BROWNFIELD SOLUTIONS LTD

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD

St Michaels, Jacksons Row, Manchester

Phase II Geo-Environmental Assessment Report

CM/C5128/11668 Rev C

April 2023

EXECUTIVE SUMMARY	
Location and Brief Site Description	The site is located off Jacksons Row, Manchester, M2 5NH. It is situated approximately 200m south-west of Manchester City Centre, centred on National Grid Reference 383645, 398043. The site comprises of a hard standing car park accessed from Jacksons Row to the north and Bootle Street to the south. A synagogue is present across the central northern section of the site.
Ground Conditions	Generalised ground conditions from the ground investigation comprise (top down): • Made ground encountered from ground level to between 1.20m and 2.85m bgl. • Natural strata (predominantly gravelly sands) encountered from 1.20m bgl to between 4.00m and 4.70m bgl. • Solid geology (sandstone) encountered from 4.00m bgl to 45.00m bgl. • Groundwater recorded between 10.98m and 11.60m bgl.
Human Health - Soils Contamination	The proposed development is of mixed end-use. The basement and ground floor will be utilised for commercial purposes, with the remainder of the proposed development being used for a mixture of office, a hotel and residential areas. Therefore, commercial screening values have been adopted. It is noted that the majority of the proposed development will comprise hardstanding or building footprint. Elevated lead was recorded within one location of the made ground, however, the made ground will be removed from site during the construction of the basement. Furthermore, the proposed development will feature hardstanding across the entire footprint of the site.
Controlled Waters – Surface and Groundwater Contamination	The risks to controlled waters are considered to be low and no further action is required.
Ground Gas	Based on the ground gas monitoring, the site is classified as CS1 and no mitigation measures are required.
Outline Remedial Strategy	Based on assessments undertaken, there are no specific remedial requirements in respect to controlled waters and human health.
Waste	Based on the waste classification database assessment, the majority of the made ground soils have been classified as non-hazardous, however, the soils within the made ground to the west of the Synagogue building have all been classified as hazardous. It is noted that during a previous investigation that cement sheeting was identified at location D2 beneath the central eastern part of the car park by WSP, although no confirmatory testing was carried out. No other asbestos was identified in soils during previous investigations.
Foundations and Floor Slabs	Piled foundations are considered the most suitable foundation option socketed into the competent sandstone bedrock. As a preliminary guide, allowable axial loads for a circular pile range between 19.8MN for a 600mm diameter pile with 25m embedment up to 75MN for a 750mm diameter pile with 35m embedment. Detailed foundation design will need to be completed by a suitably qualified specialist, also taking into consideration the requirements for the 3 storey deep basement. The basement floor slab should be supported by piles.
Concrete Classification	Made ground: DS3 AC-3 conditions prevail. Natural soils: DS1 AC-1 conditions prevail. Bedrock : DS1 AC-1 conditions prevail.
Highways Design	No dedicated highways will be included on this scheme which will be wholly covered in the proposed structure. Where required for temporary structure placement of construction access roads, equilibrium values in the existing made ground may be assumed as 2%. The above should be confirmed by in-situ testing at formation level by a specialist geotechnical engineer during construction.
Drainage	Much of the site will be covered by structures/hardstanding, which precludes the use of a large underground soakaway drainage. It is anticipated that surface water would need to be positively drained into the off-site existing sewer network, subject to agreement with the local utility provider.
Further Work	The following further works will be required to progress to the construction phase:

EXECUTIVE SUMMARY	
	• Demolition Asbestos survey. • Drilling of supplementary boreholes for geotechnical purposes only. • Detailed foundation design by a structural engineer and piling contractor.

This executive summary should be read in conjunction with the full report, reference CM/C5128/11668 Rev C and not as a standalone document.

PROJECT QUALITY CONTROL DATA SHEET

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Issued By:	**Client:**	**Engineer:**
Brownfield Solutions Ltd William Smith House 173 – 183 Witton Street Northwich Cheshire CW9 5LP Tel: 01606 334 844 brownfield-solutions.com	St Michaels UK Propco 2 Ltd / Domis Construction Ltd Unit 3 Birchwood One Business Park Birchwood WA3 7GB	Renaissance Associates Ltd Carvers Warehouse 77 Dale Street Manchester M1 2HG
	Contact:	Contact: Andrew Isherwood

Written by:

C McShane
BSc (Hons) FGS
Project Engineer

Checked by:

J Mather
BSc (Hons) FGS
Senior Project Engineer

Approved by:

A J Stokoe
BSc (Hons) CSci MIEnvSc FGS
Associate

CSci Chartered Scientist

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Drawing Number	Rev	Title
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C5128/01	-	Site Location Plan
C5128/02	-	Exploratory Hole Location Plan

APPENDICIES

Appendix	Title
Appendix A	BSL Methodology and Guidance
Appendix B	Exploratory Hole Logs
Appendix C	Chemical Testing Results
Appendix D	Geotechnical Testing Results
Appendix E	Monitoring Results
Appendix F	Waste Assessment Report

1.0 INTRODUCTION

1.1 Context

This report describes a Phase II Geo-Environmental Assessment carried out by Brownfield Solutions Limited (BSL) for St Michaels UK Propco 2 Ltd / Domis Construction Ltd on a site off Jacksons Row, Manchester, known as St Michaels, and has been completed in general accordance with the following guidance:

- Environment Agency guidance - Land Contamination: Risk Management (LCRM).
- BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites.
- BS5930: 2015+A1:2020 Code of Practice for Ground Investigations.
- BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design. General rules plus UK National Annex.
- BS EN 1997-2:2007 Eurocode 7 Geotechnical design. Ground investigation and testing plus UK National Annex.

Definitions of terms and acronyms used within this report is presented in Section 11.0.

1.2 Proposed Development

The proposed development is for a 41-storey tower within the centre of the site along with a 7-storey podium across the entire footprint of the site. A full footprint 3-storey deep basement incorporating car parking, cycle store, water tank and storage rooms is also proposed. The frame is to be of reinforced concrete construction with a mix of post tensioned and traditional RC floor slabs. The end use is mixed, with the ground floor being for a retail use, with the remainder of the structure to be utilised as a mixture of offices, a hotel and residential areas.

1.3 Previous Reports

The following reports have been produced for the site and should be read in conjunction with this assessment (in date order):

- WSP, Phase 1 Preliminary Geo-Environmental Risk Assessment, reference 70010925/001/10465, dated January 2016.
- WSP, Preliminary Geotechnical & Environmental Assessment, reference 70010925/002/10482, dated November 2016.
- WSP, Ground Investigation Report, reference 700028727/20160109, dated February 2017.
- Ramboll, Ground Contamination Assessment, dated January 2021.
- Ramboll, Remedial Statement, dated January 2021.

BSL do not have reliance on the above reports, however, raw factual data contained therein has been utilised to aid assessments where relevant.

1.4 Objectives and Scope

The objectives of this report are to determine the geo-environmental setting and ground conditions of the site, highlighting potential risks and areas of concern that may govern the development under the current planning regime.

This report has been produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance. This assessment is also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

The detailed investigation was undertaken using rotary drilling, ground gas and groundwater monitoring, laboratory chemical and geotechnical testing, with reporting on the findings. A summary of previous investigations carried out at the site has also been undertaken.

Note supplementary boreholes will be required for geotechnical purposes after demolition of the existing structures.

1.5 Limitations

This assessment has been prepared in accordance with the relevant current legislative framework, guidance and risk assessment methodology as outlined in Appendix A. BSL is not liable for any subsequent changes in the guidance and legislation.

The findings and opinions conveyed via this report are based on information obtained from a number of sources as detailed within this report, BSL have assumed this information is correct and reliable. Nevertheless, BSL cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

BSL have used reasonable skill, care and diligence for the investigation of the site and the production of this report. There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore have not been considered by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.

This report has been prepared for the sole use and reliance of the Client, St Michaels UK Propco 2 Ltd / Domis Construction Ltd. No other third parties may rely upon or reproduce the contents of this report without the written permission of Brownfield Solutions Ltd (BSL). If any unauthorised third party comes into possession of this report, they rely on it at their own risk and BSL do not owe them any Duty of Care.

The investigation carried out on the site has been conducted to provide the best information on the ground conditions within site access and budgetary constraints. The inherent variation of ground conditions allows only for definition of the actual conditions at the locations and depths of exploratory locations at the time of the investigation. Different ground conditions may exist that have not been identified within this investigation.

The recommendations in this report assume that ground levels will remain as existing, unless stated otherwise within the report. If there is to be any re-profiling (e.g. to create development platforms or flood defences) then the recommendations may not apply.

The groundwater results described are only representative of the dates on which they were recorded, and levels may vary seasonally (e.g. due to changes in weather).

This assessment has been based on the proposed planning layouts provided. Any subsequent change to the planning layout may have an impact on the validity of recommendations made within this report. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

Although every effort has been made to position exploratory holes in the least sensitive areas of the site, exploratory hole positions were located approximately as part of this investigation and no guarantee can be given as to their accuracy. Consideration should be given to the possibility that exploratory holes excavated as part of this investigation and indeed any previous ground investigation work by others may be encountered beneath or within the influence of individual foundations. BSL cannot be held responsible for structural failures caused by the location of foundations of any form of structure within the influence of exploratory holes.

Where it has not been possible to reasonably use an EC7 compliant investigation technique, a practical alternative has been adopted to obtain indicative soil parameters and any interpretation is based upon engineering experience, local precedent where applicable and relevant published information.

The chemical testing carried out for this report was not scoped to comply with the requirements of the water supply company and further work may be required, unless otherwise stated.

Notwithstanding site observations concerning the presence or otherwise of archaeological issues, asbestos-containing materials (ACM) or invasive weeds (e.g. Japanese knotweed), this report does not constitute a formal survey of these potential issues.

The site plans enclosed in this report should not be scaled off. Any site boundary line depicted on plans does not imply legal ownership of land.

Any recommendations made in this report should be confirmed with the Regulatory Authorities prior to implementation to ensure compliance.

2.0 THE SITE

2.1 Location

The site is located off Jacksons Row, Manchester, M2 5NH. It is situated approximately 200m south-west of Manchester City Centre, centred on National Grid Reference 383645, 398043 as shown on the Site Location Plan, Drawing No. C5128/01.

2.2 Site Description

The main site features and potential issues identified are detailed below.

Feature	Description
Site Area	The site covers an area of approximately 0.2 hectares.
Site Access	Access to the site is gained off Jackson Row to the north and Bootle Street to the south of the site.
Current Land Use and Site Features	The site comprises of a hard standing car park accessed from Jacksons Row to the north and Bootle Street to the south. A synagogue is present across the central northern section of the site.
Potential Sources of Gross Contamination	No potential sources of gross contamination have been identified during the site walkover.
Vegetation	Sporadic overgrown minor vegetation is present onsite.
Topography	The site is topographically flat.
Site Boundaries	The site is bounded by Jackson Row to the north, Bootle Street to the south, a public house to the south-east, a construction site to the north-east, and a multi-storey block of residential apartments to the west.
Surrounding Area	The site is set within the centre of Manchester City and is surrounded by residential apartments, office blocks and retail/hospitality units.

3.0 SUMMARY OF PREVIOUS REPORTS

3.1 WSP Phase I Preliminary Geo-Environmental Risk Assessment (2016)

A summary of the relevant points from the Phase I Preliminary Geo-Environmental Risk Assessment completed by WSP (reference 70010925/001/10465) is presented below:

- The site has had previous development since 1848 for residential and commercial end use including a public house, police station, car parking and a synagogue.
- Geology comprises glacial Till deposits (Unproductive strata) over The Sherwood Sandstone Formation (Principal Aquifer).
- A conjectured fault, named as the West Manchester Fault, is indicated to cross the south-west corner. The fault trends northwest -southwest with the downthrown side to the north-east.
- The site is within the Coal Mining Reporting Area.
- There are no records of shallow mines in and around the site.
- The nearest water feature is the Rochdale Canal circa 270m to the south-east of the site.
- The site is located in a Zone 1 floodplain.
- The risk to human health is considered to be low to moderate.
- The risk from ground gas is considered to be low and the site is not located in an area requiring radon protection measures.
- The risk to controlled waters is low.
- The site is located in the UXO moderate risk zone.
- Recommendations were for an appropriate Phase II ground investigation to be carried out to confirm the identified risks and obtain information for preliminary design.

3.2 WSP Preliminary Geotechnical & Environmental Assessment (2016)

A summary of the relevant points from the Preliminary Geotechnical & Environmental Assessment completed by WSP (reference 70010925/002/10482) is presented below:

- The investigation undertaken from 2nd to 7th November 2015 comprised of 1 rotary borehole and 3 window sample boreholes with dynamic probe follow on within WS01. All boreholes were installed for groundwater and ground gas monitoring.
- Ground conditions comprised of made ground to 4.00m bgl overlying glacial Till to 2.00m bgl over the Sherwood Sandstone Formation proven to 15.00m bgl.
- Ground water was encountered only within RT01, during the site investigation groundwater was encountered at 13.50m bgl. During the monitoring visits groundwater was encountered between 12.01m and 25.49m bgl.
- Six ground gas monitoring visits were undertaken, the ground gas regime was classified as Characteristic Situation 1 (CS1-very low risk)
- The majority of the soil results did not exceed the adopted screening criteria for a commercial end use. However, arsenic, lead and PAH exceedances were encountered within the made ground. The PAH species exceeding the adopted screening criteria were benzo(a)pyrene and benzo(a)Anthracene.
- The risk to human health considered to be low due to the presence of hardstanding across the proposed commercial development.
- The risk to controlled waters is considered to be low.

3.3 WSP Ground Investigation Report (2016/2017)

A summary of the relevant points from the Ground Investigation Report completed by WSP (reference 700028727/20160109) is presented below:

- The investigation undertaken from 28 November to 12 December 2016 comprised of 6 window sample boreholes, 3 dynamic sampling with rotary follow on, 6 foundation inspection pits and 14 wall cores. Six boreholes were installed for groundwater and ground gas.
- Ground conditions comprised of made ground to 3.00m bgl overlying glacial Till or Glaciofluvial Sheet Deposits to 4.6m bgl, and Sherwood Sandstone bedrock proven to 35.35m bgl.
- During the monitoring visits groundwater was encountered within 4 boreholes (D1-D3 and RT01) from 10.85m and 25.60m bgl.
- The majority of the soil results did not exceed the adopted screening criteria for a commercial end use. However, exceedances for lead were encountered within the made ground.
- Asbestos was not identified in the eighteen samples of made ground that were screened during the two phases of investigation, however the presence of asbestos cement fragments (Chrysotile) was identified within the hand pit for borehole D2.
- The risk to human health was considered to be low due to the presence of hardstanding across the proposed commercial development.
- The risk to controlled waters was considered to be low.

3.4 Ramboll Ground Contamination Assessment (2021)

A summary of the relevant points from the Ground Contamination Assessment completed by Ramboll is presented below:

- Ramboll utilised Structural Soils Ltd to carry out intrusive investigations on a factual basis.
- The soil analytical results obtained during the Structural Soils Ltd 2017 investigation were screened against the Ramboll GACs for a commercial / industrial end use. No contaminants were identified at concentrations above the GAC for a commercial / industrial end use.
- The made ground samples analysed where ash or clinker were noted in the borehole logs contained slightly higher concentrations of PAHs and metals than the remaining samples, but still at relatively low concentrations.
- The TPH results indicated that all TPH carbon fractions were below the laboratory detection limit of 10mg/kg.
- No evidence of any volatile compounds was identified, therefore there is likely to be a low risk to sensitive off-site receptors in this regard.
- Asbestos was not identified in any of the 14 samples analysed.
- The site is underlain by sandstone with groundwater recorded at approximately 10 - 12m bgl. It is therefore considered unlikely that any impact to groundwater beneath the site will be in continuity with local water courses.
- The identified impacts above the drinking water GACs are all minor and inconsistent across the site. These are not considered to pose a significant risk to water receptors.
- The impacts above the surface water environment GAC for chromium are consistent across the site at minor concentrations. It is considered likely this may be a background concentration in the aquifer in this area. There is no evidence to suggest it may be derived from this site. Minor impacts of zinc were noted, however this is a worst case screen assuming all zinc is bioavailable. It is unlikely that the actual bioavailable content is above the GAC. In addition, the distance to the nearest surface water receptors would indicate that this is unlikely to be a significant risk.

4.0 METHOD OF INVESTIGATION

4.1 Objectives

To confirm the risks to the identified receptors and confirm the ground conditions in respect to the identified geotechnical and geo-environmental risks, an appropriate intrusive investigation was undertaken as per the recommendations of the Phase I Desk Study Assessment.

The aim of the fieldwork was to:

- Further investigate the ground conditions on site.
- Install standpipes to allow future monitoring.
- Assess the potential contamination on the site and obtain samples for contamination screening.
- Assess the potential impact of any contamination on controlled waters.
- Obtain geotechnical information on the ground conditions at the site for preliminary foundation design and preliminary pavement design purposes.
- Give an assessment of the geo-environmental risks associated with redevelopment of the site.

4.2 Site Works

The following site works have been undertaken as part of the intrusive investigation between the dates of 14th November and 21st December 2022.

Method	No.	Range Depths (m bgl)	Purpose
Window sample boreholes – Tracked WS rig	3	4.15-4.25	Establish general ground conditions on site. Allow Standard Penetration Tests (SPTs) to be carried out and obtain samples for contamination and geotechnical and testing. Installation of ground gas and water monitoring wells.
Rotary cored boreholes – Tracked Multipurpose Rotary Rig	5	19.00-45.00	Obtain information on the deeper strata and obtain rock core for geotechnical testing and parameters for foundation design. Installation of ground gas and water monitoring wells.

The locations of all exploratory holes were provided to BSL by Renaissance Associates Ltd. This particular BSL site investigation was undertaken pre-demolition of the onsite former Synagogue building, and as such only consists of BH01-05 and WS01-03. Additional boreholes will be drilled post demolition for geotechnical purposes only in order to aid foundation design.

During the drilling of BH02 and BH03, the drilling rods and core barrel became stuck in the borehole at depths of 19.00m and 24.50m respectively. Many attempts were made to free the drilling equipment, however, the boreholes were terminated.

BH06 and BH07 will be carried out at a later date, post-demolition, with the findings of this report updated to reflect the additional geotechnical information. It should also be noted that at this stage, BH02 and BH03 were unable to reach the anticipated depth of 45m bgl, due to drilling rods and casing becoming stuck in the ground. The holes reached 19.00m and 24.50m bgl respectively.

The surveyed locations of the exploratory holes are indicated on the Exploratory Hole Location Plan, Drawing No C5128/02. The exploratory hole logs are presented in Appendix B.

The exploratory holes were logged by an experienced geo-environmental engineer in general accordance with the following guidance:

- BS 5930:2015+A1:2020 Code of Practice for Site Investigations.
- BS EN 14688-1:2018 Geotechnical Investigation and Testing – Identification and classification of soil.
- BS EN ISO 14689:2018 Geotechnical investigation and testing – Identification and classification of rock.

The site is located within an area at medium risk of UXO and in order to minimise the risk to operatives during the ground investigation works, all exploratory locations were scanned with a hand-held magnetometer as boreholes were advanced and works were supervised by a specialist UXO surveyor. No magnetic anomalies were noted during the investigation.

4.3 Sampling Strategy

Representative samples were taken from exploratory holes at regular intervals to assist in the identification of the soils and to allow subsequent laboratory testing. They were stored and transported in general accordance with BS 10175:2011+A2:2017.

The type of sample was dependent upon the stratum and the purpose of analysis in accordance with current environmental and geotechnical guidance. The distribution of samples taken across the site is recorded on the exploratory logs.

4.4 Laboratory Testing

As part of the further assessment for potential contamination of the site, selected samples were taken for the purpose of chemical contamination testing.

In the absence of particularly contaminative processes on site and the lack of visual evidence of potential hydrocarbon impaction representative soil samples were screened for the following general suite of determinands at a UKAS approved laboratory:

Determinand	No of Samples
BSL Default Soil Suite: Arsenic, Cadmium, Chromium (III), Chromium (VI), Copper, Nickel, Mercury, Lead, Zinc, Selenium, speciated polycyclic hydrocarbons (PAH 16), water soluble sulphate (2:1 Extract), soil organic matter (SOM) and pH.	8
Soil Suite A: Arsenic, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, zinc and pH.	2
Asbestos Screen.	8
Speciated Total Petroleum Hydrocarbons (TPH CWG) inc BTEX and MTBE	2
Waste Acceptance Criteria (WAC).	4

The Chemical Laboratory Testing Results are presented in Appendix C.

Representative disturbed samples were obtained for all soil types encountered. Selected samples were scheduled for testing at an approved laboratory in accordance with BS 1377 'Method of Test for Soils for Civil Engineering Purposes' and BS EN ISO 17892- Parts 1-12:2018 'Geotechnical investigation and testing. Laboratory testing of soil'.

The following tests were scheduled for geotechnical purposes:

Description	No of Samples
pH Value.	18
Water Soluble Sulphate Contents.	18
SD1 BRE Full Suite.	5
Point Load Testing.	56
Unconfined Compressive Strength (UCS).	28

The Geotechnical Laboratory Testing Results are presented in Appendix D.

4.5 Monitoring

Ground gas and ground water monitoring standpipes were installed in three boreholes and subsequently six monitoring visits have been undertaken out of six proposed as part of the current scope, in line with the recommendations of CIRIA C665. All gas monitoring was undertaken using either a GA5000 or GFM436 infrared gas meter with integral electronic flow analyser.

Flow measurements on each standpipe (l/hr) were taken. Measurements of the percentage volume in air (%v/v) of oxygen (O_2), carbon dioxide (CO_2) and methane (CH_4) were recorded in addition to the percentage Lower Explosive Limit (%LEL) of methane (Note: 100% LEL equates to 5% by volume), the atmospheric pressure (mb) and average temperature during the visit (°C).

Standpipes were constructed in general accordance with the relevant guidance. A summary of the installation construction is presented in the table below:

Location	Internal Diameter Pipe	Response Zone (m bgl)	Targeted Strata	Purpose
BH01	50mm HDPE	5.00 – 15.00	Bedrock	Ground Gas & Groundwater
BH04	50mm HDPE	5.00 – 15.00	Bedrock	Ground Gas & Groundwater
BH05	50mm HDPE	5.00 – 15.00	Bedrock	Ground Gas & Groundwater

Under current proposals, the made ground will be removed from site and therefore is not considered to be a significant potential source of ground gas.

The gas monitoring visits recorded peak and steady state conditions. Peak results are those that occur on opening the valve on the borehole tap. Steady state conditions are those that occur a period of time afterwards when the initial (accumulated) gases have been purged from the borehole.

Final ground gas monitoring results are presented in Appendix E of this report.

5.0 GROUND CONDITIONS

5.1 Summary

A brief summary of the ground conditions encountered is presented in the table below:

Stratum	Range Depths - Top (m bgl)	Range Depths - Base (m bgl)	Range Thickness' (m)	Brief Description
Made Ground	GL	0.06-0.10	0.06-0.10	Reinforced Concrete/ asphalt.
	0.06-0.10	0.25-0.30	0.15-0.24	Sub-base: fine to coarse gravel.
	0.25-0.30	1.20-2.85	0.95-2.60	Sandy gravel.
	0.30	0.95	0.65	Gravelly fine to coarse sand.
	0.95	1.35	0.40	Gravelly clay.
Natural Superficial Strata	1.20-2.85	4.00-4.70	1.25-3.50	Gravelly fine to coarse sand.
Solid Geology	4.00-4.70	4.15-5.00	0.15-0.30	Destructured sandstone recovered as gravelly fine to coarse sand.
	5.00	19.00-45.00	40.00	Fine to coarse sandstone.

Details are provided in the logs in Appendix B and the individual strata are described in the sections below.

5.2 Made Ground

Made Ground – General
Made ground was encountered within all the exploratory holes across the site and was observed from ground level to depths between 1.35m and 2.85m bgl.

Hardstanding surfacing of tarmacadam, concrete, or building footprint was present across the entirety of the site, recorded as being 0.10m thick.

The composition of the made ground beneath the hardstanding was fairly consistent across the site and represented demolition material comprising sandy gravel and gravelly sand. Cobbles of brick ranged from medium to high content.

The made ground beneath the building footprint was not observed during this phase of the investigation, although a basement feature was noted to be present to an unknown depth.

5.3 Natural Superficial Strata

The natural strata underlying the site was generally a gravelly fine to coarse sand with varying amounts of silt as a minor constituent. This interpreted to represent glacial Till. The gravel was generally subangular to subrounded fine to coarse of sandstone, mudstone and quartz.

The superficial strata were encountered to depths of between 4.00m and 4.70m bgl.

5.4 Solid Geology

Weak becoming moderately strong sandstone bedrock was encountered from depths of between 4.00m and 5.00m bgl, which was proven to a maximum depth of 45.00m bgl across the site and is interpreted to represent the Chester Formation.

The discontinuities described generally ranged from being closely to moderately spaced, planar, being horizontal to slightly sub-horizontal in orientation, although zones of sub vertical discontinuities were also recorded.

The overall percentage of Total Core Recovery (TCR) in sandstone over each core run within an individual borehole varied from 33% to 100%, although averaged at 94%. Similarly, Solid Core Recovery (SCR) ranged between 21% to 100% and averaged 88%.

Rock Quality Designation (RQD) percentages ranged between 0% up to 94%, averaged at 54%, with most values ranging between 30% and 80%. Overall, there was little consistent pattern to recorded RQD values with depth.

The West Manchester Fault is conjectured to cross the south-west corner of the site, but uncertainty remains over the exact location. The fault trends northwest -southwest with the downthrown side to the north-east. It is possible that the rock mass in the immediate vicinity of the fault may have an increased weathering profile or have a weakened state compared to the typical wider rock mass. Such zones may be very localised and difficult to locate through investigation, particularly as the position of the fault is conjectured. Within the boreholes drilled by BSL, there is no definitive evidence of a fault, such as brecciated areas, although there are a number of zones with more vertical discontinuities. During the drilling of BH02 and BH03, the drilling rods and core barrel became stuck in the borehole at depths of 19.00m and 24.50m respectively, but it is uncertain whether this is due to potential fault materials or due to mechanical issues with the drilling equipment.

5.5 Groundwater

Groundwater was not encountered during the drilling works; due to the water flush method of rock coring, it is likely that the exact location of the water strike was unable to be observed. Groundwater was observed within installed standpipes during the post site works monitoring period as summarised below:

Location	Depth During Monitoring Period (range) (m)	
	Min	Max
Overall min/max	10.75	11.60
BH01	10.75	11.07
BH04	11.30	11.60
BH05	NA*	NA*

*Position obstructed during visits.

5.6 Observations

Contamination
During the works undertaken by BSL, observations for both visual and olfactory evidence of contamination were undertaken. No visual or olfactory evidence of contamination was observed at the site.

Stability of Excavations/Boreholes
The borehole sidewalls were generally stable and window sampling progressed with casing to seal the made ground. Casing was used to seal off the superficial deposits within the rotary boreholes and to prevent collapse within the made ground.

As stated in Section 4.2, during the drilling of BH02 and BH03, the drilling rods and core barrel became stuck in the borehole at depths of 19.00m and 24.50m respectively. Many attempts were made to free the drilling equipment, however, the boreholes were terminated.

UXO
No magnetic anomalies were encountered during the works.

6.0 TEST RESULTS

6.1 Geotechnical Laboratory Testing

Unconfined Compressive Strength (UCS) and Point Load Index
A summary of the information pertaining to the Unconfined Compressive Strength (UCS) of the intact rock material (not rock mass) related to sandstone bedrock at the site is shown in the table below. The point load index results have been used to derive the UCS using the relationship of UCS=24*IS50 for sandstone (ISRM).

Point Load Index (MPa) (range)		UCS Range (MPa)	Method	No. of results
Is	IS50			
0.05 – 2.00	0.07 – 2.63	-	Point load (Axial, Diametral and Irregular)	56
-		8.0 – 25.2	UCS test	28

6.2 Aggressive Ground Conditions – Geotechnical Chemical Testing

The test results for the assessment of aggressive ground conditions are presented in Appendix D. The results are summarised and assessed within Section 8.0 of this report.

6.3 In Situ Geotechnical Testing

In Situ Standard Penetration Tests
Standard Penetration Tests (SPTs) were carried out within the window sample boreholes at regular 1.0m intervals. The results of the individual blows and the N-values are recorded on the Exploratory Hole Logs in Appendix B.

All SPT N values are uncorrected. Density and strength descriptors are reported in accordance with the guidelines stated in BS 5930:2015+A1:2020, incorporating requirements of BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2004 and BS EN ISO 14689-1:2003.

6.4 Geo-Environmental Testing

Chemical Laboratory Testing
The chemical test results for soils are presented in Appendix C. The results are summarised and assessed within Section 8.0 of this report.

Ground Gas Monitoring
Ground gas monitoring installations have been monitored on six occasions out of six visits scheduled. The final results are presented in Appendix E and are summarised and assessed within Section 8.0 of this report.

7.0 GEOTECHNICAL ASSESSMENT

7.1 Ground Model Summary

The site is currently occupied by a former Synagogue building of brick construction with associated hard standing car parking. At the time of this investigation, no exploratory boreholes were able to be positioned within the footprint of the Synagogue, and further boreholes will be carried out and reported on at a later date post demolition. There are known basements associated with the Synagogue building at the site.

The ground conditions can be summarised as below (top down):

- Made ground generally comprising sandy gravel with cobbles from ground level to between 1.20m and 2.85m bgl.
- Natural superficial deposits comprising gravelly sand proven to depths between 4.00m and 4.70m bgl.
- Solid geology comprising sandstone proven to depths ranging between 19.00m and 45.00m bgl.
- Post site works monitoring levels ranging between 10.75m and 11.60m bgl.

The West Manchester Fault is conjectured to be present near the southwest corner of the site. It is unlikely that any significant movements are ongoing with the fault, but differences in rock strengths over a potential fault zone will require consideration during detailed design.

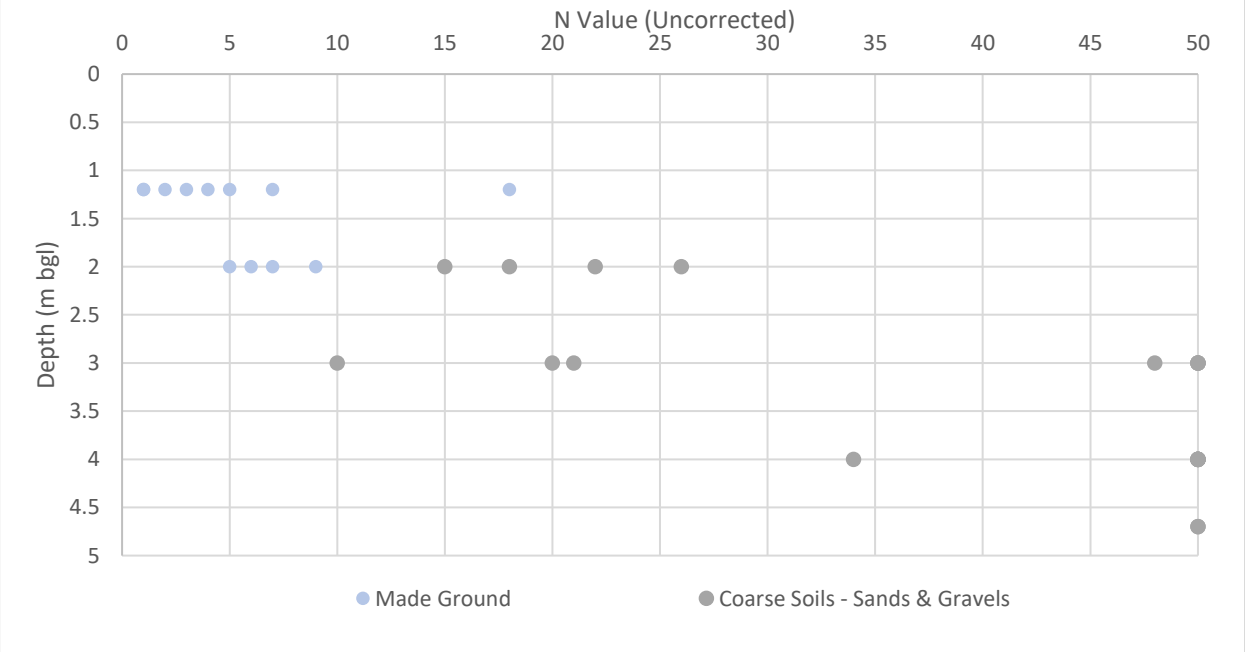
Numerous underground drainage/sewers run beneath the eastern section of the site and will need to be taken into consideration for foundation design.

A moderate UXO risk zone spans across the entirety of the site.

7.2 Design Soil Parameters

The relevant test results from the prior section have been evaluated to derive geotechnical soil parameters for the site in the following section.

Characteristic Values – Made Ground and Shallow Superficial Deposits
A depth (m bgl) vs SPT N value graph is provided below to provide a profile of the soils underlying the site.

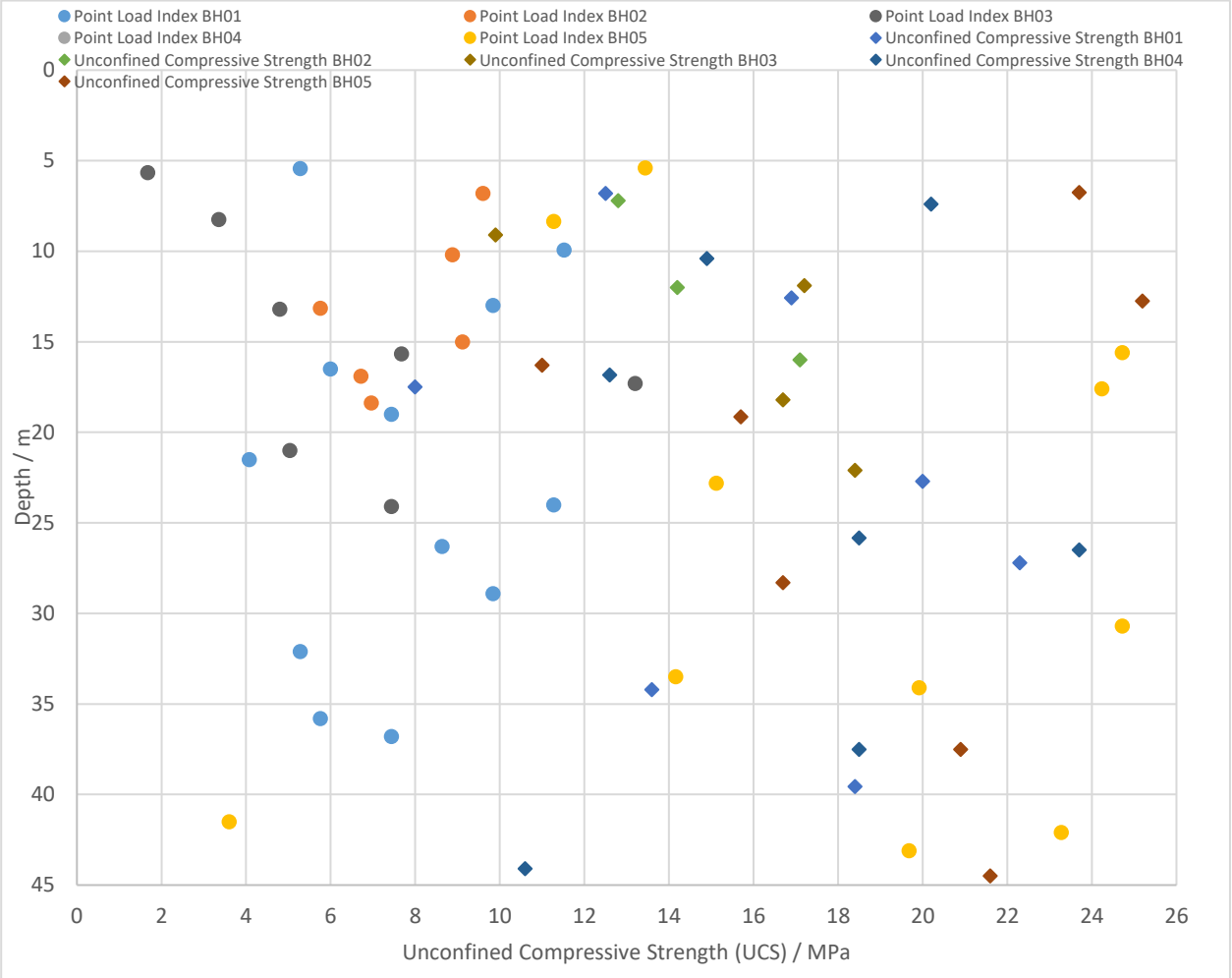


The above graph shows a general increase in soils density as depth increases within the superficial granular strata, with some slight variability between borehole locations. The majority of N values recorded in made ground were less than 10.

Given the inherent variability of the made ground, characteristic values have not been derived for this stratum. In addition, the majority of the superficial deposits will be removed from site during the construction of a basement, therefore values have not been derived for this stratum also in respect to foundation design.

Characteristic Values – Solid Geology
All SPTs undertaken in bedrock refused with an N value of 50.

The Unconfined Compressive Strength (UCS) was determined by laboratory testing and was also derived from laboratory point load testing using the relationship of UCS=24*IS50 for sandstone (ISRM). A graph showing the variation in UCS and derived UCS vs depth is presented below to provide a profile of the variation rock strengths with depth.



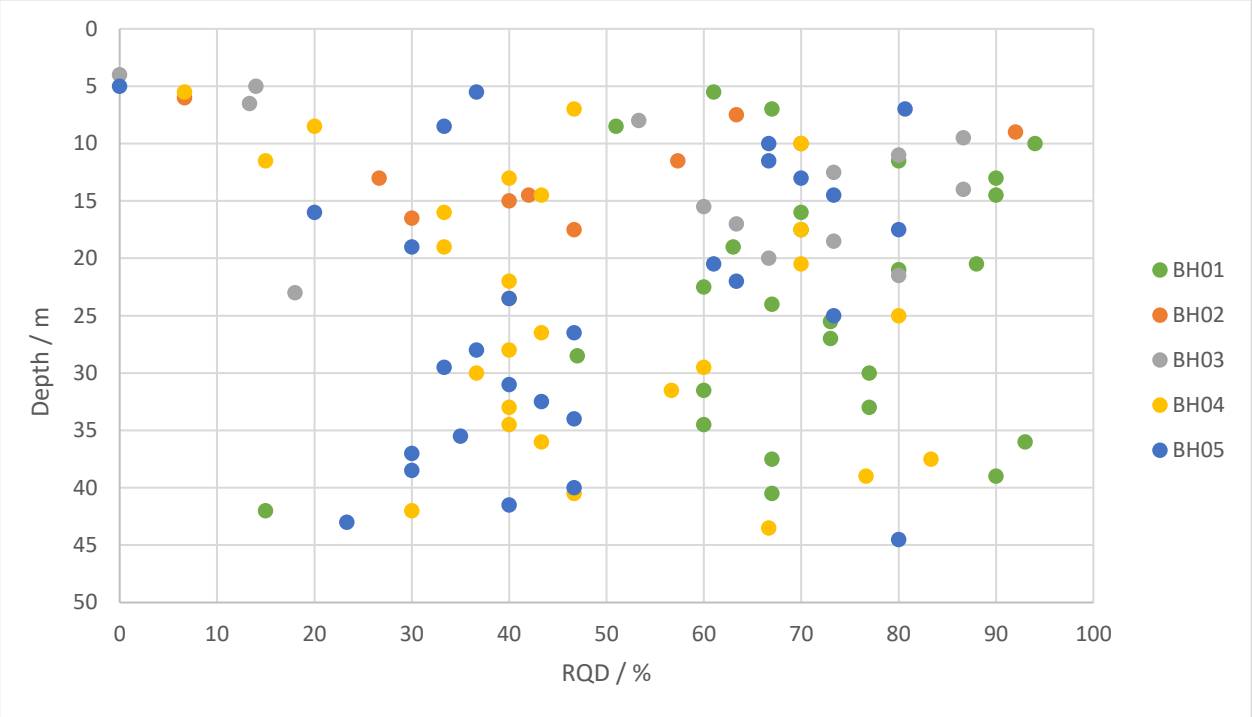
The above graph shows a weak positive correlation between an increase in rock strength with depth. This trend is strengthened with the removal of the correlated Point Load Index results from BH01. There do not appear to be any significant or definitive lower strength zones, with the vast majority of results being above 5 MPa (weak rock) as can be expected of the Chester Formation. Note there is a tendency for bias within the UCS and point load data; UCS is typically undertaken on more intact samples, whereas lower

strength area of rock tend to provide samples of rock unsuitable for UCS analysis, hence point load data is used as a proxy for UCS strengths. This should be considered during estimation of characteristic values.

Based on field strength descriptions and the laboratory testing, the characteristic UCS for the bedrock underlying the site has been derived and summarised in the table below.

Bedrock Strata	Depth (m)	Characteristic UCS (MPa)
Sandstone	10	4.5
	15	7.5
	20	11
	25	14
	30	16
	35	14
	40	19
	45	21

A graph showing the variations in RQD percentages with depth in each borehole is presented below, where RQD should be considered in respect to reduction factors for shaft resistance during detailed design (Rowe 2001).



The RQD of BH01, BH02, BH03, BH04 and BH05 averaged 70%, 47%, 59%, 47% and 47% respectively along the entire profile. Based on the above, the characteristic RQD values for the solid geology underlying the site at various depths have been derived, taking into consideration the averages above and are summarised in the table below, selected to the nearest 5% RQD:

Bedrock Strata	Depth (m)	Characteristic RQD (%)
Sandstone	10	45
	15	45
	20	50
	25	50
	30	50

Bedrock Strata	Depth (m)	Characteristic RQD (%)
	35	55
	40	65
	45	65

7.3 Foundations

The development will comprise the demolition of the existing building and the construction of a part 41-storey, part 7-storey residential tower with ground floor commercial space in addition to a 3 level basement and is considered to be classed as Geotechnical Category 2 in accordance with Eurocode 7.

Preliminary design by calculation has been undertaken to determine the design resistance of the bearing strata in the following section. No proposed structural loads were available at the time of writing, therefore the following recommendations are provisional and should be reviewed at the detailed design stage by a suitably competent engineer.

Piles

Due to the magnitude of the column loads expected to be imposed by the proposed high rise multi-storey structure, the use of shallow foundations is not considered to be feasible. Therefore, the most suitable foundations are considered to be piles extending through the made ground and superficial deposits, socketed into the sandstone bedrock which was observed from depths between 4.00-4.70m bgl and proven to a maximum depth of 45.00m bgl.

The selection of pile type and detailed design of pile foundations is typically completed by specialist piling contractors; the following general information is provided for guidance only. Based on the information from the site investigation, a replacement type piled solution will be required, such as rotary bored piles.

To provide a guide on potential requirements, preliminary calculations were undertaken for a circular concrete pile, taking into account shaft resistance, end bearing resistance and potential effects of negative skin friction. For piles socketed into bedrock, the ultimate shaft resistance for the portion of the pile embedded in the bedrock may be determined through the following equation:

$$q_s = k_1 p_{ref} \left(\frac{q_u}{p_{ref}} \right)^{k_2}$$

In this equation, q_s is the ultimate shaft resistance in kN/m^2, q_u is the UCS value of the bedrock, p_{ref} is a reference pressure of 100kPa and k_1 and k_2 are coefficients selected from the range presented in BS 8004 as 1.0 and 0.5 respectively.

The frictional contribution of the made ground and the superficial deposits has been omitted from these calculations as these material will largely be removed from the site during the creation of the basement.

The ultimate end bearing resistance of the competent bedrock has been determined using the following equation:

$$q_b = k_3 p_{ref} \left(\frac{q_u}{p_{ref}} \right)^{k_4}$$

In this equation, q_b is the ultimate base resistance in kN/m^2, q_u is the UCS value of the bedrock, p_{ref} is a reference pressure of 100kPa and k_3 and k_4 are coefficients identified in BS 8004 as 15 and 0.5 respectively for cemented materials. The design base resistance may be limited by the compressive strength of the concrete used to construct the pile or the structural capacity of the pile itself.

Following guidance provided in Rowe (2001), the ultimate bedrock shaft resistances should be reduced by a suitable factor to account for discontinuities in the rock mass. Adopting a conservative characteristic RQD of between 45% and 65%, BSL has adopted a reduction factor of 0.6 for the ultimate shaft resistance in the preliminary calculations.

Based methodology outlined above, the preliminary estimated factored allowable loads for a single circular concrete pile, to be socketed into sandstone bedrock of variable lengths and a variety of diameters (based on standard rotary pile boring equipment) are presented in the table below. For the purposes of this assessment, pile lengths are taken from the existing surface level. A global factor of safety of 3 has been used in this assessment for conservatism. The preliminary allowable loads are shown in the table below. Note these recommendations are provisional and subject to review at the detailed design stage.

Pile Length (m)	Embedment into Rock (m)	Allowable Loads (MN) for Specified Pile Diameters	
		600mm	750mm
30	25	19.8	25.4
35	30	36.7	46.4
40	35	59.5	75.0

These calculations have been based on a single pile, it is likely that piles will be installed in groups and the group action of the piles should be considered.

Supplementary boreholes are also proposed and the recommendations within this report should be updated once information from those boreholes is available.

During the construction phase supervision should be on a continuous basis to check the design assumptions are correct and construction conforms to design. Supervision should include inspections, Control Ground Investigations and monitoring. If the ground conditions encountered during the construction phase differ significantly to the conditions encountered during construction, work should cease and BSL contacted for further advice.

Trial piles are recommended to verify design assumptions including confirmation that a reasonable socket length into bedrock can be achieved used the proposed rig. Load testing can also be completed on trial piles to confirm a final design, verify that the design resistance can be achieved and confirm settlements are within the required parameters.

A conjectured outcrop of the West Manchester Fault is indicated to cross the south-west corner. The fault trends northwest -southwest with the downthrown side to the north-east. The potential presence of this fault, and possible impacts on pile emplacement alongside differential settlements should be considered during the detailed design stage. BSL have contacted a number of piling contractors (Van Elle, Keller Group and Bachy Soletanche) for general advice on piling through a potential geological fault, where feedback suggested it would be important to ascertain if any significant reduction in rock strength in a shear zone area existed. Where hard rock is underlain by weaker fractured rock, this may impact the auger during drilling and require further casing. The angle of the fault may also impact drilling works. Furthermore, there would be the potential for differential settlements over this zone, where a sufficient factor of safety should be incorporated into the pile design, with differential settlements generally be limited to 1% of the total pile diameter (i.e. 6mm for a 600mm diameter pile), however this would need to be confirmed with the preferred piling contractor and designer.

Whilst detailed design is beyond the scope of this report, the following general advice should be taken into consideration during the detailed design stage by a suitably competent contractor/engineer:

- Piles should extend a minimum of five pile diameters into the bearing stratum to fully mobilise end-bearing resistance and shaft resistance.
- Higher allowable loads than those listed in the table above could be achieved by increasing the diameter of the piles or by using pile groups.
- Obstructions in the ground (e.g. relict foundations) could cause piles to stop shallower than their anticipated design depth, or deviate from the vertical, therefore reducing their capacity.
- Bored piles through coarse soils will likely result in loosening, with resultant reduced shaft friction.
- The execution of bored cast-in-place piles should conform to BS EN 1536 and also any relevant standards associated with manufacturing the piles.
- In accordance with Eurocode 7 it would be prudent to verify the compressive resistance of the strata and the pile design should by static load testing on working piles 1.5 times the characteristic load on more than 1% of working piles. This will provide an accurate strength of the end bearing stratum.

Hybrid Piled Raft Solution

As a slight variance on a piled option, a raft assisted pile solution could also be adopted at the site. These solutions are typically used for large structures such as high-rise buildings.

Piled-raft behaviour is complex and basic empirically derived calculations are unlikely to provide the degree of precision required for settlement estimation. Therefore, if a piled raft solution is to be explored, BSL recommends that detailed analysis is carried out using finite element methods (e.g. modelling using PLAXIS). This should be undertaken by a suitably competent engineer. During the design process, the optimum number and position of piles, as well as their diameter, reinforcement and length, will need to be determined to ensure the stability of the structure, while providing an economical solution, with the raft and piles acting together to ensure the required settlements are not exceeded. It is envisaged the piles would provide most of the stiffness while the raft provides additional capacity at the ultimate loading end.

Other Considerations

Working Platform

Prior to the commencement of piling works, a working platform will be required for tracked plant. This should be designed and installed in accordance with BR470 (BRE 2004) based on the plant requirements, data and rig loadings.

UXO

Based on the available information to date, specialist UXO advice and/or supervision will be required for all groundworks, including piling.

Piling Risk Assessment

A risk assessment is likely to be necessary for piling, as there is a possibility that this could lead to creation of new pathways for migration of contamination.

7.4 Building Near Trees

Due to the presence of non-shrinkable granular soils beneath the entire site, it is not considered that special precautions will be required in respect to trees. Should any clay soils be identified on site during construction, then this should be reported to the Geotechnical Engineer immediately and remedial actions agreed.

7.5 Floor Slabs

A basement is due to be incorporated into the structure, whereby the basement floor slab should effectively be supported by and suitably tied into piles. The following general criteria should be considered during design:

- Any fill beneath the slab is suitable, well-compacted granular material placed in an appropriate thickness in accordance with a suitable specification with the end performance validated.
- Any compressible or unsuitable materials are excavated and either improved or removed and replaced with suitable materials.
- The final floor slab design should be of sufficient thickness and sufficiently reinforced to accept the envisaged applied loads, without unacceptable total or differential movement.
- As the slab will be below ground level, waterproofing requirements will require consideration; the effects of hydrostatic uplift on the slab may also require consideration, with recorded post site works groundwater levels ranging between 10.75m and 11.60m bgl (24.58m and 25.57m AOD).

7.6 General Site Preparation and Construction

The existing structures will need to be demolished and relict foundations/infrastructure grubbed out. Under existing proposals, all made ground and superficial deposits will be removed from site to facilitate the construction of a three-storey basement.

There are a number of services crossing the site. To allow construction, all services will need to be disconnected and any suspected dead services are confirmed as dead by testing.

Instability of the made ground and natural granular soils should be allowed for. All excavations should be carried out in accordance with CIRIA Report 97 'Trenching Practice'. Temporary support should be designed in accordance with BS 5975 "Code of practice for temporary works procedures and the permissible stress design of falsework".

Excavation depths should generally be readily achieved using conventional plant (JCB or similar) although high specification plant (tracked 360° or similar) is recommended to maintain the build programme. Breaking equipment may also be required locally to penetrate old foundations associated with former construction.

Groundwater and Construction
Recorded post site works groundwater levels ranged between 10.98m and 11.60m bgl (24.58m and 25.57m AOD) and there is the potential to encounter the groundwater table during basement excavations.

During 2017, BSL note that two packer tests were undertaken by WSP within borehole D2 (situated on the car park next to the Synagogue) at 7m and 12m bgl. The mean hydraulic conductivities derived from the tests were $1.7x10^{-9}$ ms^{-1} and $2.1x10^{-6}$ ms^{-1}, respectively. It was stated that the dominant control on the hydraulic conductivity of a rock mass is the frequency and condition of discontinuities; therefore the test results may indicate an increase in the frequency of discontinuities with depth or a change in the degree of weathering / condition of discontinuities i.e. more open joints or less infilling or mineral coating.

Taking the above into consideration, a specialist dewatering contactor should be consulted for advice in this instance. Further guidance is provided in CIRIA C750 "Groundwater Control: Design and Practice". It should be noted that groundwater levels will vary seasonally and the timing of construction may influence requirements.

7.7 Basement Construction

A basement structure is proposed beneath the majority of the proposed building. Depths to the base of the existing structure are approximately 2.50m bgl.

Based on the proposed development layout, the excavations for the basement will likely encounter made ground down to approximately 2.85m bgl, overlying natural sands to a maximum depth of between 4.00m and 4.70m, in turn overlying sandstone bedrock. As stated above in Section 7.6, there is the potential to

come into contact with groundwater during excavations and a specialist dewatering contractor should be consulted for advice.

The following points need to be considered in the design and construction of the basement:

- The method of excavation of materials within the basement.
- Temporary and permanent support of the excavation.
- Groundwater levels, control and water proofing of basement sidewalls/base.
- Active pressures from groundwater and the surrounding earth acting on the sidewalls/base.
- Potential settlement of adjacent structures or infrastructure due to ground deformation or dewatering.
- Differential settlement between the basement structure and other foundations or floor slab elements.
- Cut and fill requirements across the wider site.
- Floor heave/settlement.

It is likely that embedded retaining walls would be the most suitable option for constructing the basement using temporary support, where one advantage is that they could be incorporated into the foundation design for the proposed structure. This could include either a contiguous or secant piled wall or a diaphragm wall.

The selection of the type of embedded retaining wall, will depend on a range of factors such as environmental constraints, including noise and vibration, as well as cost.

The retaining basement walls which are incorporated into the structure will need to be designed by an engineer, taking into account the ground conditions and the serviceability requirements of the scheme. Specialist advice should be sought on all aspects of the construction.

Methods of water proofing basements and below ground structures are detailed in BS 8102 (2022), "Code of practice for protection of below ground structures against water from the ground".

Any water from excavations should be treated either prior to construction or during the operation of the site in accordance with the relevant permits and licences.

Temporary support should be designed in accordance with BS 5975 "Code of practice for temporary works procedures and the permissible stress design of falsework".

The design of the basement should also take into account ground gas protection measures, although at present none are required. A full assessment will be made upon completion of the ground gas monitoring programme.

7.8 Concrete Classification

The soluble sulphate and pH test results have been assessed in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005. The Design Sulphate (DS) classification and the Aggressive Chemical Environment for Concrete (ACEC) classification are presented in the table below.

For the purposes of this assessment, the made ground and natural strata is considered to be relatively permeable, therefore the groundwater has been classed as mobile.

Stratum	No. Samples	Characteristic SO_4 (g/l)	Characteristic pH	DS Class	ACEC Class
Made Ground	10	2.23	7.70	DS3	AC-3
Natural Superficial Strata	10	0.08	7.50	DS1	AC-1
Sandstone Bedrock	6	0.07	7.55	DS1	AC-1

Previous investigations onsite also determined the sandstone bedrock to be classified as DS1.

Based on the above, the results of laboratory pH and sulphate content, alongside the BRE full suite tests, indicate that sulphate class DS-3 and ACEC Class AC-3 conditions prevail for the made ground soils, sulphate class DS-1 and ACEC class AC-1 for natural soils and sulphate class DS-1 and ACEC class AC-1 for bedrock, in accordance with BRE Special Digest 1 "Concrete in aggressive ground" 2005.

The specific concrete mixes (the Design Concrete Class) to be used on site will be determined by the site-specific concrete requirements in terms of the durability and structural performance. These are assessed in terms of the Structural Performance Level (SPL) and any need for Additional Protective Measures (APM) detailed in Part D of BRE Special Digest 1 with further guidance in Pt E and F.

7.9 Highways/Pavement Design

No dedicated highways will be included on this scheme which will be wholly covered in the proposed structure.

