					Date Sampled	**28-JAN-2019**
					Matrix Class	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M		<10[13]
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M		<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M		<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M		<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M		<10

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
PCB EC7

					Concept Reference	**800092 001**
					Customer Sample Reference	**WS1**
					Test Sample	**AR**
					Top Depth	**0.1**
					Date Sampled	**28-JAN-2019**
					Matrix Class	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**		
Polychlorinated biphenyl BZ#101	GC/MS (SIR)	1	µg/kg	M		<1
Polychlorinated biphenyl BZ#118	GC/MS (SIR)	1	µg/kg	M		<1
Polychlorinated biphenyl BZ#138	GC/MS (SIR)	1	µg/kg	M		<1
Polychlorinated biphenyl BZ#153	GC/MS (SIR)	1	µg/kg	M		<1
Polychlorinated biphenyl BZ#180	GC/MS (SIR)	1	µg/kg	M		<1
Polychlorinated biphenyl BZ#28	GC/MS (SIR)	1	µg/kg	M		<1
Polychlorinated biphenyl BZ#52	GC/MS (SIR)	1	µg/kg	M		<1

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
Total and Speciated USEPA16 PAH, Coronene & Phenol

				Concept Reference	**800092 001**
				Customer Sample Reference	**WS1**
				Test Sample	**M105**
				Top Depth	**0.1**
				Date Sampled	**28-JAN-2019**
				Matrix Class	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Naphthalene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.4**
Acenaphthylene	GC/MS (MCERTS)	0.1	mg/kg	U	<0.1
Acenaphthene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.6**
Fluorene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.7**
Phenanthrene	GC/MS (MCERTS)	0.1	mg/kg	M	**6.7**
Anthracene	GC/MS (MCERTS)	0.1	mg/kg	U	**1.6**
Fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	**5.8**
Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**5.0**
Benzo(a)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	**3.3**
Chrysene	GC/MS (MCERTS)	0.1	mg/kg	M	**3.5**
Benzo(b/k)Fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	**4.5**
Benzo(a)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**2.4**
Indeno(123-cd)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**1.1**
Dibenzo(ah)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.3**
Benzo(ghi)Perylene	GC/MS (MCERTS)	0.1	mg/kg	M	**1.2**
Polyaromatic Hydrocarbons (Total)	GC/MS (MCERTS)	0.1	mg/kg	U	**37**
Phenol	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1
Coronene	GC/MS	0.1	mg/kg	N	**0.1**

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
PAH US EPA 16 (B and K split)

				Concept Reference	**800092 002**	**800092 003**	**800092 004**	**800092 005**	**800092 007**
				Customer Sample Reference	**WS1**	**WS2**	**WS2**	**WS3**	**WS4**
				Test Sample	**M105**	**M105**	**M105**	**M105**	**M105**
				Top Depth	**0.7**	**0.1**	**0.6**	**0.1**	**0.1**
				Date Sampled	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Naphthalene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.2**	**0.2**	**0.2**	**76**	<1.0[9]
Acenaphthylene	GC/MS (MCERTS)	0.1	mg/kg	U	<0.1	<0.1	<0.1	**14**	<1.0[9]
Acenaphthene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.6**	**0.6**	**0.2**	**25**	<1.0[9]
Fluorene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.5**	**0.4**	**0.2**	**33**	<1.0[9]
Phenanthrene	GC/MS (MCERTS)	0.1	mg/kg	M	**3.7**	**3.6**	**1.8**	**210**	**5.4**
Anthracene	GC/MS (MCERTS)	0.1	mg/kg	U	**1.0**	**1.0**	**0.4**	**51**	**1.3**
Fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	**4.2**	**5.3**	**2.4**	**190**	**9.7**
Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**3.7**	**4.8**	**2.2**	**180**	**8.9**
Benzo(a)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	**2.1**	**3.1**	**1.5**	**100**	**4.6**
Chrysene	GC/MS (MCERTS)	0.1	mg/kg	M	**2.0**	**2.9**	**1.4**	**95**	**4.8**
Benzo(b)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	**1.5**	**2.8**	**1.1**	**70**	**3.7**
Benzo(k)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	**1.5**	**1.5**	**1.0**	**65**	**3.5**
Benzo(a)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**1.8**	**2.7**	**1.3**	**86**	**4.1**
Indeno(123-cd)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**1.0**	**1.5**	**0.7**	**40**	**2.3**
Dibenzo(ah)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.5**	**0.7**	**0.3**	**20**	**1.1**
Benzo(ghi)Perylene	GC/MS (MCERTS)	0.1	mg/kg	M	**1.1**	**1.6**	**0.8**	**48**	**2.6**
Polyaromatic Hydrocarbons (Total)	GC/MS (MCERTS)	0.1	mg/kg	U	**25**	**33**	**15**	**1300**	**52**

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
TPH

Concept Reference	**800092 001**
Customer Sample Reference	**WS1**
Test Sample	**M105**
Top Depth	**0.1**
Date Sampled	**28-JAN-2019**
Matrix Class	**Topsoil**

Determinand	Method	LOD	Units	Symbol	
Total Petroleum Hydrocarbons (C35-C40)	GC/FID	1	mg/kg	N	**92**
Total Petroleum Hydrocarbons (C10-C35)	GC/FID	1	mg/kg	M	**1400**

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
GIP TPHUKCWG

Determinand	Method	LOD	Units	Symbol	Concept Reference	800092 002	800092 003	800092 004	800092 005	800092 007
					Customer Sample Reference	**WS1**	**WS2**	**WS2**	**WS3**	**WS4**
					Test Sample	**M105**	**M105**	**M105**	**M105**	**M105**
					Top Depth	**0.7**	**0.1**	**0.6**	**0.1**	**0.1**
					Date Sampled	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**
					Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10[13]	<10[13]	<10[13]	<10[13]	<10[13]
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Methyl tert-Butyl Ether	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	**33**	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	**52**	<10
Total Petroleum Hydrocarbons (C5 - C6 aliphatic)	GC/MS (Head Space)(MCERTS)	0.100	mg/kg	N	<0.100	<0.100	<0.100	<0.100	<0.100
Total Petroleum Hydrocarbons (C6-C8 aliphatic)	GC/MS (Head Space)(MCERTS)	0.10	mg/kg	N	<0.10	<0.10	<0.10	<0.10	<0.10
Total Petroleum Hydrocarbons (C8-C10 aliphatic)	GC/MS (Head Space)(MCERTS)	0.10	mg/kg	N	<0.10	<0.10	<0.10	<0.10	<0.10
Total Petroleum Hydrocarbons (C10-C12 aliphatic)	GC/FID (MCERTS)	1	mg/kg	N	<1[13]	<1[13]	<1[13]	**16**[13]	<1[13]
Total Petroleum Hydrocarbons (C12-C16 aliphatic)	GC/FID (MCERTS)	2	mg/kg	M	<2[13]	<2[13]	<2[13]	**49**[13]	**2**[13]
Total Petroleum Hydrocarbons (C16-C21 aliphatic)	GC/FID (MCERTS)	1	mg/kg	M	**2**[13]	<1[13]	<1[13]	**62**[13]	**5**[13]
Total Petroleum Hydrocarbons (C21-C35 aliphatic)	GC/FID (MCERTS)	4	mg/kg	M	**6**[13]	<4[13]	<4[13]	**190**[13]	**11**[13]
Total Petroleum Hydrocarbons (C16 - C35 aliphatic)	GC/FID (MCERTS)	5	mg/kg	M	**8**	<5	<5	**260**	**16**
Total Petroleum Hydrocarbons (C35-C44 aliphatic)	GC/FID	1	mg/kg	N	**12**[13]	**2**[13]	<1[13]	**230**[13]	**11**[13]
Total Petroleum Hydrocarbons (Aliphatic) total	Calc		mg/kg	N	**20**[13]	**2.0**[13]	N.D.[13]	**540**[13]	**29**[13]
Total Petroleum Hydrocarbons (C5-C7 aromatic)	GC/MS (Head Space)(MCERTS)	0.010	mg/kg	N	<0.10	<0.10	<0.10	<0.10	<0.10
Total Petroleum Hydrocarbons (C7-C8 aromatic)	GC/MS (Head Space)(MCERTS)	0.10	mg/kg	N	<0.10	<0.10	<0.10	<0.10	<0.10
Total Petroleum Hydrocarbons (C8-C10 aromatic)	GC/MS (Head Space)(MCERTS)	0.10	mg/kg	N	<0.10	<0.10	<0.10	<0.10	<0.10
Total Petroleum Hydrocarbons (C10-C12 aromatic)	GC/FID (MCERTS)	1	mg/kg	M	<1[13]	<1[13]	<1[13]	**76**[13]	**1**[13]
Total Petroleum Hydrocarbons (C12-C16 aromatic)	GC/FID (MCERTS)	1	mg/kg	M	**7**[13]	**2**[13]	**3**[13]	**890**[13]	**17**[13]
Total Petroleum Hydrocarbons (C16-C21 aromatic)	GC/FID (MCERTS)	1	mg/kg	M	**56**[13]	**16**[13]	**15**[13]	**3200**[13]	**120**[13]
Total Petroleum Hydrocarbons (C21-C35 aromatic)	GC/FID (MCERTS)	1	mg/kg	M	**180**[13]	**46**[13]	**61**[13]	**6500**[13]	**310**[13]
Total Petroleum Hydrocarbons (C35-C44 aromatic)	GC/FID	1	mg/kg	N	<1[13]	<1[13]	<1[13]	<10[13,9]	<1[13]
Total Petroleum Hydrocarbons (Aromatic) total	Calc		mg/kg	N	**240**[13]	**64**[13]	**79**[13]	**11000**[13]	**450**[13]
Total Petroleum Hydrocarbons (Aliphatic+Aromatic)	Calc		mg/kg	N	**263**[13]	**66.0**[13]	**79.0**[13]	**11200**[13]	**477**[13]