Where required for temporary structure placement of construction access roads, equilibrium CBR values in the existing made ground may be assumed as 2%, subject to confirmation via in situ testing. For the construction of the basement, all made ground and superficial deposits will be removed from the site therefore no CBR values have been provided for these materials. Where fill materials are imported to form a base for structural slabs and highways, they should be placed to an appropriate engineering specification to achieve the desired design CBR value.

7.10 Site Drainage

Much of the site will be covered by structures/hardstanding, which precludes the use of a large underground soakaway drainage. It is anticipated that surface water would need to be positively drained into the off site existing sewer network, subject to agreement with the local utility provider.

8.0 GEO-ENVIRONMENTAL RISK ASSESSMENT

8.1 Introduction

The samples were tested for an assessment of the chemical contamination that may pose a risk to human health. The results were examined with reference to a selection of guidance documents as detailed in Appendix A. In this case the LQM/CIEH S4ULs and DEFRA C4SLs for a commercial end use have been adopted as Tier 1 generic screening values, due to the currently proposed commercial space occupying the ground floor of the structure. No viable pathways from soils are considered to exist to the hotel residents in the floors above.

The apparent exceedance of the relevant screening value is taken as indicating further detailed assessment or remedial action is required.

A summary assessment sheet is presented in Appendix C alongside the chemical test results. Results are discussed in detail in the sections below.

8.2 Soils Test Results and Risk Assessment – Human Health

The following elevated metals were detected during this investigation:

Exploratory Hole	Depth (m)	Stratum	Metal	Concentration (mg/kg)	Adopted Screening Value (mg/kg)
WS01	0.50-0.70	Made Ground	Lead	5200	2300
BH01	0.30-0.50	Made Ground		19000	2300
	2.00-2.20	Made Ground		8300	2300

Previous investigations have also noted elevated concentrations of arsenic and lead within the made ground soils.

Asbestos
No asbestos fibres have been detected in any of the eight samples screened by BSL.

It is noted that during a previous investigation asbestos cement sheeting was identified at location D2 beneath the central eastern part of the car park by WSP, although no confirmatory testing was carried out. No other asbestos was identified in soils during previous investigations.

Poly Aromatic Hydrocarbons (PAHs)
No PAHs have been detected above the adopted screening criteria during this investigation.

Total Petroleum Hydrocarbons (TPH CWG)
No petroleum hydrocarbons have been identified above the adopted screening criteria.

BTEX and MTBE
No BTEX or MTBE compounds have been identified above the adopted screening criteria.

Volatile Organic Compounds (VOCs)
No VOCs have been identified above the adopted screening criteria.

Semi - Volatile Organic Compounds (SVOCs)
No SVOCs have been identified above the adopted screening criteria.

8.3 Summary – Human Health Risk Assessment

Based on the testing and assessment undertaken it would appear that there is localised contamination within the made ground in the north-western section of the site in the form of elevated levels of lead. This is generally in line with the findings of previous ground investigation on site, whereby lead and arsenic have been identified.

Asbestos fragments were also noted at a single location (D2) within the made ground during a historical investigation beneath the central eastern section of the car park, to east of the synagogue.

The above potentially pose a risk to human health and will require further consideration.

8.4 Controlled Waters Risk Assessment

Groundwater/surface water testing has not been carried out based on the preliminary CSM risk assessment and the site is not considered to pose a significant risk to controlled water for the following reasons:

- No significant gross or mobile contamination has been identified on site in soils based on the results obtained as a potential indicator of groundwater contamination.
- There is no indication under present conditions of significant pollution of controlled waters and conditions following development of the site will not be any worse.
- The nearest watercourse is the River Irwell over 400m away, which provides considerable distance for attenuation and contaminant degradation.
- The site does not lie within 500m of an SPZ.
- There are no groundwater abstractions within 2000m.
- There are no potable (sensitive) water abstractions within 2000m.
- The previous reporting undertaken by Ramboll (2021) highlighted minor concentrations of chromium, however, this is considered to be derived from natural background concentrations in the aquifer and not derived from site, with a low risk assessed. Minor impacts of zinc were also noted, however, this was deemed to also be of low risk, with the actual bioavailable content being unlikely to be above the GAC.

Based on the above, no further action is required, although given a piled foundation solution is to be adopted, which may lead to the creation of new pathways, the Local Authority and EA may condition that a piling risk assessment is carried out to support the assessed low level of risk.

8.5 Permanent Ground Gas and Vapours Results

Six gas monitoring visits have been carried out between the dates of 22nd December 2022 and 8th March 2023. Results are summarised in the table below:

	CH_4 (%)		CO_2 (%)		O_2 (%)		CO (ppm)		H_2S (ppm)		TVOC (ppm)		Steady Flow (l/hr)	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Peak	0.0	0.1	0.0	1.9	17.1	20.9	0.0	0.0	0.0	0.0	0.1	0.4	0.1	0.1
Steady	0.1	0.1	0.1	0.6	19.4	20.6							0.1	0.1

Notes: CH_4 = Methane; CO_2= Carbon dioxide; O_2= Oxygen; CO= Carbon Monoxide; H_2S= Hydrogen Sulphide; TVOC (PID)= Total Volatile Organic Compounds (as measured with Photo Ionisation Detector); ppm= Parts Per Million.

The highest methane concentrations were recorded within in both BH01 and BH04 (0.1% v/v), whilst the highest carbon dioxide concentrations were recorded in BH04 (1.9% v/v). No flows have been detected and the limit of detection of the monitoring device was noted down (i. e. 0.1 l/hr).

The atmospheric pressure ranged between 980mb and 1020mb over the monitoring period, of which visits were conducted over falling pressure trends.

Groundwater levels were not recorded above the response zones.

8.6 Ground Gas Risk Assessment

Basis of Assessment
In order to assess the ground gas situation and the requirement for ground gas precautionary measures at the site, guidance was taken from CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings', BS8485:2015+A1:2019 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' and CL:AIRE Technical Bulletin TB17 'Ground Gas Monitoring and 'Worst-Case' Conditions'.

Rationale and Suitability of Dataset
In accordance with CIRIA C665 and as set out in Appendix A of this report, the ground gas generation potential is considered to be **very low.** The sensitivity of the development is **low** on account of the proposed mixed end-use.

As part of this commission, 6 No. visits over 2 No. months has been carried out, which meets the minimum suggested monitoring within CIRIA C665.

As installations have been monitored under falling pressure on a number of occasions and what can be considered to be "worse case" conditions, the data set is considered to be suitable for assessment purposes and no further visits would be required – further visits would be unlikely to change the outcome of this assessment given the readings obtained under the conditions observed (as per CL:AIRE TB17 and BS8576).

Assessment of Data
As the proposed end-use is for a mixed end-use with a commercial basement and ground floor, guidance dictates that the gas monitoring results should be assessed in accordance with the Wilson and Card methodology.

The Wilson and Card methodology uses the concept of a Gas Screening Value (GSV) which is derived using the following equation: (max gas concentration / 100) x maximum steady flow.

A maximum steady flow of 0.1l/hr has been used to derive the GSVs. The GSV's for the site are presented below.

Ground Gas	Adopted Typical Flow Rate (l/hr)	Max Concentration (% v/v)	GSV (l/h)	Classification based on GSV	Typical Threshold Concentration Exceeded
Methane	0.1	0.1	<0.7	CS1	No
Carbon Dioxide	0.1	1.9	<0.7	CS1	No

The GSVs place the site the site into Characteristic Situation 1 (CS1).

Based on the data, the site should be classified as CS1, which is in line with the assessments of previous investigations.

8.7 Qualitative Risk Assessment

The CSM has been revised based on the findings of the site investigation and laboratory testing results and these are presented overleaf. Unless stated otherwise, in respect to off-site sources, only risks that are assessed as moderate and above within the preliminary CSM have been carried forward to this section, or where a previously unidentified potential source, pathway and / or receptor has been identified from the recent site works.

Human Health						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
On site Made Ground Metals, PAH's, asbestos	Root uptake, ingestion, direct contact, inhalation of dusts	End-users	Unlikely	Medium	Low	Elevated levels of metals have been detected within an isolated area of made ground in the northwest section of the site. However, the proposed development plan demonstrates that the made ground will be removed during the construction of the basement. Furthermore, the presence of hardstanding across the entire development will break the pathway to final end users. The risk is considered to be low.
On site Made Ground Metals and organic contamination	Migration into/chemical attack of water supply pipelines	Water Pipelines / End users	Unlikely	Mild/Minor	Very low	It is unlikely any contaminants within the soil/groundwater could potentially attack the clean potable water supply pipe as the development of a basement will result in the removal of the made ground from site.
Made Ground Ground Gas (carbon dioxide and methane)	Migration into confined spaces, inhalation and asphyxiation/ explosion	End-users / property / structures	Unlikely	Medium	Low	Based on the gas risk assessment, taking into account the results of the gas monitoring programme, the conditions on site and the proposed construction, the site has been classified as CS1. Therefore, the risk is considered to be low and no mitigation measures will be required.

Controlled Waters						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
Made Ground PAH's, Metals	Overland flow, / migration through saturated zone	River Irwell 433m away (Surface waters)	Unlikely	Medium	Low	It is considered contaminants associated with the made ground and other past industrial uses are unlikely to impact the River. This is due to the distance between the site and the river, and the potential for contaminants to attenuate and degrade over this distance. Therefore a low risk is posed to the river from the made ground.
	Leaching through unsaturated zone / Migration through saturated zone	Secondary Undifferentiated Aquifer (Ground-water)	Unlikely	Medium	Low	Made ground onsite will be removed during the construction of proposed basement, removing the potential contaminants from site. Furthermore, the site is currently surfaced in hardstanding, and will remain as such, which will further reduce the risk to controlled waters. The risk is considered to be low at this stage.
	Migration through saturated zone	Principal Aquifer (Ground-water)	Unlikely	Medium	Low	There are no groundwater abstraction licences or Source Protection Zones near the site. As stated above, the site will be surfaced in hardstanding and made ground onsite will be removed during the construction of proposed basement, removing the potential contaminants from site which will reduce the risk to controlled waters.

8.8 Outline Remedial Measures

The made ground onsite will be removed during the construction of the basement, which will remove the source of the identified lead contamination, alongside the previous reported arsenic and asbestos. This will effectively remediate the site, therefore no specific remedial measures are required for soils in respect to human health for the proposed end use.

Based on the proposed development plans, no soft landscaping is proposed – however should this not be the case, where soft landscaping is present a cover of "clean" subsoil and topsoil should be provided to break the pathway to site end users. This should be 450mm in soft landscaping areas (Public Open Space – POS) in accordance with BRE 465. This will allow plants to be grown and prevent undesirable soils being brought to the surface. The inclusion of a geotextile marker layer at the base or a coarse granular, 'hard dig' layer is recommended.

Prior to import or re-use of clean cover soils, they should be tested to confirm chemical suitability. After installation of the clean cover, soil depths should be verified by a suitably qualified independent geo-environmental engineer, such as BSL.

Utilities
The level of protection for the clean potable water supply pipes should be determined using the local water company risk assessment criteria in accordance with UKWIR. As the majority of the made ground will be removed, PE would potentially be suitable, subject to a risk assessment. Service corridors should be placed by over-excavation and replacement of materials with "clean" validated backfill during the earthworks in accordance with the utility providers requirements. Photographic evidence of over excavation and installation of clean corridors should be provided for validation purposes.

Waste Arisings / Stockpile Management
It is understood that excavation of made ground and natural soils across the entire site is proposed in order to construct a new basement structure. Any arisings from the excavation works should be stockpiled prior to determining an appropriate disposal route.

Segregation of materials and stockpiles should be maintained, and accurate records kept to avoid the potential for cross-contamination. Good site practice for stockpile management includes, but is not limited to:

- Damping down of the site surface, excavations and stockpiles to prevent the generation of dust.
- Stockpiles sizes should be kept to a minimum to reduce 'wind whip' causing potentially hazardous material to be blown from the pile.
- Once at the intended size, stockpiles should be "sealed" to ensure no excess materials are placed and mixed into the stockpiled to prevent cross contamination.
- Appropriate loading of plant to prevent spillages.
- Appropriate signage should be displayed so that site workers/visitors are aware of the intended use and are alerted to the potential hazards associated with the material to be stored on site.

Site won material shall be tested to confirm its chemical suitability. Contaminated material for disposal should be tested to define the most economical disposal route. These may include, but are not limited to, Muckaway, grab-hire or the use of a six wheeled wagon. In addition, any material to be imported to the site shall be tested and its suitability demonstrated prior to it being brought to the site.

Ground Gas Protection Systems
Based on the ground gas risk assessment no mitigation measures are required and no radon protection is required for new buildings at this location.

General
It is recommended that the approval of the Regulators (Local Authority /NHBC / Environment Agency) is obtained in regard to the above prior to any irrevocable action is taken at the site.

Once the above bodies have approved the above outline remedial proposals, a Remedial Strategy will need to be produced to meet planning requirements and submitted to the regulatory authorities for approval. This will also give guidance to enable a suitably qualified contractor to carry out the works.

A watching brief is recommended during groundworks for any unidentified sources of contamination. If any gross contaminated material is encountered works should cease in that area and BSL consulted.

Once remediation is complete, verification reports will need to be produced by a suitably qualified independent geo-environmental engineer, such as BSL, in order to achieve regulatory sign off.

8.9 Health and Safety Issues

During the reclamation and construction phases of the site development it will be necessary to protect the health and safety of site personnel. The risk to construction and ground workers is assessed in the table below:

Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk
Made Ground (heavy metals, PAHs, petroleum hydrocarbons)	Ingestion, direct contact, inhalation of dusts.	Construction Workers	Likely	Medium	Moderate
Asbestos	Ingestion, direct contact, inhalation of dusts.	Construction Workers	Likely	Medium	Moderate
Ground gas	Inhalation in confined spaces/trenches	Construction Workers	Unlikely	Medium	Low

Potential asbestos fragments were identified at the location of D2 during previous ground investigations. The risk from asbestos in the area of D2 should be highlighted in the method statements and site induction. If further evidence of asbestos is encountered in the soils, work should cease until asbestos control measures have been agreed and put in place. Asbestos is further discussed in Section 8.10 below.

The risk from the general made ground will be mitigated by standard PPE including gloves. Welfare facilities should be made available to wash before hand to mouth activities.

General guidance on these matters is given in the Health and Safety Executive (HSE) document “Protection of Workers and the General Public during the Redevelopment of Contaminated Land”. In summary, the following measures are suggested to provide a minimum level of protection:

- All ground workers should be issued with the relevant protective clothing, footwear and gloves. These protective items should not be removed from the site and personnel should be instructed as to why and how they are to be used.
- Hand-washing and boot-washing facilities should be provided.
- Care should be taken to minimise the potential for off-site migration of contamination by the provision of dust suppression control and wheel cleaning equipment during the construction works.
- Good practices relating to personal hygiene should be adopted on the site.
- The contractor shall satisfy the Health and Safety Executive with regard to any other matters concerning the health, safety and welfare of persons on the site.

8.10 Asbestos

The investigation of asbestos issues within structures was beyond the scope of this report. However, guidance from UK Government indicates that asbestos should be assumed to be present in buildings unless proven otherwise.

Any asbestos within structures will require removal prior to re-development. This will need to be done by a suitably qualified experienced and licensed contractor, who ensures that adequate PPE is provided to operatives, and that all the relevant legislation is adhered to.

In addition, the presence of asbestos within the ground will require a safe system of work to be set up on site, largely in relation to the location of D2 highlighted by WSP. This may include, but be not limited to:

- The use of qualified personnel where required.
- Careful segregation of stockpiles on site.
- Defining transport routes.
- Cleaning down of machinery in designated areas.
- Decontamination unit for ground workers.
- Damping down of soils to prevent dust migration.

Excavations in soils containing asbestos should comply with the CL:AIRE publication 'Interpretation for Managing and working with Asbestos in Soil and Construction and Demolition Materials' (CARSOIL) and CAR 2012. All such works will need to be agreed with the regulatory bodies (HSE and/or LA).

Additional guidance is provided within the BSL methodology Guidance Note in Appendix A.

9.0 WASTE SOIL CLASSIFICATION & ASSESSMENT

9.1 Summary

BSL have undertaken a preliminary assessment of potential excavation waste to arise from the site during redevelopment to:

- Classify the excavation waste to arise as either hazardous or non-hazardous.
- Identify the most sustainable options for the wastes to arise in accordance with the waste hierarchy.
- Provide a written description of the waste required as part of the Duty of Care.
- Provide details of "hazardous properties" to complete hazardous waste consignment note (where applicable).
- Be able to provide a basic classification report to a landfill operator (where waste is destined for landfill disposal).

9.2 Waste Classification Procedure

As described in the 'Waste Duty of Care Code of Practice (2016)' any substance or object that the holder discards, intends to discard or is required to discard is a waste. It is the responsibility of the waste producer to classify this waste. The classification process is described in the 'Guidance on the classification and assessment of waste' WM3 and aims to determine whether the waste is Hazardous or Non-Hazardous to human health and the environment.

Hazardous wastes are signified by entries where the code is followed by an asterisk, where some wastes are deemed hazardous without further assessment, which are termed "Absolute Entries" e.g. most waste oils. Alternatively, waste entries are termed "Mirror" entries that require further assessment of hazardous properties, in order to determine whether they are hazardous waste or not (e.g. soil and stones). The EWC codes relevant to excavation wastes are:

- 17 05 03* - soil and stones containing dangerous substances.
- 17 05 04 – soil and stones other than those mentioned in 17 05 03.

The Landfill Directive (Directive 1999/31/EC on the landfilling of waste, Decision 2003/33/EC and Landfill Regulations 2005) led to the establishment of a methodology for classifying wastes.

Wastes first need to be classified based on their total concentrations and classified as either hazardous or non-hazardous waste. WAC testing is only required if the end disposal route is a landfill and WAC analysis must not be used for waste classification.

Wastes can only be accepted at a landfill if they meet the relevant Waste Acceptance Criteria (WAC) for that type of landfill. A waste must comply with the WAC limits for the relevant landfill, otherwise the soil will need to be pre-treated. There are three different WAC criteria, these are:

- Inert waste.
- Stable Non-Reactive Hazardous Waste (SNRHW).
- Hazardous waste.

There are no standard set of WAC limits for non-hazardous landfill sites and each non-hazardous landfill will have its own set of criteria under which it is licenced to accept non-hazardous waste. These will need to be determined through the selected waste receiver prior to disposal.

A non-hazardous waste should not be compared with WAC limits for hazardous or SNRHW waste sites and the WAC test should only be used to determine if the waste is suitable for disposal at an inert waste landfill site. Likewise, wastes classified as hazardous based on their total concentrations should not be compared with WAC limits for inert waste landfill sites, as these will not be accepted.

Details of how material should be classified for waste disposal are presented in the BSL Methodology and Guidance in Appendix A and are summarised in the table below:

	PRIOR TO LEAVING SITE			
Classification based on Total Concentrations[1]	**Non-Hazardous Waste**		**Hazardous Waste**	
	IF SOILS CANNOT BE RE-USED ELSEWHERE AND MUST GO TO LANDFILL			
WAC testing	Below inert WAC limit values	Above inert WAC limit values	Below hazardous WAC limit values[4]	> WAC limit values
Landfill requirements	INERT landfill	NON-HAZARDOUS landfill[2]	HAZARDOUS landfill	PRE-TREATMENT[3]

1 Total concentrations are defined as tests results on solids as opposed to leachate (i.e. a liquid).
2 Individual sites may have certain limit values pre-determined in their licence.
3 After pre-treatment the material characteristics may have changed to an extent that allow the soil to be re-classified.
4 Possibility that wastes could be classified as stable Nonreactive HAZARDOUS waste in non-hazardous Landfill (e.g. soils containing low concentrations of asbestos, gypsum or sulphate bearing soils).

Waste classified as non-hazardous can be accepted into a non-hazardous landfill without having to pass any numerical WAC.

Soils above hazardous WAC limit values require pre-treatment prior to disposal. The effective pre-treatment, typically involving separation, sorting and screening, can offer cost savings through reducing the hazardous nature and volumes of soil. Costs for disposal of non-hazardous/hazardous soils are significant compared to the disposal of inert material.

Inert Waste
The possibility of automatic inert classification of the naturally occurring "clean" soils should be explored in accordance with Section 4.3 of the EA guidance document. The Council Decision includes a list of wastes in Section 2.1.1 of the document that are assumed to be inert and therefore acceptable at a landfill for inert waste without testing. This is the case if:

- They are single stream waste of a single waste type (although different waste types from the list may be accepted together if they are from a single source); and
- There is no suspicion of material or substances such as metals, asbestos, plastics, chemicals, etc to an extent which increases the risk associated with the waste sufficiently to justify contamination and they do not contain other classes of landfill.

9.3 Waste Classification and Waste Acceptance Criteria (WAC)

We have reviewed the testing results and assessed them through a waste classification database which allows users to code and classify waste as defined in the EWC (European Waste Catalogue) based on EC Regulation 1272/2008 on the Classification, Labelling and Packaging of Substances and Mixtures (CLP) and latest Environment Agency guidance (WM3 "Guidance on the classification and assessment of waste - Technical Guidance").

The samples tested were screened against assessment criteria within WM3 using the HazWasteOnline tool to assess whether they contained any contaminants in the hazardous range.

The Waste Classification Report and WAC testing results are presented in Appendix E/ The results of the waste assessment based on total concentrations are presented in the table below, alongside the WAC analysis test results.

Location	Depth (m)	Stratum	Waste Classification	WAC Analysis	Landfill	Comments
WS01	0.50-0.70	Made Ground	Hazardous	Hazardous	Hazardous Waste	HP7, 10, 14
WS02	0.30-0.50	Made Ground	Non-hazardous	Inert	Inert waste	
WS03	1.50-1.70	Made Ground	Non-hazardous	-	-	
BH01	0.30-0.50	Made Ground	Hazardous	Hazardous	Hazardous Waste	HP7, 10, 14
	2.00-2.20	Made Ground	Hazardous	-	-	HP7, 10, 14
BH02	1.30-1.50	Made Ground	Hazardous	-	-	HP14
BH03	1.50-1.70	Made Ground	Non-hazardous	-	-	
BH04	1.20-1.40	Made Ground	Non-hazardous	-	-	
BH05	0.30-0.50	Made Ground	Non- hazardous	-	-	
	1.20-1.40	Gravelly SAND	Non-hazardous	-	-	

Based on the waste classification database assessment, the majority of the made ground soils have been classified as **non-hazardous,** however, the soils within the made ground to the west of the Synagogue building have all been classified as **hazardous.**

Waste Containing Asbestos

Should soils contain asbestos, the concentration and type of asbestos identified, in addition to the chemical composition (i.e. hazardous or non-hazardous detailed above), will determine which waste code is applicable to the soils and which landfill will accept it.

Waste	Conc. by Weight (%)	EWC 2002 Catalogue Entry Code	Waste Disposal Route
Non-hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 04 (soil and stones other than those mentioned in 17 05 03*)	Non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.
Hazardous containing asbestos fibres	<0.001 - <0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.
Non-hazardous soils containing asbestos fibres	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos.
Non-hazardous Soils containing ACM (Mechanically separable)	>0.1%	17 06 05 (construction material containing asbestos) 17 05 04 (soil and stones other than those mentioned in 17 05 03*)	ACMs disposed of at a hazardous landfill authorised to receive asbestos, or in a stable non-reactive hazardous waste cell at a non-hazardous landfill authorised to receive asbestos. Soils should be disposed of at a non-hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a stable non-reactive hazardous landfill site.

Waste	Conc. by Weight (%)	EWC 2002 Catalogue Entry Code	Waste Disposal Route
Hazardous soils containing ACM	>0.1%	17 05 03* (soil and stones containing dangerous substances)	Hazardous landfill subject to achieving Waste Acceptance Criteria (WAC) for a hazardous landfill site.

The soils at WSP location D2 will likely be classified as hazardous as visible fragments of asbestos were identified at this position.

A watching brief should be maintained for evidence of Asbestos Containing Materials (ACMs), any ACMs observed should be handpicked and disposed of in accordance with current asbestos disposal regulations.

9.4 Options Assessment

Following the classification of waste materials, the options available for the waste can be considered in the context of the waste hierarchy as below:

- Onsite re-use (with or without prior treatment) under suitable exceptions/permits.
- Offsite processing for recycling or recovery e.g. screening.
- Offsite disposal (with or without prior treatment) i.e. landfill.

Where feasible, efforts should be made to retain soils for onsite re-use to minimise costs and maximise the sustainability of projects.

Based on the above, the possible options for the generation of waste soils at the site are described in the table below:

Waste Generation Source	Comments
Crush	Crushed concrete is/will be site derived from structures which had not been used for potentially contaminative activities. These should be subject to an asbestos survey and removal of asbestos as required, prior to demolition and crushing of structures. Assuming the above criteria are met, with materials containing no asbestos or ACM, crushed concrete is considered to be inert without testing. Where samples of crushed concrete have been subject to totals testing this is likely to hazardous due to pH, and where subject to WAC testing, the sulphate and TDS limits are breached, this is to be expected due to the presence of concrete.
Made Ground from site levelling/foundations excavations/services excavations	Samples of made ground from across the site have been classified as non-hazardous and hazardous for off-site disposal purposes, although should be suitable for re-use on site if required under suitable exemptions/permits.
Natural ground from site levelling/foundations excavations/services excavations	The Till may be considered suitable for re-use onsite as fill where the criteria of the WFD exception for re-use of naturally occurring soils can be met. Naturally occurring clean materials could also be exported to another site under the direct transfer scenario of the DoWCoP. Classified as non-hazardous and below inert WAC testing criteria for off-site disposal purposes.

General

If any gross hydrocarbon contaminated material is encountered during the construction phase, it is possible that this may be classified as hazardous and testing should be undertaken at that time.

Where it is necessary to dispose material off site it is recommended that materials are segregated and sufficient time is allowed to further classify the actual soil arisings that constitute the waste, including discussion with landfill sites and waste transfer stations to find the best disposal route. It is illegal to dilute and mix soils without a suitable permit.

9.5 Re-use of Soils

By definition in law, any material excavated from the ground becomes waste at the moment of excavation. If that soil (now a "waste") is then placed on another part of the development site (or used on another development site) without an appropriate materials management plan, permit or exemption being in place, by law this material is defined as "illegally deposited waste".

In order to comply with UK legislation and avoid excessive costs, if any re-use of soils is proposed on site, this should be done in accordance with the relevant exemptions or permits in place, although under current proposals the majority of soils will likely be removed and will require off-site disposal.

10.0 CONCLUSIONS

10.1 Geo-Environmental

Geo-Environmental – Human Health
The proposed development is of mixed end-use. The basement and ground floor will be utilised for commercial purposes, with the remainder of the proposed development being a mixture of offices, a hotel and residential areas. Therefore, commercial screening values have been adopted. It is noted that the majority of the proposed development will comprise hardstanding or building footprint.

Elevated lead was recorded within one location of the made ground. Previous investigations also encountered elevated lead and arsenic, alongside potential ACM fragments. However, the made ground will be removed from site during the construction of the basement which will effectively remove the source of contamination. Furthermore, the proposed development will feature hardstanding across the entire footprint of the site, therefore the risk is considered to be low and no specific further remedial action is required.

Ground gas monitoring has revealed a maximum peak carbon dioxide concentration of 1.9%v/v and methane concentrations of 0.1%v/v. Based on the gas monitoring and the ground gas risk assessment the site is classified as Characteristic Situation 1 and ground gas protection measures are not required. This is in line with previous assessments.

Geo-Environmental – Controlled Waters
The overall risk to controlled waters is considered to be low and no further action is required.

Waste
Based on the waste classification database assessment, the majority of the made ground soils have been classified as non-hazardous, however, the soils within the made ground to the west of the Synagogue building have all been classified as hazardous.

10.2 Geotechnical

Foundations
Based on the proposed development, the recommended foundation type is a replacement pile technique, such as emplacement by rotary bored methods, socketed into the competent sandstone bedrock. As a preliminary guide, allowable axial loads for a circular pile range between 19.8MN for a 600mm diameter pile with 25m embedment up to 75MN for a 750mm diameter pile with 35m embedment. Detailed foundation design should be completed by a suitably qualified specialist. Design of the basement walls should be undertaken in conjunction with the detailed foundation design.

BSL note that a conjectured outcrop of the West Manchester Fault is indicated to cross the south-west corner. The potential presence of this fault, and possible impacts on pile emplacement alongside differential settlements should be considered during detailed design by the piling contractor.

Floor slabs
The basement floor slab should be supported by piles.

Concrete classification
The results of laboratory pH and sulphate content, indicate that sulphate class DS-3 and ACEC class AC-3 conditions prevail for the made ground soils, sulphate class DS-1 and ACEC class AC-1 for natural soils, and DS-1 AC-1 conditions prevail for the sandstone bedrock in accordance with BRE Special Digest 1 “Concrete in aggressive ground” 2005.

Highways
No dedicated highways will be included on this scheme which will be wholly covered in the proposed structure.

Where required for temporary structure placement of construction access roads, equilibrium values in the existing made ground may be assumed as 2%. This should be confirmed by in-situ testing at formation level by a specialist geotechnical engineer during construction.

Drainage (SUDS)
Much of the site will be covered by structures/hardstanding, which precludes the use of a large underground soakaway drainage. It is anticipated that surface water would need to be positively drained into the off site existing sewer network, subject to agreement with the local utility provider.

10.3 Further Work

The following further work is considered necessary to progress the site to construction phase:

- Demolition Asbestos survey.
- Post demolition supplementary boreholes for geotechnical purposes only.
- Detailed foundation design by a structural engineer and piling contractor.

11.0 ABBREVIATIONS AND DEFINITIONS

GLOSSARY	
Term / Abbreviation	**Definition**
AST	Above Ground Storage Tank.
B(a)P	Benzo (a) Pyrene.
BGS	British Geological Survey.
BRE	Building Research Establishment.
BS	British Standard.
BSL	Brownfield Solutions Ltd.
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes.
CBR	California Bearing Ratio (used in pavement/highways design).
CAR 2012	Control of Asbestos Regulations (2012).
CBCB	Cheshire Brine Compensation Board.
CBCD	Cheshire Brine Compensation District.
CBR	California Bearing Ratio.
CIEH	Chartered Institute of Environmental Health.
CIRIA	Construction Industry Research Association.
CL:AIRE	Contaminated Land: Applications in Real Environments.
CLEA	Contaminated Land Exposure Assessment.
CLO	Contaminated Land Officer.
COMAH	Control of Major Accident Hazards.
Contamination	Presence of a substance which is in, on or under land, and which has the potential to cause significant harm or to cause significant pollution of controlled water. There is no assumption in this definition that harm results from the presence of the contamination. Naturally enhanced concentrations of harmful substances can fall within this definition of contamination. Contamination may relate to soils, surface water, groundwater or ground gas.
Controlled Waters	Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three-mile limit of territorial waters.
CPT	Cone Penetration Test.
CSM	Conceptual Site Model. A schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the basis of the information from the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process. The conceptual site model is initially derived from the information obtained by the preliminary investigation (i.e. the Phase I Desk Study). This conceptual model is used to focus subsequent investigations, where these are considered to be necessary, in order to meet the objectives of the investigations and the risk assessment. The results of intrusive investigations can provide additional data that can be used to further refine the conceptual site model.
DCP	Dynamic Cone Penetrometer.
DNAPL	Dense Non-Aqueous Phase Liquid.
DoWCoP	Definition of Waste Code of Practice.
DWS	Drinking Water Standard.
EA	Environment Agency.
EHO	Environmental health Officer.
EQS	Environmental Quality Standard.
GAC	Generic Assessment Criteria.

GLOSSARY	
Term / Abbreviation	**Definition**
GDR	Geotechnical Design Report.
GFR	Geotechnical Feedback Report.
GIR	Ground Investigation Report.
GSV	Gas Screening Value.
Harm	Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case of human health, including property/structures and water supply pipelines.
Hazard	Inherently dangerous quality of a substance, procedure or event.
HDPE	High Density Polyethylene.
HSV	Hand Shear Vane.
K	Modulus of Subgrade Reaction.
LCRM	Land Contamination: Risk Management (EA guidance).
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene).
LOD	Limit of Detection (for particular method adopted).
MMP	Materials Management Plan.
Mv	Modulus of Volume of Compressibility.
ND	Not Detected.
NHBC	National House Building Council.
NR	Not Recorded.
OS	Ordnance Survey.
PAH	Polycyclic Aromatic Hydrocarbon.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
PCB	Poly-Chlorinated Biphenyl.
PCSM	Preliminary Conceptual Site Model.
pH	Scale used to specify how acidic or basic a water-based solution is.
PHC	Petroleum Hydrocarbons.
PID	Photo Ionisation Detector.
PNEC	Predicted No-Effect Concentration.
Precision	Level of agreement within a series of measurements of a parameter.
PSD	Particle Size Distribution.
PVC	Polyvinyl Chloride.
Receptor	Human health, living organisms, ecological systems, controlled waters (surface waters and groundwater within aquifers), atmosphere, structures and utilities that could potentially be adversely affected by contaminant(s).
Risk	Probability of the occurrence, magnitude and consequences of an unwanted adverse effect on a receptor.
Risk Assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
SOM	Soil Organic Matter.
Source	Location from which contamination is, or was, derived. This could possibly be the location of the highest soil, groundwater or gas concentration of the contaminant(s).
SPT	Standard Penetration Test.
SVOCs	Semi Volatile Organic Compounds.
TOC	Total Organic Carbon.
TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group).

GLOSSARY	
Term / Abbreviation	**Definition**
TVOCs	Total volatile organic compounds.
UCS	Unconfined Compressive Strength.
Uncertainty	Parameter, associated with the result of a measurement that characterises the dispersion of the values that could reasonably be attributed to the measurement.
UST	Underground Storage Tank.
UXO	Unexploded Ordnance.
VCCs	Vibro Concrete Columns.
VSCs	Vibro Stone Columns
VOCs	Volatile Organic Compounds.
WAC	Waste Assessment Criteria.
WFD (in waste context)	Waste Framework Directive.
WFD (in water context)	Water Framework Directive.
Units	**Definition**
°	Degrees
Φ	Phi angle (in degrees)
g/l	Grams per Litre
Km	Kilometres
kPa	Kilo Pascal (Equivalent to kN/m^2)
$KN/m^2/mm$	Kilo Newton per metered squared per millimeter
kN/m^2	Kilo Newtons per metre squared
kPa	Kilo Pascal (Equivalent to kN/m^2)
l/hr	Litres per hour
MJ/kg	Mega joule per kilogram
MN	Mega Newton
M^2/MN	Mega Newton per metre squared
M	Metres
m bgl	Metres Below Ground Level
m OD	Metres Ordnance Datum (sea level)
µg/l	Micrograms per Litre (parts per billion)
µm	Micrometre
mb	Millibars (atmospheric pressure)
mg/kg	Milligrams per kilogram (parts per million)
mg/m^3	Milligram per metre cubed
mm	Millimetre
ppb	Parts Per Billion
Ppm	Parts Per Million

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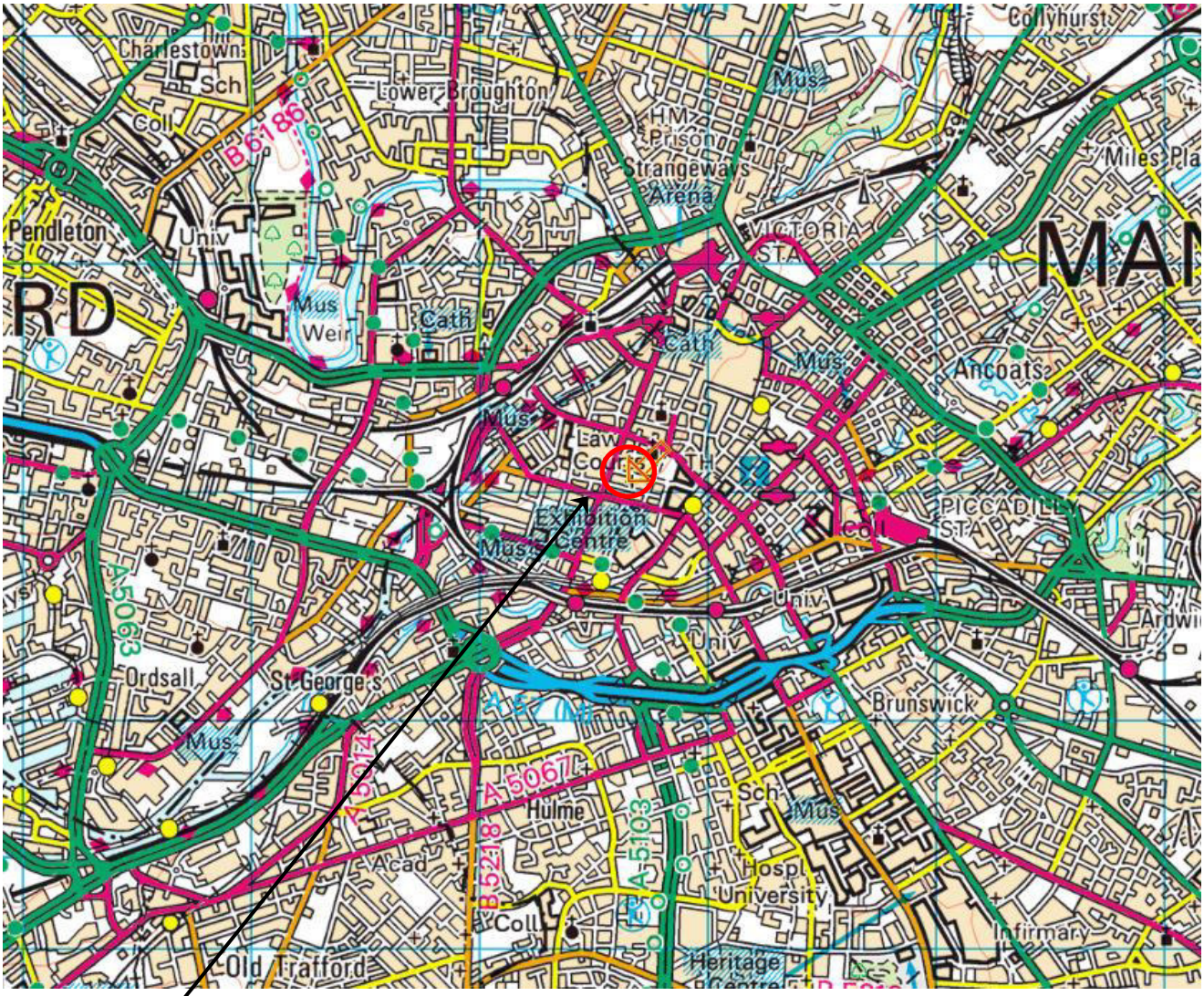
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DRAWINGS



SITE LOCATION

NEAREST POSTCODE: M2 5NH

SITE ENTRANCE WHAT3WORDS: ///middle.ears.stack



REV	DATE	DESCRIPTION	BY	CKD

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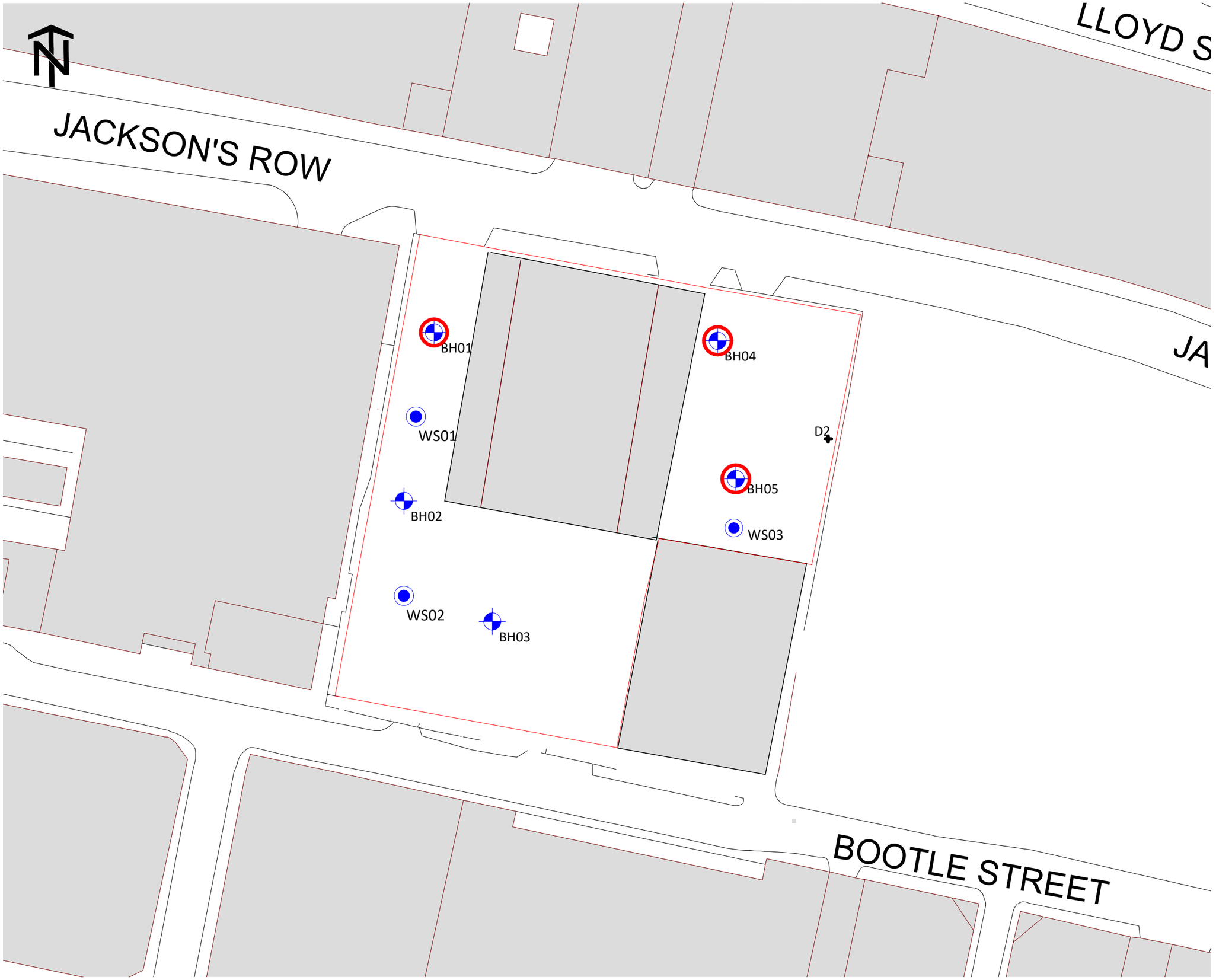
CLIENT
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PROJECT TITLE
ST MICHAELS, MANCHESTER

DRAWING TITLE
SITE LOCATION PLAN

DRAWING No.	REVISION	SCALE	DATE
C5128/01	-	NTS	03/09/22

DRAWN BY	CHECKED BY
SD	JM



KEY

- SITE BOUNDARY
- BHXX — ROTARY BOREHOLE
- WSXX — WINDOW SAMPLE
- MONITORING INSTALLATION
- D2 — PREVIOUS WSP EXPLORATORY LOCATION (POSITIVE ASBESTOS ID)

NOTES

1. ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCING WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT & ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS REPORTS. THIS DRAWING IS COPYRIGHT OF BSL.
3. DRAWING NOT FOR CONSTRUCTION PURPOSES.

REV	DATE	DESCRIPTION	BY	CKD

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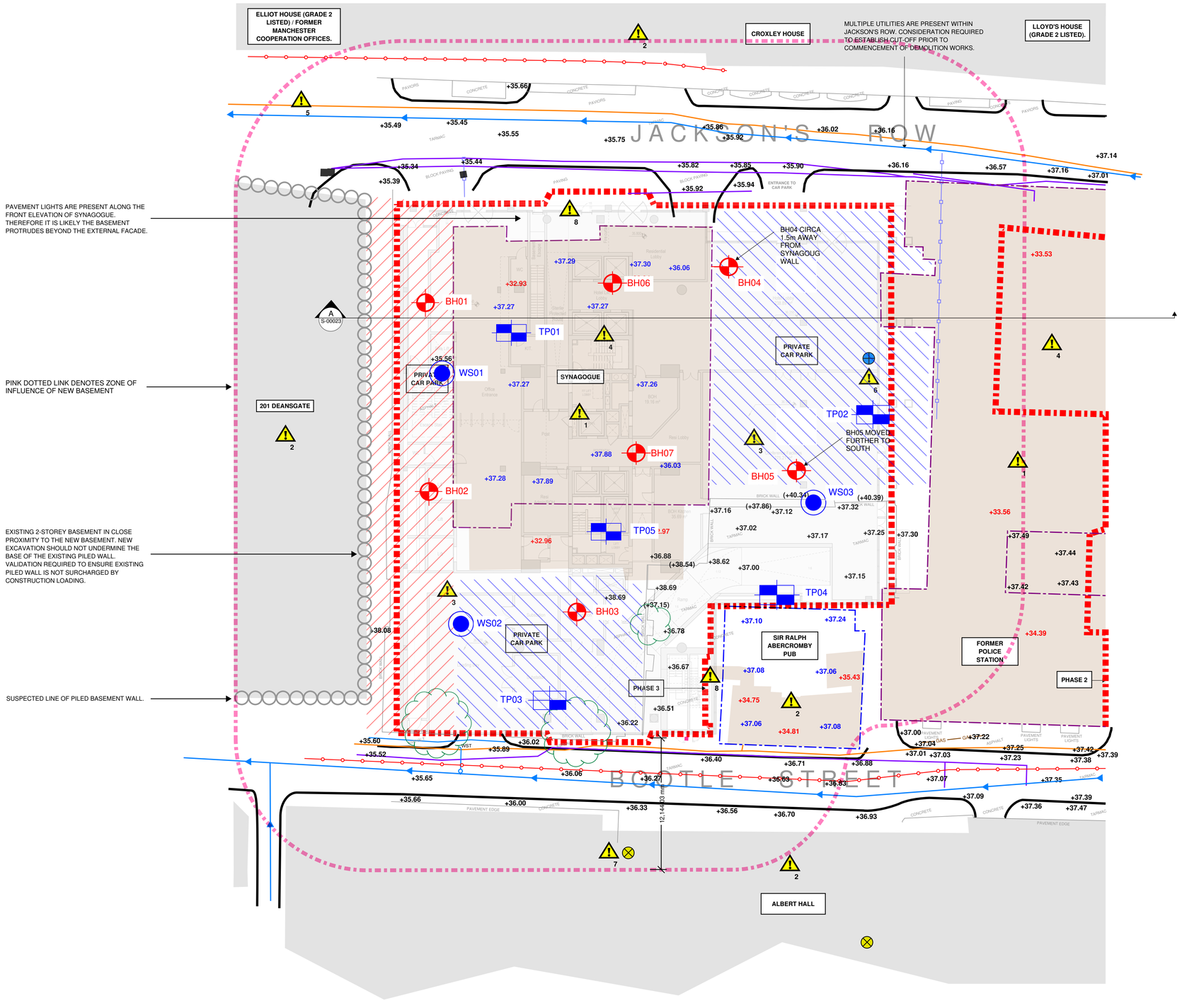
CLIENT
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PROJECT TITLE
ST MICHAELS, MANCHESTER

DRAWING TITLE
EXPLORATORY HOLE LOCATION PLAN

DRAWING No.	REVISION	SCALE	DATE
C5128/02	-	NTS	24/01/23

DRAWN BY	CHECKED BY
CGM	JM



SI TESTING KEYPLAN



GENERAL NOTES:

1. THIS DRAWING IS INTENDED TO COMMUNICATE THE SITE CONSTRAINTS AND OPPORTUNITES THAT NEED TO BE CONSIDERED WITHIN THE EMERGING CIVIL AND STRUCTURAL ENGINEERING SOLUTION. THIS WILL BE REVIEWED AND UPDATED AS THE PROJECT PROGRESSES AND MORE INFORMATION BECOMES AVAILABLE
2. THE RISKS AND OPPORTUNITES IDENTIFIED ON THIS DRAWING ARE NOT EXHAUSTIVE AND FOCUS PRIMARILY ON STRUCTUAL AND CIVIL ENGINEERING ISSUES. THESE SHOULD BE READ IN CONJUNCTION WITH OTHER DESIGN TEAM MEMBERS AND THE PROJECT SPECIFIC RISK INFORMATION.

KEY PLAN

- TREE
- APPROXIMATE EXTENT OF PROPOSED CONSTRUCTION PHASES.
- APPROXIMATE EXTENT OF BUILDING TO BE DEMOLISHED.
- APPROXIMATE EXTENT OF BUILDING TO BE RETAINED.
- INDICATES ADJACENT BUILDINGS.
- APPROXIMATE EXTENT OF EXISTING BASEMENTS.
- DENOTES EXTENT OF MISSING UTILITIES DATA.
- DENOTES EXTENT OF MISSING TOPOGRAPHIC DATA.
- DENOTES APPROX LOCATION OF BOREHOLE REQUIRED.
- APPROXIMATE LOCATION OF HISTORIC BOMB STRIKE
- APPROXIMATE LOCATION OF ASBESTOS CONTAINING MATERIAL IN THE GROUND
- +99.99 EXTERNAL SPOT LEVEL
- (+99.99) SPOT LEVEL AT TOP OF WALL
- +99.99 INTERNAL GROUND FLOOR LEVEL
- +99.99 INTERNAL BASEMENT FLOOR LEVEL

UTILITIES KEY PLAN

- VIRGIN MEDIA CABLE
- ELECTRIC
- CABLE TV
- BT CABLE
- UNITED UTILITIES SEWER
- GAS POSSIBLE GAS CABLE
- SEWER FOUL WATER

CDM RISKS

1. **EXISTING BASEMENT / REMNANT FOUNDATIONS** RISK OF VOIDS IN THE GROUND FOLLOWING DEMOLITION OF EXISTING BASEMENT.
2. **ADJACENT BUILDINGS** RISK OF UNDERMINING BUILDING FOUNDATIONS DURING BASEMENT EXCAVATION WORKS AND DEMOLITION OF ADJACENT BUILDINGS. INTRUSIVE SURVEY REQUIRED TO BETTER UNDERSTAND FOUNDATION ARRANGEMENT. VIBRATION MONITORING MAY BE REQUIRED TO MITIGATE RISK.
3. **MISSING TOPO, GROUND CONDITIONS AND UTILITIES SURVEY** CURRENTLY NO AVAILABLE TOPO LEVELS FOR THE PRIVATE CAR PARK AREAS.
4. **DEMOLITION OF EXISTING BUILDINGS AND DISPOSAL OF HAZARDOUS WASTE** CAREFUL CONSIDERATION SHOULD BE TAKEN REGARDING THE DEMILITION METHODOLOGY. INPUT FROM DEMOLITION CONTRACTOR AND STRUCTURAL ENGINEER REQUIRED TO ESTABLISH SAFE SEQUENCING OF WORK. ASBESTOS IS PRESENT IN THE BUILDING MEANING APPROPRIATE MANAGEMENT IN LINE WITH CAR 2012 IS REQUIRED.
5. **ADJACENT BUILDINGS** RISK OF UNDERMINING ADJACENT BUILDING FOUNDATIONS DUE TO CLOSE PROXIMITY TO NEW BASEMENT EXCAVATION AND DEWATERING DURING CONSTRUCTION. SETTLEMENT ANALYSIS REQUIRED TO UNDERSTAND IMPACT ON THE SURROUNDING BUILDINGS. ARCHIVE DRAWING INFORMATION OF SURROUNDING BUILDINGS IS REQUIRED.
6. **ASBESTOS CONTAINING MATERIAL IN THE MADE GROUND** APPROXIMATE LOCATION WHERE ASBESTOS WAS IDENTIFIED IN THE SHALLOW MADE GROUND
7. **LOCATION OF HISTORIC BOMB STRIKE IN CLOSE PROXIMITY TO THE SITE.**
8. **CLOSE PROXIMITY OF PILED RETAINING WALL TO BASEMENT.** EXISTING BASEMENT TO BE EXCAVATED AND BACKFILLED PRIOR TO COMMENCEMENT OF PILING.

Rev:	Description:	Date:	By:	Chkd:
P01	FOR INFORMATION	05.08.22	YE	AI

renaissance
Renaissance Associates Ltd
Carvers Warehouse
77 Dale Street
Manchester
M1 2HG

Project:
ST. MICHAEL'S MANCHESTER

Drawing Title:
SITE CONSTRAINTS PLAN

Status:
RIBA STAGE 2

Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	18.07.22	BH	-	KG

Scale: 1:200 Project No: 2203-05

Project: STM Originator: REN Volume: XX Level: XX Type: DR Role: S Category/Number: SI100 Rev: P01

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ST. MICHAELS DEVELOPMENT, MANCHESTER

S73 SUBMISSION

218739

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Interior Designer: BOWLER JAMES BRINDLEY	Synagogue Consultant: FDG fairhursts design group
Civil Engineer: curtins	Design Consultant: hodder+partners
Services Engineer: HOARE LEA	
Fire Engineer: DESIGN FIRE CONSULTANTS	
Client: STM	Landscape Designer: p-ld
	Project Manager: zerum

Architect / Structural Engineer

SOM

Skidmore, Owings & Merrill (Europe) LLP
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

STM-SOM-XX-XX-DR-A-0000

SOM Drawing No: S73-000

Revision: P03

ABBREVIATIONS

A/	Above
AOD	Above Ordnance Datum
AP	Access Panel
APT	Apartment
BAC-	Brickwork/Blockwork Accessories
BD-	Board type, see schedule
BLK-	Block/Blockwork type, see schedule
BMU	Building Maintenance Unit
BLRD	Bollard
BST	Basements steps
BT	Bathroom type
CJ	Control joint
CBD	Cupboard
CKR	Cooker
CLG	Ceiling
CLG-	Ceilings/soffit type, see schedule
CLR	Clear
CNR	Corner
COP	(Lift) Car Operating Panel
CON	Concrete
CPT-	Carpet type, see schedule
CT-	Ceramic tiling type, see schedule
CW	Curtain Wall
DFN	Deflection
DIM	Dimension
BLD	Bollard
DR	Drain
DRI	Dry Riser Inlet
DRO	Dry Riser Outlet
DW	Dishwasher
DWR	Drawer(s)
E	East, easting
EI	Fire Rating: Integrity/Insulation
EL	Evacuation Lift
EQ	Equal(s)
ERS-	External render system, see schedule
ELEC	Electrical utility cupboard
EWS-	External wall type, see schedule
EXH	Exhaust
FF	Fridge freezer
FFL	Finished floor level
FL	Fireman's Lift
FL-	Floor finish type, see schedule
GA	General Arrangement (drawing)
GA-	Gasket
GL	Grid line
GL-	Glass type, see schedule
H	Height
HIU	Heat Interface Unit
HW	Hard wood
IC	Inspection chamber, access cover
INS-	Insulation type, see schedule
INT.	Interior Design
KT	Kitchen type
LAN.	Landscape Design
LA	Landscape Architect
LV-	Louvre type, see schedule
MFR	Manufacturer
MIN	Minimum
MJ	Movement joint
MTL-	Metal finish type, see schedule
MTR-	Mortar type, see schedule
MVHR	Mechanical ventilation heat recovery
N	North, northing
NOM	Nominal(ly)
NR	Not rated
OPNG	Opening
OPH	Opposite handed
PAN-	Panel & board material, see schedule
PAS	Private Amenity Space
PBD	Plasterboard
PL	Passenger lift
PNL	Panel
PPC	Polyester powder coat(ed)
PT-	Paint type, see schedule
R	Radius
RC	Reinforced Concrete
RCH	Refuse Chute
RCP	Reflected ceiling plan
RESI	Residential
RF-	Resilient flooring type, see schedule
RFS-	Roof system, see schedule
RWO	Rainwater outlet
RWP	Rainwater pipe
S	South
SCR-	Screed
SE-	Sealant type, see schedule
SGN	Sign
SIM	Similar
SO	Sturctural Opening
SOP	Setting out point
SS	Stainless steel
SSH	Smoke shaft
SSL	Structural slab level
ST-	Stone type, see schedule
STL	Steel
STR	Storage
SVP	Soil vent pipe
SW	Softwood
T	Tread
T/	Top of
TBC	To be confirmed
TOL	Tolerance
TYP	Typical
U/	Underside of
UNO	Unless noted otherwise
UFH	Under Floor Heating Manifold
VNR-	Veneer type, see schedule
W	Wide/Width
W	West
WD-	Wood type, see schedule
WDB-	Wardrobe type, see drawings
WKTP	Worktop
WM	Washing machine
WPS-	Waterproofing system, see schedule
WP	Wind post
WTR-	Solar shading fabric
WRI	Wet riser inlet
WRO	Wet riser outlet
WV	Wood veneer

MATERIAL GRAPHIC

- EARTH
- GRAVEL / GRANULAR FILL
- MORTAR SETTING BED
- SCREED
- CONCRETE SCALES 1:500 TO 1:50
- CONCRETE SCALES 1:20 TO 1:1
- WATERPROOFING / DAMPROOFING MEMBRANE
- CONCRETE BLOCKWORK
- BRICKWORK
- STONE
- STEEL
- ALUMINIUM
- WOOD BLOCKING
- MDF BOARD
- PLYWOOD
- FINISHED SOLID STOCK WOOD
- PLASTERBOARD / CEMENT PLASTER
- BATT INSULATION
- RIGID INSULATION
- GLASS
- GASKET
- INTENSIVE GREEN ROOF
- EXTENSIVE GREEN ROOF
- VENTILATION LOUVRE
- PLASTERBOARD

ANNOTATION SYMBOLS

Symbol	Description:
SIM / A101	Detail Section Marks
WIS / 1 / A-E-236	Section Marks
Ref / 1 / A101	Detail Callouts
0	Grid Heads
Name / Elevation	Level Marker
ELE^A1^GR MACHINE ROOM	Room Tags
ELE^A1^GR MACHINE ROOM / 101 / 150 m2	Room Tags with areas and room number
	Spot Elevation Symbols - Plans
	Spot Elevation Symbols - Sections
W.P.	Workpoint
	Centre Line
	North Arrow
1	Specialty Equipment Tags
Code	Casework Tags
05-0049	Door Tags
Code / 0	Furniture Tags
	Keynote Tags
1	Lighting Fixture Tags
RISER 23 / 40-10	Multi-Category Tags
E2 / 46.2E	Wall Tags with acoustic and fire ratings
11	Window Tags
1	Revision Cloud Tags
2400 A/FFL	Ceiling Tags
	Wall and doors to be in interiors fit out package

00 View Name
1:20
View Titles

SYMBOLS

- GULLY
- STEP IN SLAB
- UPSTAND

GENERAL NOTES

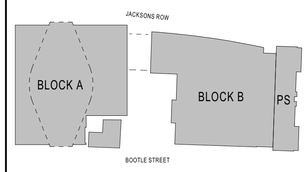
A. General

1. These drawings are to be read in conjunction with project specifications.
2. All references to codes, specifications and standards referred to in the contract documents shall mean, and are intended to be, the latest edition, amendment or revision of such reference standard in effect as of the contract documents.
3. Exceed where the contract documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the contract documents to the extent referenced. Such standards are made a part of the contract documents by reference.
4. When there appears to be a conflict between drawings and specifications; contractor to notify the architect of the discrepancy and seek clarification before proceeding with the works.
5. Project levels, ie. 7.400 are quoted Above Ordinance Datum (Ordinance Datum Newlyn).
6. Details shown are indicative of the character, profiles, materials and systems required for the work including those conditions not covered by specific details.
7. Refer to drawings of all other disciplines (structural, mechanical, plumbing, electrical, fire protection, and landscape) for additional information and coordination of work. Coordinate all work with overall aesthetic appearance of the project.
8. Where the design intent cannot be determined from the drawings or specifications, consult the architect before proceeding with the work.
9. The contractor shall visit the site and be knowledgeable of conditions thereon. The contractor shall investigate, verify and be responsible for all conditions of the project and shall notify the architect of any conditions requiring modification before proceeding with the work.
10. The owner has made available a survey of the site, existing utilities and existing construction. The survey represents all conditions known to the owner. Other construction, of which no records are available, may be encountered. The contractor shall formulate his own conclusions as to the extent of such construction, and shall notify the owner and the architect immediately if the survey appears to be at variance with the actual conditions encountered.
11. The contractor is solely responsible for properly setting out the work and for all lines and measurements for the work.
12. There shall be no manufacturer's logos, trademarks or identification on any exposed items, including doors and lifts. Only plant rooms, window washing equipment and other area not seem by the general public are exempt from this requirement.

B. Dimensioning

1. Unless noted otherwise, all dimensions are in mm.
2. Dimensions shall govern, do not scale drawings. Where there appears to be a conflict between dimensions or where dimensions cannot be determined from the drawings, consult the architect before proceeding with the work.
3. Contractor shall verify the dimensions shown on the drawings before setting out the work and be responsible for any errors or inaccuracies resulting from his failure to do so. Contractor shall also notify the architect of any discrepancies between the drawings and the site conditions encountered.
4. All core walls and partitions (ie. stairs, lift shafts, mechanical shafts and cavity/chase walls) are dimensioned to the inside face of walls relative to the clear opening requirements.
5. Exterior wall geometry elements are dimensioned to exterior face of main glazing lites.
6. Unless shown otherwise, all doors shall be located such that there is a 50-mm wall return between the jamb frame and the adjacent perpendicular wall.
7. Unless noted otherwise, typical floor elevations shown are to the top of the structural slab. Where structural slabs are depressed to receive an architectural floor finish, such as in public areas, elevations shown are to the finished architectural floor surface.
8. Unless noted otherwise, roof elevations shown on the roof plan are to the high and low points of sloped concrete fill (excluding insulation thickness), or to the high and low points of tapered roof insulation in the case of flat structural slabs.

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
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P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer

Synagogue Consultant
FDG
fdh/hurwitz design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
SIM

Landscape Designer
pia

Project Manager
zerum

Architect
SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

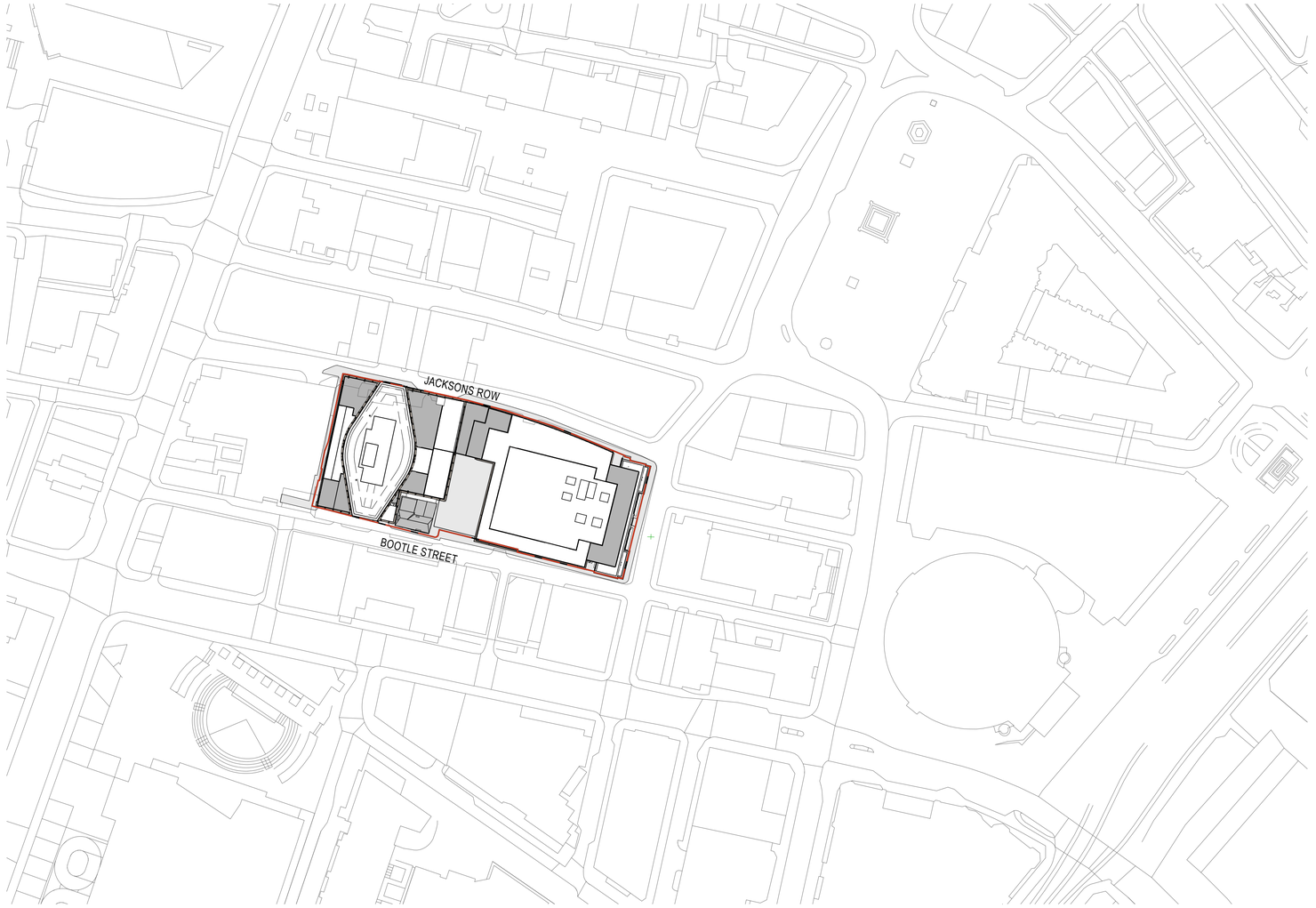
Project Name
ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title
GENERAL NOTES

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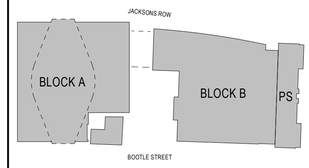
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A7 SITE PLAN

1 : 1000

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: STM

Landscape Designer: p-ie

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

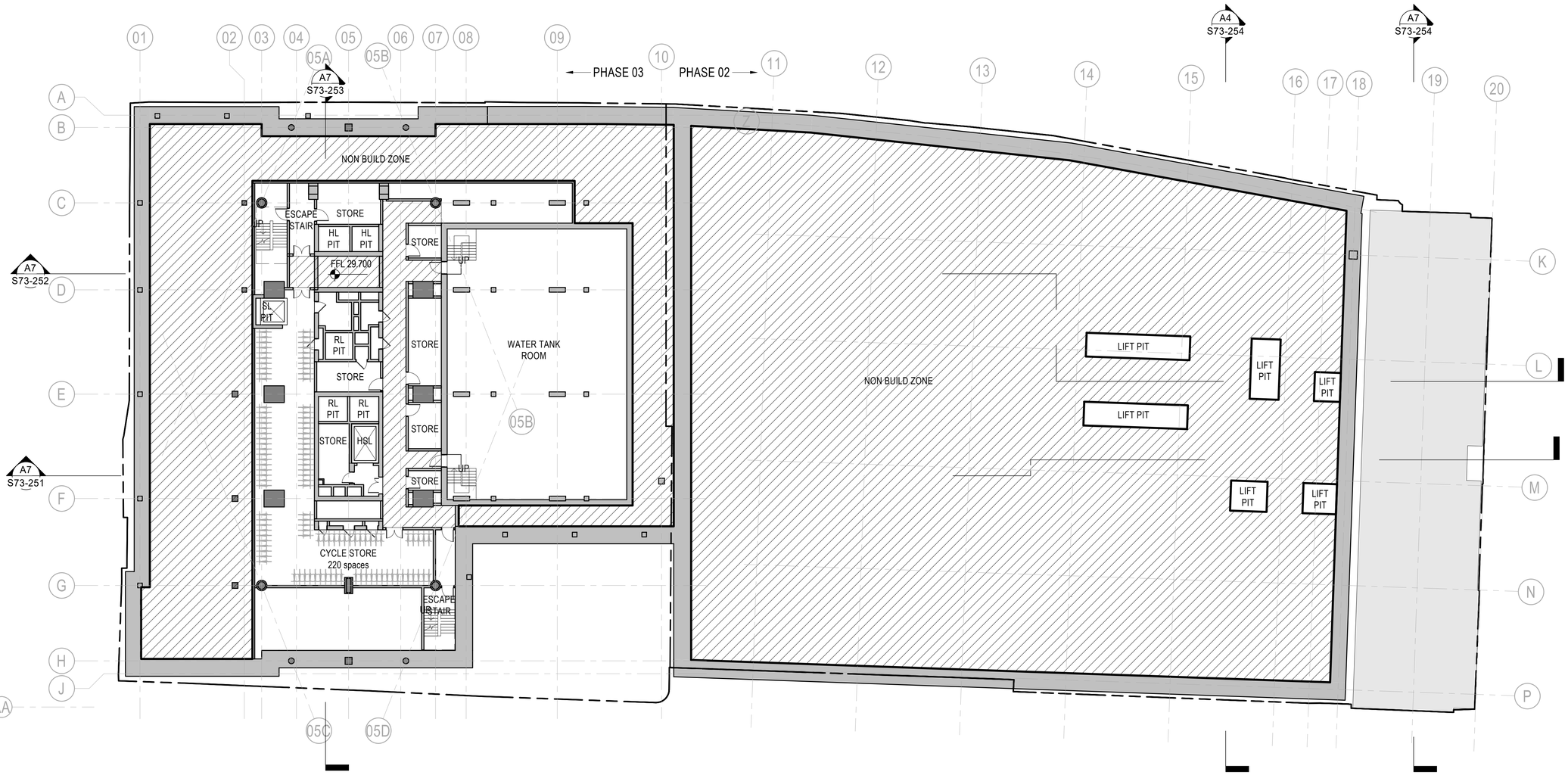
Drawing Title

SITE PLAN

Project No	Drawing No	Revision
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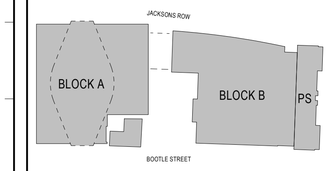


A7 LEVEL B2 PLAN

1 : 200

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: STM

Landscape Designer: pia

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

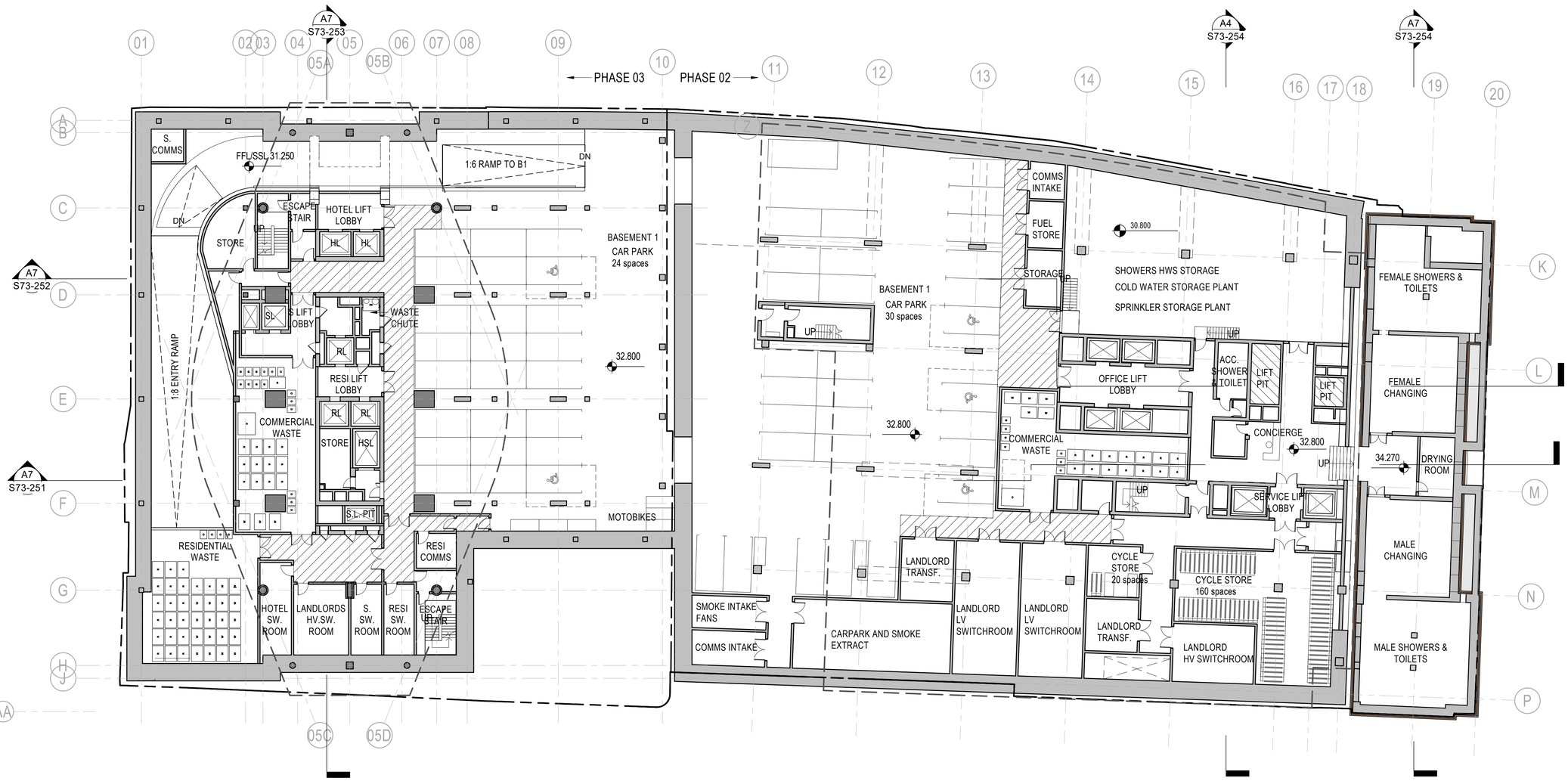
Drawing Title

BASEMENT B2 PLAN

Project No	Drawing No	Revision
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Scale @ A0: As indicated

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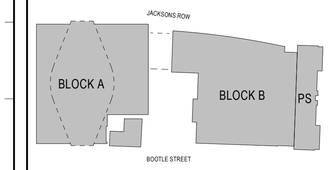


A7 LEVEL B1 PLAN

1 : 200

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhurst design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: pie

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

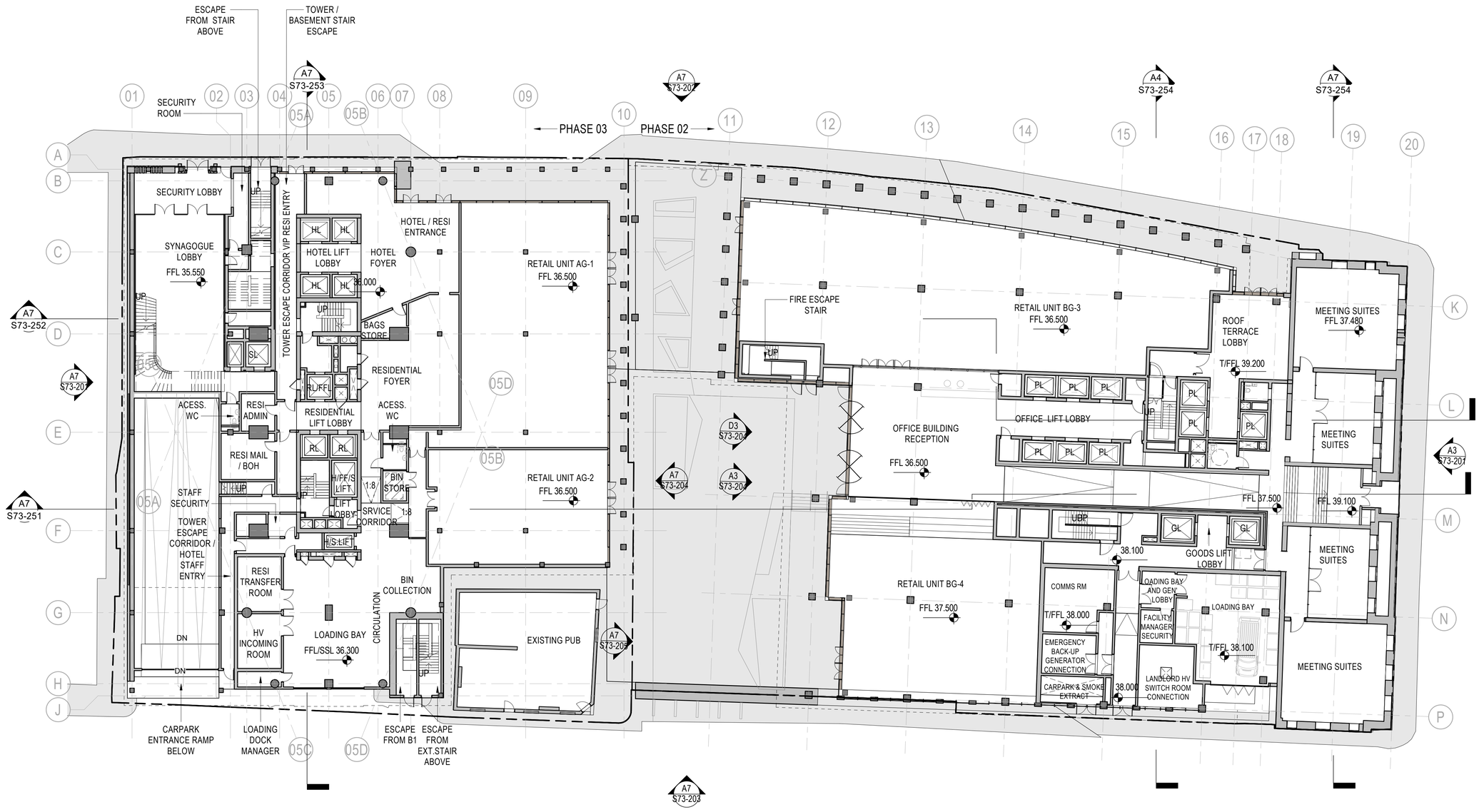
ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

BASEMENT B1 PLAN

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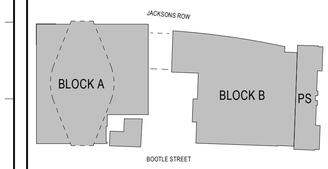


A7 GROUND LEVEL PLAN

1 : 200

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: D-12

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

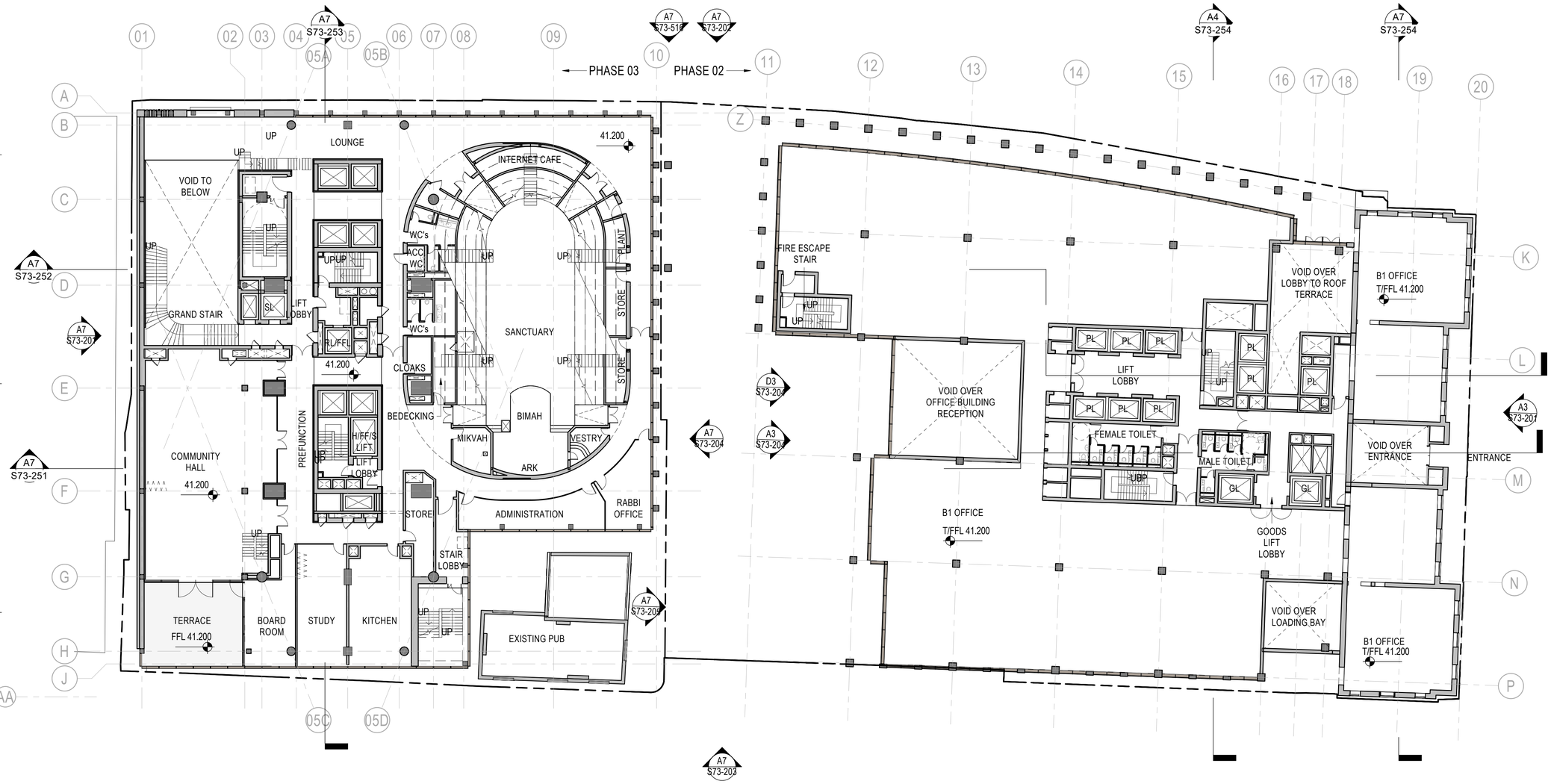
Drawing Title

GROUND LEVEL GA PLAN

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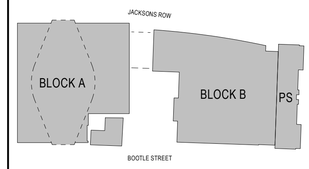


A7 LEVEL 01 PLAN

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: SIM

Landscape Designer: pie

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

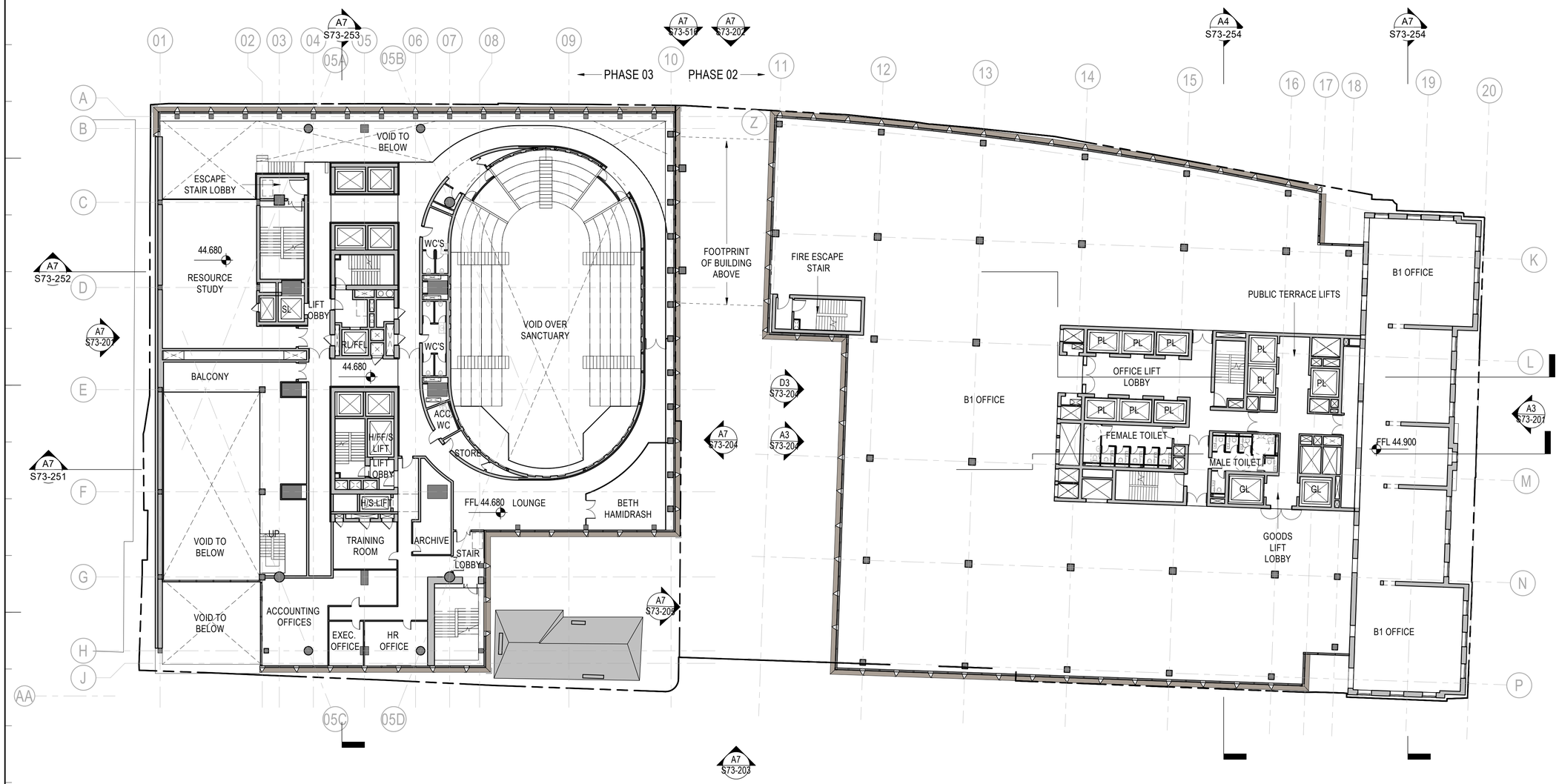
ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

LEVEL 01 GA PLAN

Project No	Drawing No	Revision
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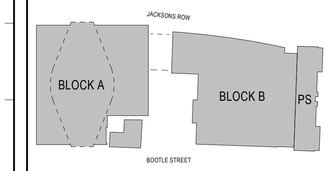
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A7 LEVEL 02 PLAN

1 : 200

Key Plan



General Notes

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P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: pie

Project Manager: zerum

Architect

SOM

Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

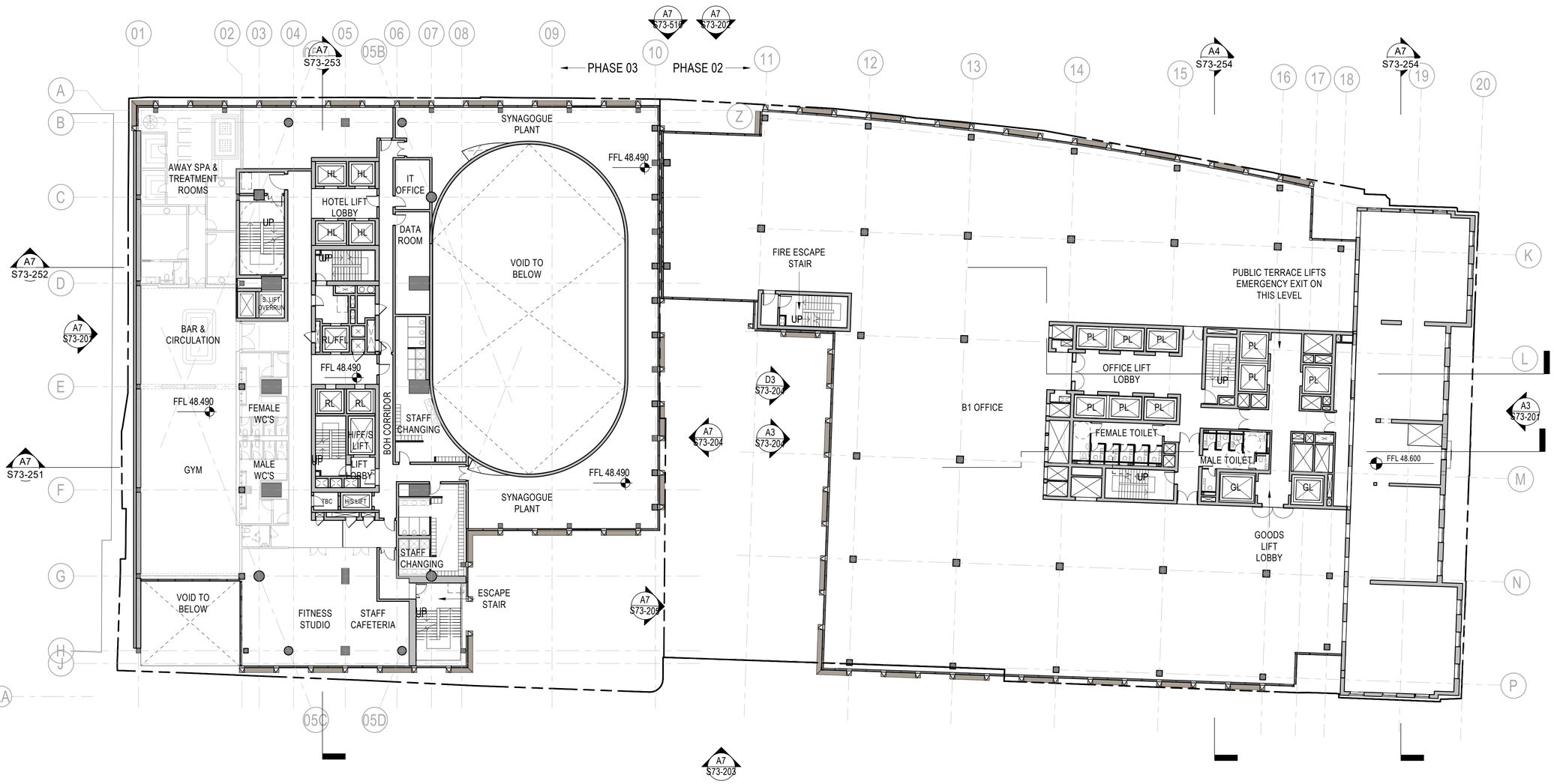
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LEVEL 02 GA PLAN

Project No	Drawing No	Revision
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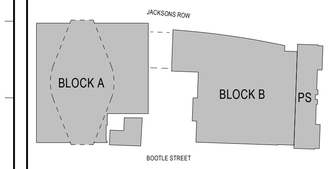


A7 LEVEL 03 PLAN

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhurst design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: STM

Landscape Designer: pre

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

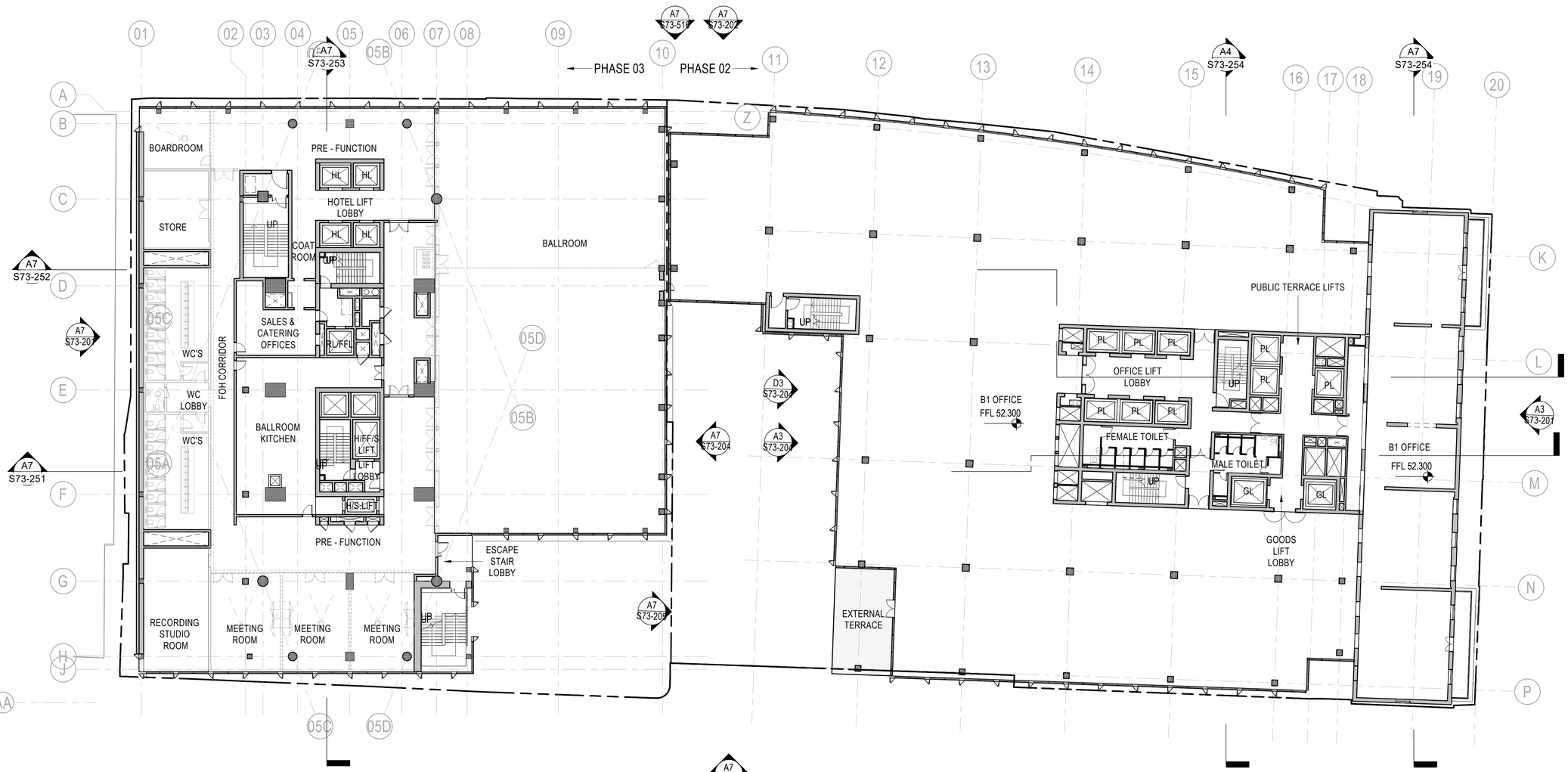
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LEVEL 03 GA PLAN

Project No	Drawing No	Revision
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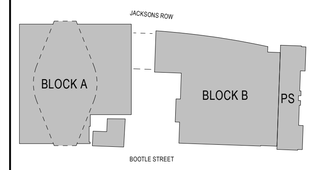


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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhurst design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: D-HE

Project Manager: zerum

Architect

SOM

Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

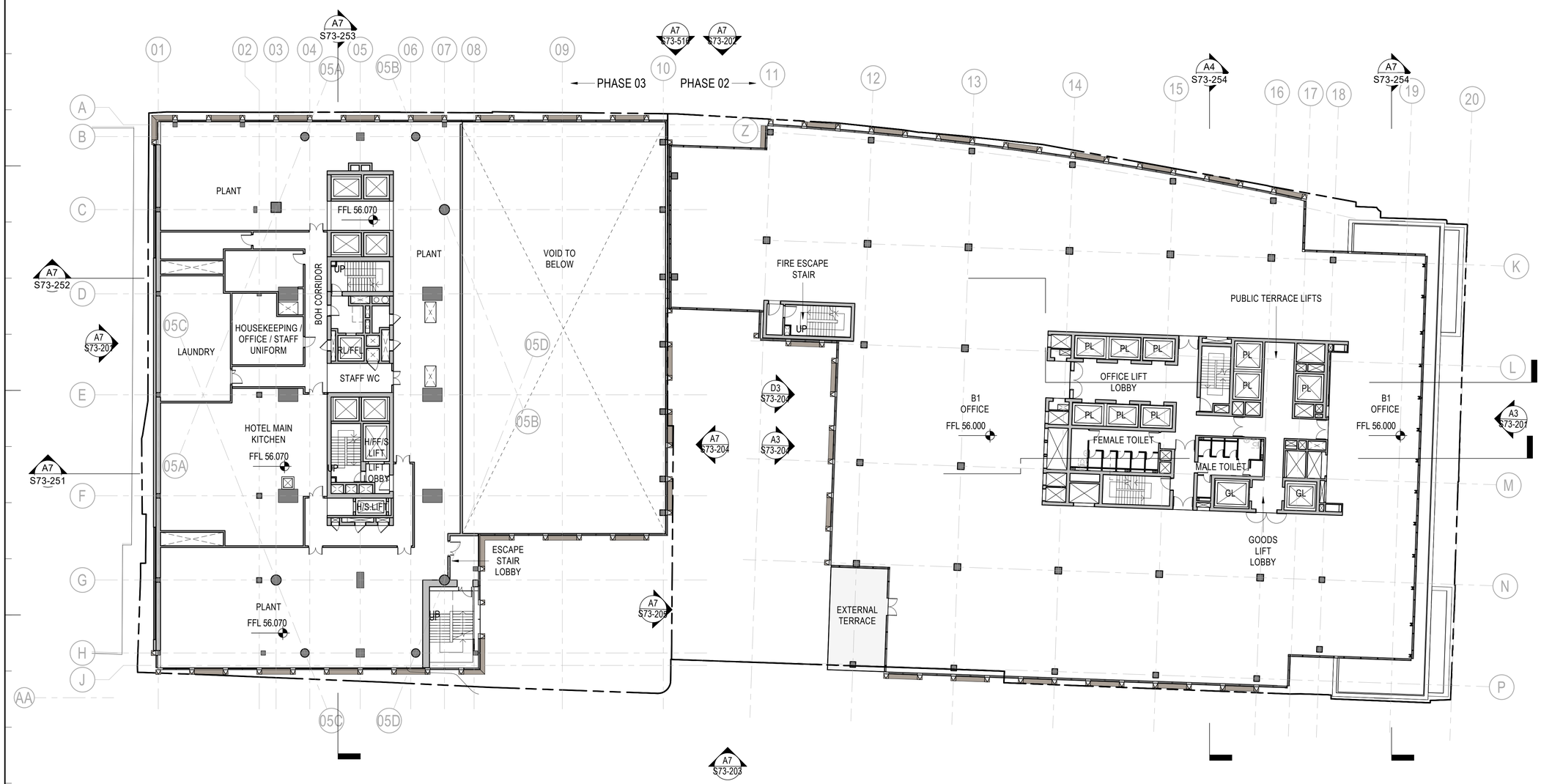
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LEVEL 04 GA PLAN

Project No	Drawing No	Revision
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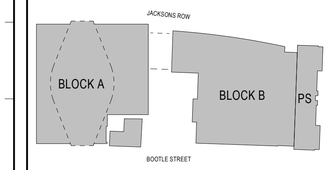


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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer
BOWLER JAMES BRINDLEY

Synagogue Consultant
FDG fairhursts design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
ST M

Landscape Designer
pie

Project Manager
zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

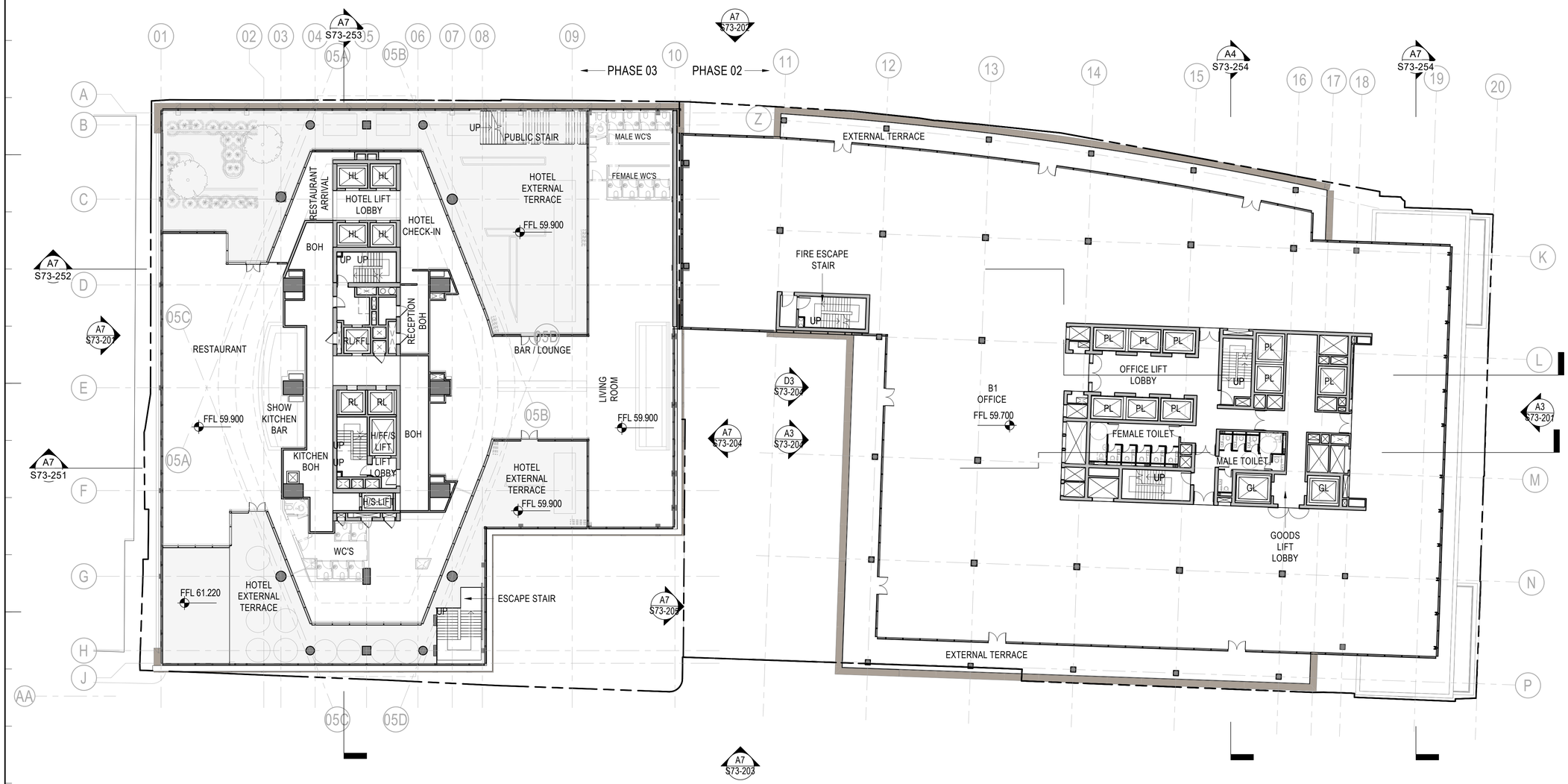
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LEVEL 05 GA PLAN

Project No	Drawing No	Revision
218739	S73-108	P03

Scale @ A0
As indicated

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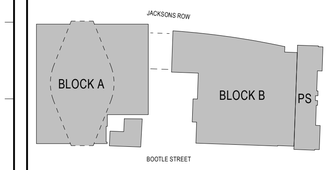


A7 LEVEL 06 PLAN

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: D-HE

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

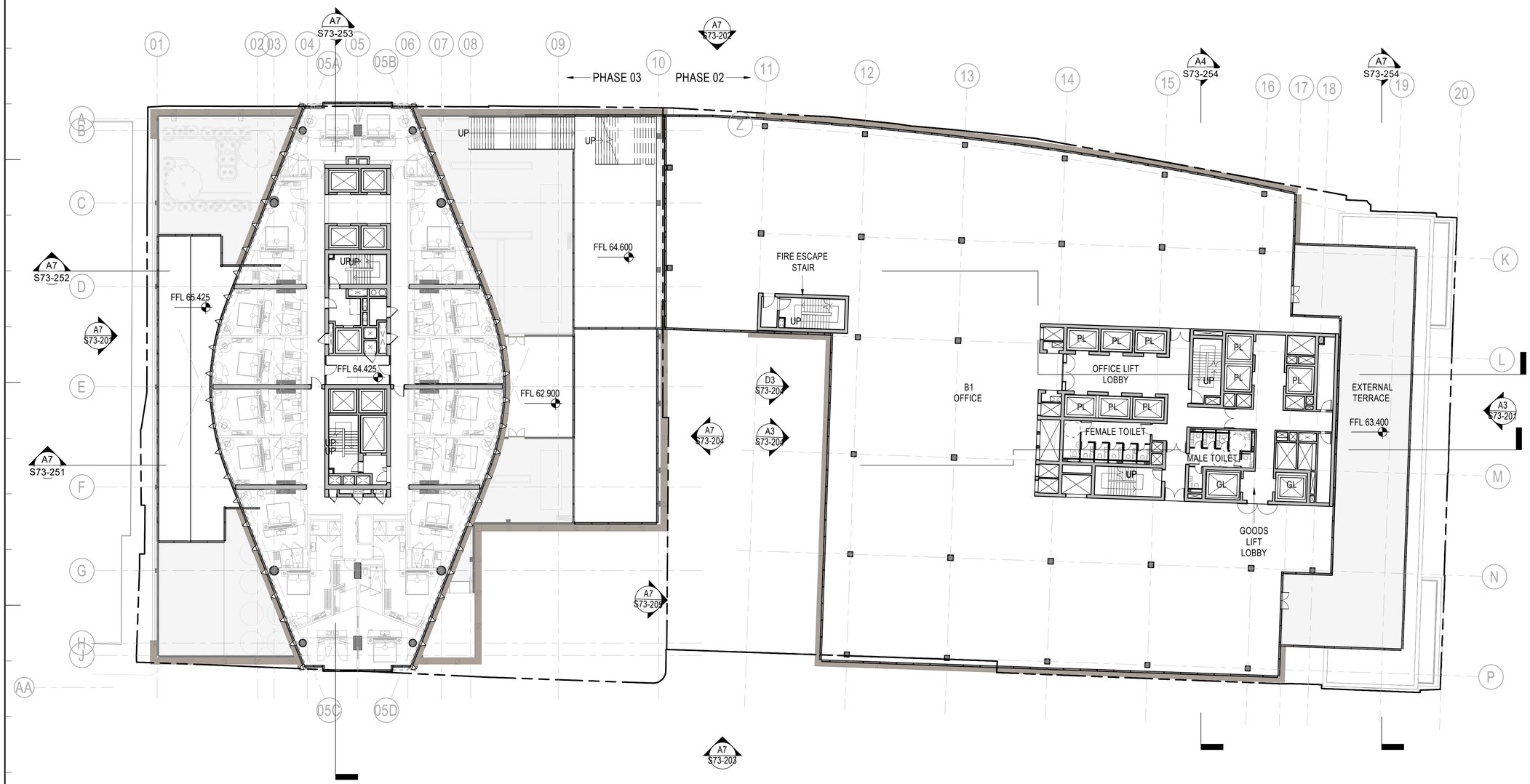
Drawing Title

LEVEL 06 GA PLAN

Project No	Drawing No	Revision
218739	S73-109	P03

Scale @ A0: As indicated

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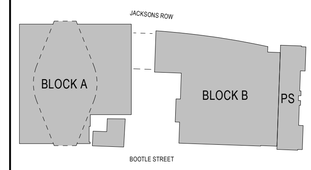


A7 LEVEL 07 PLAN

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: p-lg

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

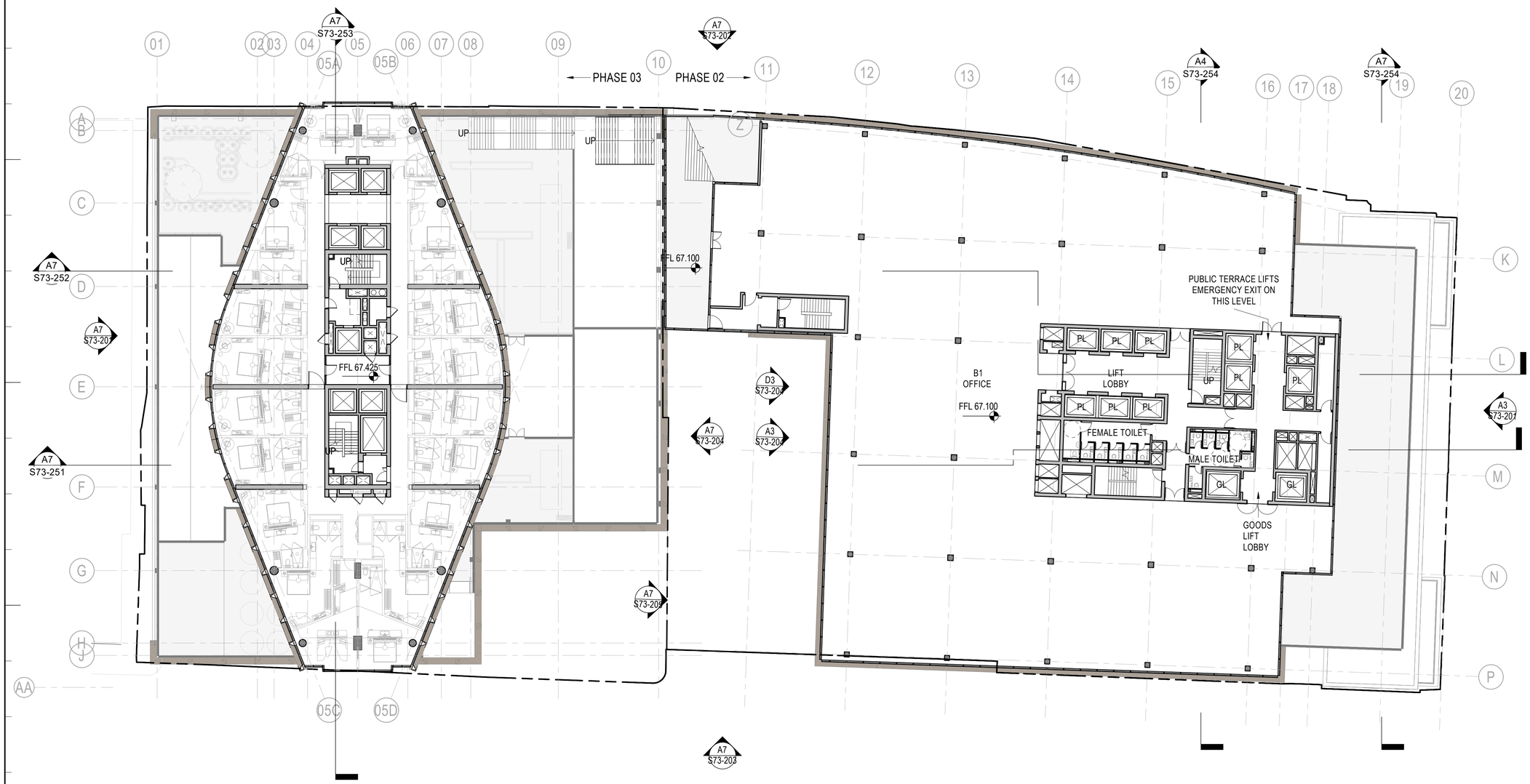
Drawing Title

LEVEL 07 GA PLAN

Project No	Drawing No	Revision
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Scale @ A0: As indicated