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Soil Analysed as Soil
Miscellaneous

				Concept Reference	**800092 004**	**800092 005**	**800092 007**
				Customer Sample Reference	**WS2**	**WS3**	**WS4**
				Test Sample	**A40**	**A40**	**A40**
				Top Depth	**0.6**	**0.1**	**0.1**
				Date Sampled	**28-JAN-2019**	**28-JAN-2019**	**28-JAN-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**			
Asbestos ID	PLM			SU	N.D.	N.D.	N.D.

Concept Reference: 800092
Project Site: St Joseph's Home, Manchester
Customer Reference: 27958

Leachate to BS EN 12457-2 (10:1) Analysed as Water
Waste Acceptance Criteria

				Concept Reference	**800092 001**
				Customer Sample Reference	**WS1**
				Test Sample	**10:1**
				Top Depth	**0.1**
				Date Sampled	**28-JAN-2019**
				Matrix Class	**Topsoil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Arsenic (Dissolved)	ICP/MS (Filtered)	0.2	µg/l	U	**3.9**
Barium (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**13**
Molybdenum (Dissolved)	ICP/MS (Filtered)	1	µg/l	N	**10**
Total Dissolved Solids	Grav	100	mg/l	N	<100
Phenols (Total-Mono)	Colorimetry	0.1	mg/l	U	<0.1
Dissolved Organic Carbon	OX/IR	1	mg/l	N	**17**
Electrical Conductivity	Probe	10	µS/cm	N	**130**
Antimony (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**2**
Cadmium (Dissolved)	ICP/MS (Filtered)	0.02	µg/l	U	<0.02
Chromium (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**1**
Copper (Dissolved)	ICP/MS (Filtered)	0.5	µg/l	U	**4.5**
Lead (Dissolved)	ICP/MS (Filtered)	0.3	µg/l	U	**1.3**
Mercury (Dissolved)	ICP/MS (Filtered)	0.05	µg/l	U	<0.05
Nickel (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	<1
Selenium (Dissolved)	ICP/MS (Filtered)	0.5	µg/l	U	**0.9**
Zinc (Dissolved)	ICP/MS (Filtered)	2	µg/l	U	<2
Chloride	Discrete Analyser	1	mg/l	U	<1
Fluoride	Discrete Analyser	0.05	mg/l	U	**1.0**
Sulphate	Discrete Analyser	0.5	mg/l	U	**3.1**