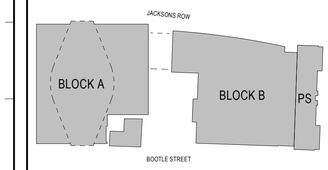
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A7 LEVEL 08 PLAN

1 : 200

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer
BOWLER JAMES BRINDLEY

Synagogue Consultant
FDG fairhursts design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
ST M

Landscape Designer
p-lg

Project Manager
zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

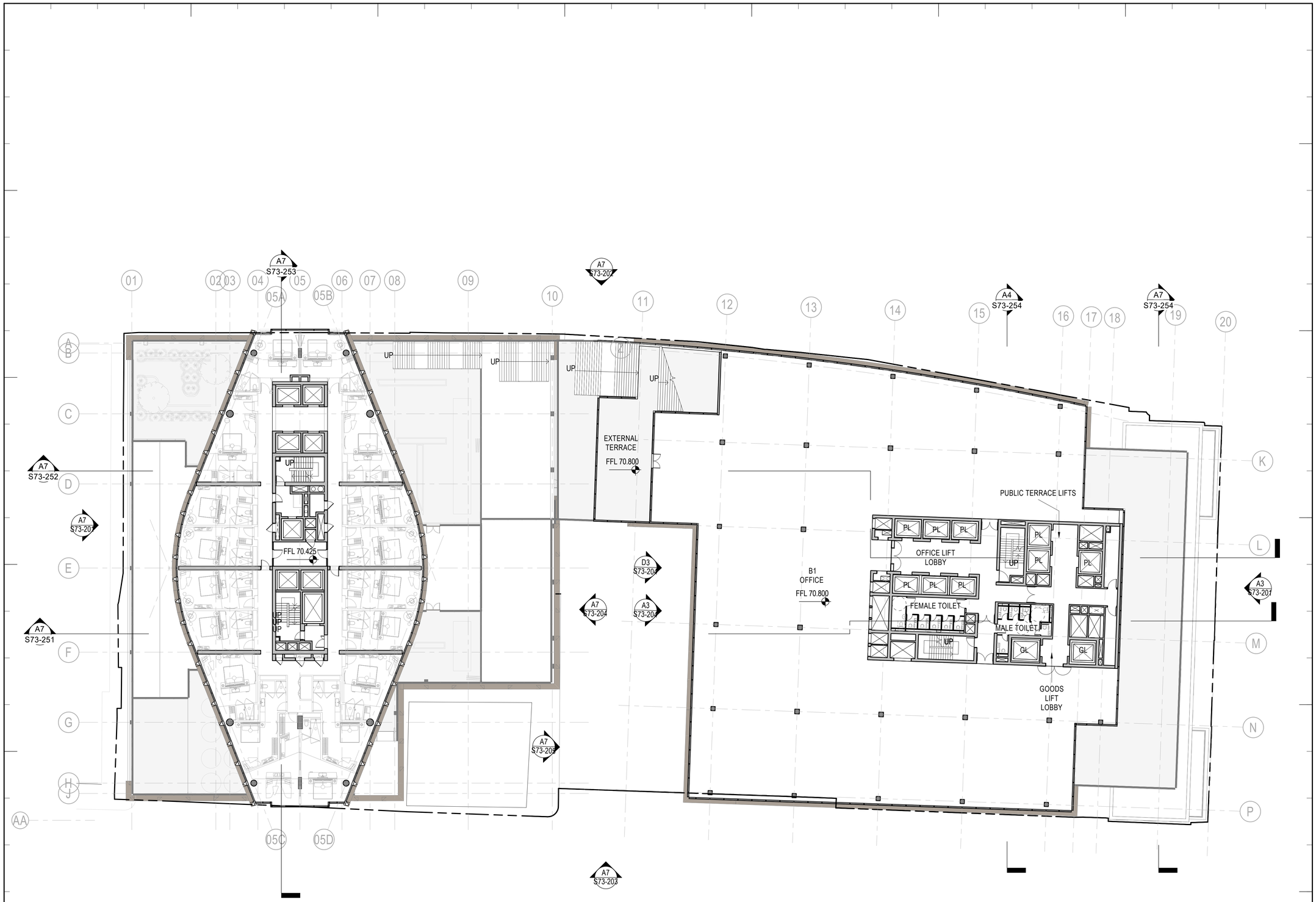
Drawing Title

LEVEL 08 GA PLAN

Project No	Drawing No	Revision
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Scale @ A0: As indicated		

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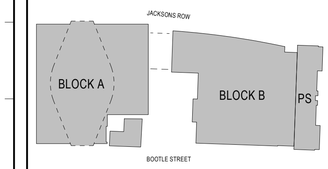


A7 LEVEL 09 PLAN

1 : 200

9/8/2021 5:27:32 PM

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: Bowler James Brindley

Synagogue Consultant: FDG fairhurst design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: pie

Project Manager: zerum

Architect

SOM

Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

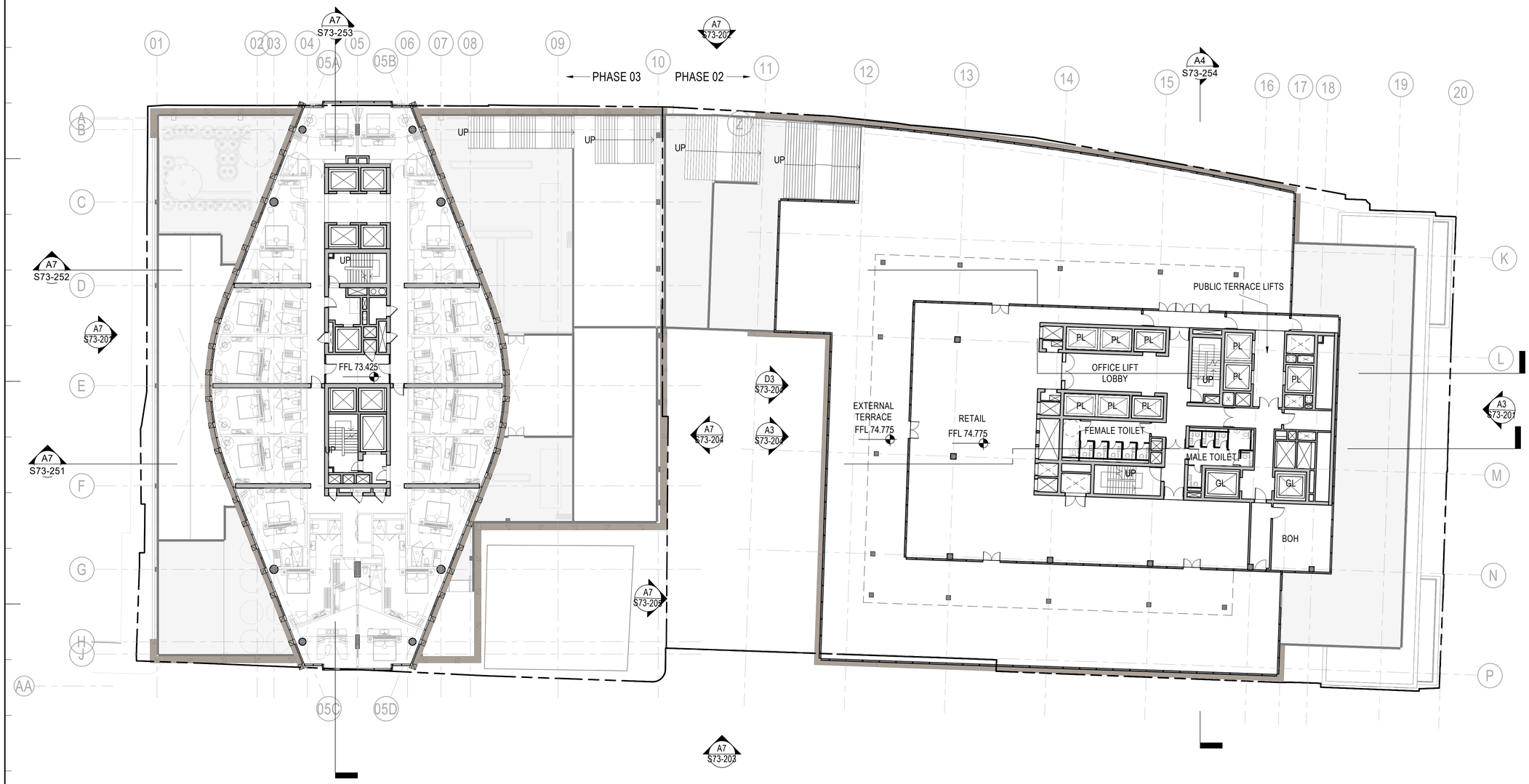
Drawing Title

LEVEL 09 GA PLAN

Project No	Drawing No	Revision
218739	S73-112	P03

Scale @ A0: As indicated

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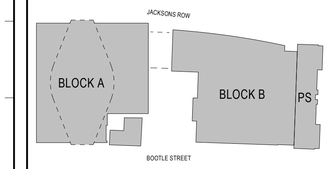


A7 LEVEL 10 PLAN

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG Harhurst design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: DHA

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

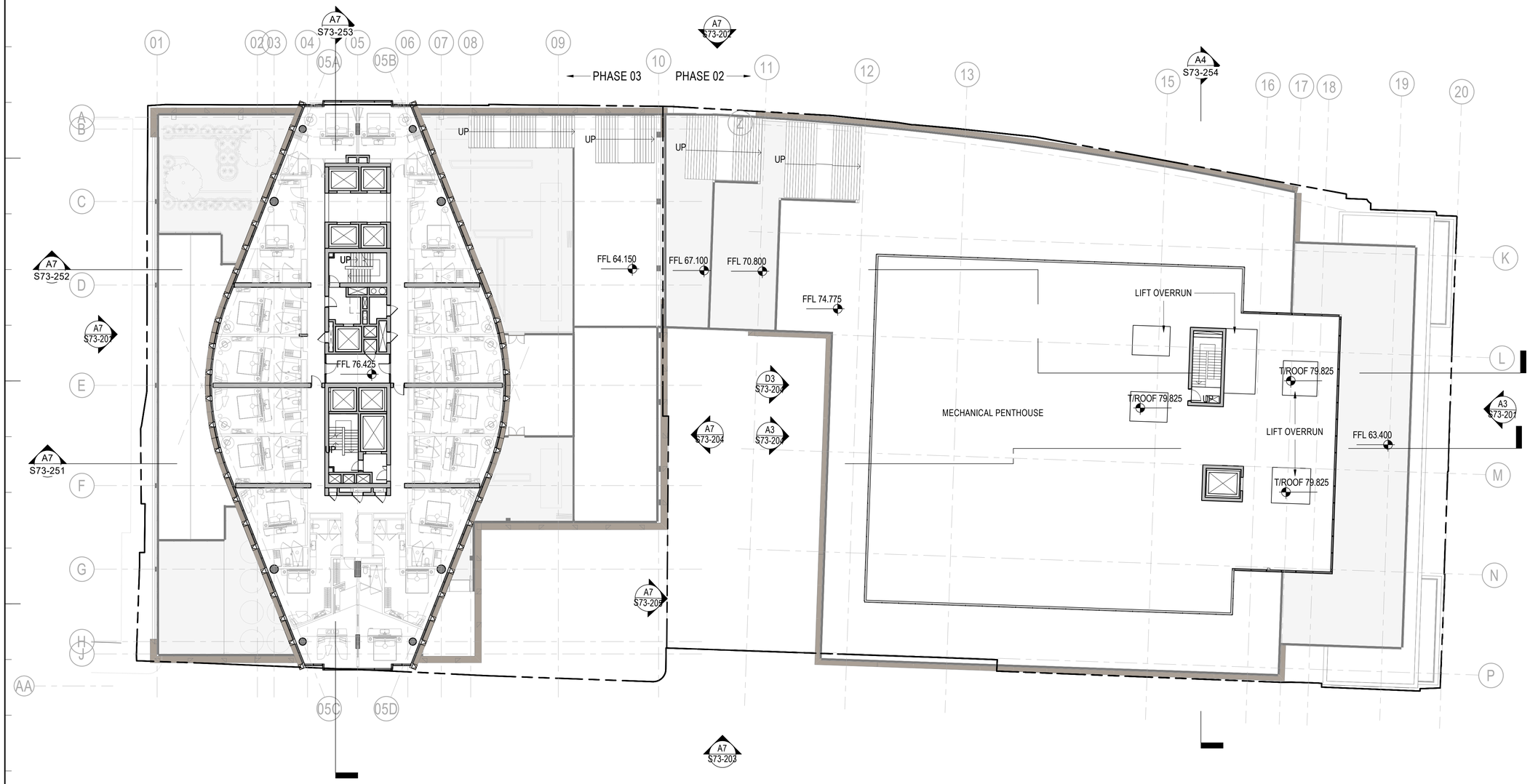
ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

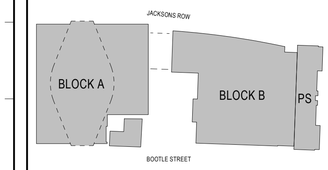
LEVEL 10 GA PLAN

Project No	Drawing No	Revision
218739	S73-113	P03
Scale @ A0: As indicated		

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fishhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: STM

Landscape Designer: pie

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

LEVEL 11 GA PLAN

Project No: 218739

Drawing No: S73-114

Revision: P03

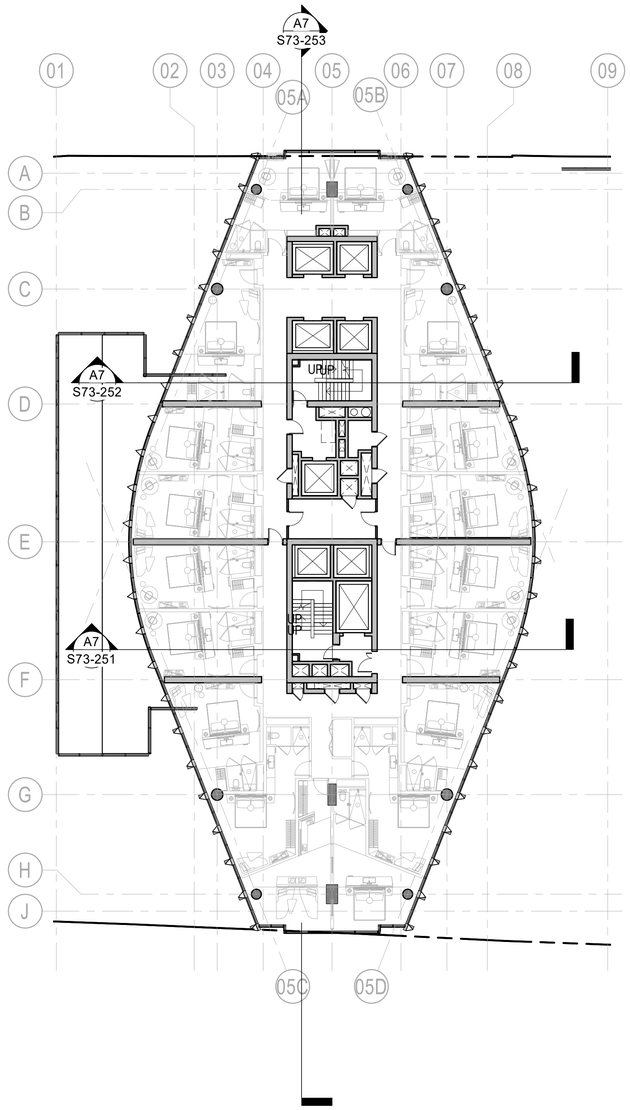
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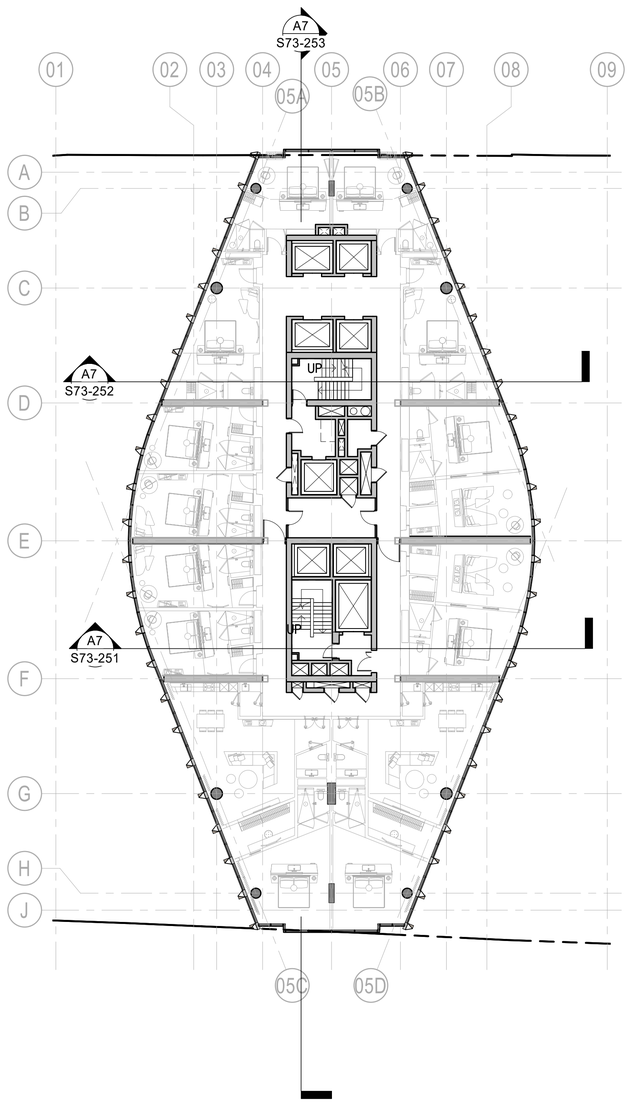
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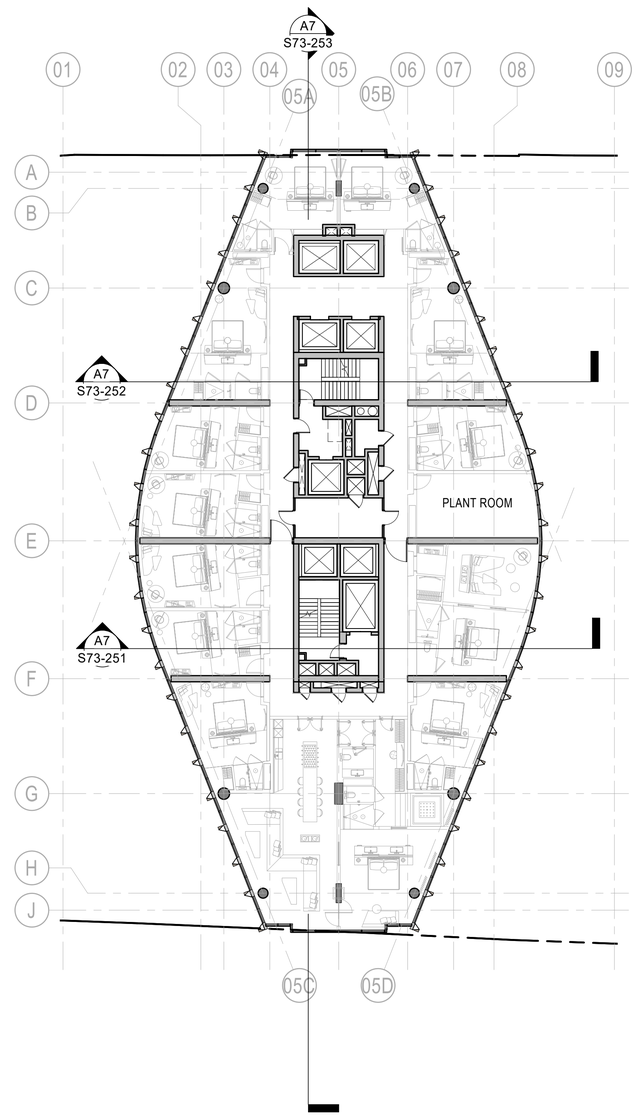
A7 LEVEL 11 PLAN

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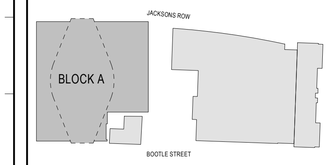
A7 LEVEL 07, HOTEL 01 PLAN
1 : 200

A5 LEVEL 17, HOTEL 11 PLAN
1 : 200

A2 LEVEL 18, HOTEL 12 PLAN
1 : 200

9/6/2021 6:48:31 PM

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer
BOWLER JAMES BRINDLEY

Synagogue Consultant
FDG fairhursts design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
ST M

Landscape Designer
p-ie

Project Manager
zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

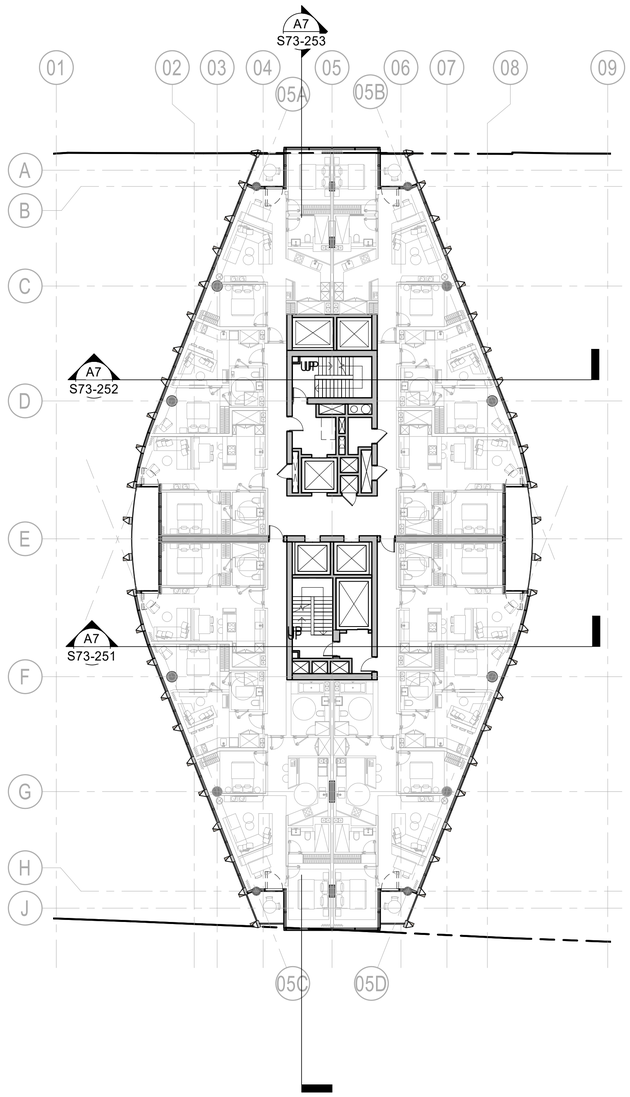
ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

TOWER GA PLANS - HOTEL

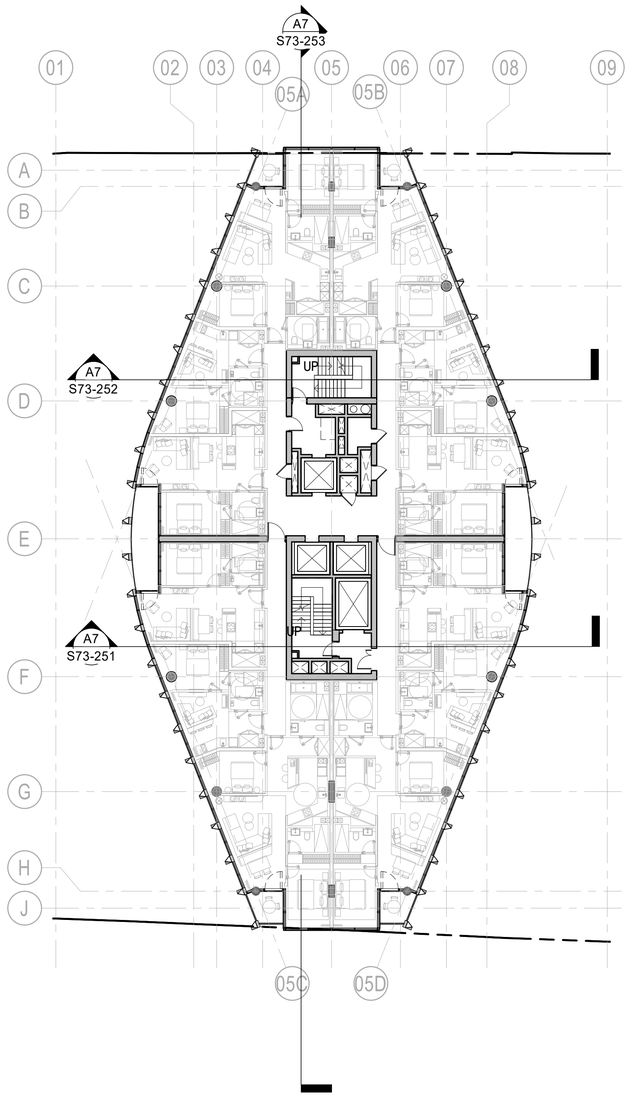
Project No	Drawing No	Revision
218739	S73-115	P03
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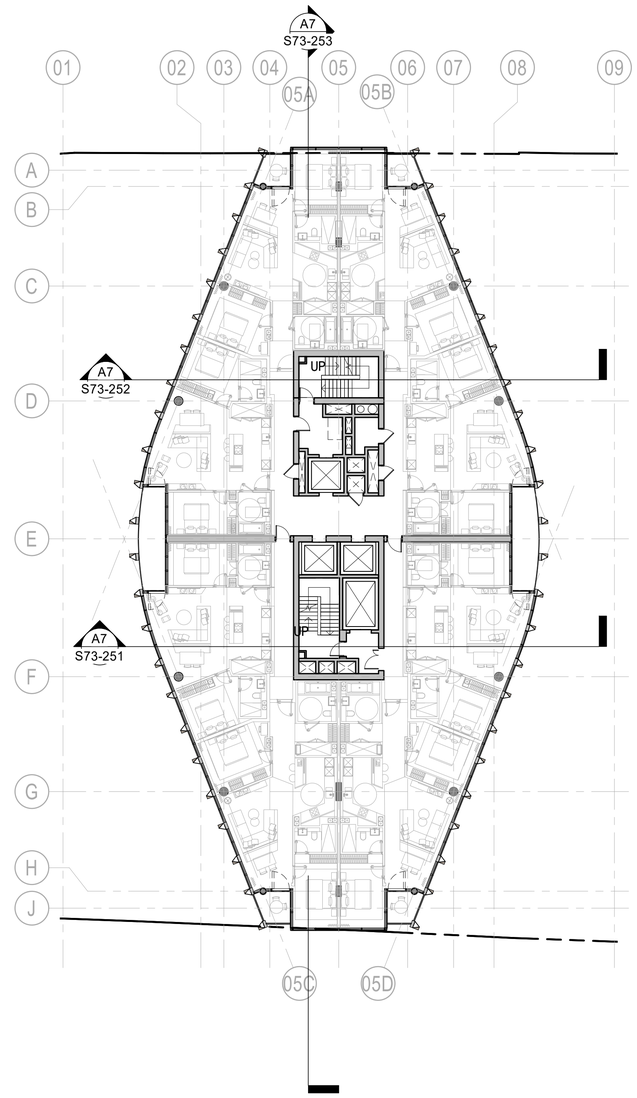
A7 LEVEL 19, RESIDENTIAL 01 PLAN

1 : 200



A5 LEVEL 20, RESIDENTIAL 02 PLAN

1 : 200

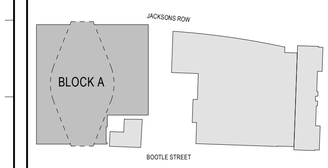


A2 LEVEL 26, RESIDENTIAL 08 PLAN

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9/6/2021 6:47:17 PM

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer
BOWLER JAMES BRINDLEY

Synagogue Consultant
FDG fairhursts design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
ST M

Landscape Designer
pie

Project Manager
zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

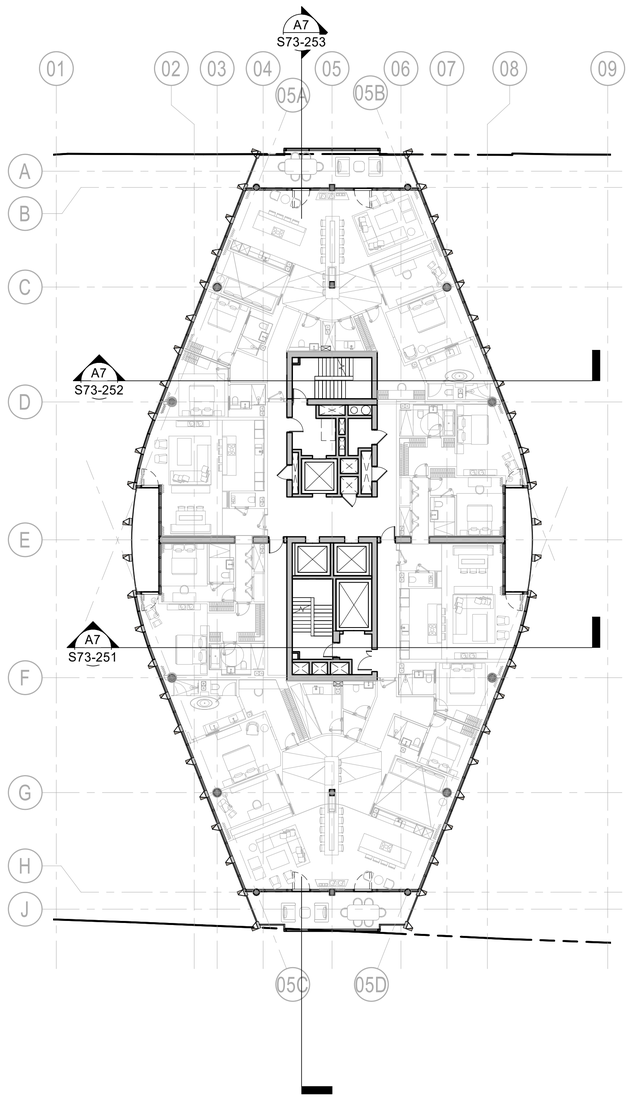
ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

TOWER GA PLANS - RESIDENTIAL

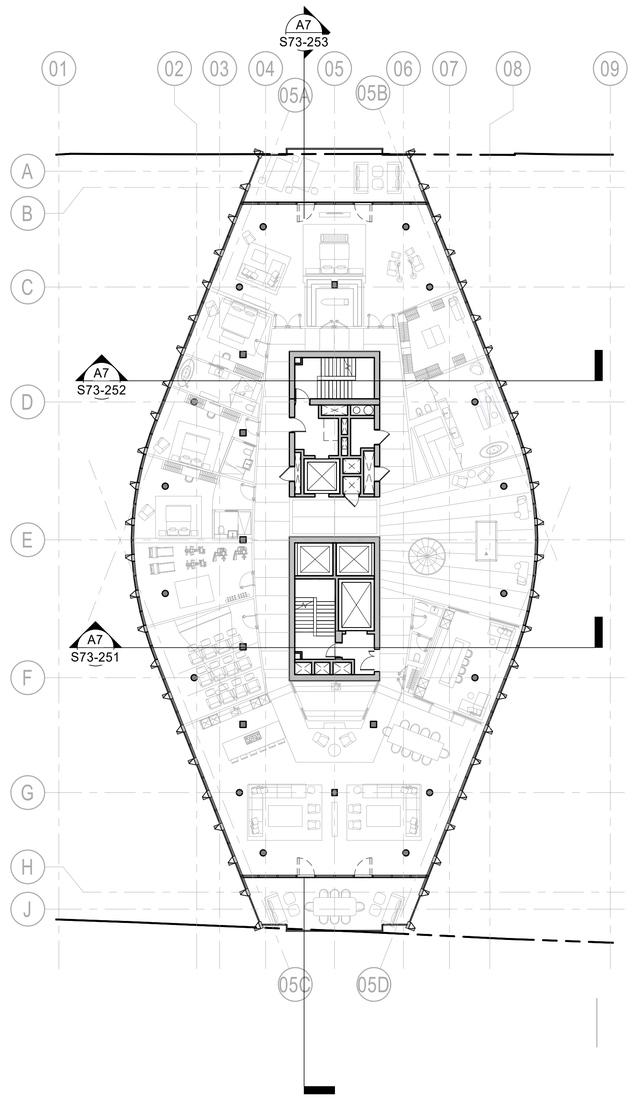
Project No	Drawing No	Revision
218739	S73-116	P03
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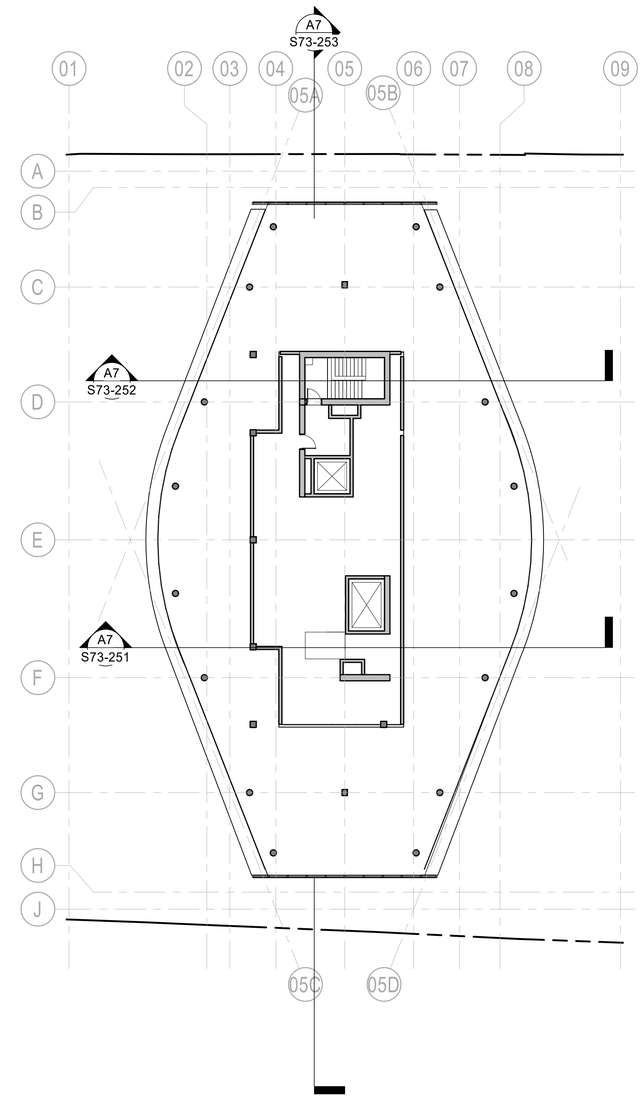
A7 LEVEL 36, RESIDENTIAL 18 PLAN

1 : 200



A5 LEVEL 40, RESIDENTIAL 22 PLAN

1 : 200

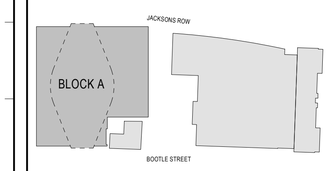


A2 LEVEL 40M, RESIDENTIAL 22M PLAN

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Key Plan



General Notes

P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission
NO:	DATE:	ISSUE:

Status

FOR INFORMATION

Interior Designer
BOWLER JAMES BRINDLEY

Synagogue Consultant
FDG
fairhursts design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
ST M

Landscape Designer
pie

Project Manager
zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

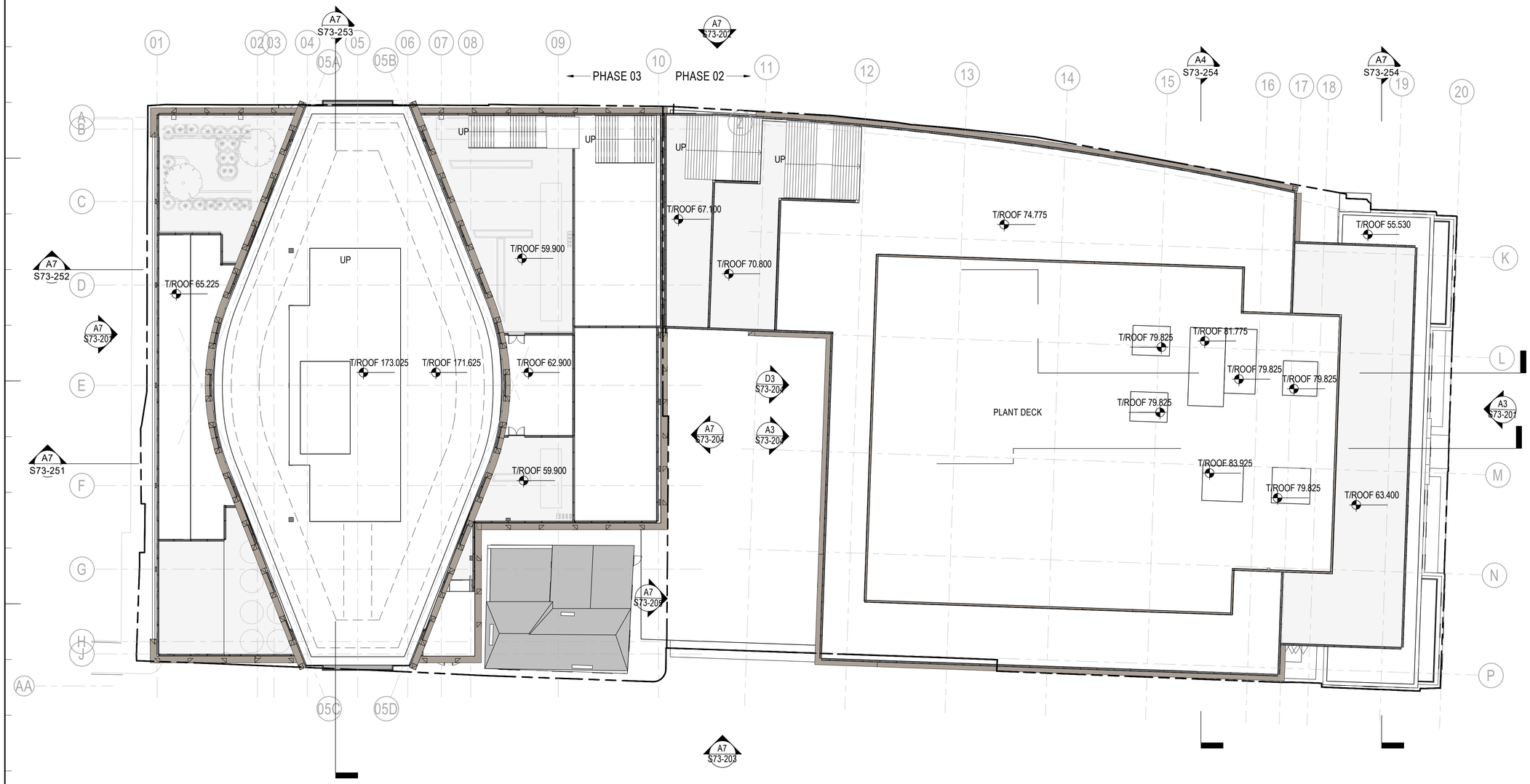
ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

TOWER GA PLANS - RESIDENTIAL

Project No	Drawing No	Revision
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Scale @ A0		
As indicated		

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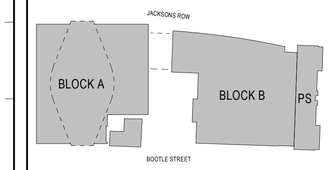


A7 SITE ROOF PLAN

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9/8/2021 5:34:46 PM

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fishhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: STM

Landscape Designer: pie

Project Manager: zerum

Architect

SOM

Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

SITE ROOF PLAN

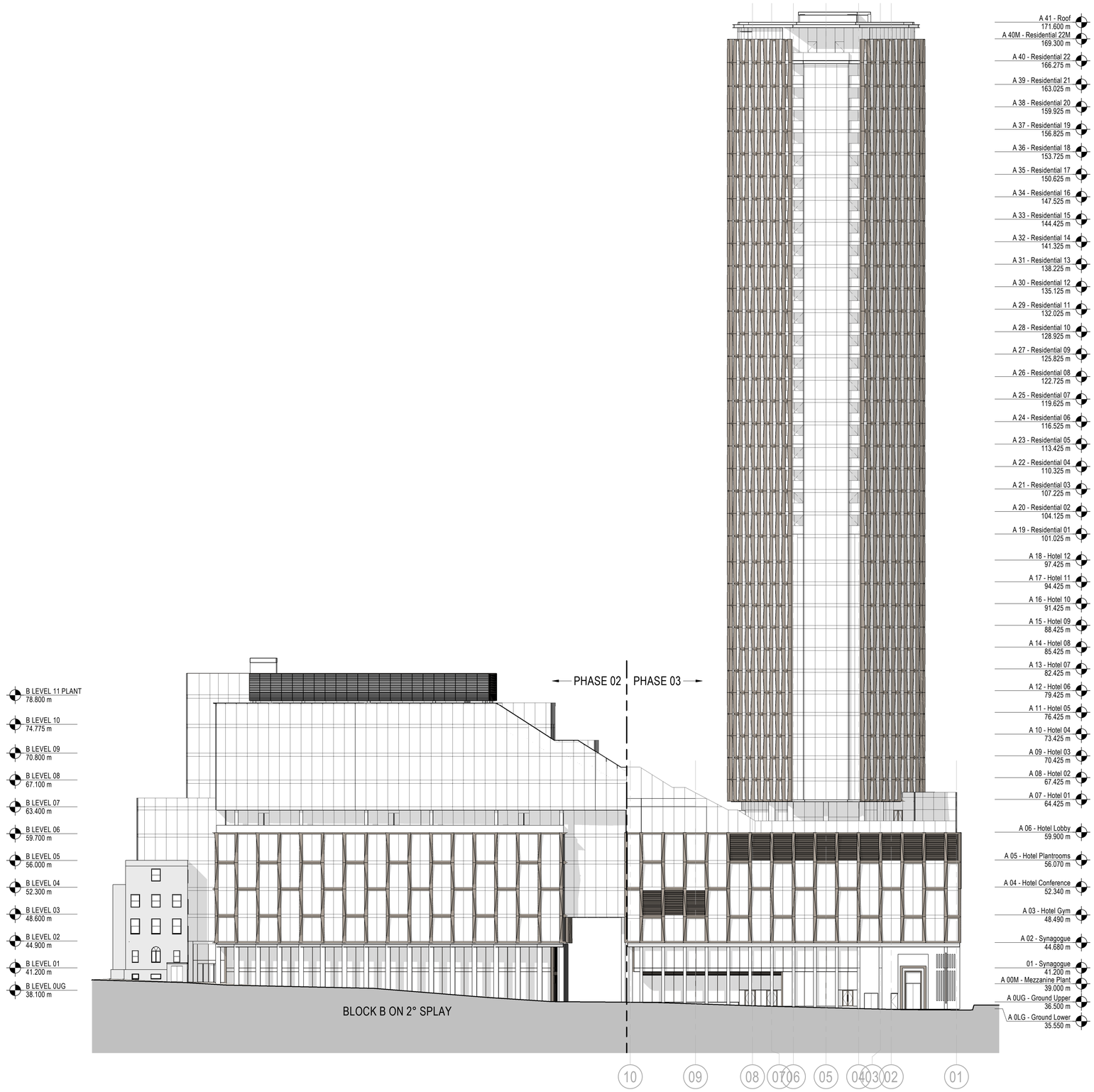
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Drawing No: S73-118

Revision: P03

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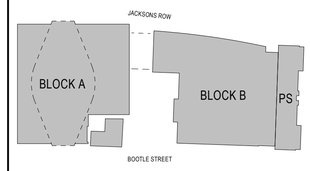


A7

ELEVATION - NORTH

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhurst design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST MICHAELS

Landscape Designer: DHE

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

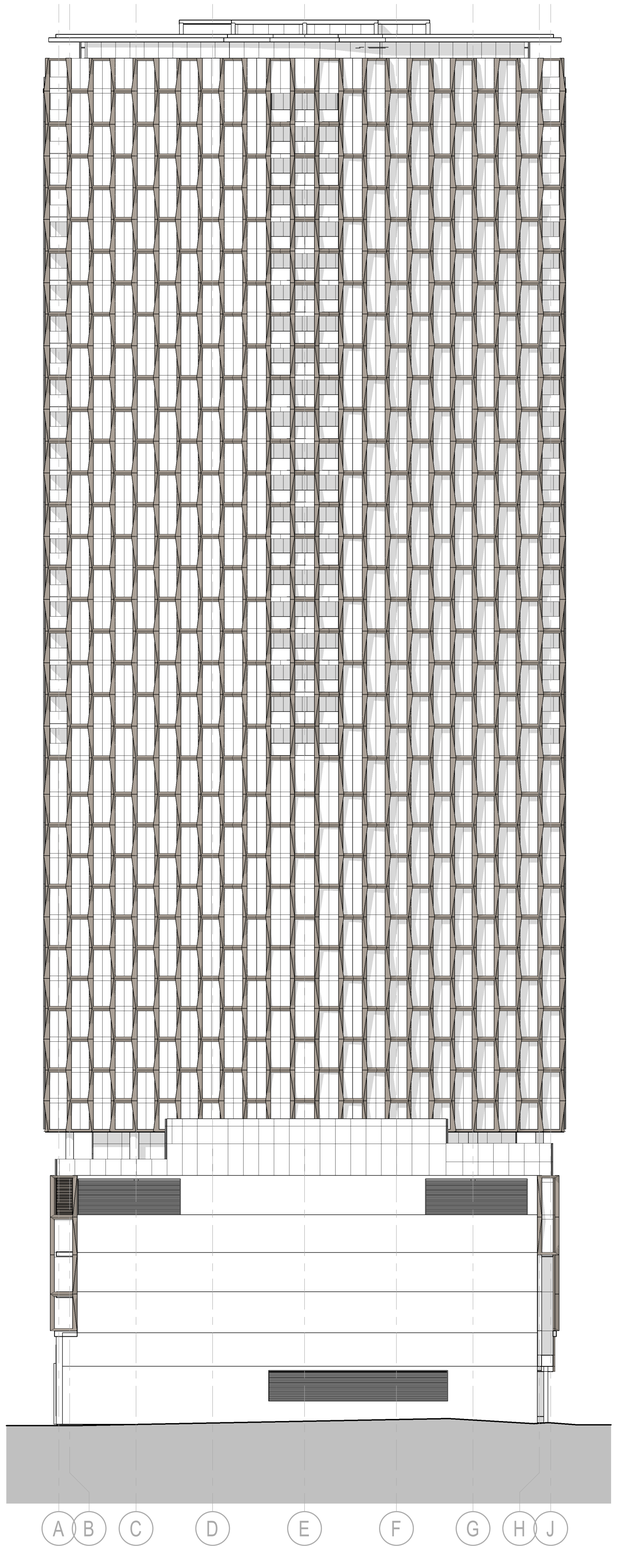
Drawing Title

ELEVATIONS - NORTH

Project No	Drawing No	Revision
218739	S73-202	P03
Scale @ A0: As indicated		

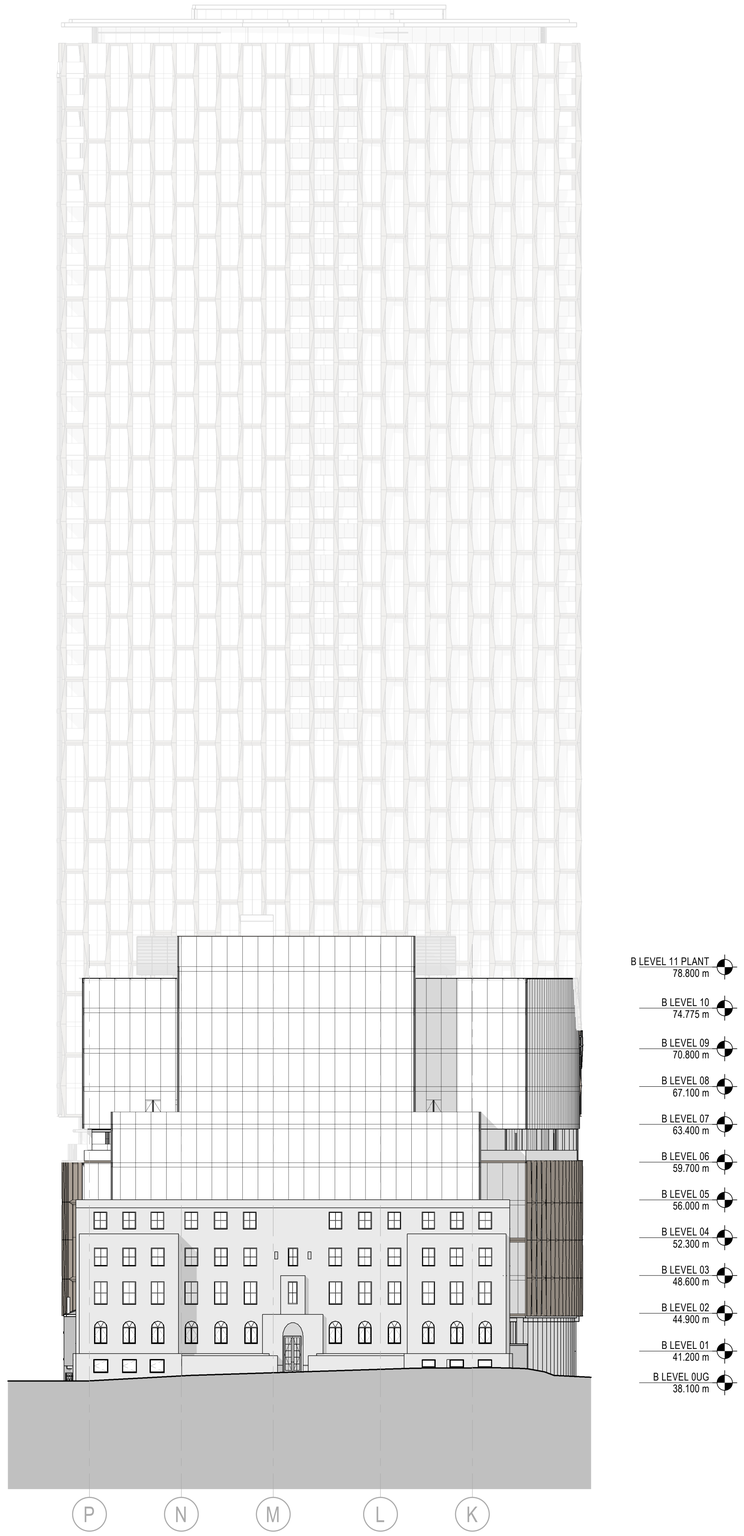
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A7 ELEVATION - WEST

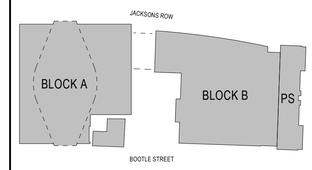
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A3 ELEVATION - EAST

1 : 300

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: DIA

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

ELEVATIONS - EAST & WEST

Project No: 218739

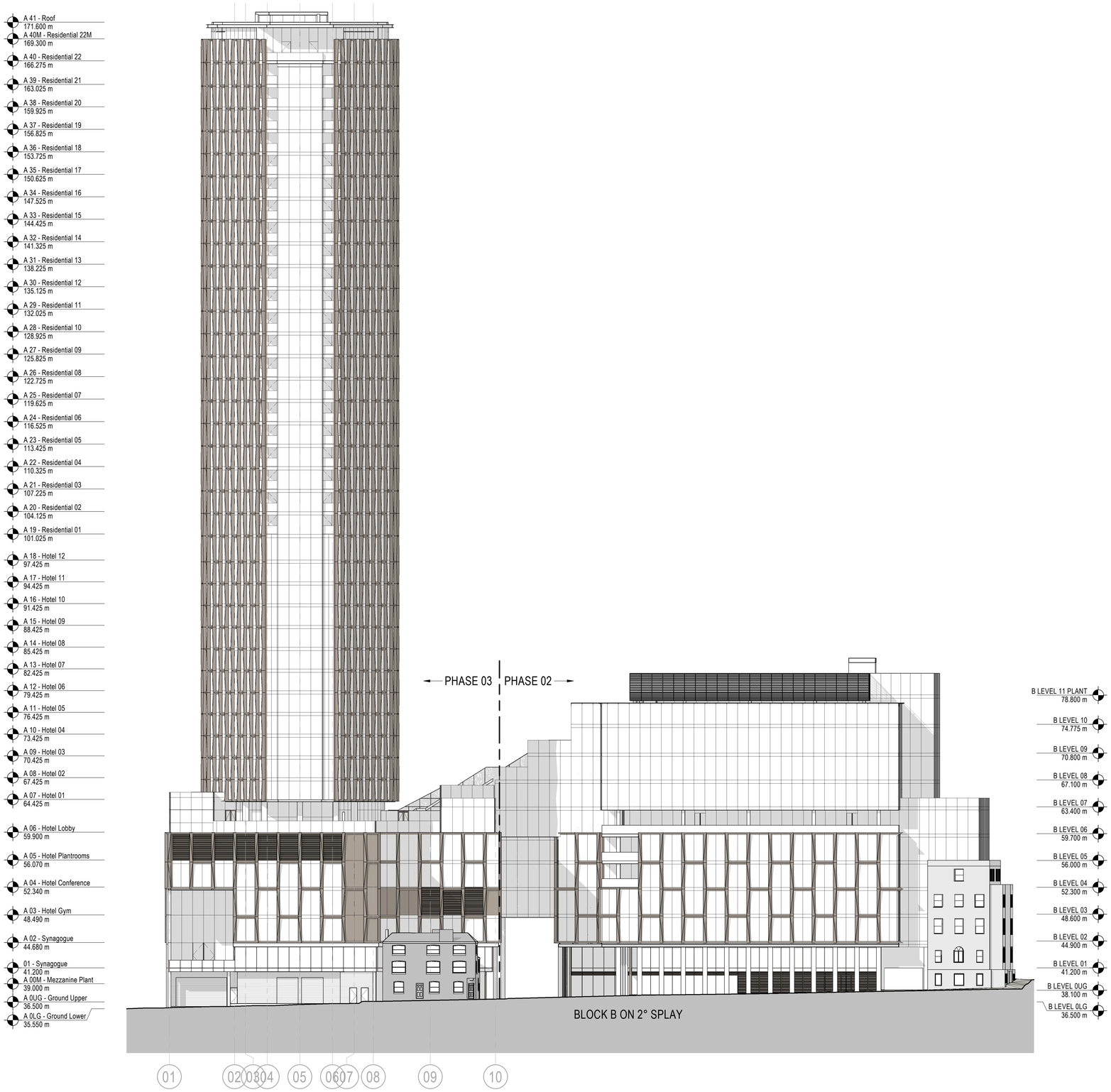
Drawing No: S73-201

Revision: P03

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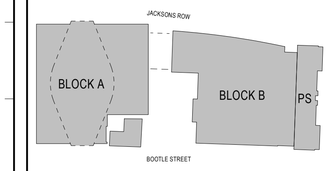
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ELEVATION - SOUTH

1 : 300

9/6/2021 6:52:21 PM

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer
BOWLER JAMES BRINDLEY

Synagogue Consultant
FDG fairhurst design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
STM

Landscape Designer

Project Manager
zerum

Architect
SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

ELEVATIONS - SOUTH

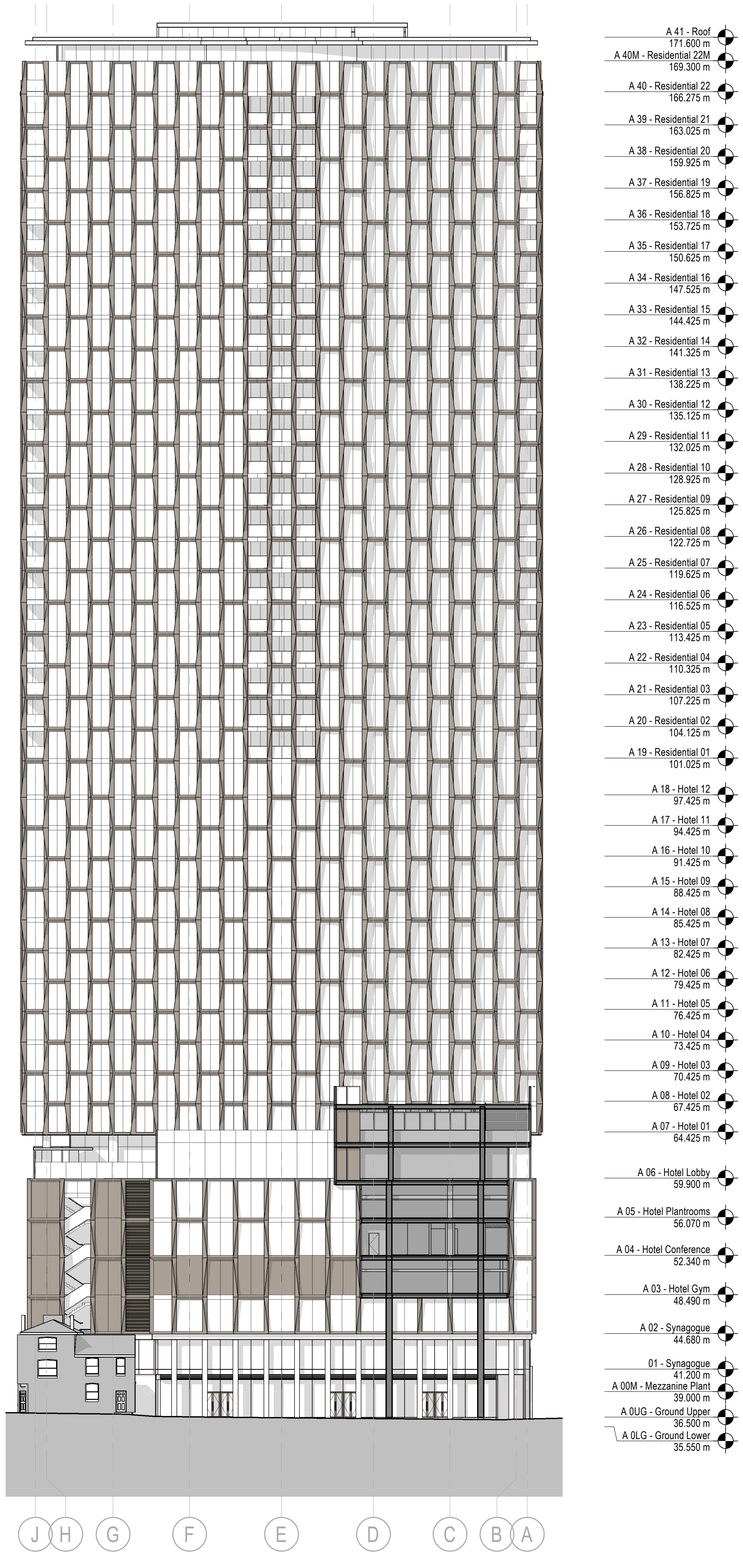
Project No
218739

Drawing No
S73-203

Revision
P03

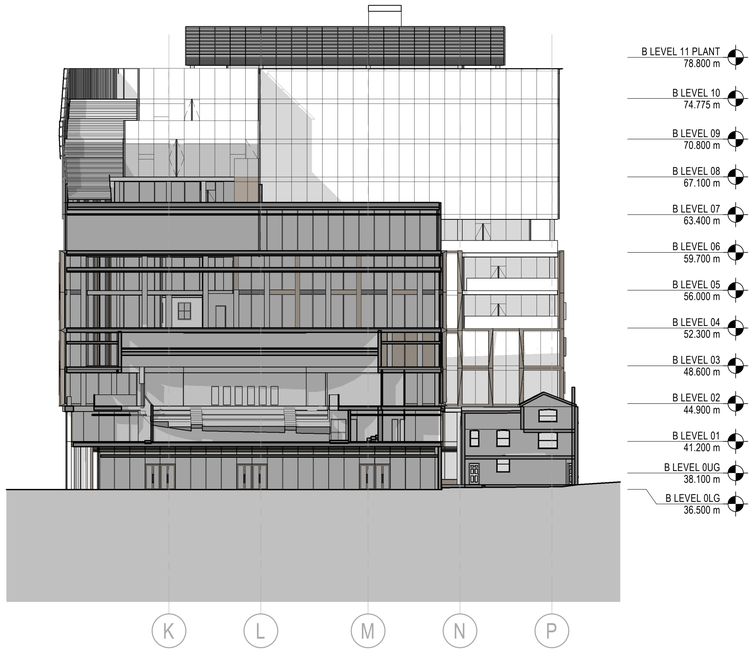
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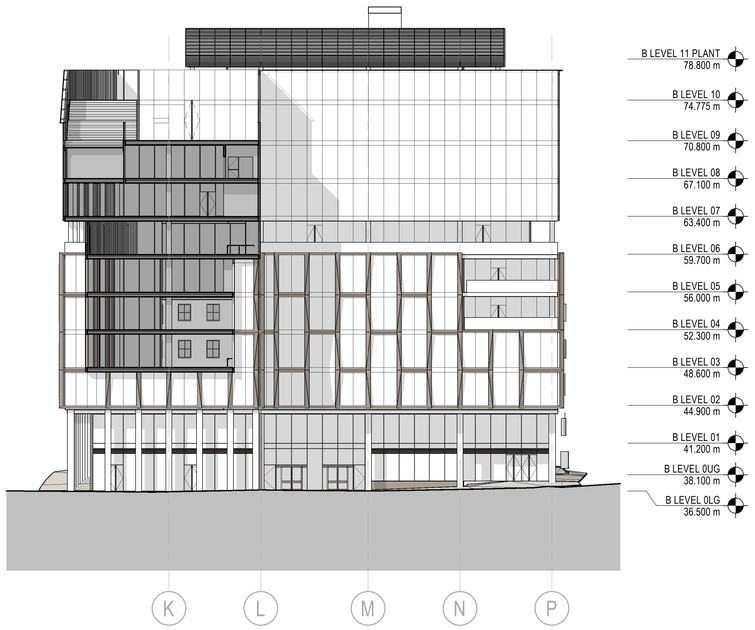
A7 ELEVATION - BLOCK A COURTYARD

1 : 300



D3 ELEVATION - BLOCK B TERRACES

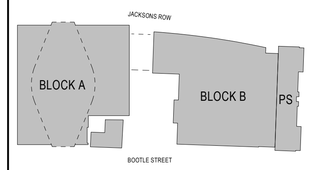
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A3 ELEVATION - BLOCK B COURTYARD

1 : 300

Key Plan



General Notes

NO:	DATE:	ISSUE:
P04	06/09/21	S73 Submission
P03	20/08/21	S73 Submission DRAFT
P02	04/12/19	S73 Submission
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer
BOWLER JAMES BRINDLEY

Synagogue Consultant
FDG fairhursts design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
ST M

Landscape Designer
pie

Project Manager
zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

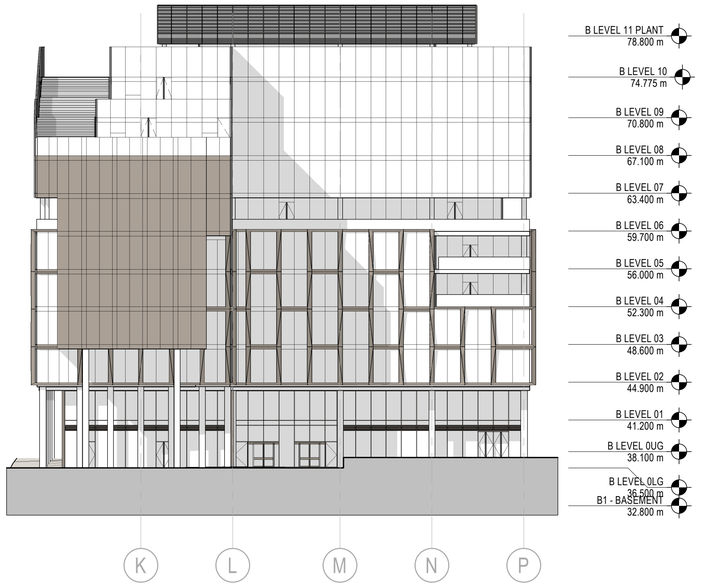
ELEVATIONS - COURTYARD BLOCK A AND BLOCK B

Project No	Drawing No	Revision
218739	S73-204	P04

Scale @ A0
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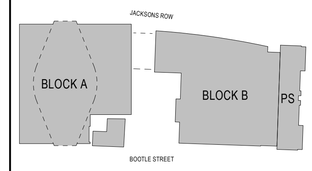


A7 BLOCK B ELEVATION WEST - PHASE 02 TEMPORARY FACADE

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9/6/2021 6:54:18 PM

Key Plan



General Notes

P02	06/09/21	S73 Submission
P01	20/08/21	S73 Submission DRAFT
NO:	DATE:	ISSUE:

Status

FOR INFORMATION

Interior Designer
BOWLER JAMES BRINDLEY

Synagogue Consultant
FDG fairhursts design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
ST M

Landscape Designer
pre

Project Manager
zerum

Architect
SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

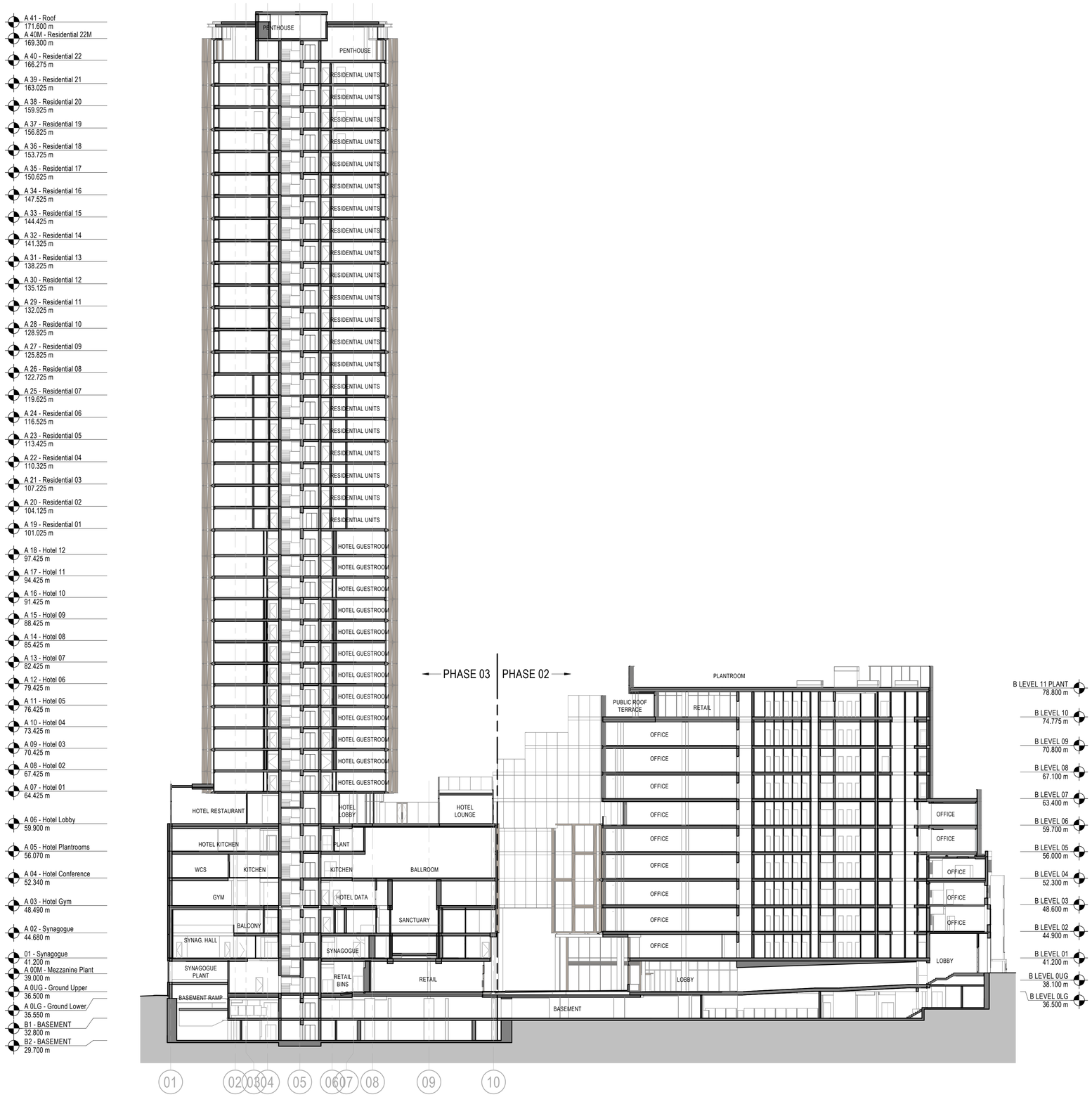
ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

ELEVATIONS - BLOCK B WEST (TEMPORARY FACADE)

Project No	Drawing No	Revision
218739	S73-205	P02
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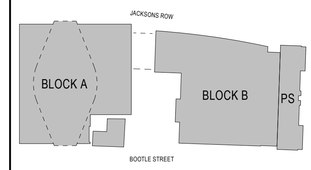


A7 CROSS SECTION WEST-EAST A

1 : 300

9/6/2021 6:54:43 PM

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer
BOWLER JAMES BRINDLEY

Synagogue Consultant
FDG fairhursts design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
ST M

Landscape Designer
pie

Project Manager
zerum

Architect
SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

BUILDINGS SECTIONS - WEST-EAST

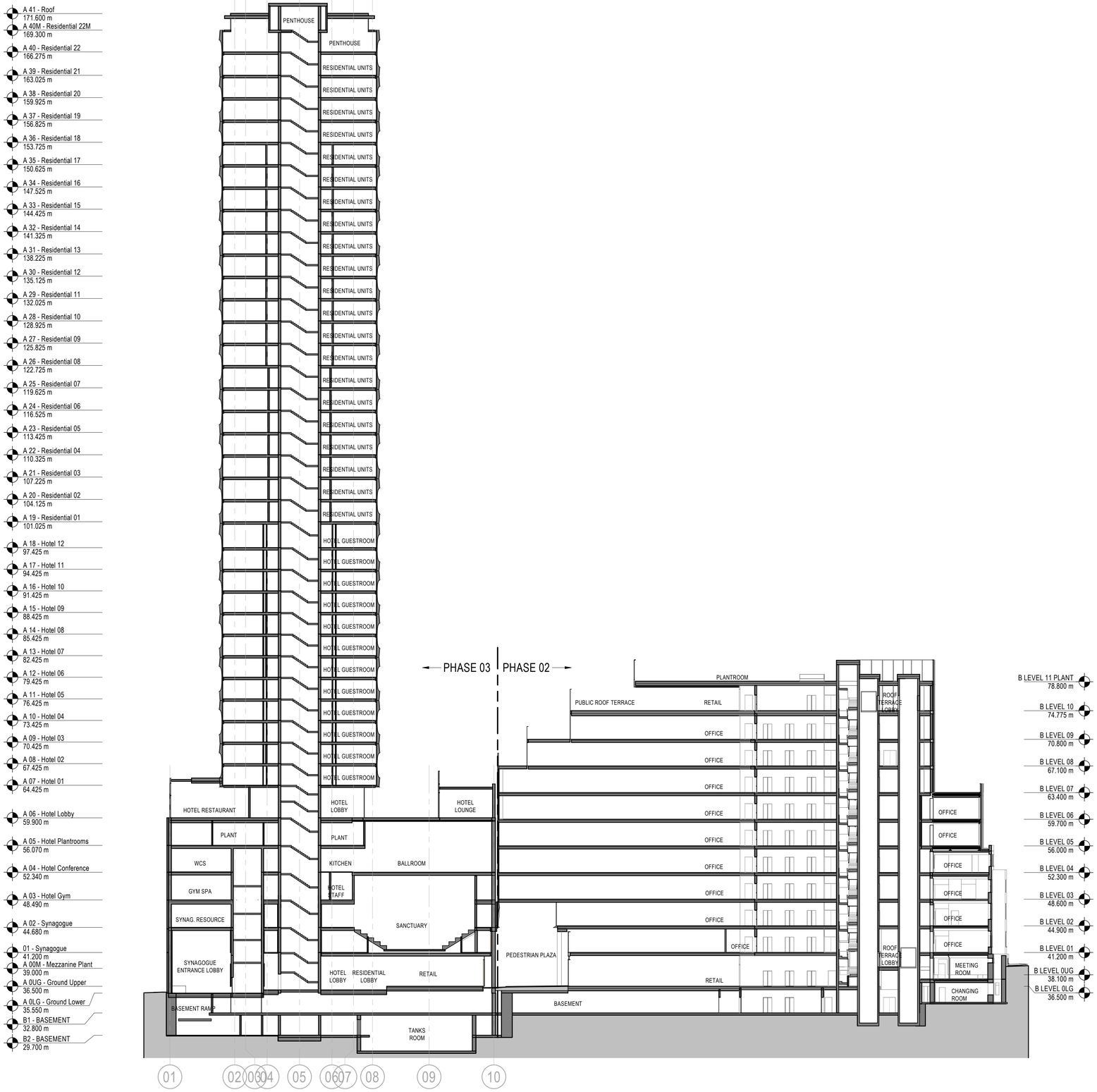
Project No
218739

Drawing No
S73-251

Revision
P03

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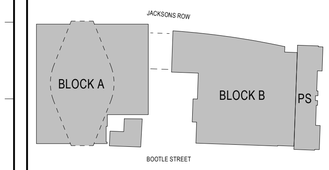


A7 CROSS SECTION WEST-EAST B

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9/6/2021 6:55:07 PM

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: Bowler James Brindley

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: STM

Landscape Designer: pie

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

BUILDINGS SECTIONS - WEST-EAST BRIDGE

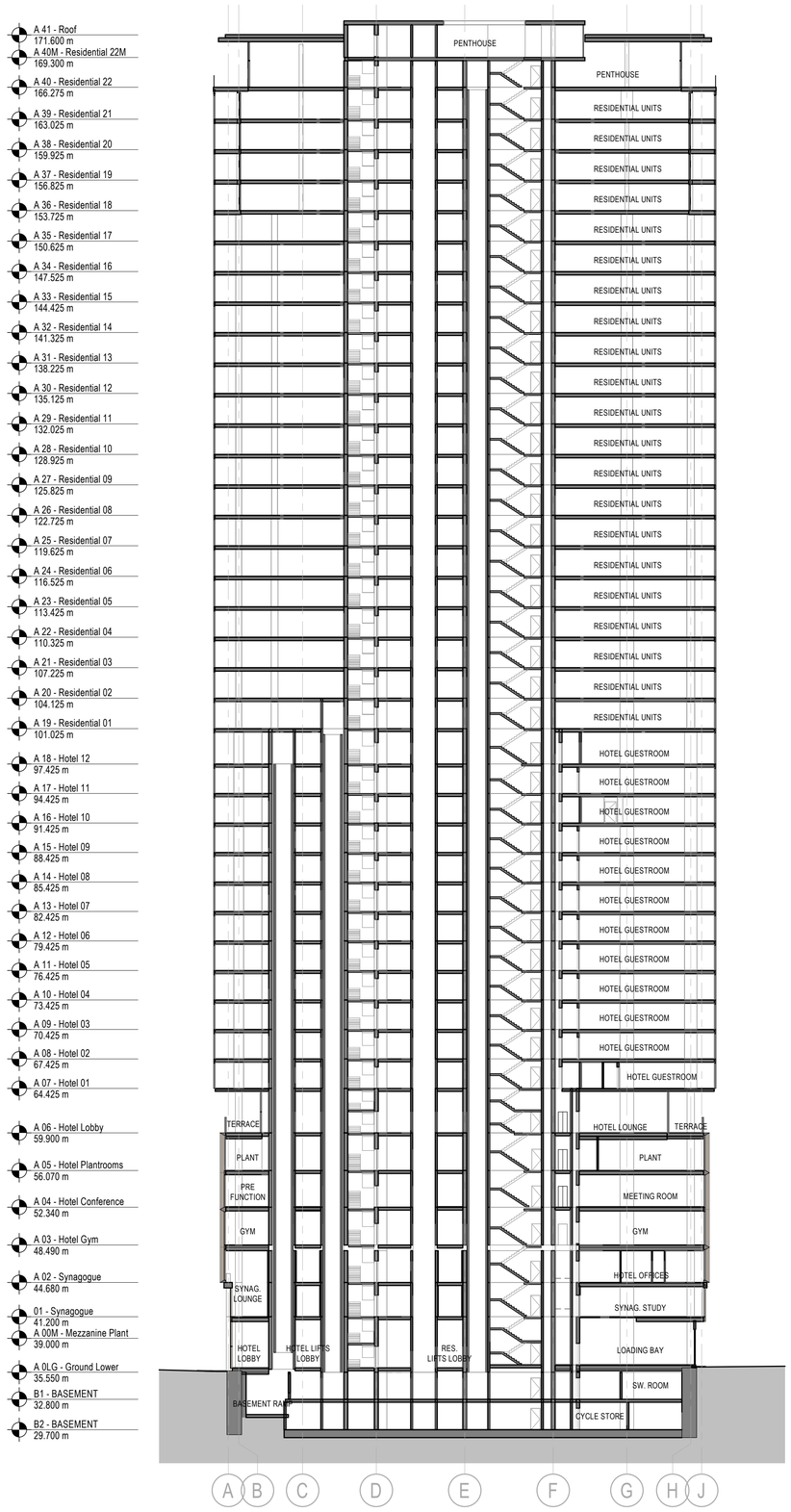
Project No: 218739

Drawing No: S73-252

Revision: P03

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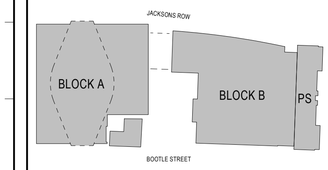


A7 CROSS SECTION BLOCK A NORTH-SOUTH

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer
BOWLER JAMES BRINDLEY

Synagogue Consultant
FDG fairhursts design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
STM

Landscape Designer
pie

Project Manager
zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

BUILDINGS SECTIONS - NORTH-SOUTH BLOCK A

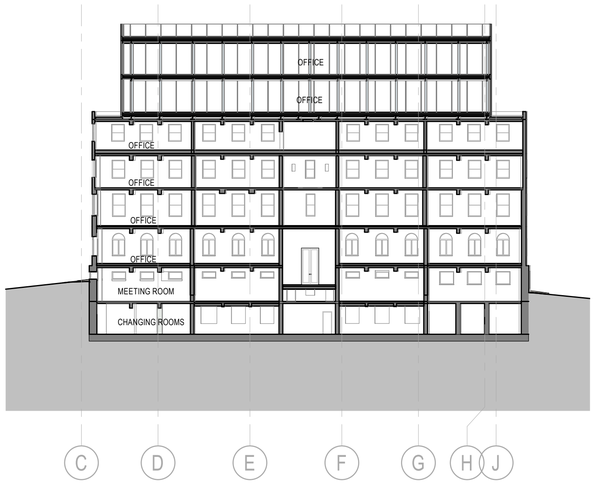
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Drawing No S73-253

Revision P03

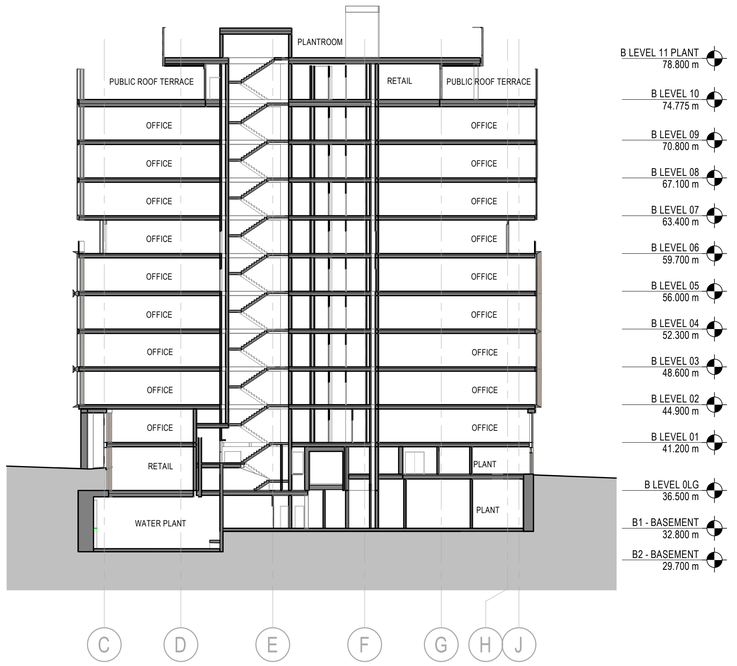
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A7 CROSS SECTION NORTH-SOUTH

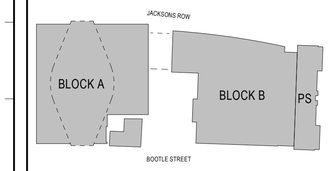
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A4 CROSS SECTION BLOCK B NORTH-SOUTH

1 : 300

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: pre

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

BUILDINGS SECTIONS - NORTH-SOUTH BLOCK B

Project No: 218739

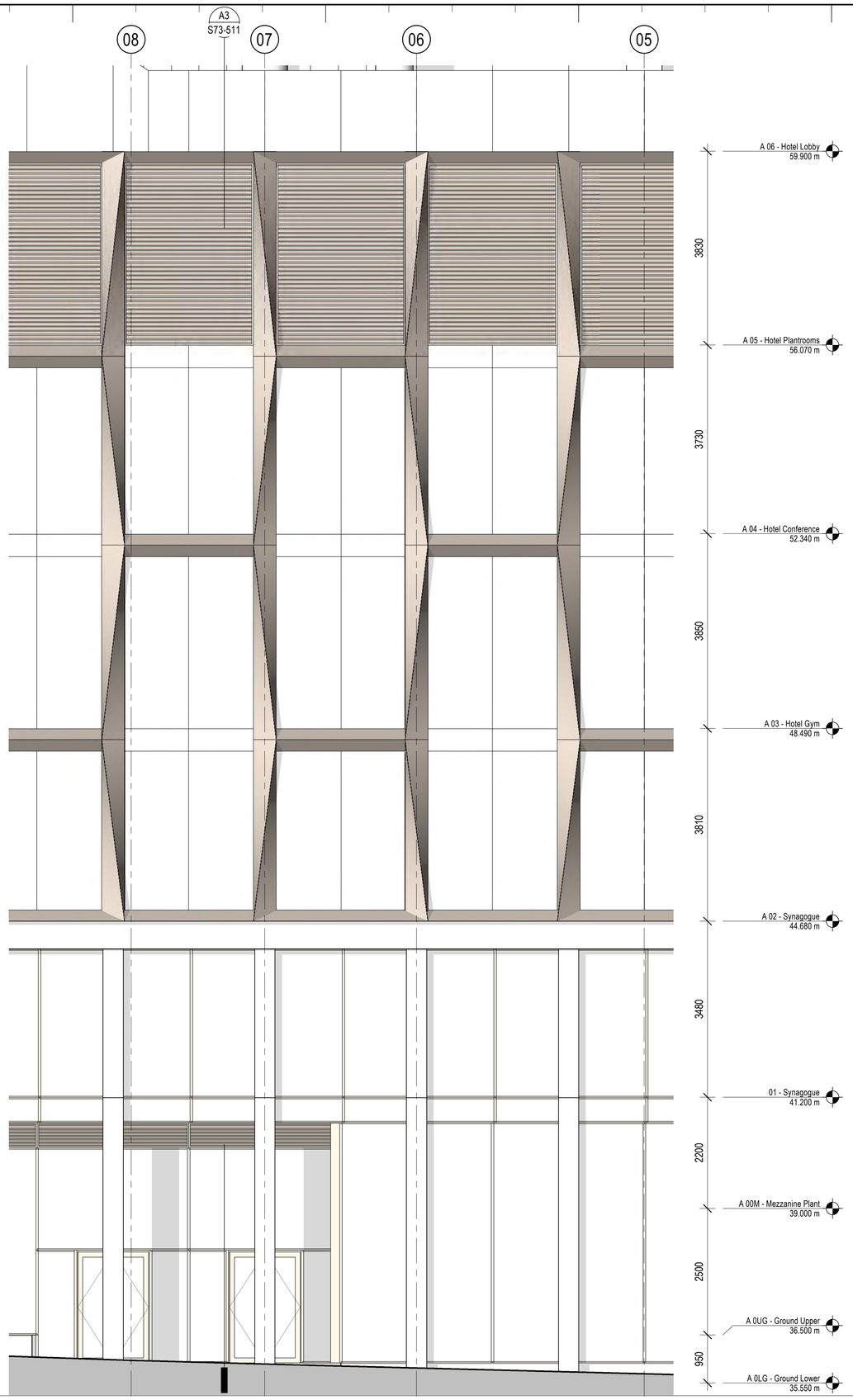
Drawing No: S73-254

Revision: P03

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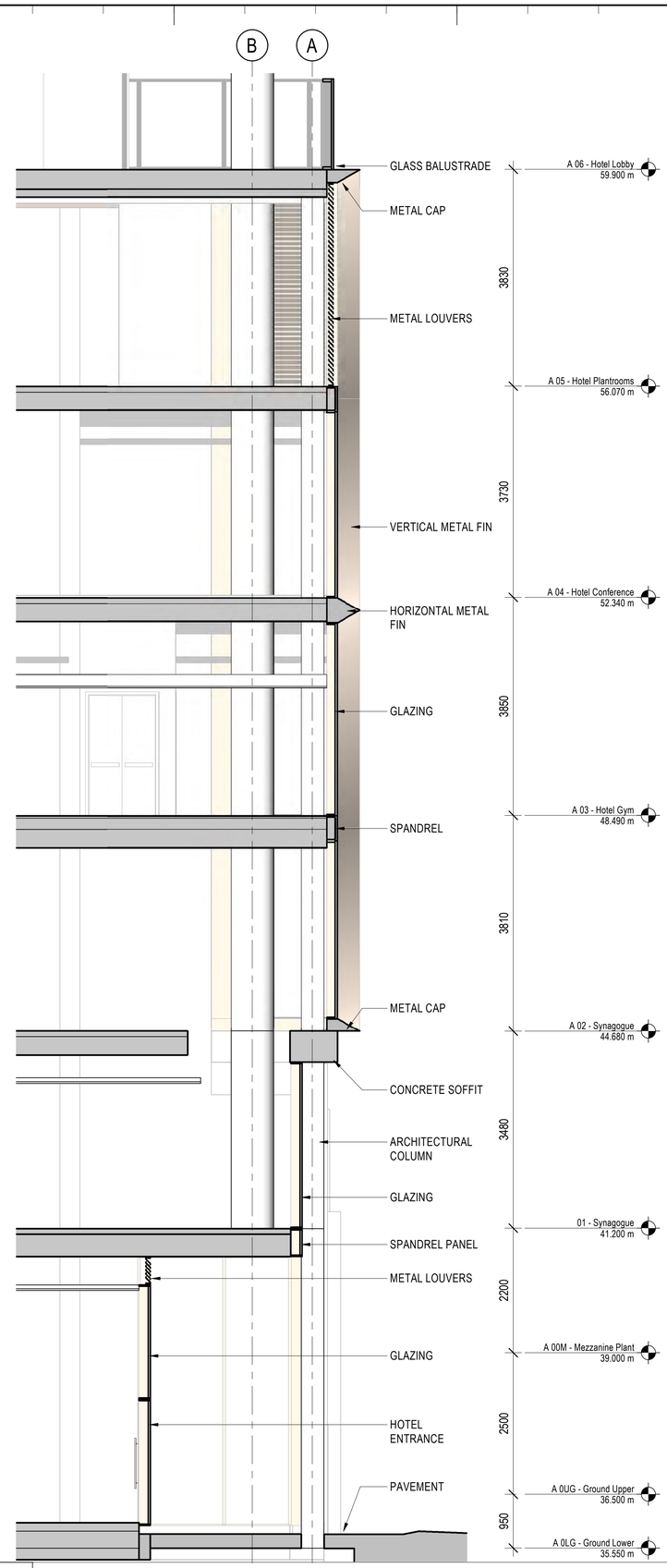
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A7 TYP ENCLOSURE ELEVATION - HOTEL PODIUM

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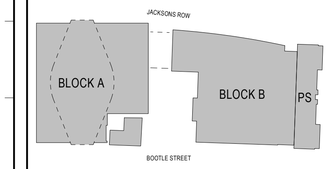


A3 TYP ENCLOSURE SECTION - HOTEL PODIUM

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Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: STM

Landscape Designer: pre

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

BUILDING ENCLOSURE - HOTEL PODIUM

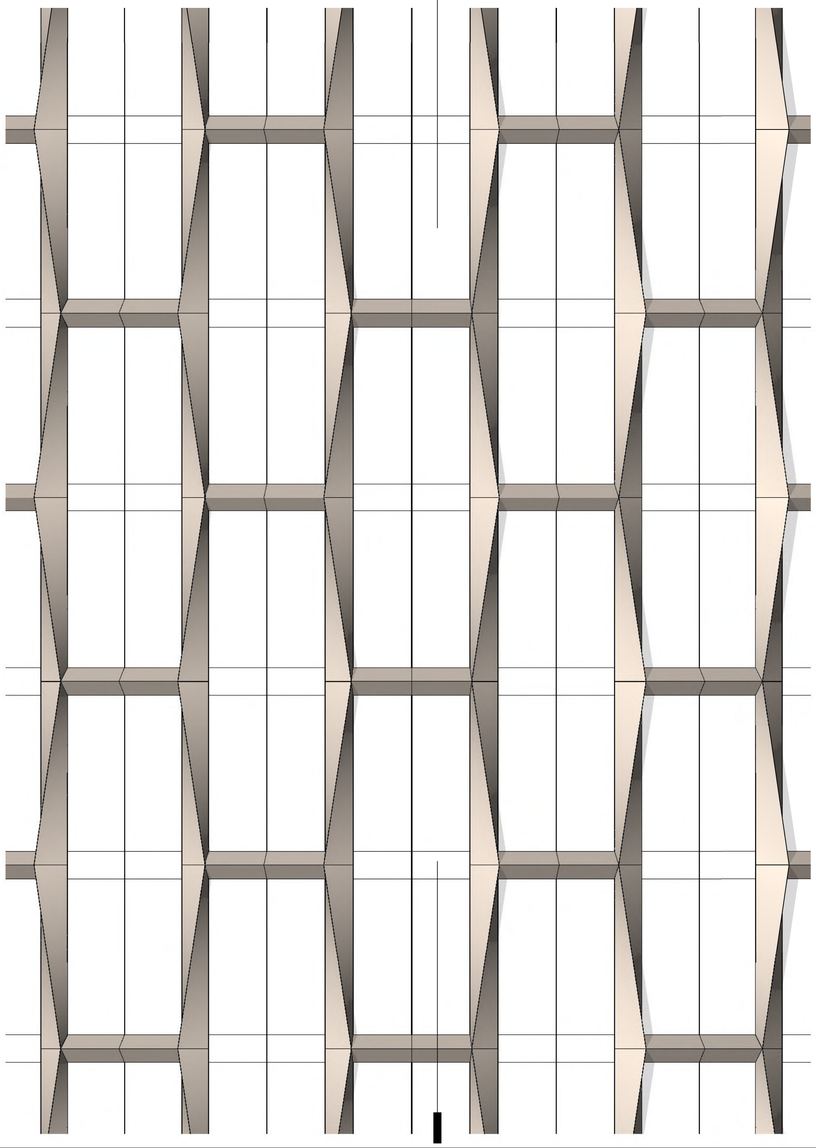
Project No: 218739

Drawing No: S73-511

Revision: P03

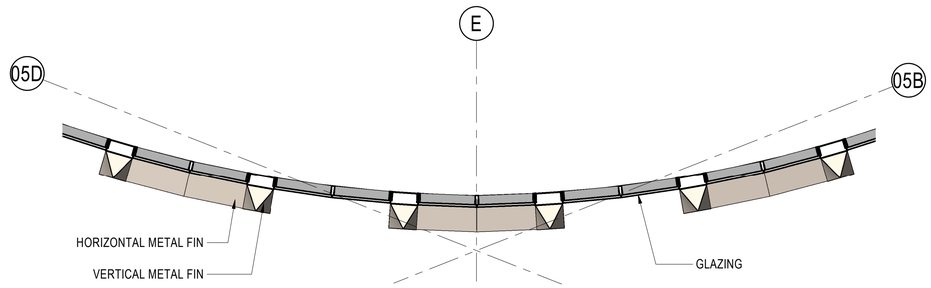
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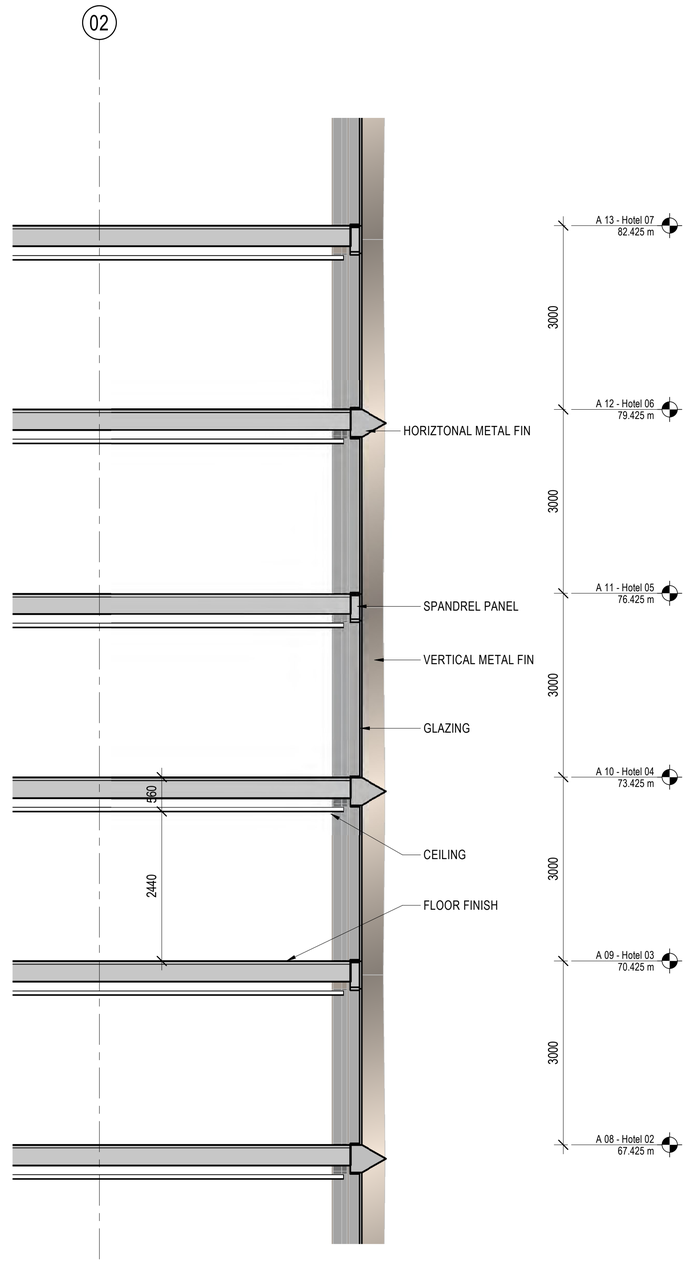
B7 TYP ENCLOSURE ELEVATION - HOTEL TOWER

1 : 50



A7 TYP ENCLOSURE PLAN - HOTEL TOWER

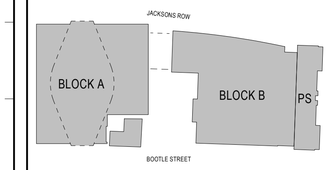
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A3 TYP ENCLOSURE SECTION - HOTEL TOWER

1 : 50

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: St M

Landscape Designer: p:re

Project Manager: zerum

Architect
SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

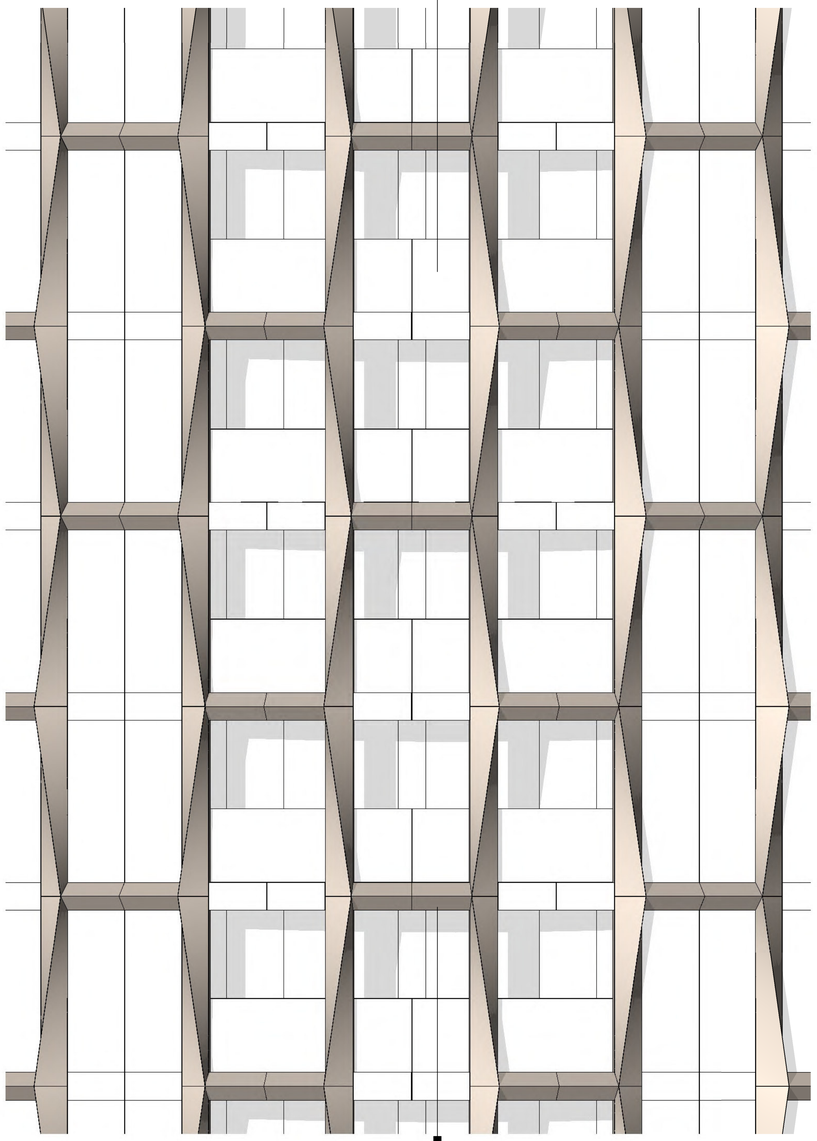
BUILDING ENCLOSURE - HOTEL TOWER

Project No	Drawing No	Revision
218739	S73-512	P03

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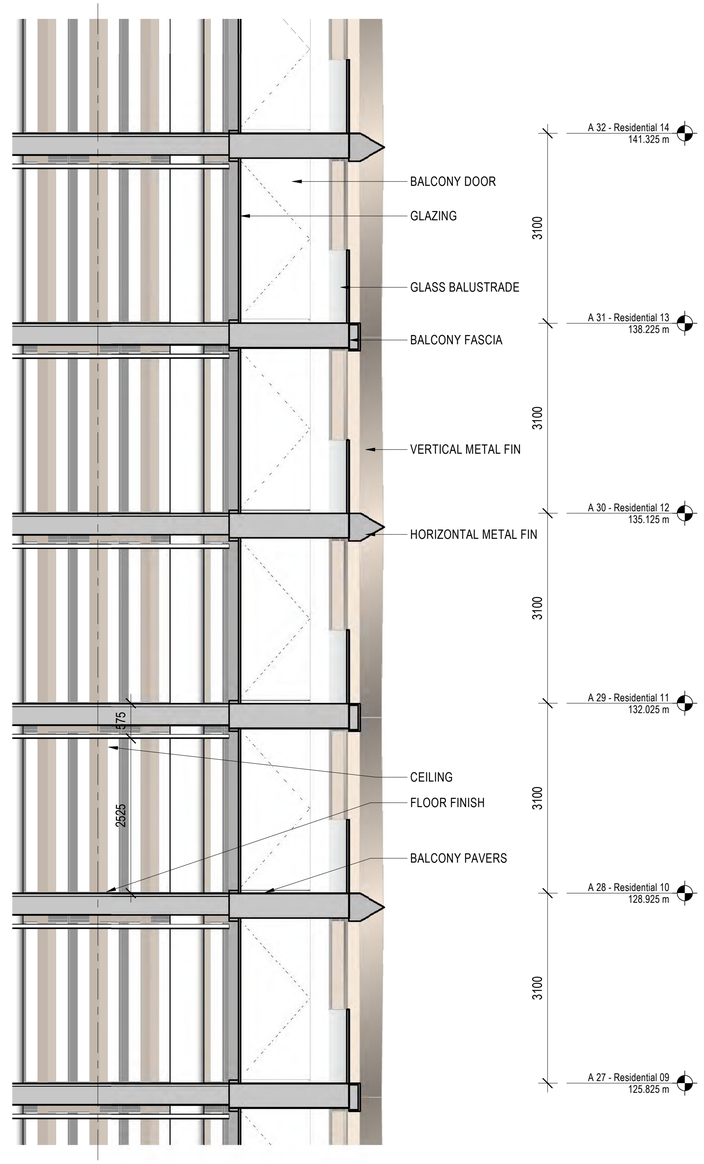


B7 TYP ENCLOSURE ELEVATION - RESIDENTIAL TOWER

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A7 TYP ENCLOSURE PLAN - RESIDENTIAL TOWER

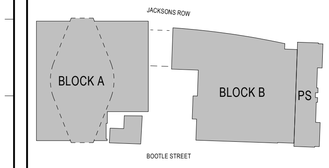
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A3 TYP ENCLOSURE SECTION - RESIDENTIAL TOWER

1 : 50

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: D-HE

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

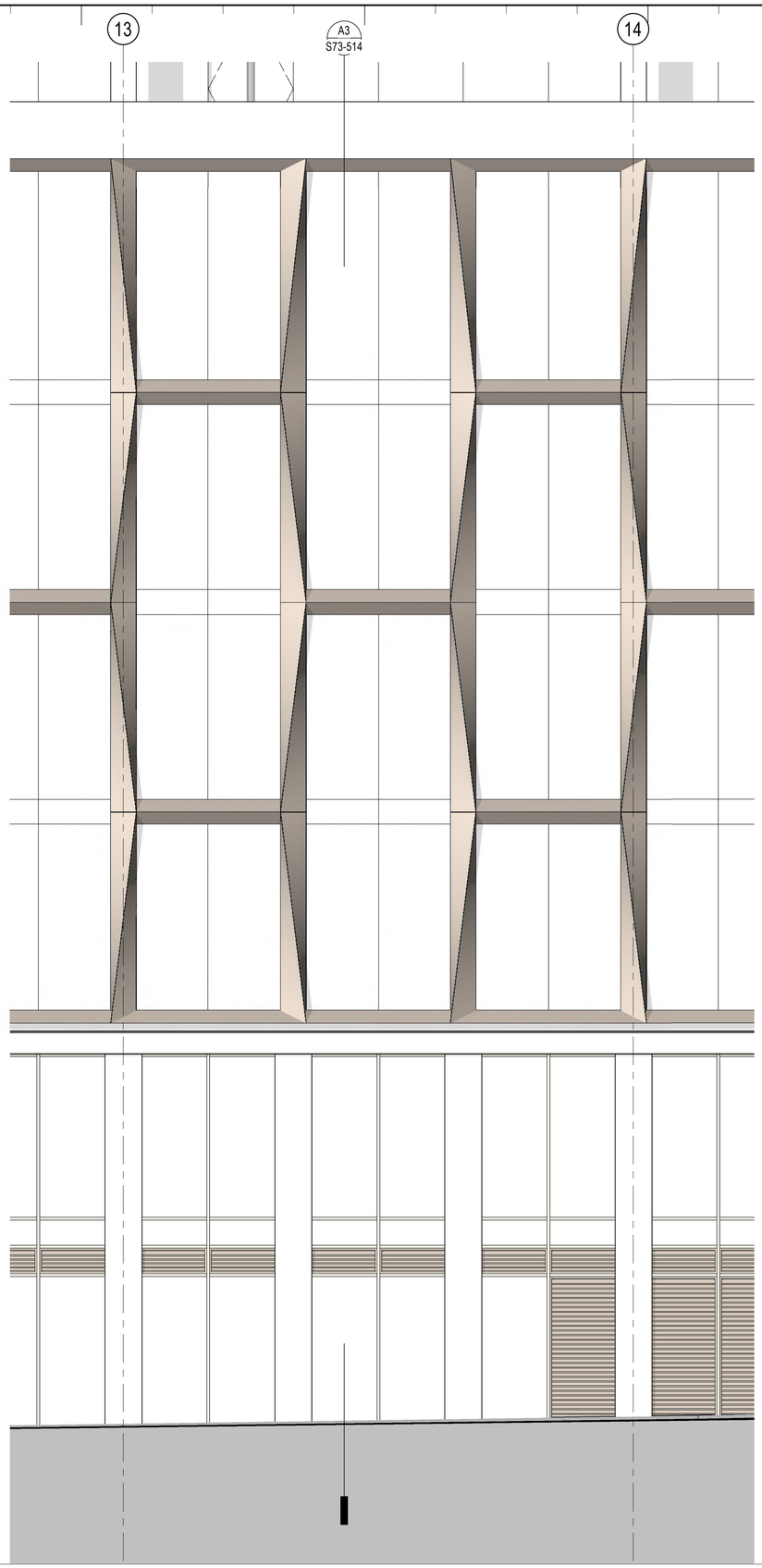
BUILDING ENCLOSURE - RESIDENTIAL TOWER

Project No	Drawing No	Revision
218739	S73-513	P03

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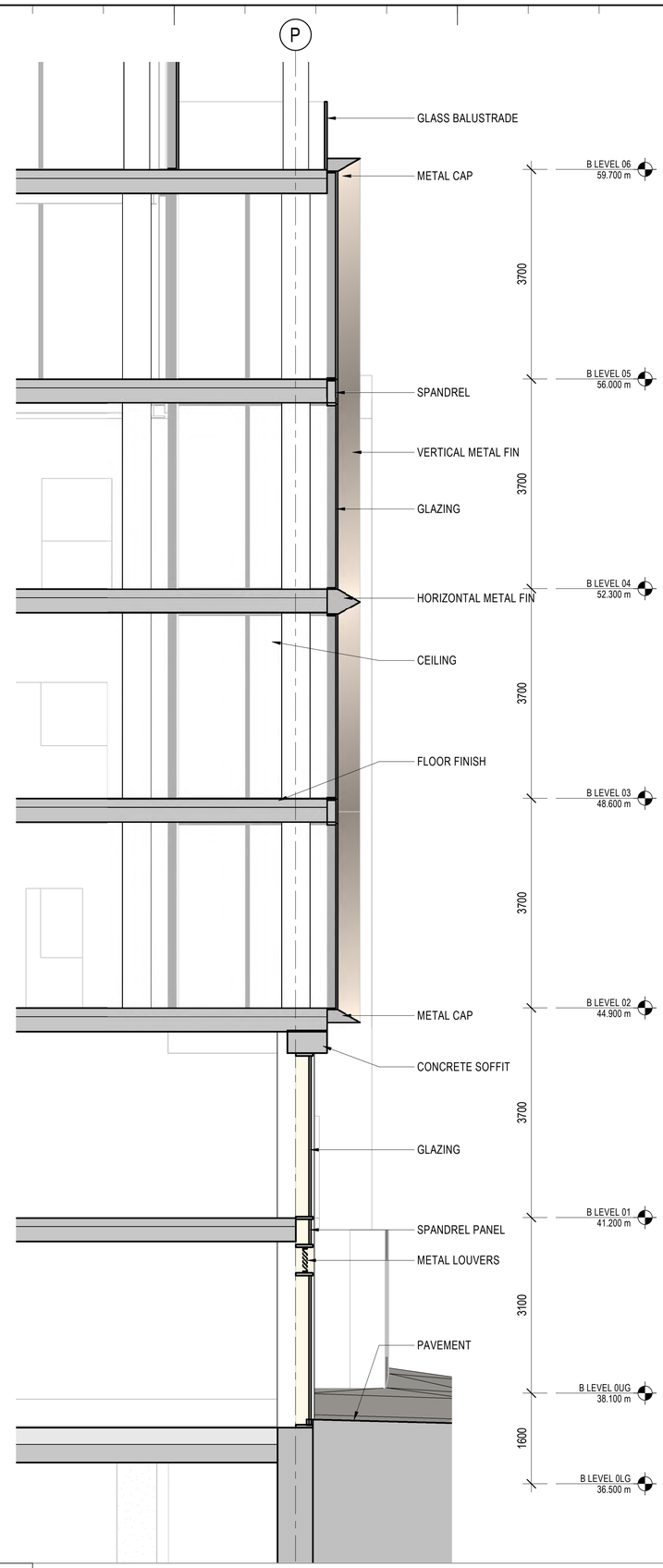
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A7 TYP ENCLOSURE ELEVATION - OFFICE PODIUM