Index to symbols used in 800092-1

Value	Description
10:1	Leachate to BS EN 12457-2 (10:1)
A40	Assisted dried < 40C
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
10:1 S	Data for BS EN 12457-2 (10:1)
AR	As Received
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
N.D.	Not Detected
9	LOD raised due to dilution of sample
13	Results have been blank corrected.
S	Analysis was subcontracted
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited

N	Analysis is not UKAS accredited

Notes

Asbestos testing was subcontracted to REC Asbestos.

APPENDIX E



Devonshire House, Ettingshall Road,
Wolverhampton. WV2 2JT.
Tel. 01902 459558
www.gipuk.com
info@gipuk.com

STANDPIPE GAS & GROUNDWATER MONITORING RESULTS

CONTRACT No. 27958 | **SITE** St Joseph's Home, Manchester | **CLIENT :** The Little Sisters of the Poor

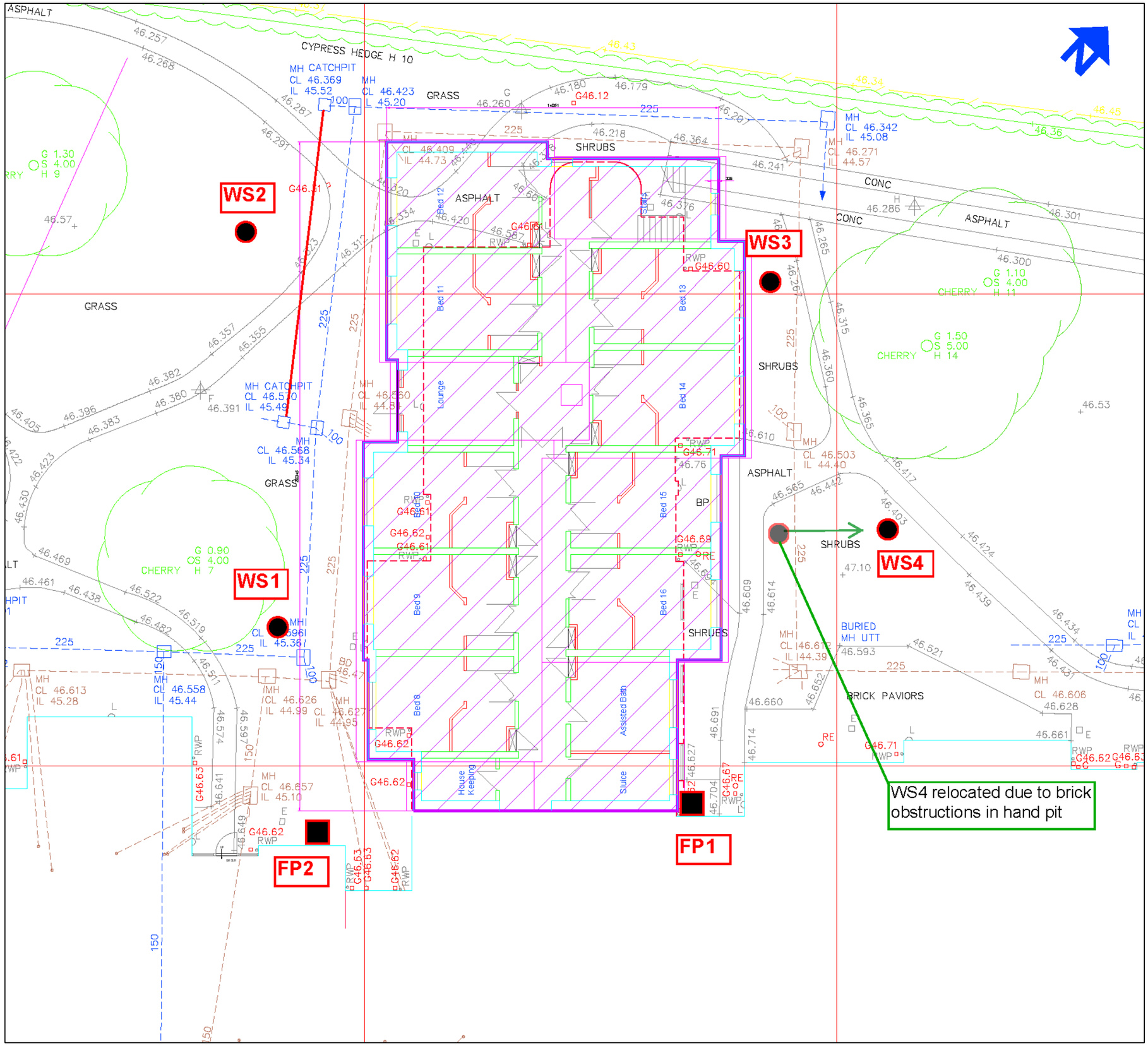
REPORT DATE March 2019 | **ENGINEER :** David Symonds Associates