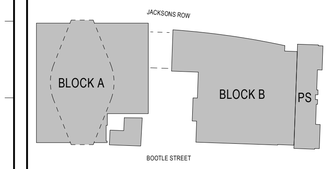
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A3 TYP ENCLOSURE SECTION - OFFICE PODIUM

1 : 50

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer
BOWLER JAMES BRINDLEY

Synagogue Consultant
FDG fairhursts design group

Design Consultant
hodder+partners

Civil Engineer
curtins

Services Engineer
HOARE LEA

Fire Engineer
DESIGN FIRE CONSULTANTS

Client
ST M

Landscape Designer
pre

Project Manager
zerum

Architect
SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

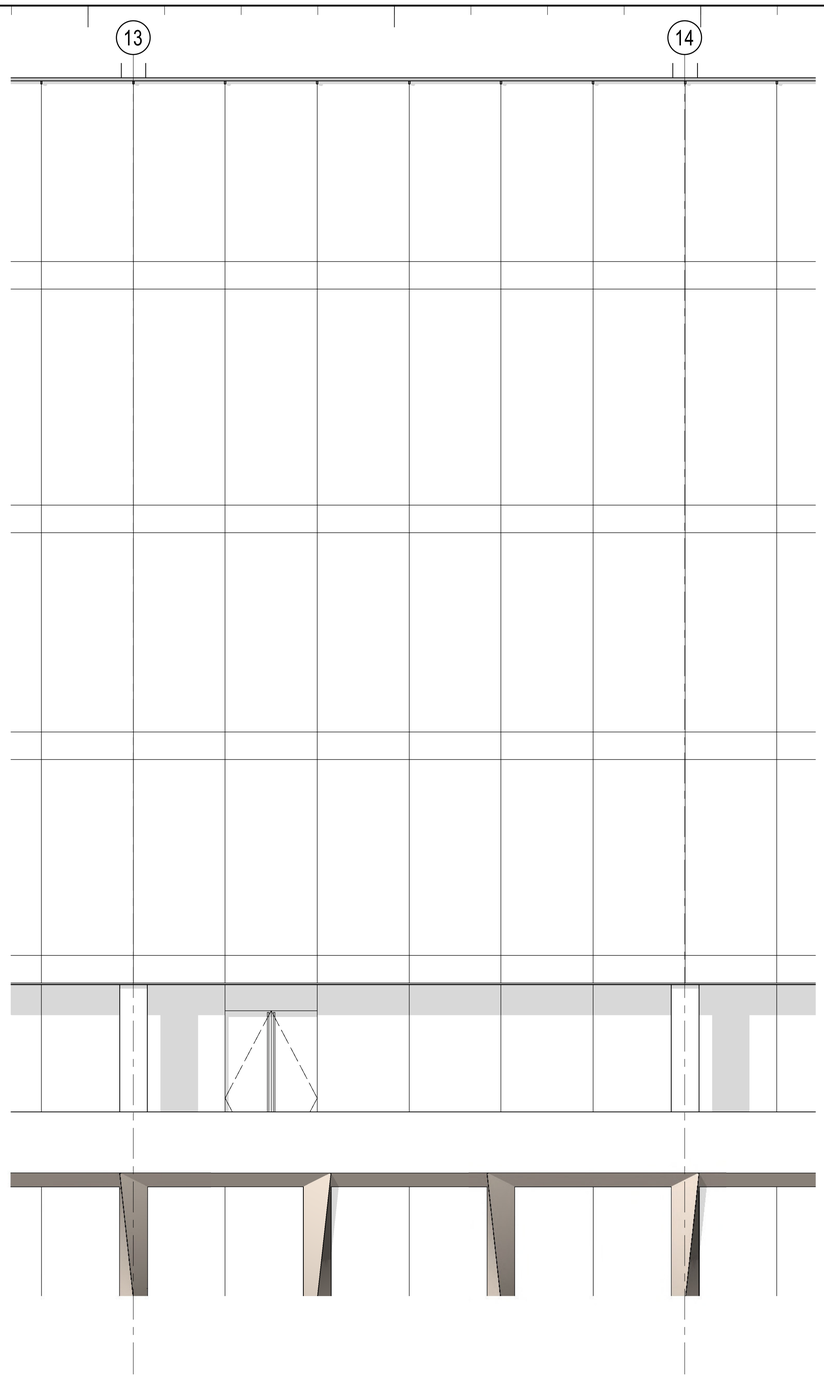
BUILDING ENCLOSURE - OFFICE PODIUM

Project No	Drawing No	Revision
218739	S73-514	P03

Scale @ A0
As indicated

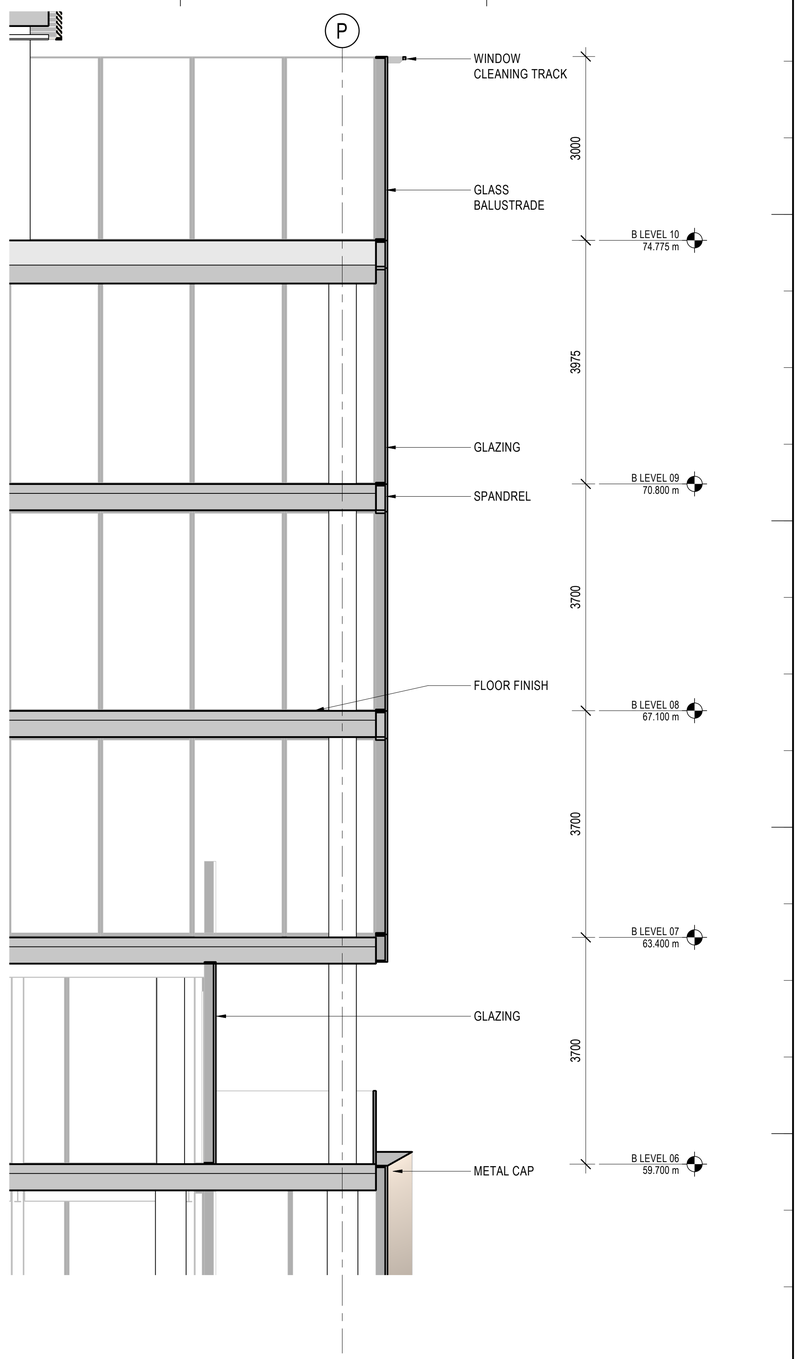
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A7 TYP ENCLOSURE ELEVATION - OFFICE

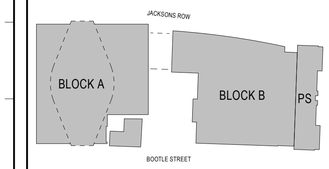
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A3 TYP ENCLOSURE SECTION - OFFICE

1 : 50

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	15/11/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: ST M

Landscape Designer: pie

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

BUILDING ENCLOSURE - OFFICE

Project No	Drawing No	Revision
218739	S73-515	P03

Scale @ A0: As indicated

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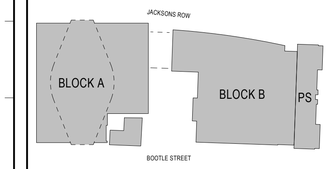


A7 ELEVATION - NORTH

1 : 50

9/6/2021 6:57:51 PM

Key Plan



General Notes

NO:	DATE:	ISSUE:
P03	06/09/21	S73 Submission
P02	20/08/21	S73 Submission DRAFT
P01	04/12/19	S73 Submission

Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: STM

Landscape Designer: pie

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

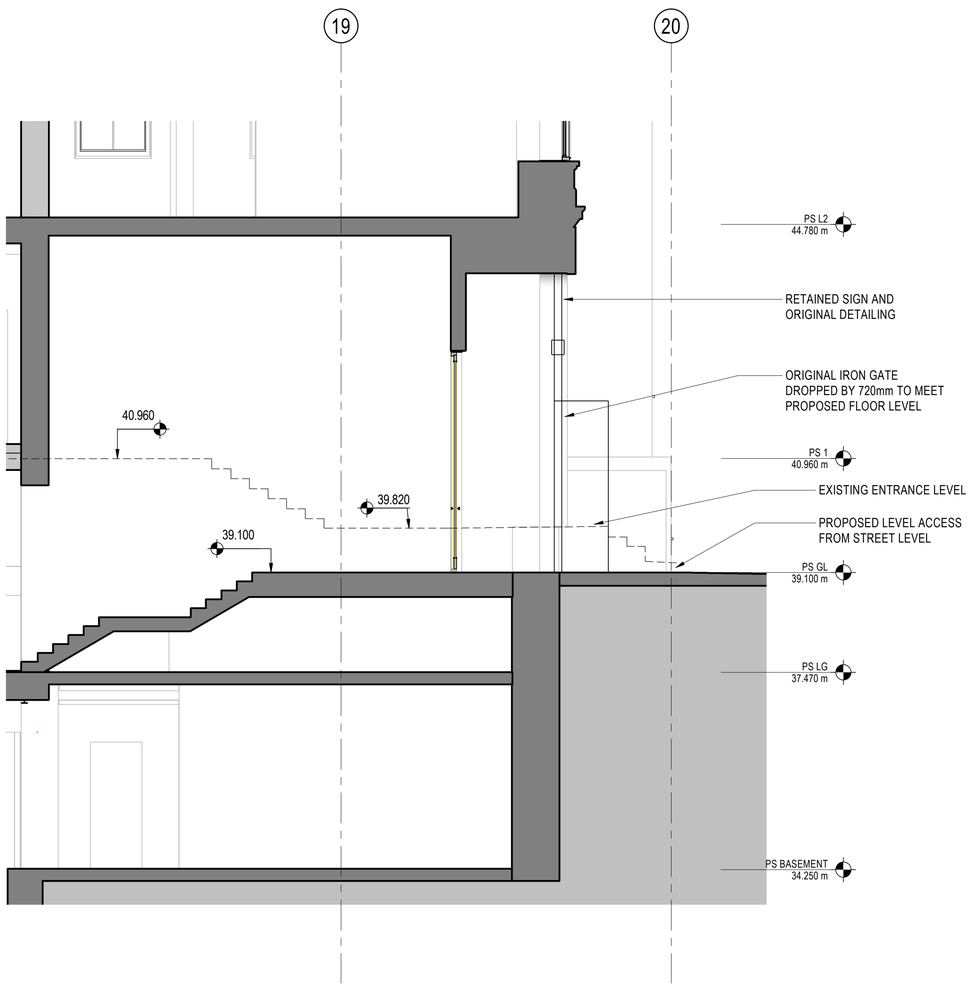
ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

BUILDING ENCLOSURE - SYNAGOGUE

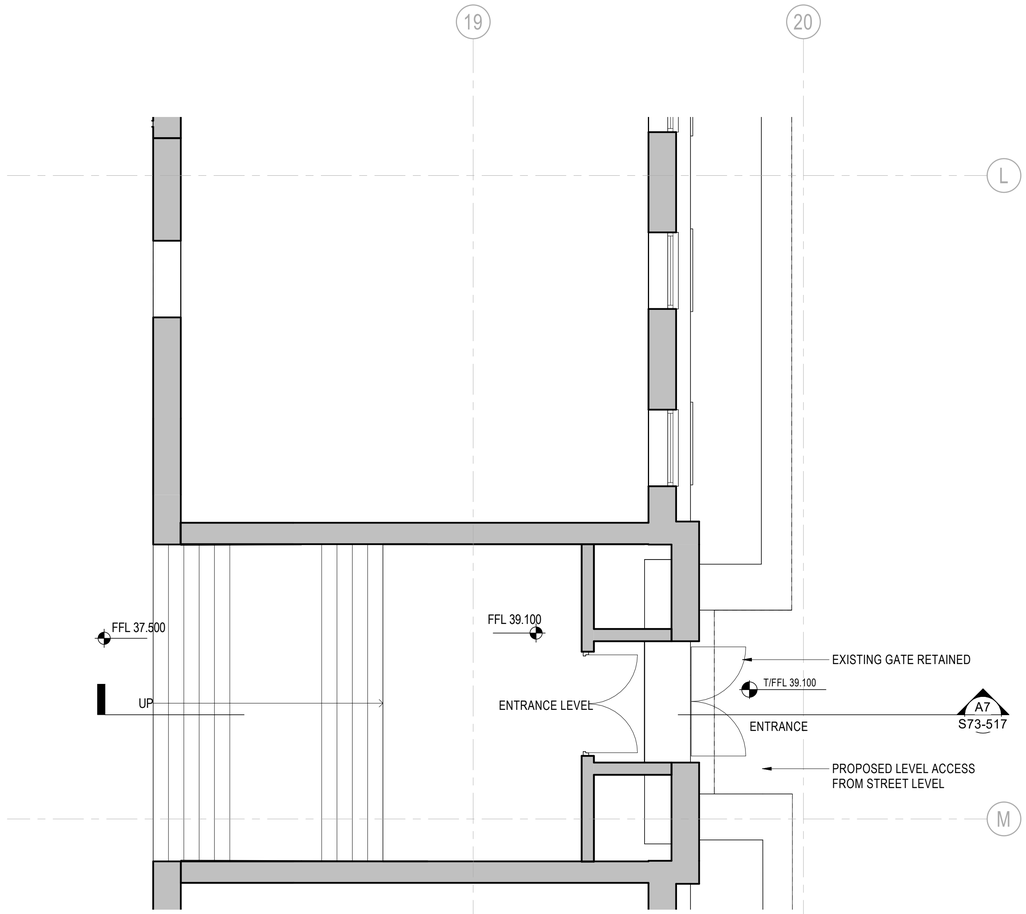
Project No	Drawing No	Revision
218739	S73-516	P03
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A7 SECTION

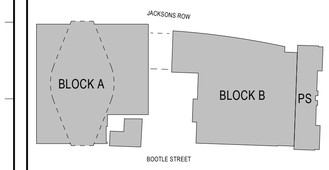
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A4 PLAN

1 : 50

Key Plan



General Notes

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P02	20/08/21	S73 Submission DRAFT
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Status

FOR INFORMATION

Interior Designer: BOWLER JAMES BRINDLEY

Synagogue Consultant: FDG fairhursts design group

Design Consultant: hodder+partners

Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: STM

Landscape Designer: DHA

Project Manager: zerum

Architect

SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

BUILDING ENCLOSURE - POLICE STATION ENTRANCE

Project No	Drawing No	Revision
218739	S73-517	P03
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COMMERCIAL BIN STORE
RESIDENTIAL BIN STORE
BIN PRESENTATION COLLECTION POINT
BLOCK A RETAIL AND PUB WASTE STORE
BLOCK A RETAIL AND PUB WASTE STORE
BIN TUG ROUTE
PEDESTRIAN ACCESS

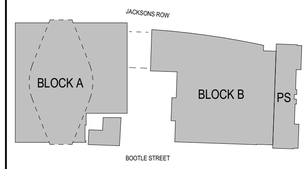
PHASE 03 PHASE 02



A7 LEVEL B1 PLAN
1 : 200

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Key Plan



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Synagogue Consultant
FDG fdh\hunts design group
Design Consultant
hodder+partners
Civil Engineer
curtins
Services Engineer
HOARE LEA
Fire Engineer
DESIGN FIRE CONSULTANTS
Client
ST M
Landscape Designer
Project Manager
zerum

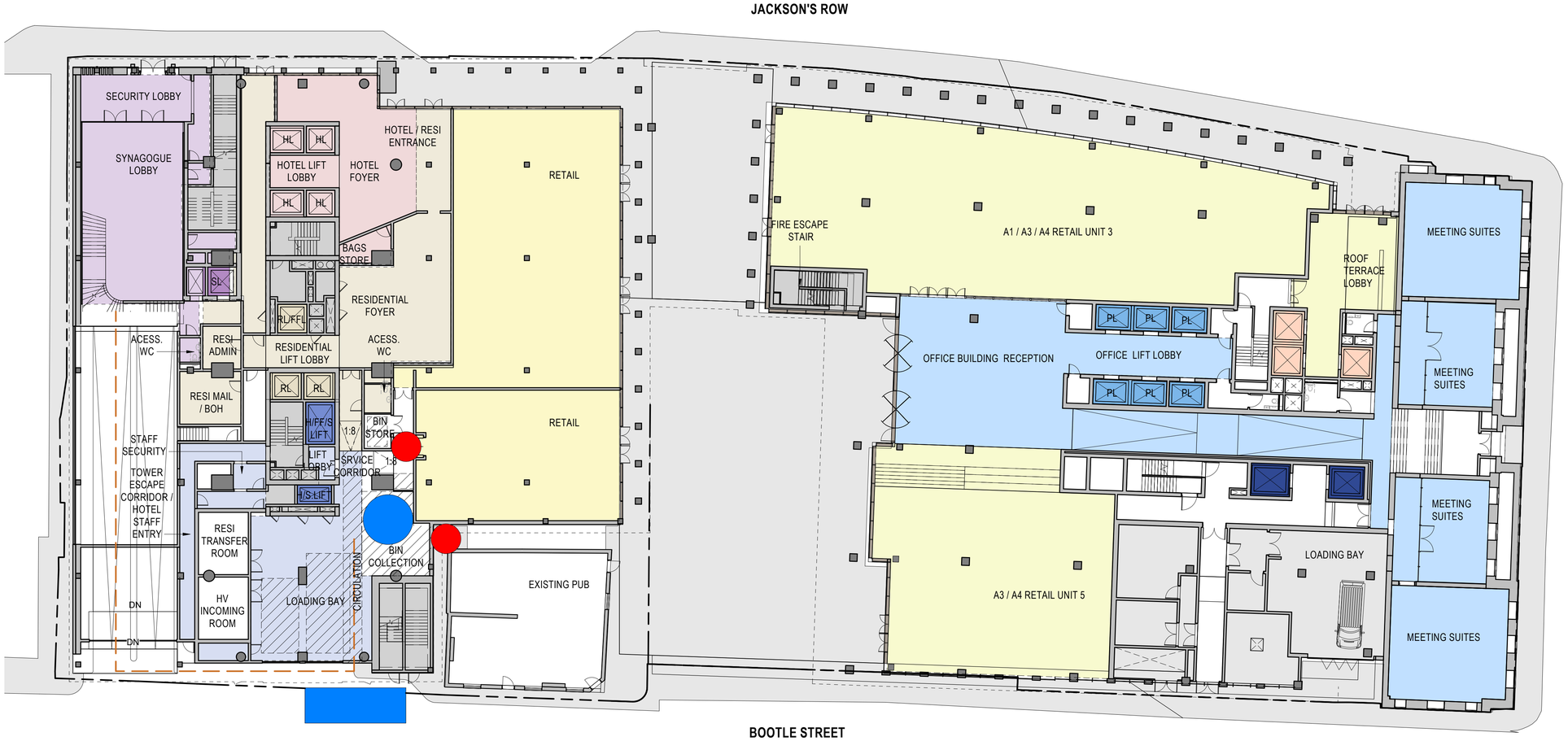
Architect
SOM
Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name
ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title
WASTE MANAGEMENT - BASEMENT 1

Project No 218739
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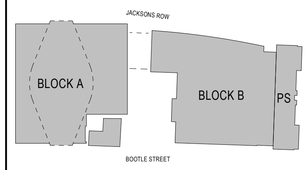


A7 GROUND LEVEL PLAN

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Key Plan



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Civil Engineer: curtins

Services Engineer: HOARE LEA

Fire Engineer: DESIGN FIRE CONSULTANTS

Client: STM

Landscape Designer: DHP

Project Manager: zerum

Architect

SOM

Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

WASTE MANAGEMENT - GROUND LEVEL

Project No	Drawing No	Revision
218739	S73-902	P02

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PEDESTRIAN ENTRY/EXIT

LOADING DOCK ENTRY/EXIT

CARPARK ENTRY/EXIT

ESCAPE ROUTE AND EXIT

1	TOWER STAIR 1 SERVES LEVELS GROUND TO LEVEL 40
2	TOWER STAIR 2 SERVES LEVELS GROUND TO LEVEL 39
3	PODIUM EXTERNAL STAIR 3 SERVES LEVELS GROUND TO LEVEL 6
3B	BASEMENT STAIR 3B SERVES LEVELS BASEMENT 2 TO GROUND LEVEL
4	PODIUM STAIR 4 SERVES LEVELS GROUND TO LEVEL 4
4B	BASEMENT STAIR 4B SERVES LEVELS BASEMENT 2 TO GROUND LEVEL CAN SERVE AS SYNAGOGUE CIRCULATION STAIR
6	OFFICE STAIR 6 SERVES LEVELS GROUND LEVEL TO LEVEL 8 CONNECTS TO PODIUM ON LEVELS 4 AND 6
8	OFFICE STAIR 8 SERVES LEVELS GROUND TO LEVEL 10 CONNECTS TO POLICE STATION BUILDING AND PUBLIC ROOF TERRACE
9	OFFICE STAIR 9 SERVES LEVELS GROUND TO LEVEL 10 CONNECTS TO POLICE STATION BUILDING AND PUBLIC ROOF TERRACE
9B	BASEMENT STAIR 9B SERVES LEVELS BASEMENT TO GROUND

HOTEL PASSENGER LIFTS

RESIDENTIAL PASSENGER LIFTS

SYNAGOGUE PASSENGER LIFTS

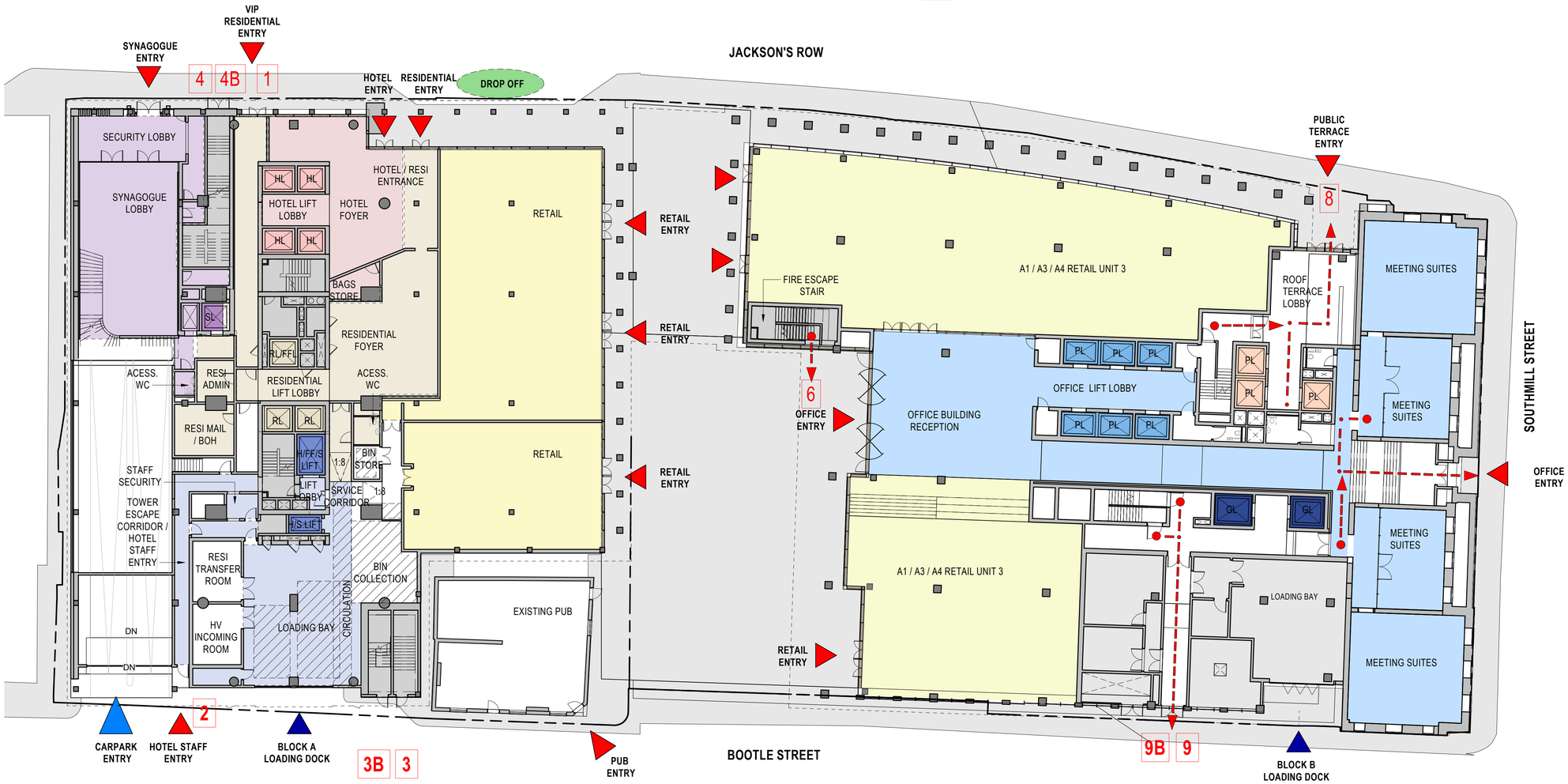
GOODS LIFTS

OFFICE PASSENGER LIFTS

OFFICE / PUPLIC TERRACE GOODS LIFTS

PUBLIC TERRACE PASSENGER LIFTS

BOUTIQUE HOTEL PASSENGER / GOODS LIFTS



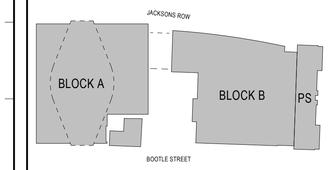
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S73 - GROUND LEVEL ACCESS

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Client: STM

Landscape Designer: D-HB

Project Manager: zerum

Architect

SOM

Skidmore, Owings & Merrill, Inc.
The Broadgate Tower, 20 Primrose Street
London EC2A 2EW, UK
Tel: +44 (0)20 7798 1000 Fax: +44 (0)20 7798 1100

Project Name

ST. MICHAELS DEVELOPMENT, MANCHESTER

Drawing Title

ACCESS - GROUND LEVEL

Project No	Drawing No	Revision
218739	S73-903	P02

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APPENDIX A

BSL Methodology and Guidance

BSL Phase I & II Geo-Environmental Assessment Reports - Methodology and Guidance

This Appendix provides information on the approaches, methods and guidance used by Brownfield Solutions Ltd in the preparation of this report.

The term 'geo-environmental' is used to describe aspects relating to ground-related environmental issues (such as potential soils and groundwater contamination). The term 'geotechnical' is used to describe aspects relating to the physical nature of the site (such as foundation requirements). It should be noted that this is an integrated investigation and these two main aspects are related, unless otherwise specified within the report.

Phase I reports are written in general accordance with the description of a Preliminary Investigation as defined in BS10175:2011+A2:2017 and are also produced in general accordance with the recommendations for a Tier 1 Preliminary Risk Assessment as described in LCRM guidance

The first stage of the investigation and assessment of a site is the Preliminary Investigation/Tier 1 Preliminary Risk Assessment, often referred to as a Phase 1 Desk Study, comprising a desk study and walk-over survey and collation of desk-based searches, which culminates in the Preliminary Risk Assessment and the development of a preliminary/initial Conceptual Site Model (CSM). From this are identified any potential geotechnical and geo-environmental hazards and the qualitative degree of risk associated with them.

From the geo-environmental perspective, the hazard Identification process uses professional judgement to evaluate all the hazards in terms of possible contaminant linkages (of source-pathway-receptor). Possible contaminant linkages are potentially unacceptable risks in terms of the current contaminated land regime legal framework and require either remediation or further assessment. These are normally addressed via intrusive ground investigation and generic risk assessment as part of Phase II investigations and reports.

The second stage is the Ground Investigation, Generic Risk Assessment and Geotechnical Interpretation. This represents the further assessment mentioned above. The Ground Investigation comprises field work and laboratory testing based on the findings of the Preliminary Risk Assessment, to reduce uncertainty in the geotechnical and geo-environmental hazard identification. This may include an exploratory, a detailed or/and supplementary Investigations as described in BS 10175:2011+A2:2017. Phase II Assessments are produced in general accordance with the recommendations for a Tier 2 Generic Quantitative Risk Assessment as described in LCRM guidance and are also intended to fulfil the requirements of a Ground Investigation Report (GIR) as detailed in BS EN 1997-2:2007.

Contaminated Land - Legislative Background

Land contamination can be addressed in several ways, e.g. during planning, under Part 2A, following an incident, during an investigation into environmental damages, or during the application of an environmental permit, or its surrender.

For the planning process the key test is **as a minimum the site cannot be determined as contaminated land**, e.g. there is not significant harm, significant possibility of significant harm to human health or that there is not significant harm to, or the significant possibility that the pollution of controlled waters will occur.

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act.
- The Contaminated Land Statutory Guidance, DEFRA – April 2012.
- The Contaminated Land (England) Regulations 2006.
- The Contaminated Land (England) Amendment Regulations 2012.
- Water Resources Act.
- Water Framework Directive.
- Environmental Damage Regulations.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM) 2019.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

1) Significant harm is being caused or there is a significant possibility of such harm being caused.
2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

Source - substances that are potential contaminants or pollutants that may cause harm.
Pathway - a potential route by which contaminants can move from the source to the receptor , and the impact of that migration on the source e.g. ;attenuation.
Receptor - a receptor that may be harmed, for example the water environment, humans and water, considering the sensitivity of the receptor

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the S-P-R approach is 'suitable for use' criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents
This report has been prepared in accordance with the list of guidance below, however the list is not exhaustive:

- DETR: Circular 02/2000: Environmental Protection Act 1990: Part IIA: Contaminated land. 2012.
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002.
- BS 10175:2011+A2:2017.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM). 2019.

- Groundwater Protection - https://www.gov.uk/government/collections/groundwater-protection.
- UK Technical Advisory Group (UKTAG) - - Water Framework Directive
- Incidents and their classification: the Common Incident Classification Scheme (CICS) – Used by the Environment Agency to classify pollution incidents.

Relevant Legislative Documents
The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012).
- The Environment Protection Act (1990).
- The Water Resources Act (1991).
- The Environment Act (1995).
- The Contaminated Land (England) Act (2000).
- The Pollution Prevention and Control (England and Wales) Regulations (2000).
- The Landfill Regulations (England and Wales) Regulations (2002).
- The Landfill (England and Wales) (Amendment) Regulations (2004).
- Contaminated Land (England) Regulations (2012).
- The Environmental Damage (Prevention and Remediation) Regulations (2009).
- Environmental Permitting Regulations (England and Wales) Regulations (2010).
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017
- Health and Safety at Work Act.
- National Planning Policy Framework (NPPF)(2021).

Contaminated Land Risk Assessment Approach

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:

Hazard Identification ➡ Hazard Assessment ➡ Risk Estimation ➡ Risk Evaluation.

LCRM outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process. Under LCRM, three tiers of risk assessment exist – Stage/Tier Preliminary Risk Assessment, Stage 2 Generic Quantitative and Stage 3 Detailed Quantitative.

Further information can be found at the below site:
https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552, with reference to Incidents and their classification: the Common Incident Classification Scheme

(CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report if applied.

The likelihood of a given receptor being impacted is related to a number of factors, e.g. the geology which could inhibit contaminant migration. For example, a site with a significant thickness of clay between it and a receptor may reduce migration of contamination via the subsurface, which will reduce the likelihood of a given receptor being impacted. The geology or drainage for example could offer a preferential pathway e.g. mines shafts/faults increasing the likelihood and potential magnitude of an impact. The depth of contamination will also affect the exposure pathway, for example petroleum hydrocarbons at depth are unlikely to reach a receptor via dermal contact but could via vapour pathways which will influence the likelihood of an impact being felt e.g. if there are no buildings on site.

The terms and definitions used for the assessment of the likelihood are provided below:

High likelihood: There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Examples - Extensive areas with concentrations above saturation limits for mobile contamination e.g. petroleum hydrocarbons within the water table.

Likely: There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term.
Examples – Localised areas of contaminants with concentrations above saturation limits for mobile contamination e.g. localised petroleum hydrocarbons within the water table; shallow contamination above relevant human health generic assessment criteria is present with little or no hardstanding,

Low likelihood: There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term.
Examples - A thickness/distance of low permeability deposits preventing contaminant migration to a receptor is present; a site is mostly covered hard standing preventing exposure to soil contamination.

Unlikely: There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.
Examples – A site is underlain by a substantial thickness of low permeability clays, between the source and potential receptors which will inhibit significantly, but not completely rule out migration to sensitive receptors.

The severity is also classified using a system based on CIRIA C552, with reference to Incidents and their classification: the Common Incident Classification Scheme (CICS), Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance 2012 and other guidance as appropriate which will be detailed within the main body of the report, if applied. The terms and definitions are:

Severe: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse.

Medium: Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);
Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve.

Mild: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment.
Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.

Minor: harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.
Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low
	No Linkage	Negligible			

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

Very high: There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required.

High: Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the longer term.

Moderate: It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term.

Low: It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.

Very Low: There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

Some linkages may be identified which constitutes a theoretical connection between a source and a receptor, but professional judgement shows them not to be possible for some reason. These are labelled 'no linkage' in the summary table, which give rise to a **negligible** risk category and no further action is required.

Ground Gas Risk Assessment Guidance

BS8485:2015+A1:2019, BS 8576:2013, CIRIA C665 and CL:AIRE RB17 are the current guidance which gives up-to-date advice on all aspects of ground gas. They outline good practice in investigation, the collection of relevant data and monitoring programmes in a risk-based approach to ground gas contamination.

Within BS8485:2015+A1:2019, BS 8576:2013 and CIRIA C665, two semi-quantitative methods are set out for the assessment of risk:

1 For low rise housing with a ventilated under floor void at minimum 150 mm (Boyle and Witherington).
2 For all other development types (Wilson and Card).

Both methods use the concept of Gas Screening Values (GSVs) to identify levels of risk. The mitigation and management of potentially unacceptable risk is described with reference to both passive and active systems of gas. Source removal is also discussed as an option. A sperate approach is discussed under the RB17 header further below.

The aim of the guidance is for a consistent approach to decision making, particularly relating to the scope of protective design measures on a site-specific basis.

Legislative Framework
BS8485:2015+A1:2019, BS 8576:2013 and CIRIA C665 provides technical guidance, however they also recognise the context into which the guidance has to be employed. Government policy is based upon a "suitable for use approach", which is relevant to both the current and proposed future use of land. When considering the current use of land, Part IIA of the Environment Protection Act 1990 provides the regulatory regime. The presence of hazardous ground gases could provide the "source" in a "pollutant linkage" which could lead the regulator to determine that considerable harm or there is a significant possibility of such harm being caused. Under such circumstances, the regulator would determine the land to be "contaminated land" under the provisions of the Act, setting out the process of remediation as described in the DETR Circular 02/2000 *Statutory guidance on contaminated land.*

Generation Potential of Sources
BS 8576:2013 Figure 6 provides a basis for assessing the generation potential from sources identified as part of the Phase I Assessment. These are summarised below:

Generation Potential	Typical Sources
Very Low	• Natural carbonate soil and strata, e.g. chalk and limestone. • Natural soil strata with a low degradable organic content, e.g. alluvium, peat. • In-filled pond less than 15 m diameter, in-filled before 1930s to 1940s. • Made ground with low degradable organic content (e.g. up to 5% organic material such as pieces of wood, pieces of paper, rags, etc. with a high proportion of ash and no food or other easily degradable waste). • Mine workings shallow or shaft (where there is clear evidence that they are flooded). • Inert landfill sites.
Low	• Natural soil strata with a high degradable organic content (DOC). • Made ground with total organic carbon (TOC) up to 6% (e.g. dock silt, no food or other easily degradable waste). • Foundry sand (includes phenolic binders, rags and wood that decay, albeit at low rates). • Landfill 1945 to mid 1960s (see also Moderate below).
Moderate	• Sewage sludge. • Mine workings – unflooded, more than 50 years since last worked (gas is liberated from coal when mine workings are excavated; this continues for up to about 50 years). • Landfill 1945 to mid 1960s (this could also be "low" or, if disturbed, "high").

Generation Potential	Typical Sources
High	• Landfill mid 1960s to early 1990s. • Mine workings – unflooded – less than 50 years since last worked.
Very High	• Municipal landfill sites. • Landfill early 1990s onward.

Frequency and Duration of Monitoring

The monitoring period for a specific site covers the "worst case" scenario. A "worst case" scenario will typically occur during falling atmospheric pressure and, in particular, weather conditions such as rainfall, frost and dry weather.

The benefits of the additional information and whether it is likely to change the scope of gas protection should be considered, as are the consequences of failing to characterise adequately pollutant linkages. Investigations concerned with soil gas are required to provide monitoring data sufficient to allow prediction of worst case conditions enabling the confident assessment of risk and subsequent design of appropriate gas protection schemes. Monitoring programmes should not be an academic exercise in data collection. CL:AIRE publication TB17 "Ground Gas Monitoring and 'Worst-Case' Conditions" provides further guidance.

Below are matrices that will aid in determining an appropriate number of gas monitoring visits and the length of monitoring period.

Typical/idealised periods of monitoring

		Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	1 month	2 months	3 months	6 months	12 months
	Moderate (Apartments)	2 months	3 months	6 months	12 months	24 months
	High (Low rise Residential)	3 months	6 months	6 months	12 months	24 months

Typical/idealised frequency of monitoring/Number of Visits Required

		Gas Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	4	6	6	12	12
	Moderate (Apartments)	6	6	9	12	24
	High (Low rise Residential)	6	9	12	24	24

Note

1 NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).
2 Generation potential of sources based on descriptions within BS 8576:2013.
3 At least two sets of readings should be at low and falling atmospheric pressure (but not restricted to periods below <1000 mb) known as worst case conditions. Historical data can be used as part of the data set (Table 5.5b).

It is recommended that newly installed monitoring wells are left for 24 hours to allow the soil gas to reach equilibrium. It should be recognised, however, that some soil gas regimes could take considerably longer (up to seven days). Interpretation of any initial readings should take this equilibrium process into account.

RB17 Approach

CL:AIRE RB17 (Card et al 2012) is a pragmatic approach to ground gas risk assessment and was developed because gas concentration, pressure and flow rate measured in a well headspace may not be representative of the conditions in the surrounding formation.

In these low-risk situations, the approach is to use the conceptual site model and the estimation of the likely gas generation from a source to identify where or if gas monitoring is required to better define the risks.

Under this approach, for sites with natural soils only with no credible methane source, then no action is required (no monitoring or gas protection measures) as this represents Characteristic Situation 1 (CS1).

Unexploded Ordnance (UXO) Guidance

Clients have a legal duty under the CDM 2015 Regulations to provide designers and contractors with project-specific health and safety information needed to identify hazards and risks. This includes the possibility of unexploded ordnance (UXO) being encountered on the site. Further details are given in CIRIA report C681.

BSL carry out non-specialist UXO screening exercises by considering any evidence of UK defence activities on or near the site evident from gathered desk study information and the unexploded aerial delivered bomb (UXB) online risk maps produced by Zetica. Other data sources are available, but as a first stage screening exercise the freely available online Zetica maps have been used. The level of risk stated is that determined by Zetica, a company experienced and considered competent in the assessment of UXO.

Contaminated Land Screening Values

In assessing the potential for contamination Brownfield Solutions Limited (BSL) follows UK guidance and current best practice.

General
The current recommended method for assessing contamination is on the basis of:

Source-Pathway-Receptor

Where any one of these "pollution linkages" is absent there is deemed to be no risk.

Fundamentally, receptors can be considered as humans (human health) and controlled waters (surface and ground waters).

The purpose of using generic Tier 1 screening levels is to have a simple means of assessing the potential contamination of a site and to inform decisions on whether further investigation is warranted or whether an option to undertake clean up based on the data to hand is cost effective.

Human Health
Current UK guidance is provided by DEFRA and the Environment Agency (EA). Publications forming part of the guidance include the CLEA Mode and toxicological reports collectively referred to as the CLEA Guidance. The CLEA Guidance has included a number of publications which have provided initial screening values for soil contamination based on standard land uses and soil assumptions.

CLEA guidance has gone through a number of revisions over time. Tier 1 generic S4UL values have been published using the CLEA 1.06 Model by CIEH/LQM. These are the third set of generic assessment criteria generated by CIEH and replace the previous two sets of GACs (Generic Assessment Criteria). The revised S4UL values are based on greater knowledge of relevant toxicology and further consideration of exposure frequencies.

C4SL values for six determinands including lead was published by DEFRA/CL:AIRE in December 2014 and they represent a low risk as opposed to minimal risk. These screening values were published by DEFRA for Part 2A use, although with the dual purpose for use under planning. However, S4ULs remain the first reference due to the broader range of end uses and soil organic content.

The preference from the EA is that site specific screening levels are used wherever possible. Due to numerous factors it is not always possible to utilise site specific values. In these instances the following data sources are used in the order of preference given below:

- CIEH S4UL values (derived by CIEH/LQM).
- DEFRA/CL:AIRE C4SL's.
- CL:AIRE GAC values.
- Guidance from other European countries.
- Guidance from the outside Europe.

Controlled Waters
The European Water Framework Directive (WFD) became UK law in December 2003. It was created to ensure that European countries manage their rivers, groundwater and lakes so that they stay healthy for people and for wildlife.

This is achieved by the use of chemical standards for surface waters and groundwater. These values describe concentrations of chemicals that are not expected to cause harm to environmental organisms or human health, provided they are not exceeded. The same chemical may have several standards for different environmental regimes, and for different protection objectives.

Statutory Standards are set in legislation and if exceeded, this constitutes non-compliance with statutory obligations. European Directives are implemented in England and Wales by corresponding statutory instruments (i.e. regulations). The statutory instruments can be the exact same standards as they appear in the Directive or be more stringent.

A number of non-statutory standards also exist, these are set by various organisations (including the EA) for chemicals that are considered to be of concern, but are not covered by any specific legislation.

The chemical standards used in the UK to control impaction of contamination on controlled waters are Environmental Quality Standards (EQS). The EQS's cover a large number of compounds.

Where certain compounds are not covered by the EQS these are commonly compared to the UK Drinking Water Standards (DWS).

Further Assessment
When screening values are exceeded then further consideration is required. This could include the use of simple measures to break the pollution pathway and mitigate the risk, further additional detailed investigation, including the deriving of site-specific values to better define the risk, and to design appropriate remedial measures.

Re-Use Of Waste - Guidance Note

Definition of Waste
The Environment Agency considers waste to be "*...any material that is discarded, or intended to be discarded*..." This includes any soil from trenches, footing, site strip etc. It is no longer required in its original location, therefore it is considered to be waste.

CL:AIRE: Code of Practice
Where materials are excavated for construction purposes, wherever possible these should be retained on site for engineering purposes if they are suitable for use. This can be implemented under the CL:AIRE "Development Industry Code of Practice for the Definition of Waste" (CL:AIRE DoWCoP), also commonly referred to as a "Materials Management Plan".

The developer/contractor is advised to complete all works under the DoWCoP.

Potential scenarios where soils may be able to be re-used:

- Material capable of being used in another place on the same site without treatment.
- Material capable of being used in another place on the same site following ex-situ treatment on site.
- Material capable of being used in another development site without treatment (Direct Transfer).
- Material capable of being used in another development site following ex-situ treatment on another site eg Hub site.

The Code of Practice requires 4 No. Factors to be addressed:

1) Protection of human health and protection of the environment.
2) Suitability of use, without further treatment.
3) Certainty of use.
4) Quantity of material.

In order to satisfy these requirements the following are required:

i) Consultation/approval with Local Authority & Environment Agency to confirm they have no objections to the proposed re-use of waste soils, or the risk assessments for the site.
ii) Risk Assessments to demonstrate that the site does not present an Environmental Hazard.
iii) Remediation Strategy for contaminated sites (or Design Statement for non-contaminated sites).
iv) Materials Management Plan (MMP) which details material generated stockpiles and the end use.
v) Volume calculations.
vi) Planning permission for the development.
vii) Contractual details to be clear, regarding who steps in is a contractor goes into administration/liquidation.

The use of the CoP is effectively industry regulated, there is a requirement to appoint an independent Qualified Person (QP) who checks all the requirements have been met and registers the documentation with the Environment Agency. This person must not have had any involvement with the preparing of the risk assessments or remedial strategy on the site.

Soils which require treatment on site (eg bioremediation, stabilisation) will require an Environmental Permit for treatment, together with justification and validation to prove, once treated, this material is suitable for use.
Site management procedures need to be in place to ensure that material is tracked through from excavation stockpiling, treatment and remediation processes. Should the process of material tracking be considered non-robust, or not adhered to, this may fail the test whether excavated materials may be considered non-waste.

Waste Classification for Soils

Introduction
Waste producers have a duty of care to classify the waste they are producing:

- Before it is collected, disposed of or recovered.
- To identify the controls that apply to the movement of the waste.
- To complete waste documents and records.
- To identify suitably authorised waste management options.
- To prevent harm to people and the environment.

The most sustainable and economic method of dealing with waste soil is usually the retention and re-use on site. Where this is not possible there are three main options for the disposal of soils:

1. Disposal to a permitted waste recycling facility.
2. Re-use on another site (subject to the suitability).
3. Disposal to a landfill site.

The disposal to a permitted facility will be subject to the **specific conditions of the permits for each individual facility** and will vary dependent on location and environmental sensitivity of the receiving site. Re-use on another site will also be subject to the acceptability criteria of that site.

The guidance below relates to disposal to **landfill sites only**.

Background for Landfill Disposal
In July 2005 the United Kingdom implemented the European Directive 1999/31/EC (The Landfill Directive), this introduced the current regime for waste and waste disposal to landfill. The Landfill Directive places controls on waste disposal. These controls include requirements to follow the waste acceptance procedures and criteria that have been agreed by the Council of the European Union and are laid out in Council Decision 2003/33/EC.

Before a waste can be accepted at a landfill site, the landfill **operator** must be satisfied that the waste meets his permit conditions, the waste acceptance procedures (WAP) and waste acceptance criteria (WAC).

If disposal to landfill is the best management option for the waste soils, these procedures **must** be followed or the operator may refuse to accept the waste.

Key Points:

- Not all waste can be landfilled
- Landfills are classified according to whether they can accept hazardous, non-hazardous or inert wastes.
- Wastes can only be accepted at a landfill if they meet the waste acceptance criteria (WAC) for that class of landfill.
- Most wastes must be treated before you can send them to landfill.
- There are formal processes for identifying and checking wastes that must be followed before wastes can be accepted at a landfill site.

Classification
Wastes are listed in the European Waste Catalogue (EWC 2002) and grouped according to generic industry, process or waste types. Wastes within the EWC are either hazardous or non-hazardous. Some of these wastes are hazardous without further assessment (absolute entries) or are 'mirror' entries that require further assessment of their hazardous properties in order to determine whether they are hazardous waste.

Waste soil has mirror entries on the EWC and as such the first phase of the waste classification process is that of determining if the waste is hazardous or not i.e the hazard assessment. The most common EWC waste codes related to soil are:

17 05	**soil (including excavated soil from contaminated sites), stones and dredging spoil**
17 05 03*	soil and stones containing dangerous substances
17 05 04	soil and stones other than those mentioned in 17 05 03

Soils may contain certain contaminants (eg asbestos, oil,) which have prescribed concentration thresholds, that if breached will render the material hazardous waste. These are based on specific "hazardous properties" which include hazards such as carcinogenicity, flammability and toxicity.

In the first instance the concentrations of plausible contaminants within the soil should be identified and wastes should be **classified based on their total concentrations**.

Waste Definitions

Inert	• Will not undergo any significant physical, chemical or biological transformations. • Will not dissolve. • Will not burn. • Will not physically or chemically react. • Will not biodegrade. • Will not adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health. • Has insignificant total leachability and pollutant content. • Produces a leachate with an ecotoxicity that is insignificant (if it produces leachate).
Non-Hazardous	Is not inert (see above) Is not hazardous (see below)
Hazardous	Soil has hazardous properties as defined in WM3 (Guidance on the classification and assessment of waste (1st edition 2015)- Technical Guidance)
Stable Non-reactive hazardous waste#	Hazardous waste, the leaching behaviour of which will not change adversely in the long-term, under landfill design conditions or foreseeable accidents either: in the waste alone (for example, by biodegradation), under the impact of long-term ambient conditions (for example, water, air, temperature or mechanical constraints) or by the impact of other wastes (including waste products such as leachate and gas).

This option allows hazardous waste that is stable and thus has a low leaching potential to be deposited in cells with a standard of containment consistent with non-hazardous wastes.

WAC Testing

The purpose of WAC analysis is to confirm that the waste complies with the relevant WAC for the receiving landfill. If the waste has any disposal route other than a landfill site (e.g. recycling facility, incineration etc) the WAC is not relevant. Furthermore, the WAC limits **cannot** be used to make an assessment of whether a waste is hazardous. WAC testing does however define if a non-hazardous waste is suitable for an inert landfill.

Classification based on Total Concentrations[1]	**Non-Hazardous Waste**		**Hazardous Waste**	
WAC testing	Below inert WAC limit values:	Above inert WAC limit values:	Below hazardous WAC limit values	Above hazardous WAC limit values
Landfill requirements	INERT landfill	NON-HAZARDOUS landfill[2]	HAZARDOUS landfill	PRE-TREATMENT[3]

1 Total concentrations are defined as tests results on solids as opposed to leachate (i.e. a liquid).
2 Individual sites may have certain limit values pre-determined in their licence.
3 After pre-treatment the material characteristics may have changed to an extent that allow the soil to be re-classified.

Hydrocarbons in Soils
WM3 uses the term Oil or Waste Oil to cover hydrocarbons products such as fuel oil, petrol or diesel. These are defined by WM3 as hazardous under an absolute entry in the List of Wastes. However, hydrocarbons in soils are a mixture rather than a pure product and are therefore not absolute entries.

Known Oils
The simplest scenario is where the identity of the contaminating oil is known or can be identified. If the oil is known the manufacturer's or supplier's REACH compliant safety data sheet for the specific oil can be obtained and the hazard statement codes on that Safety Data Sheet can be used for the hazardous waste assessment.

Where the identity of the oil can only be identified down to a petroleum group level (i.e. the contaminating oil is known to be diesel, but the specific type/brand is unknown), then the classification of that petroleum group should be used in the assessment. The marker compounds associated with that petroleum group may be used to confirm carcinogenicity.

Oils may contain a range of hydrocarbons, so the presence of for instance Diesel Range Organics (DRO) does not enable the assessor to conclude that diesel is present. These hydrocarbons may have arisen from other oils, the laboratory needs to provide an interpretation of the chromatograph to determine if it is consistent with diesel or weathered diesel as a whole.

The concentration of known oils should be determined using a method that as a minimum spans the range in which the carbon numbers for that known oil fall.

Unknown Oils
Where hydrocarbons are contaminating soils, it is likely that the oil will be unknown or cannot be determined.

WM3 states that:

> For contaminated land specific consideration must be given to the following before proceeding;
>
> - The presence of other organic contaminants, for example solvents or coal tar that could be detected as hydrocarbons. Coal Tar is not an oil and is considered separately in WM3 example 2. Where the site history or investigation indicates the presence of hydrocarbons from oil and other sources (e.g. coal tar), and the origin of the hydrocarbons cannot reliably be assigned to either, then a worst case approach of considering the hydrocarbons both as waste oil (in accordance with this example) and from other sources, for example coal tar should be taken.
> - The presence of diesel, or weathered diesel, should be specifically considered by the laboratory and where this is confirmed by the hydrocarbon profile the oil should be assessed as a known or identified oil (diesel).

The use of marker compounds is optional; however, it is recommended that where possible the marker compounds should be used. WM3 states:

> If the identity of the oil is unknown, and the petroleum group cannot be established, then the oil contaminating the waste can be classified as non-carcinogenic/mutagenic due to the presence of oil if all three of the following criteria are met:
>
> - The waste contains benzo[a]pyrene (BaP) at a concentration of less than 0.01% (1/10,000th) of the TPH concentration (This is the carcinogenic limit specified in table 3.1 of the CLP for BaP)
> - This has been determined by an appropriate and representative sampling approach in accordance with the principles set out in Appendix D of WM3, and
> - The analysis clearly demonstrates, for example by carbon bands or chromatograph, and the laboratory has reasonably concluded that the hydrocarbons present have not arisen from petrol or diesel.

For example:

TPH Concentration (mg/kg)	Petrol or Diesel	BaP (mg/kg)	Classification
10,000	No	0.9	Non- Hazardous
1,000	No	Not available	Hazardous
1,000	Yes	Not relevant	Hazardous

References

1. Environmental Permitting (England and Wales) Regulations 2010 (as amended) (EP Regulations), the Landfill Directive (1999/31/EC) and the subsequent Council Decisions.
2. Environment Agency Environmental Permitting Regulations: "Inert Waste Guidance- Standards and Measures for the Deposit of Inert Waste on Land" 2009.
3. Environment Agency "Waste acceptance at landfills - Guidance on waste acceptance procedures and criteria" Nov 2010.
4. Environment Agency "Guidance on the classification and assessment of waste (Technical Guidance WM3)".
5. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).
6. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives
7. 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament
8. Environmental Permitting Guidance The Landfill Directive For the Environmental Permitting (England and Wales) Regulations 2010 Updated March 2010 Version 3.1
9. Classification, Labelling and Packaging of Substances Regulation (EC 1272/2008) (CLP).

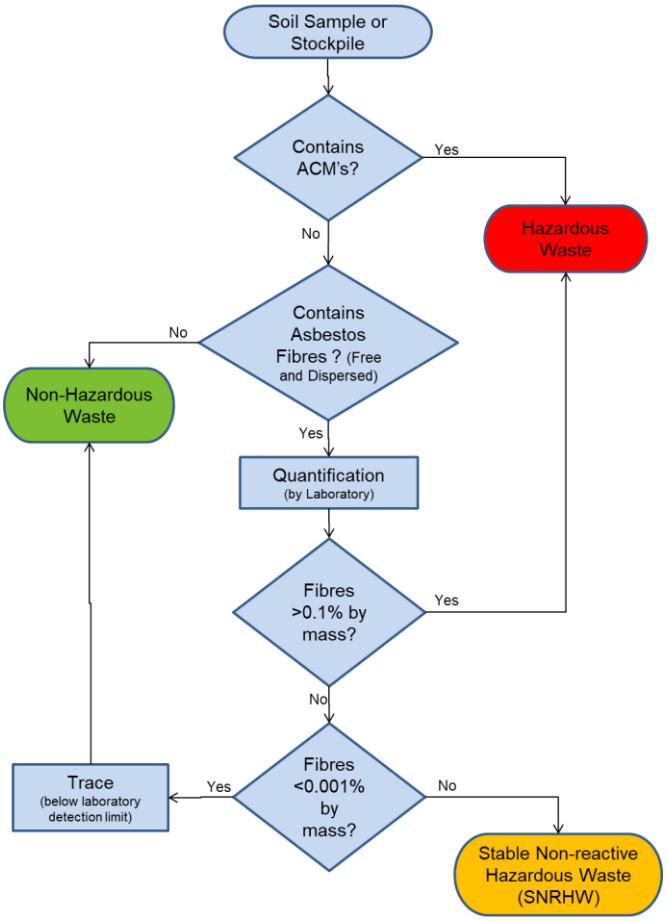
Additional Asbestos Guidance Notes

Disposal

The 1st Edition of WM3 "Guidance on the classification and assessment of waste", details the way in which Asbestos is assessed within soils.

The assessment of asbestos containing waste is dependent on whether the asbestos is present as:

- Fibres that are free and dispersed, or
- Identifiable pieces of asbestos containing materials (ACM's)



Identifiable pieces of asbestos are any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye. The result is that commonly soils with visible ACM's are sorted and the ACM's removed by hand picking and separate disposal.

Asbestos concentrations below 0.001% by mass are below standard laboratory detection limits and are not currently regarded as containing asbestos for the purposes of disposal and may be disposed of to an inert landfill site[1]. These levels are often termed "trace" by laboratories.

Asbestos concentrations between 0.001% and 0.1% are stable non-reactive hazardous waste (SNRHW)[1]. Waste transfer stations where soil recycling takes place may be able to take SNRHW, but are unlikely to take soils containing asbestos above trace concentrations.

The following codes should be assigned to the asbestos waste as appropriate:

17 06	**Insulation materials and asbestos-containing construction materials**
17 06 01	Insulation materials containing asbestos
17 06 03	Other insulation materials consisting of or containing hazardous substances
17 06 04	Insulation materials other than those mentioned in 17 06 01 and 17 06 03
17 06 05	Construction material containing asbestos

WM3 indicates that 17 06 05 would normally be used in preference to 17 06 01 for the asbestos in asbestos contaminated soil and stones.

Construction materials containing asbestos and "*other suitable materials*" may be landfilled at landfills for non-hazardous waste in accordance with the Landfill Directive without testing.

This means that wastes that are only hazardous because of their asbestos content can be disposed of at landfills for non-hazardous waste in separate landfill cells that only accept asbestos wastes and other suitable materials. The Landfill Directive requires that stable non-reactive hazardous waste shall not be deposited with biodegradable waste (for example organic material, household waste, paper etc..) and must meet the waste acceptance criteria set out in accordance with Annex II.

Construction
Health and Safety Executive (HSE) guidance on asbestos is not directly related to soil and much of the guidance focuses on the removal of asbestos from buildings. The overarching legislation is the Control of Asbestos Regulation (CAR 2012). However, where work involves (or is likely to involve) contact with asbestos then CAR 2012 requires a risk assessment including whether or not the work is licensed or notifiable non-licensed work and may require an Asbestos Management Plan. Work becomes notifiable if it is considered that the control limit could be exceeded.

Brownfield sites frequently have soils that contain asbestos and the presence of asbestos needs to be considered within the context of construction, particularly in relation to groundworks. The exposure of soils and the use of excavators and plant to move soil around increases the possibility of fibres becoming airborne. However, it is good site practice to not generate dusts and to employ dust suppression on all sites regardless of the presence of asbestos.

The legal control limit for asbestos is 0.1f/ml over a continuous four-hour period. The control limit is not a '*safe*' level and exposure from work activities involving asbestos must be reduced to as far below the control limit as possible.

Clearly the higher the concentrations in the soil the greater potential there is for fibres to be released, however IOM publication TM/88/14 "the release of dispersed asbestos fibres from soil" 1988 concludes that:

- Mixtures of asbestos in dry soils with asbestos content as low as 0.001% can produce airborne respirable asbestos concentrations greater than 0.1f/ml in dust clouds where the respirable dust concentrations are less than 5mg/m^3.
- An action limit is recommended of no higher than 0.001% asbestos in soils above which steps should be taken to minimise exposure to airborne fibres (e.g. by wetting).
- The addition of relatively small quantities (10%) of water can reduce the airborne fibre concentrations by an order of magnitude.

Where asbestos has been identified at concentrations above 0.001% as free and dispersed fibres in the soil precautions need to be adopted. Concentrations below this are considered to be normal background, although good site practice dictates that the generation of dusts should be avoided and therefore any fugitive fibre release from minor concentrations should be kept to a practical minimum.

End Use
The use of materials containing asbestos and material containing asbestos is prohibited under EU legislation. There is currently a Joint Industry Working Group (JIWG) tasked with producing a Code of Practice for Asbestos in Soil, Made Ground and Construction & Demolition Material that will clarify in due course the position of the various government agencies.

Asbestos containing materials can remain in situ under a suitable cover system which may be hardsurfacing or soft landscaping (with or without hard dig layers and markers).

There is a risk that future maintenance may compromise such systems and details of the presence of asbestos should be kept in the Health and Safety File.

Preliminary publications from JIWG (April 2015) provide guides for decision making in relation to construction.

The re-use of waste soils should be undertaken in accordance with the CL:AIRE Code of Practice and is subject to suitable risk assessments demonstrating low risk . There is nothing that specifically excludes the re-use of soils containing asbestos as fill to raise levels. However, the movement of materials increases the risk of fibres becoming airborne and suitable precautions will be required.

The re-use of soils containing asbestos at concentrations above hazardous waste levels is likely to meet with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be feasible where there is a long program for implementation.

Asbestos in Soil as Free Fibres

Concentration (by weight)	Waste Disposal				Construction Issues	End Use	
	Recyc	Inert	SNR	Hazardo		Suitable for re-use on site	Precautions
Not detected	√	√			No precautions necessary, however on a brownfield site asbestos not previously identified may be found during works and a statement within the contractors method statement for how they will deal with this unforeseen asbestos would be good practice to ensure compliance with CAR2012.	Yes	None
Trace (<0.001%)		√ [2]			Precautions are unlikely to be required, however a detailed method statement may be required to ensure compliance with CAR2012. Basic asbestos management good practice will be required. Typically precautions would include: • Ensuring soils do not dry out to become dusty. • Site personnel have the risk communicated at induction stage.	Yes Soils can be re-used under CL:AIRE CoP with the correct precautions in place.	Generally clean cover or hardstanding cover required.
0.001% – 0.099%			√		Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: • Site personnel have the risk communicated at induction stage. • Ensuring personnel have suitable training. • Task monitoring to inform PPE requirements. • Ensuring soils do not dry out to become dusty and that misting is available during groundworks. • Separate stockpiling. • Clean haulage routes.	Possibly Soils may be able to be re-used under CL:AIRE CoP, subject to a satisfactory Risk Assessment and regulatory agreement with the correct precautions in place.	Clean cover or hardstanding cover required.
0.1+%				√	Contractor needs to produce an Asbestos Management Plan in accordance with CAR2012 as part of their method statement. Typical precautions would include: • Site personnel have the risk communicated at induction stage. • Ensuring personnel have suitable training. • Task monitoring to inform PPE requirements. • Site wide and or perimeter monitoring. • Ensuring soils do not dry out to become dusty and that misting is available during groundworks. • Separate stockpiling. • Clean haulage routes. • Decontamination unit	Unlikely [3] Re-use of soils containing asbestos within an earthworks scheme will involve significant engineering and the Risk for generating dusts will be significantly increased with	Clean cover and a hard dig layer. A plan should be in place for future excavations as part of the Health and Safety File.

Concentration (by weight)	Waste Disposal				Construction Issues	End Use	
	Recyc	Inert	SNR	Hazardo		Suitable for re-use on site	Precautions
						repeated handling and compaction.	

1. The standard laboratory detection limit is normally 0.001%. Below 0.001% is trace and currently regarded as not containing asbestos for the purposes of disposal off site. However the waste producer has a duty to fully classify the waste and the presence of trace asbestos should be declared. Consequently it is unlikely that a waste treatment site will take this soil and an inert landfill may make a commercial decision to only take it under some circumstances.

2 The re-use of soils containing asbestos at concentrations above hazardous waste is likely to meet with regulatory opposition. Assuming a suitable strategy could be agreed this would take a considerable amount of time and is only likely to be warranted where there a long program for implementation.

APPENDIX B

Exploratory Hole Logs

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.
BH01
Sheet 1 of 5

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type**: RC
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale**: 1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 13/12/22 - 19/12/22	**Logged**: JEM; **Checked**: JM

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	TCR	SCR	RQD	Depth (m)	Level (m OD)	Legend	Stratum Description
								0.10			MADE GROUND: Reinforced concrete. 10mm rebar at 0.08m bgl.
								0.25			MADE GROUND: Grey sub-angular fine to coarse gravel of limestone.
		1.20	SPT	N=1 (1,1/0,0,0,1)							MADE GROUND: Greyish brown sandy gravel with low cobble content. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, concrete and limestone. Cobbles are angular of brick up to 200mm in diameter.
		2.00	SPT	N=5 (1,2/1,1,1,2)							
		3.00	SPT	N=20 (3,4/4,6,5,5)				2.85			Orange brwn silty gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of mudstone, sandstone and quartz.
		4.00	SPT	N≥50 (4,5/50 for 170mm)				4.05			Destructured SANDSTONE recovered as brownish red gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and quartz.
		5.43-5.50	D								
		5.50 - 7.00	4		100	77	61	5.50			Moderately strong partially weathered brownish red fine to coarse SANDSTONE.
		6.80 - 7.00	D								*5.50-7.00m bgl: Discontunites are widely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		7.00 - 8.50	4		100	87	67				*7.00-7.50m bgl: Discontunites are widely spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
			7								*7.50-7.60m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *7.60-8.50m bgl: Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
		8.50 - 10.00	5		100	95	51				*8.35-8.50m bgl: Sub-vertical fracture (88 degrees).* *8.50-9.05m bgl: Discontunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			NI								*9.05-9.13m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.* *9.13-10.00m bgl: Discontunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			6								
					TCR	SCR	RQD				

Remarks

1. Service clearance by BSL Engineer.
2. UXO Clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 5.50m bgl with Rotary Coring follow on to 43.50m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.
BH01
Sheet 2 of 5

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** RC
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 13/12/2022 - 19/12/2022	**Logged** JEM / **Checked** JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		9.93 - 10.00	D	100	100	94				*10.00-11.50m bgl: Discontunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		10.00 - 11.50	10							
		11.50 - 13.00	1 NI 0 4	100	93	80				*11.50-11.63m bgl: Discontunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *11.63-11.70m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.* *11.70-11.80m bgl: No discontinuities.* *11.80-11.84m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.* *11.50-11.63m bgl: Discontunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		12.57 - 12.80	D							
		13.00 - 13.08	D	100	93	90				*11.70-11.80m bgl: No discontinuities.* *13.08-13.09m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.* *13.09-14.50m bgl: Discontunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		13.00 - 14.50	4							
		14.50 - 16.00	8	100	97	90				*14.50-15.80m bgl: Discontunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			NI 0	100	97	70				*15.80-15.90m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *15.90-16.00m bgl: No discontinuities.* *16.00-17.20m bgl: Slightly gravelly of fine to coarse quartz. Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
		16.50 - 16.60	D							
		16.00 - 17.50	7							
			NI 0							*17.20-17.25m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.* *17.25-17.50m bgl: Slightly gravelly of fine to coarse quartz. Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).* *17.50-17.75m bgl: No discontinuities.* *17.75-17.85m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.* *17.85-18.20m bgl: Slightly gravelly of fine to coarse quartz. Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).* *18.20-18.25m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.* *18.25-19.00m bgl: Slightly gravelly of fine to coarse quartz. Discontunites are moderately spaced, smooth, undulating, planar and horizontal to*
		17.50 - 17.80	D	100	90	70				
			0 NI							
		17.50 - 19.00	4 NI							
			5							
		19.00 - 19.10	D	100	97	63				

Remarks

1. Service clearance by BSL Engineer.
2. UXO Clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 5.50m bgl with Rotary Coring follow on to 43.50m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.
BH01
Sheet 3 of 5

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type**: RC
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale**: 1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 13/12/2022 - 19/12/2022	**Logged**: JEM; **Checked**: JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		19.00 - 20.50	7							*sub-horizontal (0-5 degrees).* *19.00-20.20m bgl: Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
			1	100	100	88				
		20.50 - 21.00	4							*20.20-20.24m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.* *20.24-20.50m bgl: Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
		21.50 - 21.60	D	100	100	80				*20.50-21.00m bgl: Slightly gravelly of fine to coarse quartz. Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
		21.00 - 22.50	8							*21.00-22.50m bgl: Slightly gravelly of fine to coarse quartz. Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
		22.70 - 22.95	D	100	90	60				*22.50-23.35m bgl: Slightly gravelly of fine to coarse quartz. Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
			4							
		22.50 - 24.00	NI							*23.35-23.50m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *22.50-23.35m bgl: Slightly gravelly of fine to coarse quartz. Discontunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			12							
		24.00 - 24.08	D	100	100	67				*24.00-24.80m bgl: Slightly gravelly of fine to coarse quartz. Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
			5							
		24.00 - 25.50	?				24.80			Extremely weak partially weathered brownish red MUDSTONE. *24.80-25.10m bgl: Thinly laminated.*
			1				25.10			Moderately strong partially weathered brownish red fine to coarse SANDSTONE.
		25.50 - 27.00 26.30 - 26.43	11 D	100	100	73				*24.00-24.80m bgl: Discontunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *25.50-27.00m bgl: Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
		27.20 - 27.40	B	100	93	73				*27.00-27.40m bgl: Discontunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			NI							
		27.00 - 28.50	4							*27.40-27.45m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *27.45-28.20m bgl: Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
			NI							
			3	87	47	47				*28.20-28.25m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *28.25-28.50m bgl: Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).* *28.50-28.60m bgl: Vertical fracture.* *28.50-29.20m bgl: Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).* *29.20-30.00m bgl: Non-intact recovered as brownish red fine to coarse*
		28.90 - 29.00 28.50 - 30.00	3 D							

20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO Clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 5.50m bgl with Rotary Coring follow on to 43.50m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.
BH01
Sheet 4 of 5

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** RC
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 13/12/2022 - 19/12/2022	**Logged** JEM / **Checked** JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
			NI							*sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			0	100	92	77				*30.00-30.20m bgl: No discontinuities.*
			0							*30.20-30.22m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			NI							*30.22-30.60m bgl: No discontinuities.*
		30.00 - 31.50	8							*30.60-30.70m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.*
				100	97	60				*28.50-29.20m bgl: Discontunites are close to moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
										31.50-32.60m bgl: Slightly gravelly of fine to coarse quartz. Discontinuities are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).
		32.15 - 32.25 31.50 - 33.00	16 D							
			NI							
			2							*32.60-32.65m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.*
			1	100	87	77				*32.65-33.00m bgl: Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
			NI							*33.00-33.45m bgl: Slightly gravelly of fine to coarse quartz. Discontinuities are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
		33.00 - 34.50	6							*33.45-33.50m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.*
		34.20 - 34.40	D							*33.50-34.20m bgl: Slightly gravelly of fine to coarse quartz. Discontinuities are close to moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
			NI							*34.20-34.30m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.*
			2							*34.30-34.50m bgl: Slightly gravelly of fine to coarse quartz. Discontinuities moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
			NR	80	72	60				*34.50-35.80m bgl: No recovery.*
			NI							*34.80-34.90m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
		34.50 - 36.00	5							*34.90-36.00m bgl: Slightly gravelly of fine to coarse quartz. Discontinuities are close to moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
		35.85 - 35.95	D							*36.00-37.40m bgl: Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
				100	93	93				
		36.00 - 37.50 36.80 - 36.90	7 D							
			NI							*37.40-37.50m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			8	100	100	67				*37.50-38.00m bgl: Discontunites are closely spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
		37.50 - 39.00	4							*38.00-39.00m bgl: Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
			0	100	98	90				*39.00-39.15m bgl: No discontinuities.*

30.0 31.0 32.0 33.0 34.0 35.0 36.0 37.0 38.0 39.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO Clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 5.50m bgl with Rotary Coring follow on to 43.50m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.	BH01
	Sheet 5 of 5
PROJECT NO:	C5128
CO-ORDS:	
Hole Type	RC
PROJECT NAME:	ST MICHAELS, MANCHESTER
LEVEL:	
Scale	1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD
DATES:	13/12/2022 - 19/12/2022
Logged	JEM
Checked	JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		39.55 - 39.75	D							*39.15-39.18m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
		39.00 - 40.50	5							*39.18-40.50m bgl: Discontunites are moderately spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
										39.25-39.35m bgl: Vertical fracture.
				100	93	67				
			5							*40.50-41.70m bgl: Discontunites are moderate to widely spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
		40.50 - 42.00								
		41.50 - 41.60	D							
			NI							
			1							*41.70-41.80m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.*
				100	90	15				*41.80-42.00m bgl: Discontunites are moderate to widely spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
		42.00 - 43.50	19							*42.00-43.30m bgl: Discontunites are closely spaced, smooth, undulating, planar and horizontal to sub-horizontal (0-5 degrees).*
			NI							*43.30-43.45m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse of sandstone and quartz.*
			1				43.50			*43.45-43.50m bgl: Discontunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
										End of Borehole at 43.50m

40.0
41.0
42.0
43.0
44.0
45.0
46.0
47.0
48.0
49.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO Clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 5.50m bgl with Rotary Coring follow on to 43.50m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.

BH02

Sheet 1 of 2

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** RC
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 07/11/22 - 21/12/22	**Logged** CM / **Checked** JM

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	TCR	SCR	RQD	Depth (m)	Level (m OD)	Legend	Stratum Description
								0.06			MADE GROUND: Asphalt.
								0.30			MADE GROUND: Greyish brown sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of limestone and sandstone.
		1.20	SPT	N=1 (1,0/0,0,0,1)							MADE GROUND: Brownish grey gravelly clay. Gravel is sub-angular fine to coarse of brick and sandstone. Rare coal.
		1.30-1.50	D ES					1.55			
		2.00	D SPT	N=18 (3,4/5,4,4,5)							Orange brown silty gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of mudstone, sandstone and quartz.
		3.00	D SPT	N≥50 (9,10/50 for 275mm)							
		4.00 / 275	SPT	N≥50 (6,6/50 for 275mm)				4.25			
			NR		67	67	7				Destructured SANDSTONE recovered as brownish red gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and quartz. *4.50-6.00m bgl: No recovery.* *6.00-6.50m bgl: No recovery.*
		6.00 - 7.50	NI					6.50			Moderately strong partially weathered brownish red fine to coarse SANDSTONE. *6.50-7.07m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *7.06-7.50m bgl: Discontinuites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *7.50-8.25m bgl: Discontinuites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *8.25-9.00m bgl: No recovery.* *9.00-10.00m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			10		95	83	63				
		7.50 - 9.00	11								
			NR		100	100	92				
		9.00 - 10.00	6								

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 4.00m bgl with Rotary Coring follow on to 19.00m bgl
5. No groundwater encountered.
6. Borehole progress halted at 19.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.	BH02
	Sheet 2 of 2
PROJECT NO:	C5128
CO-ORDS:	
Hole Type	RC
PROJECT NAME:	ST MICHAELS, MANCHESTER
LEVEL:	
Scale	1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD
DATES:	07/11/2022 - 21/12/2022
Logged	CM
Checked	JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
				100	97	70				*10.00-11.01m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		10.00 - 11.50	8							
			NI 2							*11.01-11.06m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
				100	97	57				*11.06-11.50m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		11.50 - 13.00	11							*11.50-12.72m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			NI 0							*12.72-12.77m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded of fine to coarse sandstone.*
			NR	53	53	27				*13.00-13.14m bgl: No recovery.*
			3							*13.14-13.40m bgl: Discontinuites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		13.00 - 14.50	NR							*13.40-13.66m bgl: No recovery.*
			3							*13.66-13.90m bgl: Discontinuites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			NR							*13.90-14.10m bgl: No recovery.*
			2							*14.10-14.34m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			NR							*14.35-14.50m bgl: No recovery.*
				100	100	42				*14.50-15.00m bgl: Discontinuities are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		14.50 - 15.00	7							
				100	97	40				*15.00-15.40m bgl: Discontinuities are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			4							
			3							*15.40-15.43m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
		15.00 - 16.50	1							*15.43-15.47m bgl: Sub-vertical fracture (48 degrees).*
			7							*15.43-15.64m bgl: Discontinuities are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
										15.59-15.61m bgl: Sub-vertical fracture (20 degrees)
				100	100	30				*15.67-15.81m bgl: Discontinuities are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		16.50 - 17.50	12							*15.81-15.83m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded of sandstone.*
										15.83-16.50m bgl: Discontinuities are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).
				100	100	47				*16.50-17.50m bgl: Discontinunties are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		17.50 - 19.00	15							*17.50-19.00m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
							19.00			End of Borehole at 19.00m

10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 4.00m bgl with Rotary Coring follow on to 19.00m bgl
5. No groundwater encountered.
6. Borehole progress halted at 19.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.

BH03

Sheet 1 of 3

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** RC
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 07/11/22 - 21/12/22	**Logged** CM / **Checked** JM

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	TCR	SCR	RQD	Depth (m)	Level (m OD)	Legend	Stratum Description
								0.06			MADE GROUND: Asphalt.
		0.50-0.70	D ES					0.25			MADE GROUND: Greyish brown sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of limestone and sandstone.
								0.85			MADE GROUND: Brownish grey sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, concrete and sandstone.
		1.20	SPT	N=18 (3,3/4,4,5,5)							MADE GROUND: Reddish brown slightly sandy gravel with high cobble content. Sand is fine to coarse of ash. Gravel is angular to sub-angular fine to coarse of brick. Cobbles are angular of brick up to 200mm in diameter.
		1.50-1.70	D ES								
		2.00	SPT	N=9 (3,4/4,2,1,2)							
		3.00	D SPT	N=10 (3,3/3,2,3,2)				2.95			Orange brown slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and limestone.
		4.00	SPT	0 N≥50 (6,7/50 for 115mm)	0	0	0	4.05			*4.00- 5.00mbgl: No recovery.*
		4.00 - 5.00	NR								Destructured SANDSTONE recovered as brownish red gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and quartz.
			NI		100	67	14	5.00 5.12			Non intact SANDSTONE recovered as brownish red fine to coarse sandy GRAVEL. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		5.00 - 6.50	10								*5.00-5.12m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			NI NI 2 NI 3								Moderately strong partially weathered brownish red fine to coarse SANDSTONE.
			NI		67	40	13				*5.12-5.82m bgl: Discontunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			NR								*5.82- 5.90m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			NI								*5.95-6.00m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
		6.50 - 8.00	2 NI 3 NI								*6.00-6.10m bgl: Discontunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			7								*6.10-6.22m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			2		100	93	53				*6.22-6.30m bgl: Discontunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			7								*6.30-6.50m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
		8.00 - 9.50	NI								*6.50-7.00m bgl: No recovery.*
			8								*7.00-7.12m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			NI 2								*7.12-7.20m bgl: Discontinuites are closely space, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
					100	97	87				*7.20-7.24m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 4.00m bgl with Rotary Coring follow on to 24.50m bgl.
5. No groundwater encountered.
6. Hole progress halted at 24.50m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.	BH03
	Sheet 2 of 3
PROJECT NO:	C5128
CO-ORDS:	
Hole Type	RC
PROJECT NAME:	ST MICHAELS, MANCHESTER
LEVEL:	
Scale	1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD
DATES:	07/11/2022 - 21/12/2022
Logged	CM
Checked	JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		9.50 - 11.00	13	95	97	80				7.24-7.39m bgl: Discontinuites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 7.30-7.32m bgl: Sub-vertical fracture (30 degrees). 7.34-7.39m bgl: Sub-vertical fracture (45 degrees). 7.39-4.49m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. 7.49-8.00m bgl: Discontinuites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 7.54-7.60m bgl: Sub-vertical fracture (48 degrees). 8.00-8.10m bgl: Discontinuites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 8.10-8.13m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. . 8.13-8.73m bgl: Discontinuites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 8.72-8.82m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. 8.81-9.40m bgl: Discontinuites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 9.40-9.46m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. 9.46-9.50m bgl: Discontinuites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 9.50-11.00m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 11.00-11.17m bgl: No recovery. 11.17-12.50m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 12.50-12.72m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 12.72-12.80m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. 12.80-13.50m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 13.40-13.42m bgl: Sub-vertical fracture (85 degrees). 13.43-13.50m bgl: Vertical fracture (91 degrees). 13.50-13.62m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. 13.62-14.00m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 14.00- 15.50m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 15.50-17.00m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 17.00-17.11: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone. 17.11-18.50m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 18.50-19.33m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees). 19.42- 20.00m bgl: Discontinuites are moderately spaced, smooth, planar
			NR							
		11.00 - 12.50	10							
			1	100	93	73				
			NI							
		12.50 - 14.00	7							
			NI							
			4							
		14.00 - 15.50	14	100	99	87				
		15.50 - 17.00	9	100	99	60				
			NI							
		17.00 - 18.50	12	100	93	63				
		18.50 - 20.00	8	100	93	73				
			0							

10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 4.00m bgl with Rotary Coring follow on to 24.50m bgl.
5. No groundwater encountered.
6. Hole progress halted at 24.50m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.	BH03
	Sheet 3 of 3
PROJECT NO:	C5128
CO-ORDS:	
Hole Type	RC
PROJECT NAME:	ST MICHAELS, MANCHESTER
LEVEL:	
Scale	1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD
DATES:	07/11/2022 - 21/12/2022
Logged	Checked
CM	JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
			4	100	97	67				*and horizontal to sub-horizontal (0-5 degrees).*
		20.00 - 21.50	8							*20.00-20.52m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			6							*20.53-20.87m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			4							*20.87-21.50m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		21.50 - 23.00	12	100	90	80				*21.50-23.00m bgl: Discontinuites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		23.00 - 24.50	NR	33	21	18				*23.00-24.06m bgl: No recovery.*
			4							*24.06-24.50m bgl: Discontinuites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
							24.50			End of Borehole at 24.50m

20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 4.00m bgl with Rotary Coring follow on to 24.50m bgl.
5. No groundwater encountered.
6. Hole progress halted at 24.50m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.
BH04
Sheet 1 of 5

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** RC
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 17/11/22 - 25/11/22	**Logged** CM / **Checked** JM

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	TCR	SCR	RQD	Depth (m)	Level (m OD)	Legend	Stratum Description
								0.10			MADE GROUND: Asphalt.
		0.30-0.50	D ES					0.25			MADE GROUND: Grey sub-angular fine to coarse gravel of limestone.
		1.20-1.40 1.20	D ES SPT	N=3 (1,0/1,1,0,1)							MADE GROUND: Brownish grey sandy gravel with low cobble content. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, sandstone and limestone. Rare coal and ceramic fragements. Cobbles are angular of brick up to 200mm in diameter.
		2.00	D SPT	N=7 (2,1/1,2,2,2)							
		3.00	D SPT	N≥50 (10,10/12,12,13,13)				2.45			Brown gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and quartz.
		4.00	SPT	N=34 (6,6/8,8,8,10)							
		4.70	SPT	N≥50 (25 for 100mm/50 for 140mm)				4.70			Destructured SANDSTONE recovered as brownish red gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and quartz.
			NR					5.00			Weak weathered brownish red fine to coarse SANDSTONE.
		5.50 - 7.00	13 5 NI 3 5		100	77	7	5.56			Moderately strong partially weathered brownish red fine to coarse SANDSTONE. *5.56-6.19m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *5.80-5.82m bgl: Sub-vertical fracture (45 degrees).* *6.03-6.09m bgl: Vertical fracture (90 degrees).* *6.19-6.24m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *6.24-6.50m bgl: Discontinunites are closely spaced, smooth, planar to horizontal to sub-horizontal (0-5 degrees).* *6.50-6.72m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *6.72-6.86m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *6.86-6.91m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *6.91-7.00m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *7.00-7.06m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *7.00-8.01m bgl: Discontinunites are close to moderately spaced, smooth, planar to undulating and horizontal to sub-horizontal (0-5 degrees).* *7.70-7.78m bgl: Vertical fracture (45 degrees).* *7.85-7.88m bgl: Vertical fracture (45 degrees).* *8.01-8.04m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *8.04-8.50m bgl: Discontinunites are moderately spaced, smooth, planar*
		7.00 - 8.50	9 3		100	93	47				
		8.50 - 10.00	16		100	100	20				

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window sampling to 5.00m bgl with Rotary Coring follow on to 45.00m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.	BH04
	Sheet 2 of 5
PROJECT NO:	C5128
CO-ORDS:	
Hole Type	RC
PROJECT NAME:	ST MICHAELS, MANCHESTER
LEVEL:	
Scale	1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD
DATES:	17/11/2022 - 25/11/2022
Logged	CM
Checked	JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
				100	100	70				*and horizontal to sub-horizontal (0-5 degrees).* *8.24-8.38m bgl: Vertical fracture (45 degrees)>.* *8.50-10.00m bgl: Discontinunites are close to moderately spaced, smooth, planar to undulating and horizontal to sub-horizontal (0-5 degrees).* *8.94-8.99m bgl: Vertical fracture (33 degrees).* *9.01-9.12m bgl: Vertical fracture (45 degrees).* *9.02-9.31m bgl: Vertical fracture (45 degrees).* *9.30-9.61m bgl: Vertical fracture (45 degrees).* *9.71-9.86m bgl: Vertical fracture (40 degrees).* *10.00-11.50m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *10.01-10.12m bgl: Vertical fracture (43 degrees).*
		10.00 - 11.50	11							
		11.50 - 13.00	28	95	95	15				*11.50-13.00m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *12.31-12.40m bgl: Vertical fracture (30 degrees).* *12.39-12.49m bgl: Vertical fracture (30 degrees).* *12.54-12.61m bgl: Vertical fracture (30 degrees).* *12.63-12.75m bgl: Vertical fracture (45 degrees).*
		13.00 - 14.50	8 NI 5 3	100	93	40				*13.00-13.62m bgl: Discontinuites are closely spaced, smooth, planar and horizontal to sub-horizontal (0.-5 degrees).* *13.21-13.25m bgl: Vertical fracture (45 degrees).* *13.62-13.67m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *13.67-13.91m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *13.91-14.50m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		14.50 - 16.00	12	100	100	43				*14.50-16.00m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *14.51-14.60m bgl: Vertical fracture (35 degrees).* *14.64-14.78m bgl: Vertical fracture (90 degrees).*
		16.00 - 17.50	NR 10	93	87	33				*16.00-16.10m bgl: No recovery.* *16.10-17.50m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *16.25-16.27m bgl: Vertical fracture (20 degrees).*
		17.50 - 19.00	6	100	100	70				*17.50-19.00m bgl: Discontinuites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *18.41-18.52m bgl: Vertical fracture (90 degrees).*
			NR	60	60	33				*19.00-19.60m bgl: No recovery.*

10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window sampling to 5.00m bgl with Rotary Coring follow on to 45.00m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.
BH04
Sheet 3 of 5

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** RC
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 17/11/2022 - 25/11/2022	**Logged** CM / **Checked** JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		19.00 - 20.50	4	100	100	70				*19.60-20.50m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		20.50 - 22.00	10							*20.50-22.00m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		22.00 - 23.50	12	100	100	40				*22.00-23.50m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *22.60-22.62m bgl: Vertical fracture (45 degrees).* *23.21-23.26m bgl: Vertical fracture (45 degrees).*
		23.50 - 25.00	NR 3 NI 5 NI NI 1	93	89	40				*23.50-23.60mn bgl: No recovery.* *23.60-23.65m bgl: Discontinunites ate closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *23.75-23.82m bgl: Non-intact recovered as brownish sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *23.82-24.57m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *24.57-24.62m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angulartto sub-rounded fine to coarse of sandstone.*
		25.00 - 26.50	2 NI	100	100	80				*24.71-14.76m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *25.00-25.73m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *25.75-26.30m bgl: Discontinunties are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		26.50 - 28.00	2 6	100	93	43				*26.30-26.39m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *26.50-26.97m bgl: Discontinunties are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *26.97-28.00m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *27.31-28.00m bgl: Vertical fracture (90 degrees).*
		28.00 - 29.50	11	100	100	40				*28.00-29.50m bgl: Discontinunites are moderately spaces, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *28.43-28.50m bgl: Vertical fracture (90 degrees).*

20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window sampling to 5.00m bgl with Rotary Coring follow on to 45.00m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.	BH04
	Sheet 4 of 5
PROJECT NO:	C5128
CO-ORDS:	
Hole Type	RC
PROJECT NAME:	ST MICHAELS, MANCHESTER
LEVEL:	
Scale	1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD
DATES:	17/11/2022 - 25/11/2022
Logged / Checked	CM / JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
				100	100	60				
		29.50 - 30.00	4							*29.50-30.00m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
				100	100	37				*30.00-31.50m bgl: Discontinunites are moderately spaced, smooth planar and horizontal to sub-horizontal (0-5 degrees).*
		30.00 - 31.50	11							*30.86-30.87m bgl: Sub-vertical fracture (45 degrees).*
				100	100	57				*31.50-32.06m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		31.50 - 33.00	4 5 NR 3							*32.06-32.16m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *32.09-32.11m bgl: Sub-vertical fracture (45 degrees).* *32.11-32.12m bgl: Sub-horizontal fracture (30 degrees).* *32.13-32.16m bgl: Sub-vertical fracture (45 degrees).* *32.50-32.58m bgl: No recovery.* *32.58-33.00m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
				73	73	40				*33.00-34.10m bgl: Discontinunites are close to moderatley spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		33.00 - 34.50	12 NR							*34.10-34.50m bgl: No recovery.*
				73	73	40				*34.50-34.90m bgl: No recovery.*
		34.50 - 36.00								*34.90-36.00m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
				100	100	43				*36.00-36.70m bgl: Disconntinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		36.00 - 37.50								*36.55-36.57m bgl: Vertical fracture (45 degrees).* *36.70-36.92m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *36.71-36.79m bgl: Vertical fracture (90 degrees).* *36.91-37.12m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal and sub-horizontal (0-5 degrees).* *37.12-37.17m bgl: No recovery.*
				100	100	83				*37.12-37.50m bgl: Dicontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		37.50 - 39.00								*37.55-37.61m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *37.80-37.82m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *37.82-39.00m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal and sub-horizontal (0-5 degrees).*
				100	100	77				*39.00-40.02m bgl: Discontinunites are moderately spaced, smooth,*

30.0 31.0 32.0 33.0 34.0 35.0 36.0 37.0 38.0 39.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window sampling to 5.00m bgl with Rotary Coring follow on to 45.00m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
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PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

		Rotary Borehole No.	BH04
			Sheet 5 of 5
PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** RC
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 17/11/2022 - 25/11/2022	**Logged** CM / **Checked** JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		39.00 - 40.50	4	83	77	47	45.00			*planar and horizontal and sub-horizontal (0-5 degrees).*
		40.50 - 42.00	10 NR NI NR	100	100	30				*40.02-40.05m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *40.14-40.23m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *40.50-41.64m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal and sub-horizontal (0-5 degrees).*
		42.00 - 43.50	2 3 3 NI 4	100	100	67				*41.64-41.75m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *41,86-42.00m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *42.00-42.24m bgl: Discontinunites are closely spaced, smooth, planar and horizontal and sub-horizontal (0-5 degrees).* *42.24-42.34m bgl: Discontinunites are closely spaced, smooth, planar and horizontal and sub-horizontal (0-5 degrees).* *42.25-42.29m bgl: Vertical fracture (90 degrees).* *42.34-42.78m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *42.78-42.86m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *42.86-43.50m bgl: Discontinunites are closely to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		43.50 - 45.00	7							*43.50-45.00m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontla to sub-horizontal (0-5 degrees).*
										End of Borehole at 45.00m

40.0 41.0 42.0 43.0 44.0 45.0 46.0 47.0 48.0 49.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window sampling to 5.00m bgl with Rotary Coring follow on to 45.00m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.

BH05

Sheet 1 of 5

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** RC
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 17/11/22 - 22/11/22	**Logged** CM / **Checked** JM

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	TCR	SCR	RQD	Depth (m)	Level (m OD)	Legend	Stratum Description
								0.10	-0.10		MADE GROUND: Asphalt.
								0.25	-0.25		MADE GROUND: Grey sub-angular fine to coarse gravel of limestone.
		0.70	D ES								MADE GROUND: Brownish grey sandy gravel with low cobble content. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, sandstone and mudstone. Cobbles are angular of brick up to 200mm in diameter.
		1.20-1.40	D ES					1.20	-1.20		Brown gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and quartz.
		1.20	SPT	N=4 (3,2/2,1,1,0)							
		2.00	D SPT	N=15 (2,2/3,3,4,5)							
		3.00	D SPT	N=48 (6,8/10,12,12,14)							
		4.00	SPT	N≥50 (8,10/50 for 225mm)							
		4.70	SPT	N≥50 (25 for 110mm/50 for 95mm)				4.70	-4.70		Destructured SANDSTONE recovered as brownish red gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and quartz.
		5.00 - 5.50	10		100	100	0	5.00	-5.00		Weak weathered brownish red fine to coarse SANDSTONE.
								5.45	-5.45		*5.00-5.46m bgl: Discontinuities are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		5.50 - 7.00	6		100	100	37	5.73	-5.73		Weak partially weathered brownish red fine to coarse SANDSTONE.
			13								*5.46-5.50m bgl: Discontinuities are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
											5.50-5.73m bgl: Discontinuities are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).
		7.00 - 8.50	NR		87	87	81				Moderately strong partially weathered brownish red fine to coarse SANDSTONE.
			14								*5.73-7.00m bgl: Discontinuities are closely spaced, smooth, planar to undulating and horizontal to sub-horizontal (0-5 degrees).*
											5.85-5.87m bgl: Vertical fracture (30 degrees).
											7.00-7.20m bgl: No recovery.
											7.20-8.50m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).
		8.50 - 10.00	NR		67	67	33				*8.50-9.00m bgl: No recovery.*
			8								*9.00-9.30m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			NI								*9.30-9.46m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			9								

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 5.00m bgl with Rotary Coring follow on to 45.00m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.	BH05
	Sheet 2 of 5
PROJECT NO:	C5128
CO-ORDS:	
Hole Type	RC
PROJECT NAME:	ST MICHAELS, MANCHESTER
LEVEL:	
Scale	1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD
DATES:	17/11/2022 - 22/11/2022
Logged	CM
Checked	JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
				100	97	67				*9.46-10.00m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *10.00-10.91m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		10.00 - 11.50	7							
			4	100	100	67				*19.91-10.95m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *10.95-11.50m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *11.50-13.00m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		11.50 - 13.00	11							
		13.00 - 14.50	11	100	97	70				*13.00-14.45m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			2							
			6	100	97	73				*14.35-14.37m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *14.37-14.50m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *14.50-15.30m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		14.50 - 16.00	5							*15.30-15.49m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *15.49-16.00m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			3							
				100	100	20				*16.00-17.00m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *16.22-16.32m bgl: Vertical fracture (90 degrees).*
		16.00 - 17.50	12							*16.84-18.87m bgl: Vertical fracture (45 degrees).*
				100	97	80				*17.50-18.33m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		17.50 - 19.00	3							
			2							*18.33-18.39m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *18.39-19.00m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
				100	93	30				*19.00-20.50m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*

10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 5.00m bgl with Rotary Coring follow on to 45.00m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.
BH05
Sheet 3 of 5

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** RC
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 17/11/2022 - 22/11/2022	**Logged** CM / **Checked** JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		19.00 - 20.50	11	100	100	61				*20.50-22.00m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		20.50 - 22.00	13							
		22.00 - 23.50	4 NI 2 NI 3	100	97	63				*22.00-22.50m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *22.50-22.58m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *22.58-22.69m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *22.69-22.80m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
		23.50 - 25.00	3 NI 1 NI 2	100	63	40				*22.80-23.50m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *23.50-23.85m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *23.85-23.94m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *24.02-24.09m bgl: Non-intact recovered as brownish red fine to coarse sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
		25.00 - 26.50	NR 15 7	90	87	73				*24.09-24.75m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *24.50-24.58m bgl: Vertical fracture (35 degrees).* *23.60-24.62m bgl: Vertical fracture (36 degrees).* *24.75-24.80m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *24.80-25.00m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *25.00-25.15m bgl: No recovery.*
		26.50 - 28.00	3 2 6 1 NI 3	100	83	47				*25.15-26.50m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *26.12-26.15m bgl: Vertical fracture (30 degrees).* *26.50-26.79m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *26.79-27.13m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *27.13-27.32m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		28.00 - 29.50	3 7 NI	90	80	37				*27.61-27.76m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *27.76-28.00m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *28.00-28.41m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *28.41-28.43m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.* *28.43-29.22m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).* *29.22-29.50m bgl: Non-intact recovered as brownish red sandy gravel.*

20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 5.00m bgl with Rotary Coring follow on to 45.00m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.	BH05
	Sheet 4 of 5
PROJECT NO:	C5128
CO-ORDS:	
Hole Type	RC
PROJECT NAME:	ST MICHAELS, MANCHESTER
LEVEL:	
Scale	1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD
DATES:	17/11/2022 - 22/11/2022
Logged	CM
Checked	JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
				80	75	33				*Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
										29.50-29.92m bgl: No recovery.
		29.50 - 31.00	NR							*29.92-31.00m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			5							
				95	87	40				*31.00-31.56m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		31.00 - 32.50	5							*31.48-31.50m bgl: Vertical fracture (20 degrees).*
			4							*31.56-31.59m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			6							*31.59-31.79m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
										31.79-32.28m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).
			NR	100	97	43				*31.93-31.97m bgl: Vertical fracture (90 degrees).*
		32.50 - 34.00	6							*32.28-32.32m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			2							*32.40-32.50m bgl: No recovery.*
			10							*32.50-33.07m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
										33.07-33.36m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).
				100	100	47				*33.36-34.00m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		34.00 - 35.50	10							*34.00-35.17m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
										34.52-34.54m bgl: Vertical fracture (30 degrees).
			7							*34.72-37.73m bgl: Vertical fracture (90 degrees).*
										35.17-35.50m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).
			NI	100	67	35				*35.50-35.66m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			1							*35.77-35.83m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			NI							*35.83-36.06m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			3							*36.04-36.12m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.*
			NI							*36.12-37.00m bgl: Discontinunites are close to moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		35.50 - 37.00	8							*36.41-36.63m bgl: Vertical fracture (45 degrees).*
										37.00-38.50m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).
				100	100	30				*37.72-37.45m bgl: Vertical fracture (30 degrees).*
		37.00 - 38.50	21							
										38.50-39.36m bgl: Discontinunities are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).
				60	60	30				*38.86-39.94m bgl: Sub-vertical fracture (45 degrees).*
										38.94-40.00m bgl: No recovery.

30.0 31.0 32.0 33.0 34.0 35.0 36.0 37.0 38.0 39.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 5.00m bgl with Rotary Coring follow on to 45.00m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Rotary Borehole No.	BH05
	Sheet 5 of 5
PROJECT NO:	C5128
CO-ORDS:	
Hole Type	RC
PROJECT NAME:	ST MICHAELS, MANCHESTER
LEVEL:	
Scale	1:50
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD
DATES:	17/11/2022 - 22/11/2022
Logged	CM
Checked	JM

Well	Water Strike	Depth (m)	Type / FI	Coring TCR (%)	Coring SCR (%)	Coring RQD (%)	Depth (m)	Level (m OD)	Legend	Stratum Description
		38.50 - 40.00	6	100	100	47				*40.00-40.50m bgl: Discontinunites are moderately spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		40.00 - 41.50	3							*40.50-41.25m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
			5							*40.82-41.00m bgl: Vertical fracture (90 degrees).*
			4	100	97	40				*41.25-41.50m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
		41.50 - 43.00	6							*41.30-41.43m bgl: Vertical fracture (90 degrees).*
			NI							*41.50-41.54m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse sandstone.*
			12							*41.54-41.88m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
										41.71-41.88m bgl: Vertical fracture (88 degrees).
										41.88-41.98m bgl: Non-intact recovered as brownish red sandy gravel. Sand is fine to coarse. Gravel is sub-angular to sub-rounded fine to coarse of sandstone.
		43.00 - 44.50	9	60	60	23				*41.98-43.00m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).*
										43.00-43.83m bgl: Discontinunites are closely spaced, smooth, planar and horizontal to sub-horizontal (0-5 degrees).
			NR							*43.83-44.50m bgl: No recovery.*
			NR	80	80	80				*44.50-44.60m bgl: No recovery.*
		44.50 - 45.00	1							
							45.00	-45.00		End of Borehole at 45.00m

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. Window Sampling to 5.00m bgl with Rotary Coring follow on to 45.00m bgl.
5. No groundwater encountered.
6. Install: 5.00m plain, slotted to 15.00m bgl.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS01
Sheet 1 of 1

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 07/11/22	**Logged** JM / **Checked** JM

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.10	-0.10		MADE GROUND: Reinforced concrete. 10mm rebar at 0.08m bgl.
					0.25	-0.25		MADE GROUND: Grey sub-angular fine to coarse gravel of limestone.
		0.50-0.70	D ES					MADE GROUND: Brown sandy gravel with high cobble content. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, concrete and limestone. Cobbles are angular of brick up to 200mm in diameter. Rare glass.
		1.20	SPT	N=5 (1,2/2,1,1,1)				
		1.50-1.70	D ES					
		2.00	SPT	N=6 (1,2/2,2,1,1)				
					2.85	-2.85		Orange brown gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone.
		3.00	D SPT	N=21 (3,4/5,5,5,6)				
		3.50	D					
		4.00	SPT	N≥50 (5,7/50 for 105mm)				
					4.10	-4.10		Destructured SANDSTONE recovered as brownish red gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and quartz.
					4.25	-4.25		End of Borehole at 4.25m

1.0 2.0 3.0 4.0 5.0 6.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. No groundwater encountered.
5. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS02
Sheet 1 of 1

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 07/11/22	**Logged** JM / **Checked** JM

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.06	-0.06		MADE GROUND: Asphalt.
		0.30-0.50	D ES		0.30	-0.30		MADE GROUND: Greyish brown sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of limestone and sandstone.
								MADE GROUND: Brownish grey gravelly fine to coarse sand. Gravel is sub-angular fine to coarse of brick, mudstone and sandstone.
		1.00-1.20	D ES		0.95	-0.95		MADE GROUND: Greyish brown gravelly clay. Gravel is sub-angular fine to coarse of brick, sandstone and occasional coal fragments.
		1.20	SPT	N=7 (1,2/1,2,2,2)				
		1.50	D		1.35	-1.35		Orange brown slightly gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and mudstone.
		2.00	SPT	N=26 (3,4/4,5,7,10)				
		2.50	D		2.25	-2.25		Reddish brown gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone, mudstone and quartz.
		3.00	SPT	N≥50 (7,9/50 for 265mm)				
		4.00	SPT	N≥50 (25 for 115mm/50 for 40mm)	4.00	-4.00		Destructured SANDSTONE recovered as brownish red gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and quartz.
					4.15	-4.15		End of Borehole at 4.15m

1.0 2.0 3.0 4.0 5.0 6.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. No groundwater encountered.
5. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

BROWNFIELD SOLUTIONS LTD

Borehole Log

Window Sampler No.
WS03
Sheet 1 of 1

PROJECT NO:	C5128	**CO-ORDS:**	**Hole Type** WS
PROJECT NAME:	ST MICHAELS, MANCHESTER	**LEVEL:**	**Scale** 1:30
CLIENT:	ST MICHAELS UK PROPCO 2 LTD / DOMIS CONSTRUCTION LTD	**DATES:** 17/11/22	**Logged** JM / **Checked** JM

Well	Water Strikes	Sample and In Situ Testing: Depth (m)	Type	Results	Depth (m)	Level (m OD)	Legend	Stratum Description
					0.10	-0.10		MADE GROUND: Asphalt.
					0.30	-0.30		MADE GROUND: Grey sub-angular fine to coarse gravel of limestone.
		0.50-0.70	D ES					MADE GROUND: Greyish brown sandy gravel. Sand is fine to coarse. Gravel is sub-angular fine to coarse of brick, coal, ash and sandstone.
		1.20	SPT	N=2 (1,0/1,0,1,0)				
		1.50-1.70	D ES					
		2.00	D SPT	N=22 (5,5/6,6,5,5)	2.20	-2.20		Brown gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and quartz.
		3.00	D SPT	N≥50 (6,8/50 for 240mm)				
		4.00	SPT	N≥50 (23 for 114mm/50 for 95mm)	4.05	-4.05		Destructured SANDSTONE recovered as brownish red gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded fine to coarse of sandstone and quartz.
					4.21	-4.21		End of Borehole at 4.21m

1.0 2.0 3.0 4.0 5.0 6.0

Remarks

1. Service clearance by BSL Engineer.
2. UXO clearance by Brimstone Engineer.
3. Inspection pit to 1.20m bgl.
4. No groundwater encountered.
5. Borehole backfilled with arisings upon completion.

ES = Environmental Sample
D = Disturbed Sample
B = Bulk Sample
LB = Large Bulk Sample
U = Undisturbed Sample
UT = Undisturbed Thin Wall Sample
SPT = Standard Penetration Test
PID = Photoionization Detector (ppm)
PPM = Part Per Million
HSV = Hand Shear Vane

APPENDIX C

Chemical Testing Results

Jack Mather
Brownfield Solutions Ltd
William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP

e: j.mather@brownfield-solutions.co.uk

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

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

Analytical Report Number : 22-95726

Project / Site name:	St Michaels, Manchester	**Samples received on:**	09/11/2022
Your job number:	C5128	**Samples instructed on/ Analysis started on:**	09/11/2022
Your order number:	C5128-3694-JM	**Analysis completed by:**	16/11/2022
Report Issue Number:	1	**Report issued on:**	16/11/2022
Samples Analysed:	8 soil samples		

Signed:

Elżbieta Suchy
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

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The results included within the report relate only to the sample(s) submitted for testing

Analytical Report Number: 22-95726
Project / Site name: St Michaels, Manchester
Your Order No: C5128-3694-JM

Lab Sample Number				2494190	2494191	2494192	2494193	2494194
Sample Reference				WS01	WS02	BH01	BH02	BH03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				3.00	1.50	4.10	3.00	3.00
Date Sampled				07/11/2022	07/11/2022	07/11/2022	07/11/2022	07/11/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	7.4	5.7	9	9.2	15
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.2	0.5	0.5

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2	8.1	8.1	8	8.1
Total Sulphate as SO4	%	0.005	MCERTS	-	-	-	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.13	0.029	0.021	0.015	0.15
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	-	-
Total Sulphur	%	0.005	MCERTS	-	-	-	-	-
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	-	-	-	-	-
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	-	-
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	-	-	-

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	-	-
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	-	-

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

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Analytical Report Number: 22-95726
Project / Site name: St Michaels, Manchester
Your Order No: C5128-3694-JM

Lab Sample Number				2494195	2494196	2494197
Sample Reference				BH01	BH02	BH03
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				3.00	2.00	4.00
Date Sampled				07/11/2022	07/11/2022	07/11/2022
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	6.4	7.8	9.9
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.5

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8	8.1	8.3
Total Sulphate as SO4	%	0.005	MCERTS	0.057	< 0.005	0.016
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.17	0.013	0.051
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	169	13.4	51
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	3.3	1.9	5.7
Total Sulphur	%	0.005	MCERTS	0.025	< 0.005	0.012
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	< 0.5	< 0.5	< 0.5
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0	2.8

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	19	21	40
Magnesium (leachate equivalent)	mg/l	2.5	NONE	9.6	10	20

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

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Analytical Report Number : 22-95726
Project / Site name: St Michaels, Manchester

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2494190	WS01	None Supplied	3	Brown sand with gravel.
2494191	WS02	None Supplied	1.5	Brown sand with gravel.
2494192	BH01	None Supplied	4.1	Brown clay and sand.
2494193	BH02	None Supplied	3	Brown sand.
2494194	BH03	None Supplied	3	Brown clay and sand.
2494195	BH01	None Supplied	3	Brown sand with gravel.
2494196	BH02	None Supplied	2	Brown sand.
2494197	BH03	None Supplied	4	Brown clay and sand.