CHECKED | **NOTES**

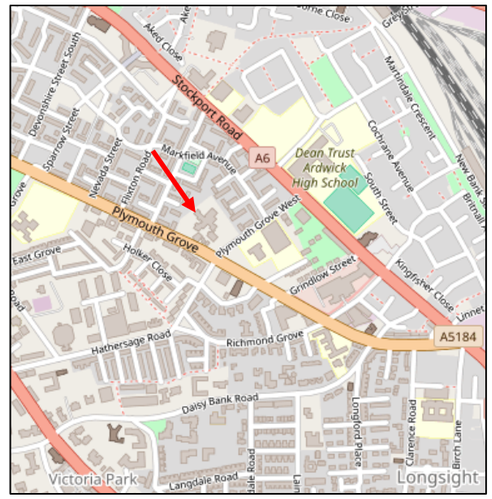
Borehole. ID No	DATE	CH_4 (%) (by Volume)	LEL (%)	CO_2 (%) (by Volume)	O_2 (%) (by Volume)	H_2S (ppm)	CO (ppm)	Flow Rate (l/h)	Peak Flow (l/h)	Differential Pressure (mbar)	Atmospheric Pressue (mbar)	Groundwater (mbgl)	Base of Standpipe (mbgl)	Base of Borehole (mbgl)	Air Temperature (ºC)	Monitoring Technician Initials
WS3	31/01/2019	0	0	1.5	19.0	0	0	0	0.0	-0.2	991	2.40	4.78	5.45	2	IS
WS3	05/02/2019	0	0	1.0	19.0	0	0	0	0.0	0.3	1019	1.92	4.79	5.45	5	IS
WS3	12/02/2019	0	0	0.9	19.2	0	0	0	0.1	0.2	1025	1.20	4.79	5.45	9	IS
WS3	27/02/2019	0	0	1.0	20.3	0	0	0	0.0	0.2	1018	1.55	4.79	5.45	13	RCW
WS4	31/01/2019	0	0	0.1	20.2	0	0	0	0.0	0.0	991	Dry	1.85	2.34	2	IS
WS4	05/02/2019	0	0	0.1	20.1	0	0	0	0.0	0.1	1019	Dry	1.84	2.34	5	IS
WS4	12/02/2019	0	0	0.0	19.8	0	0	0	0.0	0.0	1025	Dry	1.87	2.34	9	IS
WS4	27/02/2019	0	0	0.1	21.0	0	0	0	0.0	0.0	1019	Dry	1.87	2.34	13	RCW

APPENDIX F





Site Location



Key:

- = Windowless Sample Boreholes
- = Foundation Pits

GIP Ltd. Ground Investigation & Piling Limited

Devonshire House, Ettingshall Road,
Wolverhampton, WV2 2JT.
Tel: 01902 459558
www.gipuk.com info@gipuk.com

Title: Ground Investigation at St Joseph's Home, Manchester

Plan Detailing Existing and Proposed Site Layout & Approximate Exploratory Hole Locations.

Client: The Little Sisters of the Poor
Engineer: David Symonds Associates

Scale: Not to Scale	**Date:** February 2019
Contract: 27958	**Drg:** 1

All positions are approximate as shown



Flexipave. Rubber crumb and aggregate resin bound surfacing to footpaths. Does not require edging.



Gridforce 50 containment system to fire vehicle access road. Infilled with topsoil and seeded.



Paved surface
Tobermore Fusion 600 x 300 x 80mm
in 'Cream''



3 No. Betula utilis jacquemontii. Heavy Standards with flexipave permable surface laid up to / around trunk.



Paved surface
Tobermore Lincoln 600 x 300 x 80mm
in 'Natural'



Ennos Low Level lighting Bollard in Stainless steel, grade 304
Surface fixed (standard). Bolts at low level secure the bollard to a surface fixed plate.
Separate buried root available on request
Supplied with 13W D/E TC-DEL lamp
Also available anti-glare louvres
620mm ht x 154mm diam



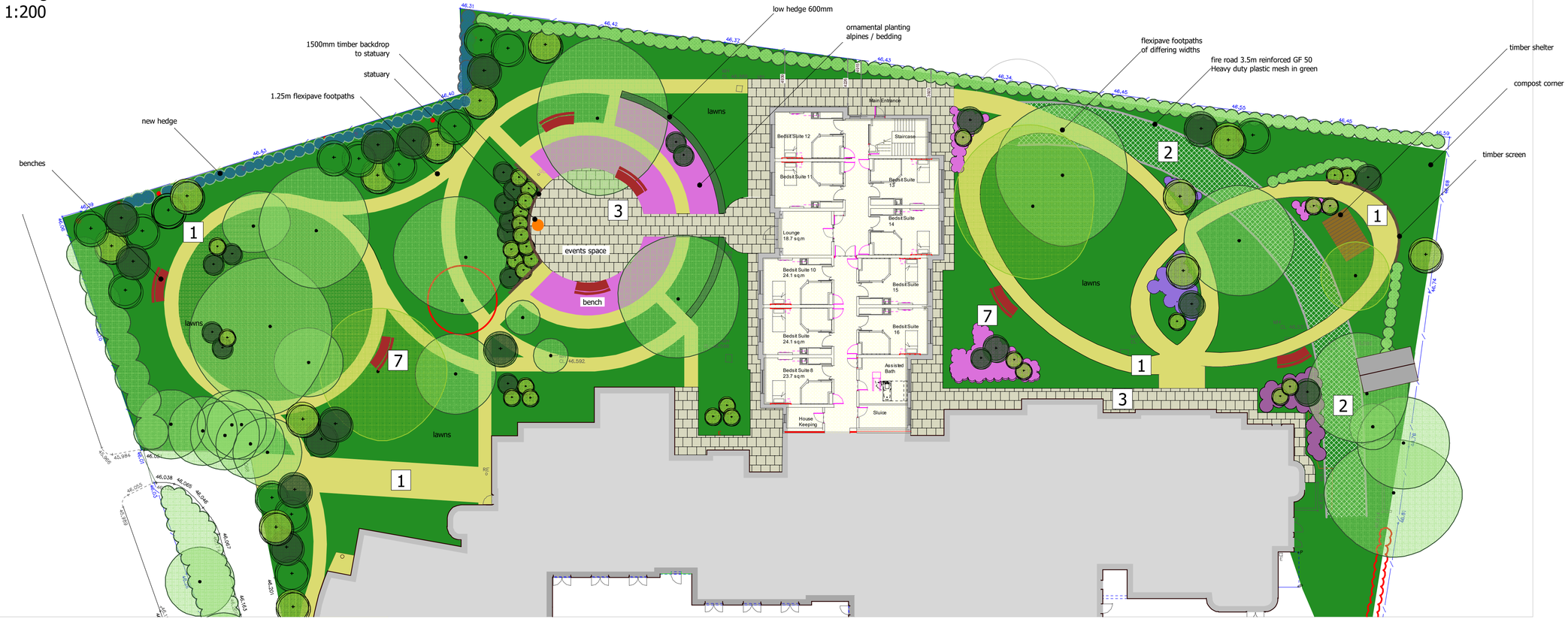
The Nuvola bench
Materials:
Wood. Corten steel. Galvanised and powder coated steel.

Dimensions:
Height: 710mm
Length: 1840mm
Width: 570 / 714m

break out space / parking area
1:100



rear gardens
1:200



lingard·farrow·styles
landscape architects · urban designers / environmental consultants

rev:	date:	description:
A	1 11 2018	Building layout updated

tel: 0333 4561132 fax: 01743 243602
email: info@lingardstyles.co.uk
9 College Hill, Shrewsbury Shropshire. SY1 1LZ
The Studio, Farm Lodge, Leighton, Welshpool, Powys. SY21 8HJ

client / project:

LITTLE SISTERS of the POOR

St Josephs Home
Plymouth Grove
Manchester M13 0AR

title:

Landscape Proposals

dwg. no:	scale:	drawn:	chkd by:
2957-002 A	1:100, 1:200 @ A1	THF	PS

notes:
- All dimensions to be checked and confirmed onsite prior to any works.
- Do not scale off this drawing.
- Any errors, omissions or descrepancies are to be brought to the attention of Lingard Farrow Styles immediately.

north

DO NOT SCALE FROM DRAWING. © DRAWING IS COPYRIGHT

APPENDIX G



General Notes

1. The copyright of this report and other plans and documents prepared by Ground Investigation and Piling Limited are owned by them. No such report plan or document may be produced, published or adapted without the written consent of Ground Investigation and Piling Limited. Copies of this report may however, be made and distributed by the Client as an expedient in dealing with matters related to its commission.

2. This report is provided for sole use by the client and is confidential to the Client and the Clients professional advisors. No responsibility whatsoever for the contents of the report will be accepted to any other person other than the client.

3. The report and/or opinion will be prepared for the specific purpose stated in the document and in relation to the nature and extent of proposals made available to us at the time of your enquiry. The recommendations should not be used for other schemes on or adjacent to the site without further reference to Ground Investigation and Piling Limited. The assessment of the factual data will be provided to assist the client and his Engineer and/or advisors in the preparation of their designs.

4. The report will be based on the ground conditions encountered in the exploratory holes together with results of field and laboratory testing in the context of the proposed development. Conditions between exploratory holes have been interpolated, however soils and rock conditions are highly variable and may differ from our interpolation There may be conditions, appertaining to the site, which may not be revealed by the investigation, and which may not be taken into account in the report.

5. Methods of construction and/or design other than those proposed by the designers or referred to in the report may require consideration during the evolution of the proposals and further assessment of the geotechnical data would be required to provide discussion and recommendation appropriate to these methods.

6. The accuracy of the results reported will depend upon the technique of measurement, investigation and test used and these values should not be regarded necessarily as characteristic of the strata as a whole. Where such measurements are critical, the technique of the investigation will need to be reviewed and supplementary investigation undertaken in accordance with the advice of the company where necessary.

7. Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes, or on possible presence of a feature based on either visual, verbal, written, cartographical, photographic or published evidence, this will be for guidance only and no liability can be accepted for its accuracy.

8. Ground conditions should be monitored during the construction of the works and the recommendations of the report re-evaluated on the light of these data by the supervising geotechnical engineers.

9. Any comments on groundwater conditions will be based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of the boring, drilling or excavation and that groundwater levels will vary due to seasonal or other effects.

10. Unless specifically stated, the investigation will not take into account possible effects of mineral extraction.

11. The economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical considerations hence its evaluation will be outside the scope of the report.