Analytical Report Number : 22-95726
Project / Site name: St Michaels, Manchester

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Jack Mather
Brownfield Solutions Ltd
William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP

e: j.mather@brownfield-solutions.co.uk

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

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

Analytical Report Number : 22-95731

Project / Site name:	St Michaels, Manchester	**Samples received on:**	09/11/2022
Your job number:	C5128	**Samples instructed on/ Analysis started on:**	09/11/2022
Your order number:	C5128 3693 JM	**Analysis completed by:**	29/11/2022
Report Issue Number:	1	**Report issued on:**	29/11/2022
Samples Analysed:	6 soil samples		

Signed:

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

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

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

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

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

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Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report relate only to the sample(s) submitted for testing

Analytical Report Number: 22-95731
Project / Site name: St Michaels, Manchester
Your Order No: C5128 3693 JM

Lab Sample Number				2494204	2494205	2494206	2494207	2494208
Sample Reference				WS01	WS02	BH01	BH01	BH02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50-0.70	0.30-0.50	0.30-0.50	2.00-2.20	1.30-1.50
Date Sampled				07/11/2022	07/11/2022	07/11/2022	07/11/2022	07/11/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	14	17	15	17
Total mass of sample received	kg	0.001	NONE	0.9	0.9	0.9	1	1
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	LFT	LFT	LFT	LFT	LFT
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.5	7.6	8.2	7.7	7.9
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	270	3100	530	5400	87
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.13	1.6	0.26	2.7	0.044
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	135	1550	263	2710	43.6
Organic Matter (automated)	%	0.1	MCERTS	3.4	2.4	4	3.2	3.6
Speciated PAHs								
Naphthalene	mg/kg	0.05	NONE	0.18	0.14	0.21	0.27	< 0.05
Acenaphthylene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	0.07	< 0.05
Acenaphthene	mg/kg	0.05	NONE	0.08	0.13	< 0.05	0.19	< 0.05
Fluorene	mg/kg	0.05	NONE	0.14	0.14	0.05	0.31	< 0.05
Phenanthrene	mg/kg	0.05	NONE	1.4	1.4	0.5	4	0.83
Anthracene	mg/kg	0.05	NONE	0.31	0.23	0.11	1	0.17
Fluoranthene	mg/kg	0.05	NONE	2	1.3	0.7	5.4	1.4
Pyrene	mg/kg	0.05	NONE	2	1.2	0.7	5.3	1.4
Benzo(a)anthracene	mg/kg	0.05	NONE	1.2	0.54	0.41	2.8	0.79
Chrysene	mg/kg	0.05	NONE	0.98	0.58	0.36	2.4	0.62
Benzo(b)fluoranthene	mg/kg	0.05	NONE	0.84	0.39	0.32	2.1	0.67
Benzo(k)fluoranthene	mg/kg	0.05	NONE	0.56	0.35	0.26	1.8	0.47
Benzo(a)pyrene	mg/kg	0.05	NONE	0.89	0.4	0.27	2.1	0.77
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	0.35	0.2	0.14	0.82	0.4
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	0.19	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	NONE	0.53	0.29	0.19	1	0.5
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	11.4	7.23	4.22	29.9	8
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	24	29	69	48	41
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.4	< 0.2	< 0.2	< 0.2	3.8
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	22	19	25	25	22
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	22	19	25	25	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	100	200	770	4200	2200
Lead (aqua regia extractable)	mg/kg	1	MCERTS	5200	980	19000	8300	760
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	2.4	1.1	0.7	1.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	42	22	36	74
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	310	610	1600	1600	1300
Monoaromatics & Oxygenates								
Total BTEX & MTBE	mg/kg	0.007	NONE	< 0.007	-	< 0.007	-	-

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Analytical Report Number: 22-95731
Project / Site name: St Michaels, Manchester
Your Order No: C5128 3693 JM

Lab Sample Number				2494204	2494205	2494206	2494207	2494208
Sample Reference				WS01	WS02	BH01	BH01	BH02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50-0.70	0.30-0.50	0.30-0.50	2.00-2.20	1.30-1.50
Date Sampled				07/11/2022	07/11/2022	07/11/2022	07/11/2022	07/11/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics & Oxygenates								
Benzene	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
Toluene	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
Ethylbenzene	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
p & m-xylene	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
o-xylene	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	NONE	< 1.0	-	< 1.0	-	-
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	NONE	< 2.0	-	< 2.0	-	-
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	NONE	< 8.0	-	19	-	-
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	NONE	< 8.0	-	150	-	-
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	< 10	-	160	-	-
TPH-CWG - Aliphatic >EC35 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	< 10	-	< 10	-	-
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	< 10	-	160	-	-
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	< 0.001	-	< 0.001	-	-
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	NONE	< 1.0	-	< 1.0	-	-
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	NONE	< 2.0	-	< 2.0	-	-
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	< 10	-	11	-	-
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	12	-	58	-	-
TPH-CWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	< 10	-	< 10	-	-
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	20	-	69	-	-
TPH Total C5 - C40 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	12	-	230	-	-
TPH (C5 - C10) $_{HS\_1D\_TOTAL}$	mg/kg	1	NONE	< 1.0	-	< 1.0	-	-
TPH (C10 - C16) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	NONE	< 10	-	< 10	-	-
TPH (C16 - C40) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	NONE	20	-	240	-	-

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

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Analytical Report Number: 22-95731
Project / Site name: St Michaels, Manchester
Your Order No: C5128 3693 JM

Lab Sample Number				2494209
Sample Reference				BH03
Sample Number				None Supplied
Depth (m)				1.50-1.70
Date Sampled				07/11/2022
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	13
Total mass of sample received	kg	0.001	NONE	1

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

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	120
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.06
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	60.3
Organic Matter (automated)	%	0.1	MCERTS	1.4

Speciated PAHs

Naphthalene	mg/kg	0.05	NONE	< 0.05
Acenaphthylene	mg/kg	0.05	NONE	< 0.05
Acenaphthene	mg/kg	0.05	NONE	0.28
Fluorene	mg/kg	0.05	NONE	0.23
Phenanthrene	mg/kg	0.05	NONE	3.7
Anthracene	mg/kg	0.05	NONE	0.79
Fluoranthene	mg/kg	0.05	NONE	5.2
Pyrene	mg/kg	0.05	NONE	4.5
Benzo(a)anthracene	mg/kg	0.05	NONE	2.1
Chrysene	mg/kg	0.05	NONE	2
Benzo(b)fluoranthene	mg/kg	0.05	NONE	1.9
Benzo(k)fluoranthene	mg/kg	0.05	NONE	1.1
Benzo(a)pyrene	mg/kg	0.05	NONE	2.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	1
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	0.2
Benzo(ghi)perylene	mg/kg	0.05	NONE	1.2

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	26.2

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.7
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2
Chromium (III)	mg/kg	1	NONE	15
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	15
Copper (aqua regia extractable)	mg/kg	1	MCERTS	29
Lead (aqua regia extractable)	mg/kg	1	MCERTS	120
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	11
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	180

Monoaromatics & Oxygenates

Total BTEX & MTBE	mg/kg	0.007	NONE	-

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Analytical Report Number: 22-95731
Project / Site name: St Michaels, Manchester
Your Order No: C5128 3693 JM

Lab Sample Number				2494209
Sample Reference				BH03
Sample Number				None Supplied
Depth (m)				1.50-1.70
Date Sampled				07/11/2022
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Monoaromatics & Oxygenates				
Benzene	mg/kg	0.001	NONE	-
Toluene	mg/kg	0.001	NONE	-
Ethylbenzene	mg/kg	0.001	NONE	-
p & m-xylene	mg/kg	0.001	NONE	-
o-xylene	mg/kg	0.001	NONE	-
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.001	NONE	-
Petroleum Hydrocarbons				
TPH-CWG - Aliphatic >EC5 - EC6 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	-
TPH-CWG - Aliphatic >EC6 - EC8 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	-
TPH-CWG - Aliphatic >EC8 - EC10 $_{HS\_1D\_AL}$	mg/kg	0.001	NONE	-
TPH-CWG - Aliphatic >EC10 - EC12 $_{EH\_CU\_1D\_AL}$	mg/kg	1	NONE	-
TPH-CWG - Aliphatic >EC12 - EC16 $_{EH\_CU\_1D\_AL}$	mg/kg	2	NONE	-
TPH-CWG - Aliphatic >EC16 - EC21 $_{EH\_CU\_1D\_AL}$	mg/kg	8	NONE	-
TPH-CWG - Aliphatic >EC21 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	8	NONE	-
TPH-CWG - Aliphatic >EC16 - EC35 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-
TPH-CWG - Aliphatic >EC35 - EC40 $_{EH\_CU\_1D\_AL}$	mg/kg	10	NONE	-
TPH-CWG - Aliphatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AL}$	mg/kg	10	NONE	-
TPH-CWG - Aromatic >EC5 - EC7 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	-
TPH-CWG - Aromatic >EC7 - EC8 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	-
TPH-CWG - Aromatic >EC8 - EC10 $_{HS\_1D\_AR}$	mg/kg	0.001	NONE	-
TPH-CWG - Aromatic >EC10 - EC12 $_{EH\_CU\_1D\_AR}$	mg/kg	1	NONE	-
TPH-CWG - Aromatic >EC12 - EC16 $_{EH\_CU\_1D\_AR}$	mg/kg	2	NONE	-
TPH-CWG - Aromatic >EC16 - EC21 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-
TPH-CWG - Aromatic >EC21 - EC35 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-
TPH-CWG - Aromatic >EC35 - EC40 $_{EH\_CU\_1D\_AR}$	mg/kg	10	NONE	-
TPH-CWG - Aromatic (EC5 - EC35) $_{EH\_CU+HS\_1D\_AR}$	mg/kg	10	NONE	-
TPH Total C5 - C40 $_{EH\_CU+HS\_1D\_TOTAL}$	mg/kg	10	NONE	-
TPH (C5 - C10) $_{HS\_1D\_TOTAL}$	mg/kg	1	NONE	-
TPH (C10 - C16) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	NONE	-
TPH (C16 - C40) $_{EH\_CU\_1D\_TOTAL}$	mg/kg	10	NONE	-

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

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 22-95731
Project / Site name: St Michaels, Manchester

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2494204	WS01	None Supplied	0.50-0.70	Grey clinker with rubble.**
2494205	WS02	None Supplied	0.30-0.50	Grey sand with rubble.
2494206	BH01	None Supplied	0.30-0.50	Grey sand with clinker
2494207	BH01	None Supplied	2.00-2.20	Grey sand with clinker
2494208	BH02	None Supplied	1.30-1.50	Brown clay and sand with gravel.
2494209	BH03	None Supplied	1.50-1.70	Brown sand with brick.

**NON MCERTS MATRIX

Analytical Report Number : 22-95731
Project / Site name: St Michaels, Manchester

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	NONE

Analytical Report Number : 22-95731
Project / Site name: St Michaels, Manchester

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

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

Jack Mather
Brownfield Solutions Ltd
William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP

e: j.mather@brownfield-solutions.co.uk

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

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

Analytical Report Number : 22-98007

Project / Site name:	St Michaels, Manchester	**Samples received on:**	21/11/2022
Your job number:	C5128	**Samples instructed on/ Analysis started on:**	21/11/2022
Your order number:	C5128 3693 JM	**Analysis completed by:**	28/11/2022
Report Issue Number:	1	**Report issued on:**	28/11/2022
Samples Analysed:	4 soil samples		

Signed:

Anna Goc
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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Analytical Report Number: 22-98007
Project / Site name: St Michaels, Manchester
Your Order No: C5128 3693 JM

Lab Sample Number				2507024	2507025	2507026	2507027
Sample Reference				BH04	BH05	WS03	BH05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20-1.40	0.30-0.50	1.50-1.70	1.20-1.40
Date Sampled				17/11/2022	17/11/2022	17/11/2022	17/11/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	20	11	< 0.1
Moisture Content	%	0.01	NONE	19	16	21	16
Total mass of sample received	kg	0.001	NONE	0.7	0.8	0.8	0.8
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-
Asbestos Analyst ID	N/A	N/A	N/A	PDO	PDO	N/A	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8	8.5	8	7.9
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	210	3500	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.11	1.7	-	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	106	1750	-	-
Organic Matter (automated)	%	0.1	MCERTS	2.4	2	-	-

Speciated PAHs

Naphthalene	mg/kg	0.05	NONE	0.61	0.27	-	-
Acenaphthylene	mg/kg	0.05	NONE	2.6	0.12	-	-
Acenaphthene	mg/kg	0.05	NONE	0.53	0.88	-	-
Fluorene	mg/kg	0.05	NONE	0.75	0.55	-	-
Phenanthrene	mg/kg	0.05	NONE	3.6	6.4	-	-
Anthracene	mg/kg	0.05	NONE	2.6	1.4	-	-
Fluoranthene	mg/kg	0.05	NONE	28	8.1	-	-
Pyrene	mg/kg	0.05	NONE	40	7.7	-	-
Benzo(a)anthracene	mg/kg	0.05	NONE	7.3	3.4	-	-
Chrysene	mg/kg	0.05	NONE	8.1	2.8	-	-
Benzo(b)fluoranthene	mg/kg	0.05	NONE	8.5	3.2	-	-
Benzo(k)fluoranthene	mg/kg	0.05	NONE	3.4	1.5	-	-
Benzo(a)pyrene	mg/kg	0.05	NONE	5	3	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	2.1	1.6	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	0.56	0.41	-	-
Benzo(ghi)perylene	mg/kg	0.05	NONE	2.1	1.8	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	116	43	-	-

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	22	24	9.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	1.4	1.9	< 0.2
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	10	34	15	13
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	11	34	15	13
Copper (aqua regia extractable)	mg/kg	1	MCERTS	33	120	200	15
Lead (aqua regia extractable)	mg/kg	1	MCERTS	95	350	800	20
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.8	1	1.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	9.5	31	27	7.9
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	38	210	280	29

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

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Analytical Report Number : 22-98007
Project / Site name: St Michaels, Manchester

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2507024	BH04	None Supplied	1.20-1.40	Brown gravelly clay with brick.
2507025	BH05	None Supplied	0.30-0.50	Brown gravelly clay with stones.
2507026	WS03	None Supplied	1.50-1.70	Brown gravelly clay with brick and stones.
2507027	BH05	None Supplied	1.20-1.40	Brown sandy clay with gravel.

Analytical Report Number : 22-98007
Project / Site name: St Michaels, Manchester

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Human Health Assessment Summary						Soil Type:	MG	MG	MG	MG	MG	MG	MG	MG	MG	NS
						Location:	WS01	WS02	BH01	BH01	BH02	BH03	BH04	BH05	WS03	BH05
						Depth:	0.50-0.70	0.30-0.50	0.30-0.50	2.00-2.20	1.30-1.50	1.50-1.70	1.20-1.40	0.30-0.50	1.50-1.70	1.20-1.40
Contaminant	GAC (mg/kg)	No. Samples	Min. Value	Max. Value	No. Samples ≥GAC											
Moisture Content	-	10	13.00	21.00	-		20	14	17	15	17	13	19	16	21	16
Soil Organic Matter	-	8	1.40	4.00	-		3.4	2.4	4.0	3.2	3.6	1.4	2.4	2.0		
pH	-	10	7.60	8.60	-		8.5	7.6	8.2	7.7	7.9	8.6	7.8	8.5	8.0	7.9
Water Soluble Sulphate (2:1 Leachate Equivalent)	-	0	0.00	<LOD	-											
Arsenic	640	10	9.70	69.00	0		24.0	29	69	48	41	12	16	22	24	10
Cadmium	190	10	< LOD	3.80	0		1.4	< 0.2	< 0.2	< 0.2	3.80	0.70	< 0.2	1.40	1.90	< 0.2
Chromium (III)	8600	10	10.00	34.00	0		22.0	19	25	25	22	15	10	34	15	13
Hexavalent Chromium (VI)	33	10	< LOD	<LOD	0		< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Copper	68000	10	15.00	4200.00	0		100.0	200	770	4200	2200	29	33	120	200	15
Lead	2300	10	20.00	19000.00	3		5200.0	980	19000	8300	760	120	95	350	800	20
Mercury	58.0	10	< LOD	2.40	0		0.4	2.4	1.1	0.7	1.4	< 0.3	0.8	1.0	1.3	< 0.3
Nickel	980	10	7.90	74.00	0		18.0	42	22	36	74	11	10	31	27	8
Selenium	12000	10	< LOD	<LOD	0		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	730000	10	29.00	1600.00	0		310.0	610	1600	1600	1300	180	38	210	280	29
Naphthalene	460.0	8	< LOD	0.61	0		0.18	0.14	0.21	0.27	< 0.05	< 0.05	0.61	0.27		
Acenaphthylene	97000	8	< LOD	2.60	0		< 0.05	< 0.05	< 0.05	0.07	< 0.05	< 0.05	2.60	0.12		
Acenaphthene	97000	8	< LOD	0.88	0		0.08	0.13	< 0.05	0.19	< 0.05	0.28	0.53	0.88		
Fluorene	68000	8	< LOD	0.75	0		0.14	0.14	0.05	0.31	< 0.05	0.23	0.75	0.55		
Phenanthrene	22000	8	0.50	6.40	0		1.40	1.4	0.5	4.0	0.8	3.7	3.6	6.4		
Anthracene	540000	8	0.11	2.60	0		0.31	0.23	0.11	1.00	0.17	0.79	2.60	1.40		
Fluoranthene	23000	8	0.70	28.00	0		2.00	1.3	0.7	5.4	1.4	5.2	28.0	8.1		
Pyrene	54000	8	0.70	40.00	0		2.00	1.2	0.7	5.3	1.4	4.5	40.0	7.7		
Benzo(a)anthracene	170.0	8	0.41	7.30	0		1.20	0.5	0.4	2.8	0.8	2.1	7.3	3.4		
Chrysene	350	8	0.36	8.10	0		0.98	0.6	0.4	2.4	0.6	2.0	8.1	2.8		
Benzo(b)fluoranthene	44.0	8	0.32	8.50	0		0.84	0.4	0.3	2.1	0.7	1.9	8.5	3.2		
Benzo(k)fluoranthene	1200	8	0.26	3.40	0		0.56	0.35	0.26	1.80	0.47	1.10	3.40	1.50		
Benzo(a)pyrene	35.0	8	0.27	5.00	0		0.89	0.4	0.3	2.1	0.8	2.1	5.0	3.0		
Indeno(1,2,3-cd)pyrene	510	8	0.14	2.10	0		0.35	0.20	0.14	0.82	0.40	1.00	2.10	1.60		
Dibenz(a,h)anthracene	3.60	8	< LOD	0.56	0		< 0.05	< 0.05	< 0.05	0.19	< 0.05	0.20	0.56	0.41		
Benzo(ghi)perylene	4000	8	0.19	2.10	0		0.53	0.29	0.19	1.00	0.50	1.20	2.10	1.80		
Asbestos Detected (Detected or Not-Detected)	Y	8	-	0.00	0		N	N	N	N	N	N	N	N		
Asbestos Quantification (% w/w)	0	0	0.19	<LOD	0											
Petroleum Hydrocarbons Aliphatic >EC5-EC6	5900	2	0.00	<LOD	0		< 0.001		< 0.001							
Petroleum Hydrocarbons Aliphatic >EC6-EC8	17000	2	0.00	<LOD	0		< 0.001		< 0.001							
Petroleum Hydrocarbons Aliphatic >EC8-EC10	4800	2	< LOD	<LOD	0		< 0.001		< 0.001							
Petroleum Hydrocarbons Aliphatic >EC10-EC12	23000	2	< LOD	<LOD	0		< 1.0		< 1.0							
Petroleum Hydrocarbons Aliphatic >EC12-EC16	82000	2	< LOD	<LOD	0		< 2.0		< 2.0							
Petroleum Hydrocarbons Aliphatic >EC16-EC35	1700000	2	< LOD	160.00	0		< 10		160.00							
Petroleum Hydrocarbons Aromatic >EC5-EC7	46000	2	< LOD	<LOD	0		< 0.001		< 0.001							
Petroleum Hydrocarbons Aromatic >EC7-EC8	110000	2	< LOD	<LOD	0		< 0.001		< 0.001							
Petroleum Hydrocarbons Aromatic >EC8-EC10	8100	2	< LOD	<LOD	0		< 0.001		< 0.001							
Petroleum Hydrocarbons Aromatic >EC10-EC12	28000	2	< LOD	<LOD	0		< 1.0		< 1.0							
Petroleum Hydrocarbons Aromatic >EC12-EC16	37000	2	< LOD	<LOD	0		< 2.0		< 2.0							
Petroleum Hydrocarbons Aromatic >EC16-EC21	28000	2	< LOD	11.00	0		< 10		11.00							
Petroleum Hydrocarbons Aromatic >EC21-EC35	28200	2	< LOD	58.00	0		12.00		58.00							
Benzene	47.000	2	< LOD	<LOD	0		< 0.001		< 0.001							
Toluene	110000	2	12.00	<LOD	0		< 0.001		< 0.001							
Ethyl benzene	13000	2	< LOD	<LOD	0		< 0.001		< 0.001							
o-Xylene	150000	2	< LOD	<LOD	0		< 0.001		< 0.001							
m- & p-Xylene	28000	2	< LOD	<LOD	0		< 0.001		< 0.001							
MTBE	13000	2	< LOD	<LOD	0		< 0.001		< 0.001							
Mean Average SOM	**2.8**															
Mean Average pH	**8.1**															
	Commercial 2.5% SOM					**Values in RED are > the relevant GAC (Generic Assesment Criteria).**										
Job Number:	**C5128**															
Client:	**Domis Construction Ltd**															
Site:	**St Michaels**															
Soil Group Type	**Combined Results**															

APPENDIX D

Geotechnical Testing Results

Jack Mather
Brownfield Solutions Ltd
William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP

e: j.mather@brownfield-solutions.co.uk

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

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

Analytical Report Number : 22-98006

Project / Site name:	St Michaels Manchester	**Samples received on:**	21/11/2022
Your job number:	C5128	**Samples instructed on/ Analysis started on:**	21/11/2022
Your order number:	C5128 3694 JM	**Analysis completed by:**	25/11/2022
Report Issue Number:	1	**Report issued on:**	26/11/2022
Samples Analysed:	5 soil samples		

Signed:

Joanna Wawrzeczko
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing

Analytical Report Number: 22-98006
Project / Site name: St Michaels Manchester
Your Order No: C5128 3694 JM

Lab Sample Number				2507016	2507017	2507018	2507019	2507020
Sample Reference				WS03	BH04	BH05	BH04	BH05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				3.00	4.00	3.00	3.00	4.00
Date Sampled				17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	28
Moisture Content	%	0.01	NONE	12	9.5	14	13	10
Total mass of sample received	kg	0.001	NONE	0.4	0.4	0.4	0.4	0.4

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.9	8.1	7.9	7.7	7.4
Total Sulphate as SO4	%	0.005	MCERTS	-	-	-	0.019	0.042
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.05	0.035	0.057	0.076	0.11
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	75.9	107
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	-	-	-	1.7	2.6
Total Sulphur	%	0.005	MCERTS	-	-	-	0.022	0.034
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	-	-	-	< 0.5	< 0.5
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	-	-	-	< 2.0	< 2.0

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	-	-	-	5.9	18
Magnesium (leachate equivalent)	mg/l	2.5	NONE	-	-	-	3	9.2

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

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The results included within the report relate only to the sample(s) submitted for testing

Analytical Report Number : 22-98006
Project / Site name: St Michaels Manchester

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2507016	WS03	None Supplied	3	Brown sandy clay.
2507017	BH04	None Supplied	4	Brown sand with gravel.
2507018	BH05	None Supplied	3	Brown sandy clay.
2507019	BH04	None Supplied	3	Brown sandy clay.
2507020	BH05	None Supplied	4	Brown sandy clay with stones.

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The results included within the report relate only to the sample(s) submitted for testing

Analytical Report Number : 22-98006
Project / Site name: St Michaels Manchester

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client Brownfield Solutions

Address William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Contract C5128

Job Number MRN 4268/18
Date of Issue 20 December 2022

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

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

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.

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

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

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF POINT LOAD STRENGTH INDEX OF ROCK
METHOD IN ACCORDANCE WITH ASTM STANDARD D 5731

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE LABEL	BH04	DATE SAMPLED	22-Nov-22
LAB SAMPLE No	119427-119441	DATE RECEIVED	01-Dec-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

MATERIAL	Rock Core
ADVISED SOURCE	As client and site above

Depth (m)	Test Type*	D (mm)	W** (mm)	Load (P) (kN)	D_e^2 (mm^2)	D_e (mm)	Is (MPa)	F	$I_{s(50)}$ (MPa)
28.32-28.45	D	88.0		6.9	7744.00	88.00	0.89	1.29	1.15
31.10-31.26	D	88.0		8.4	7744.00	88.00	1.08	1.29	1.40
43.60-43.72	D	88.0		15.2	7744.00	88.00	1.96	1.29	2.53
11.31-11.40	D	89.0		8.8	7921.00	89.00	1.11	1.30	1.44
21.82-21.94	D	88.0		14.2	7744.00	88.00	1.83	1.29	2.36
42.00-42.12	D	87.0		7.8	7569.00	87.00	1.03	1.28	1.32
17.40-17.50	D	89.0		11.0	7921.00	89.00	1.39	1.30	1.80
19.05-19.19	D	89.0		12.2	7921.00	89.00	1.54	1.30	2.00
38.20-38.40	D	88.0		14.8	7744.00	88.00	1.91	1.29	2.46
9.90-10.00	A	88.0	81.0	11.2	9075.65	95.27	1.23	1.34	1.65
23.50-23.60	D	89.0		10.4	7921.00	89.00	1.31	1.30	1.70
36.20-36.43	D	88.0		10.8	7744.00	88.00	1.39	1.29	1.80
15.60-15.74	D	88.0		8.0	7744.00	88.00	1.03	1.29	1.33
5.70-5.77	A	88.0	60.0	10.0	6722.70	81.99	1.49	1.25	1.86
33.87-34.00	D	88.0		14.8	7744.00	88.00	1.91	1.29	2.46
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00

Test Type *

A	Axial Test	D	Diametral Test
B	Block Test	I	Irregular Lump Test

*W Entry required if test type is not Diametral

REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF POINT LOAD STRENGTH INDEX OF ROCK
METHOD IN ACCORDANCE WITH ASTM STANDARD D 5731

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE LABEL	BH05	DATE SAMPLED	25-Nov-22
LAB SAMPLE No	119442-119456	DATE RECEIVED	01-Dec-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

MATERIAL	Rock Core
ADVISED SOURCE	As client and site above

Depth (m)	Test Type*	D (mm)	W** (mm)	Load (P) (kN)	D_e^2 (mm^2)	D_e (mm)	Is (MPa)	F	$I_{s(50)}$ (MPa)
21.50-21.58	A	88.0	75.0	16.8	8403.38	91.67	2.00	1.31	2.63
33.50-33.57	D	89.0		3.6	7921.00	89.00	0.45	1.30	0.59
5.40-5.50	D	89.0		3.4	7921.00	89.00	0.43	1.30	0.56
17.60-17.70	D	89.0		6.2	7921.00	89.00	0.78	1.30	1.01
8.35-8.45	D	88.0		2.8	7744.00	88.00	0.36	1.29	0.47
10.35-10.45	D	88.0		6.8	7744.00	88.00	0.88	1.29	1.13
39.30-39.38	A	88.0	61.0	9.8	6834.75	82.67	1.43	1.25	1.80
34.10-34.22	D	88.0		5.0	7744.00	88.00	0.65	1.29	0.83
22.80-22.92	D	88.0		3.8	7744.00	88.00	0.49	1.29	0.63
43.10-43.22	D	89.0		5.6	7921.00	89.00	0.71	1.30	0.92
15.60-15.73	D	88.0		6.2	7744.00	88.00	0.80	1.29	1.03
28.00-28.10	A	88.0	70.0	8.0	7843.16	88.56	1.02	1.29	1.32
30.70-30.82	D	88.0		6.2	7744.00	88.00	0.80	1.29	1.03
25.60-25.75	D	88.0		6.8	7744.00	88.00	0.88	1.29	1.13
42.10-42.22	D	88.0		5.8	7744.00	88.00	0.75	1.29	0.97
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00

Test Type *

A	Axial Test	D	Diametral Test
B	Block Test	I	Irregular Lump Test

*W Entry required if test type is not Diametral

REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH04 26.50-26.81	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119420	DATE SAMPLED	22-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	144.2	MEASURED COMPRESSIVE STRENGTH (N/mm2)	23.7

COMPRESSIVE STRENGTH (MPa)	**23.7**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH04 44.10-44.41	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119421	DATE SAMPLED	22-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	64.4	MEASURED COMPRESSIVE STRENGTH (N/mm2)	10.6

COMPRESSIVE STRENGTH (MPa)	**10.6**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

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TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH04 25.83-26.17	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119422	DATE SAMPLED	22-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	112.3	MEASURED COMPRESSIVE STRENGTH (N/mm2)	18.5

COMPRESSIVE STRENGTH (MPa)	**18.5**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH04 10.41-10.71	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119423	DATE SAMPLED	22-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	89
LENGTH AFTER PREPARATION (mm)	178	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	92.9	MEASURED COMPRESSIVE STRENGTH (N/mm2)	14.9

COMPRESSIVE STRENGTH (MPa)	**14.9**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH04 16.83-17.00	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119424	DATE SAMPLED	22-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	76.8	MEASURED COMPRESSIVE STRENGTH (N/mm2)	12.6

COMPRESSIVE STRENGTH (MPa)	**12.6**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH04 37.50-37.74	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119425	DATE SAMPLED	22-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	112.6	MEASURED COMPRESSIVE STRENGTH (N/mm2)	18.5

COMPRESSIVE STRENGTH (MPa)	**18.5**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH04 7.40-7.82	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119426	DATE SAMPLED	22-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	122.7	MEASURED COMPRESSIVE STRENGTH (N/mm2)	20.2

COMPRESSIVE STRENGTH (MPa)	**20.2**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

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DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH05 19.14-19.40	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119457	DATE SAMPLED	25-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	95.6	MEASURED COMPRESSIVE STRENGTH (N/mm2)	15.7

COMPRESSIVE STRENGTH (MPa)	**15.7**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH05 6.76-7.00	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119458	DATE SAMPLED	25-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	144.1	MEASURED COMPRESSIVE STRENGTH (N/mm2)	23.7

COMPRESSIVE STRENGTH (MPa)	**23.7**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH05 16.30-16.63	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119459	DATE SAMPLED	25-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	67.1	MEASURED COMPRESSIVE STRENGTH (N/mm2)	11.0

COMPRESSIVE STRENGTH (MPa)	**11.0**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH05 12.75-13.00	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119460	DATE SAMPLED	25-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	153.0	MEASURED COMPRESSIVE STRENGTH (N/mm2)	25.2

COMPRESSIVE STRENGTH (MPa)	**25.2**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH05 37.50-37.75	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119461	DATE SAMPLED	25-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	127.3	MEASURED COMPRESSIVE STRENGTH (N/mm2)	20.9

COMPRESSIVE STRENGTH (MPa)	**20.9**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH05 44.50-44.80	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119462	DATE SAMPLED	25-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	131.3	MEASURED COMPRESSIVE STRENGTH (N/mm2)	21.6

COMPRESSIVE STRENGTH (MPa)	**21.6**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4268/18

SAMPLE REFERENCE	BH05 28.30-28.62	DATE RECEIVED	01-Dec-22
SAMPLE NUMBER	119463	DATE SAMPLED	25-Nov-22
DATE TESTED	15-Dec-22	SAMPLED BY	Client

DIMENSIONS

TESTED BY	MW	DIAMETER (mm)	88
LENGTH AFTER PREPARATION (mm)	176	LENGTH/DIAMETER RATIO	2.00

METHOD OF END PREPARATION	Saw / Grinding	TIME IN WATER PRIOR TO TEST	0 Hours
DATE OF DRILLING	Not advised	DRILLED BY	Others
MATERIAL	Rock Core	SAMPLE LOCATION	Not advised

DESCRIPTION OF CORE AFTER TEST	Split vertically from top to bottom, with no visible end effects

COMPRESSIVE STRENGTH

LOAD AT FAILURE (kN)	101.4	MEASURED COMPRESSIVE STRENGTH (N/mm2)	16.7

COMPRESSIVE STRENGTH (MPa)	**16.7**

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
None

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 20-Dec-22

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client Brownfield Solutions

Address William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Contract C5128

Job Number MRN 4573/1
Date of Issue 10 January 2023

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

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

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.

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

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

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TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF POINT LOAD STRENGTH INDEX OF ROCK
METHOD IN ACCORDANCE WITH ASTM STANDARD D 5731

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4573/1

SAMPLE LABEL	BH01	DATE SAMPLED	18-Nov-22
LAB SAMPLE No	119833-119851	DATE RECEIVED	21-Dec-22
DATE TESTED	04-Jan-23	SAMPLED BY	Client

MATERIAL	Sandstone
ADVISED SOURCE	Site Investigation Samples

Depth (m)	Test Type*	D (mm)	W** (mm)	Load (P) (kN)	D_e^2 (mm^2)	D_e (mm)	Is (MPa)	F	$I_{s(50)}$ (MPa)
5.43-5.50	A	87.0	63.0	1.2	6978.63	83.54	0.17	1.26	0.22
9.93-10.00	A	87.0	55.0	2.4	6092.45	78.05	0.39	1.22	0.48
13.00-13.08	A	87.0	76.0	2.6	8418.66	91.75	0.31	1.31	0.41
16.50-16.60	D	87.0		1.5	7569.00	87.00	0.20	1.28	0.25
19.00-19.10	D	87.0		1.8	7569.00	87.00	0.24	1.28	0.31
21.50-21.60	D	87.0		1.0	7569.00	87.00	0.13	1.28	0.17
24.00-24.08	A	86.0	76.0	3.0	8321.89	91.22	0.36	1.31	0.47
26.30-26.43	D	87.0		2.1	7569.00	87.00	0.28	1.28	0.36
28.90-29.00	D	87.0		2.4	7569.00	87.00	0.32	1.28	0.41
32.15-32.25	D	87.0		1.3	7569.00	87.00	0.17	1.28	0.22
35.85-35.95	A	87.0	78.0	1.6	8640.20	92.95	0.19	1.32	0.24
36.80-36.90	D	87.0		1.8	7569.00	87.00	0.24	1.28	0.31
41.50-41.60	D	87.0		0.9	7569.00	87.00	0.12	1.28	0.15
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00

Test Type *			
A	Axial Test	D	Diametral Test
B	Block Test	I	Irregular Lump Test

*W Entry required if test type is not Diametral

REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 10-Jan-23

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4573/1

DATE RECEIVED	21-Dec-22	DATE SAMPLED	18-Nov-22
DATE TESTED	06-Jan-23	SAMPLED BY	Client
MATERIAL	Sandstone		

Sample Number	Sample Reference	Tested By	Diameter (mm)	Length* (mm)	L/D Ratio	Method of Preparation	Load at Failure (kN)	Compressive Strength (N/mm^2)	Description after Test
119832	BH01 6.80-7.00	MW	87	174	2.00	Saw / Grinding	74.6	**12.5**	Split vertically top to bottom with no visible end defects
119835	BH01 12.57-12.80	MW	87	174	2.00	Saw / Grinding	100.4	**16.9**	Split vertically top to bottom with no visible end defects
119838	BH01 17.50-17.80	MW	87	174	2.00	Saw / Grinding	47.5	**8.0**	Split vertically top to bottom with no visible end defects
119841	BH01 22.70-22.95	MW	87	174	2.00	Saw / Grinding	119.1	**20.0**	Split vertically top to bottom with no visible end defects
119844	BH01 27.20-27.40	MW	87	174	2.00	Saw / Grinding	132.5	**22.3**	Split vertically top to bottom with no visible end defects
119847	BH01 34.20-34.40	MW	87	174	2.00	Saw / Grinding	80.8	**13.6**	Split vertically top to bottom with no visible end defects
119850	BH01 39.55-39.75	MW	87	174	2.00	Saw / Grinding	109.1	**18.4**	Split vertically top to bottom with no visible end defects

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
*Length after sample preparation

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 10-Jan-23

M U R R A Y R I X

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DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF POINT LOAD STRENGTH INDEX OF ROCK
METHOD IN ACCORDANCE WITH ASTM STANDARD D 5731

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4573/1

SAMPLE LABEL	BH02	DATE SAMPLED	07-Nov-22
LAB SAMPLE No	120005-120020	DATE RECEIVED	21-Dec-22
DATE TESTED	04-Jan-23	SAMPLED BY	Client

MATERIAL	Sandstone
ADVISED SOURCE	Site Investigation Samples

Depth (m)	Test Type*	D (mm)	W** (mm)	Load (P) (kN)	D_e^2 (mm^2)	D_e (mm)	Is (MPa)	F	$I_{s(50)}$ (MPa)
15.00-15.10	A	86.0	75.0	2.4	8212.40	90.62	0.29	1.31	0.38
13.15-13.27	D	87.0		1.4	7569.00	87.00	0.18	1.28	0.24
6.80-6.88	A	86.0	79.0	2.6	8650.39	93.01	0.30	1.32	0.40
10.20-10.31	D	87.0		2.2	7569.00	87.00	0.29	1.28	0.37
16.90-17.00	D	86.0		1.6	7396.00	86.00	0.22	1.28	0.28
18.37-18.50	D	87.0		1.7	7569.00	87.00	0.22	1.28	0.29
17.30-17.40	A	87.0	78.0	3.6	8640.20	92.95	0.42	1.32	0.55
21.00-21.12	D	86.0		1.2	7396.00	86.00	0.16	1.28	0.21
13.20-13.32	D	87.0		1.2	7569.00	87.00	0.16	1.28	0.20
8.25-8.35	D	87.0		0.8	7569.00	87.00	0.11	1.28	0.14
5.66-5.76	D	87.0		0.4	7569.00	87.00	0.05	1.28	0.07
15.66-15.76	D	87.0		1.9	7569.00	87.00	0.25	1.28	0.32
24.10-24.20	D	87.0		1.8	7569.00	87.00	0.24	1.28	0.31
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00

Test Type *			
A	Axial Test	D	Diametral Test
B	Block Test	I	Irregular Lump Test

*W Entry required if test type is not Diametral

REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 10-Jan-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4573/1

DATE RECEIVED	21-Dec-22	DATE SAMPLED	07-Nov-22
DATE TESTED	06-Jan-23	SAMPLED BY	Client
MATERIAL	Sandstone		

Sample Number	Sample Reference	Tested By	Diameter (mm)	Length* (mm)	L/D Ratio	Method of Preparation	Load at Failure (kN)	Compressive Strength (N/mm^2)	Description after Test
120011	BH02 16.00-16.30	MW	87	174	2.00	Saw / Grinding	101.4	**17.1**	Split vertically top to bottom with no visible end defects
120012	BH02 12.00-12.33	MW	87	174	2.00	Saw / Grinding	84.5	**14.2**	Split vertically top to bottom with no visible end defects
120013	BH02 7.20-7.42	MW	87	174	2.00	Saw / Grinding	76.3	**12.8**	Split vertically top to bottom with no visible end defects
120021	BH02 18.20-18.42	MW	87	174	2.00	Saw / Grinding	99.2	**16.7**	Split vertically top to bottom with no visible end defects
120022	BH02 22.10-22.33	MW	87	174	2.00	Saw / Grinding	109.4	**18.4**	Split vertically top to bottom with no visible end defects
120023	BH02 11.90-12.22	MW	87	174	2.00	Saw / Grinding	102.5	**17.2**	Split vertically top to bottom with no visible end defects
120024	BH02 9.10-9.35	MW	87	174	2.00	Saw / Grinding	59.1	**9.9**	Split vertically top to bottom with no visible end defects

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
*Length after sample preparation

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 10-Jan-23

Jack Mather
Brownfield Solutions Ltd
William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP

e: j.mather@brownfield-solutions.co.uk

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

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

Analytical Report Number : 23-14277

Project / Site name:	St Michaels Manchester	**Samples received on:**	26/01/2023
Your job number:	C5128	**Samples instructed on/ Analysis started on:**	26/01/2023
Your order number:	C5128 3694 JM	**Analysis completed by:**	01/02/2023
Report Issue Number:	1	**Report issued on:**	02/02/2023
Samples Analysed:	4 soil samples		

Signed:

Adam Fenwick
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-14277
Project / Site name: St Michaels Manchester
Your Order No: C5128 3694 JM

Lab Sample Number				2566680	2566681	2566682	2566683
Sample Reference				BH02	BH04	BH05	BH01
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				10.00	20.00	30.00	40.00
Date Sampled				17/11/2022	17/11/2022	17/11/2022	17/11/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	8.6	10	9	11
Total mass of sample received	kg	0.001	NONE	0.9	0.9	0.9	0.9

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6.4	8.8	9.0	8.7
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0026	0.0015	0.0023	0.0054

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

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 23-14277
Project / Site name: St Michaels Manchester

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2566680	BH02	None Supplied	10	Brown sand.
2566681	BH04	None Supplied	20	Brown sand.
2566682	BH05	None Supplied	30	Brown sand.
2566683	BH01	None Supplied	40	Brown sand.

Analytical Report Number : 23-14277
Project / Site name: St Michaels Manchester

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Sample Deviation Report

Analytical Report Number : 23-14277

Project / Site name: St Michaels Manchester

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH01	None Supplied	S	2566683	c	pH in soil (automated)	L099-PL	c
BH02	None Supplied	S	2566680	c	pH in soil (automated)	L099-PL	c
BH04	None Supplied	S	2566681	c	pH in soil (automated)	L099-PL	c
BH05	None Supplied	S	2566682	c	pH in soil (automated)	L099-PL	c

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client Brownfield Solutions

Address William Smith House
173-183 Witton Street
Northwich
Cheshire
CW9 5LP

Contract C5128

Job Number MRN 4573/1
Date of Issue 10 January 2023

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

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

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted.

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

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

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF POINT LOAD STRENGTH INDEX OF ROCK
METHOD IN ACCORDANCE WITH ASTM STANDARD D 5731

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4573/1

SAMPLE LABEL	BH01	DATE SAMPLED	18-Nov-22
LAB SAMPLE No	119833-119851	DATE RECEIVED	21-Dec-22
DATE TESTED	04-Jan-23	SAMPLED BY	Client

MATERIAL	Sandstone
ADVISED SOURCE	Site Investigation Samples

Depth (m)	Test Type*	D (mm)	W** (mm)	Load (P) (kN)	D_e^2 (mm^2)	D_e (mm)	Is (MPa)	F	$I_{s(50)}$ (MPa)
5.43-5.50	A	87.0	63.0	1.2	6978.63	83.54	0.17	1.26	0.22
9.93-10.00	A	87.0	55.0	2.4	6092.45	78.05	0.39	1.22	0.48
13.00-13.08	A	87.0	76.0	2.6	8418.66	91.75	0.31	1.31	0.41
16.50-16.60	D	87.0		1.5	7569.00	87.00	0.20	1.28	0.25
19.00-19.10	D	87.0		1.8	7569.00	87.00	0.24	1.28	0.31
21.50-21.60	D	87.0		1.0	7569.00	87.00	0.13	1.28	0.17
24.00-24.08	A	86.0	76.0	3.0	8321.89	91.22	0.36	1.31	0.47
26.30-26.43	D	87.0		2.1	7569.00	87.00	0.28	1.28	0.36
28.90-29.00	D	87.0		2.4	7569.00	87.00	0.32	1.28	0.41
32.15-32.25	D	87.0		1.3	7569.00	87.00	0.17	1.28	0.22
35.85-35.95	A	87.0	78.0	1.6	8640.20	92.95	0.19	1.32	0.24
36.80-36.90	D	87.0		1.8	7569.00	87.00	0.24	1.28	0.31
41.50-41.60	D	87.0		0.9	7569.00	87.00	0.12	1.28	0.15
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00

Test Type *			
A	Axial Test	D	Diametral Test
B	Block Test	I	Irregular Lump Test

*W Entry required if test type is not Diametral

REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 10-Jan-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4573/1

DATE RECEIVED	21-Dec-22	DATE SAMPLED	18-Nov-22
DATE TESTED	06-Jan-23	SAMPLED BY	Client
MATERIAL	Sandstone		

Sample Number	Sample Reference	Tested By	Diameter (mm)	Length* (mm)	L/D Ratio	Method of Preparation	Load at Failure (kN)	Compressive Strength (N/mm^2)	Description after Test
119832	BH01 6.80-7.00	MW	87	174	2.00	Saw / Grinding	74.6	**12.5**	Split vertically top to bottom with no visible end defects
119835	BH01 12.57-12.80	MW	87	174	2.00	Saw / Grinding	100.4	**16.9**	Split vertically top to bottom with no visible end defects
119838	BH01 17.50-17.80	MW	87	174	2.00	Saw / Grinding	47.5	**8.0**	Split vertically top to bottom with no visible end defects
119841	BH01 22.70-22.95	MW	87	174	2.00	Saw / Grinding	119.1	**20.0**	Split vertically top to bottom with no visible end defects
119844	BH01 27.20-27.40	MW	87	174	2.00	Saw / Grinding	132.5	**22.3**	Split vertically top to bottom with no visible end defects
119847	BH01 34.20-34.40	MW	87	174	2.00	Saw / Grinding	80.8	**13.6**	Split vertically top to bottom with no visible end defects
119850	BH01 39.55-39.75	MW	87	174	2.00	Saw / Grinding	109.1	**18.4**	Split vertically top to bottom with no visible end defects

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
*Length after sample preparation

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 10-Jan-23

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF POINT LOAD STRENGTH INDEX OF ROCK
METHOD IN ACCORDANCE WITH ASTM STANDARD D 5731

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4573/1

SAMPLE LABEL	BH02	DATE SAMPLED	07-Nov-22
LAB SAMPLE No	120005-120020	DATE RECEIVED	21-Dec-22
DATE TESTED	04-Jan-23	SAMPLED BY	Client

MATERIAL	Sandstone
ADVISED SOURCE	Site Investigation Samples

Depth (m)	Test Type*	D (mm)	W** (mm)	Load (P) (kN)	D_e^2 (mm^2)	D_e (mm)	Is (MPa)	F	$I_{s(50)}$ (MPa)
15.00-15.10	A	86.0	75.0	2.4	8212.40	90.62	0.29	1.31	0.38
13.15-13.27	D	87.0		1.4	7569.00	87.00	0.18	1.28	0.24
6.80-6.88	A	86.0	79.0	2.6	8650.39	93.01	0.30	1.32	0.40
10.20-10.31	D	87.0		2.2	7569.00	87.00	0.29	1.28	0.37
16.90-17.00	D	86.0		1.6	7396.00	86.00	0.22	1.28	0.28
18.37-18.50	D	87.0		1.7	7569.00	87.00	0.22	1.28	0.29
17.30-17.40	A	87.0	78.0	3.6	8640.20	92.95	0.42	1.32	0.55
21.00-21.12	D	86.0		1.2	7396.00	86.00	0.16	1.28	0.21
13.20-13.32	D	87.0		1.2	7569.00	87.00	0.16	1.28	0.20
8.25-8.35	D	87.0		0.8	7569.00	87.00	0.11	1.28	0.14
5.66-5.76	D	87.0		0.4	7569.00	87.00	0.05	1.28	0.07
15.66-15.76	D	87.0		1.9	7569.00	87.00	0.25	1.28	0.32
24.10-24.20	D	87.0		1.8	7569.00	87.00	0.24	1.28	0.31
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00
					0.00	0.00	0.00	0.00	0.00

Test Type *			
A	Axial Test	D	Diametral Test
B	Block Test	I	Irregular Lump Test

*W Entry required if test type is not Diametral

REMARKS

SIGNED

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 10-Jan-23

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS
ASTM D7012 - 14 Method C

CLIENT	Brownfield Solutions
SITE	C5128
JOB NUMBER	MRN 4573/1

DATE RECEIVED	21-Dec-22	DATE SAMPLED	07-Nov-22
DATE TESTED	06-Jan-23	SAMPLED BY	Client
MATERIAL	Sandstone		

Sample Number	Sample Reference	Tested By	Diameter (mm)	Length* (mm)	L/D Ratio	Method of Preparation	Load at Failure (kN)	Compressive Strength (N/mm^2)	Description after Test
120011	BH02 16.00-16.30	MW	87	174	2.00	Saw / Grinding	101.4	**17.1**	Split vertically top to bottom with no visible end defects
120012	BH02 12.00-12.33	MW	87	174	2.00	Saw / Grinding	84.5	**14.2**	Split vertically top to bottom with no visible end defects
120013	BH02 7.20-7.42	MW	87	174	2.00	Saw / Grinding	76.3	**12.8**	Split vertically top to bottom with no visible end defects
120021	BH02 18.20-18.42	MW	87	174	2.00	Saw / Grinding	99.2	**16.7**	Split vertically top to bottom with no visible end defects
120022	BH02 22.10-22.33	MW	87	174	2.00	Saw / Grinding	109.4	**18.4**	Split vertically top to bottom with no visible end defects
120023	BH02 11.90-12.22	MW	87	174	2.00	Saw / Grinding	102.5	**17.2**	Split vertically top to bottom with no visible end defects
120024	BH02 9.10-9.35	MW	87	174	2.00	Saw / Grinding	59.1	**9.9**	Split vertically top to bottom with no visible end defects

Comments / Deviation from standard method / Abnormalities noted during visual inspection.
*Length after sample preparation

NAME O.P. Davies BA (Hons) (Laboratory Manager) SIGNED  DATE 10-Jan-23

APPENDIX E

Monitoring Results

Ground Gas Monitoring Results

BROWNFIELD SOLUTIONS LTD

CLIENT:	Date	Operator	Analsyer	Weather Observations			Temp (°C)	Pressure Trend	Min Barometric Pressure (mb)	Notes
DOMIS	22/12/2022	CGM	GA5000	Light rain	Light breeze	Cool	8	Falling	980	
JOB NO.	06/01/2023	CGM	GA5000	Sunny	No wind	Cool	6	Falling	1003	
C5128	20/01/2023	CGM	GA5000	Sunny	No wind	Cool	6	Rising	1013	
SITE:	09/02/2023	CGM	GFM436	Sunny	Light breeze	Cool	8	Falling	1020	
ST MICHAELS MANCHESTER	22/02/2023	CGM	GFM436	Overcast	No wind	Cool	9	Falling	1006	
	08/03/2023	CGM	GFM436	Overcast	No wind	Cool	4	Falling	990	

Notes: mb = milibars; CH_4 = methane; LEL = lower explosive limit = 5%v/v; CO_2 = carbon dioxide; O_2 = oxygen; CO=carbon monoxide; H_2S = hydrogen sulphide; TVOC= Total volatile organic compounds; PPM = parts per million. Where the flow is less than the limit of detection of the instrument, the detection limit is reported (Highlighted in **green**). Gas Screening Values (GSVs) are rounded to 3 decimal places. Calibration Records for analysers used availble on request.

Date	Time	Location	Response zone (m)	Pressures (mb)		Gas flows (l/hr)		CH_4 (%v/v)		CH_4 (%LEL)		CO_2 (%v/v)		O_2 (%v/v)		Other Gases (PPM)			Depth to Water (m)	Well Base (m)	Gas Screening Value (CH_4) (l/hr)	Gas Screening Value (CO_2) (l/hr)	Notes
				Atmospheric Pressure	Relative Well Pressure	Initial	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	CO	H_2S	TVOC (PID)					
				Summary Statistcs																			
			Max. values:	1013	0.0	0.1	0.1	0.1	0.1	2.0	2.0	1.9	0.6	20.9	20.6	0.0	0.0	0.4	11.6	14.8	0.000	0.002	
			Min. values:	1013	0.0	0.1	0.1	0.0	0.1	0.0	2.0	0.0	0.1	17.1	19.4	0.0	0.0	0.1	10.8	13.3	0.000	0.000	
				Worst-case GSVs based on maximum recorded steady flow and maximum individual peak concentrations:																	0.000	0.002	
22/12/2022	AM	Ambient						0.1		2.0		0.1		20.9			0.0						
BH01			5.00-15.00			0.1	0.1	0.1	0.1	2.0	2.0	0.3	0.1	20.4	20.6	N/A	0.0	N/A	11.00	14.70	0.000	0.000	
22/12/2022	AM	Ambient						0.1		2.0		0.1		20.9			0.0						
06/01/2023	AM	Ambient						0.1		2.0		0.1		20.3			0.0						
BH01			5.00-15.00			0.1	0.1	0.1	0.1	2.0	2.0	0.5	0.2	19.8	20.0	N/A	0.0	0.1	10.98	14.80	0.000	0.001	
BH04			5.00-15.00			0.1	0.1	0.1	0.1	2.0	2.0	1.5	0.6	18.0	19.4	N/A	0.0	0.4	11.59	13.63	0.000	0.002	
BH05			5.00-15.00			/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	HOLE OBSTRUCTED
06/01/2023	AM	Ambient						0.1		2.0		0.1		20.3			0.0						
20/01/2023	AM	Ambient		1013				0.1				0.1		20.2			0						
BH01			5.00-15.00			0.1	0.1	0.1	0.1	2.0	2.0	0.3	0.1	19.9	20.1	/	0.0	/	11.07	14.60	0.000	0.000	
BH04			5.00-15.00			0.1	0.1	0.1	0.1	2.0	2.0	1.6	0.2	17.8	19.9	/	0.0	/	11.60	13.32	0.000	0.002	
BH05			5.00-15.00			/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	HOLE OBSTRUCTED
20/01/2023	AM	Ambient																					
09/02/2023	PM	Ambient						0.0		0.0		0.0		20.4									
BH01			5.00-15.00			0.1	0.1	0.1	0.1	2.0	2.0	0.4	0.1	19.9	20.0	0.0	0.0	/	10.86	14.60	0.000	0.000	
BH04			5.00-15.00			/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	UNABLE TO ACCESS, CRANE IN USE.
BH05			5.00-15.00			/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	UNABLE TO ACCESS, CRANE IN USE.
09/02/2023	PM	Ambient						0.0		0.0		0.0		20.4									
22/02/2023	PM	Ambient						0.0		0.0		0.0		20.5									
BH01			5.00-15.00			0.1	0.1	0.1	0.1	2.0	2.0	0.7	0.1	19.6	20.4	0.0	0.0	/	10.81	14.65	0.000	0.001	
BH04			5.00-15.00			0.1	0.1	0.1	0.1	2.0	2.0	1.9	0.3	17.1	19.9	0.0	0.0	/	11.30	13.26	0.000	0.002	
BH05			5.00-15.00			/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	HOLE OBSTRUCTED
22/02/2023	PM	Ambient						0.0		0.0		0.0		20.5									
08/03/2023	AM	Ambient						0.0		0.0		0.2		20.0									
BH01			5.00-15.00			0.1	0.1	0.1	0.1	2.0	2.0	0.1	0.1	20.0	20.4	0.0	0.0	/	10.75	14.63	0.000	0.000	
BH04			5.00-15.00			/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	HOLE OBSTRUCTED
BH05			5.00-15.00			/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	HOLE OBSTRUCTED
08/03/2023	AM	Ambient						0.0		0.0		0.2		20.0									

TEST DATE AND CONDITIONS	
Date	23/01/23
Atmospheric pressure	1023 mb
Ambient Temp	20.1 °C
Environics Serial No.	2518

GAS DATA LTD
Unit 4 Fairfield court
Seven Stars Estate
Coventry
CV3 4LJ, UK
+44 (0) 24 7630 3311

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GFM436-1 OUTWARD INSPECTION & QUALITY CHECK SHEET

INSTRUMENT DETAILS					
SO Number	Instrument Banner	Instrument Serial Number + SW Version	Job Number(s)		
333016	GFM436	13233 V27.10	24706	—	—

Calibration Technician ..... **DATE** 19/1/23

Inspection Technician ..... **DATE** 23/01/23

INSTRUMENT CHECKS		Pass (P), Fail (F) or not applicable(NA)	INSTRUMENT PACKING LIST		Tick if included
Function Tests	Dust Caps Fitted	P	Instrument		✓
	Keyboard Test (All keys)	P	Leather Case		✓
	Backlight Test	P	Instrument Strap		✓
	Clock Set / Running	P	AC Battery Charger (UK)		✓
	Comms Test	P	AC Battery Charger (EURO)		X
	Pump Flow Test (In & Out)	P	AC Battery Charger (US)		X
	Overall Leak Test (30mb)	N/A	AC Battery Charger (AUS)		X
	Battery Charge Test	P	Gas Sample Pipe		X
	Service Date set to?	19/01/24	Hard Carry Case		✓
Channel Tests	Data Logging Enabled?	P	Spares Pot		X
	Verify CH4/LEL/Hexane/PID	P	Allen Key		X
	Verify CO2	P	Flow Sample Pipe		X
	Verify O2	P	Temperature Probe		X
	Verify H2S	P	Vane Anemometer		X
	Verify CO	P	USB Cable		✓
	Verify LEL	P	USB Memory Stick		✓
	Verify 1st Option gas	N/A	SM V5 Software	Ver 6.05	✓
	Verify atmospheric pressure	P	Internal Filter Pack	Qty	X
	Verify differential pressure	P	External Filter Pack	Qty	X
	Verify flow	P	Field Guide		X
	Verify temperature probe input	P	EX Safety Flier		X
	Verify vane anemometer input	P	Extra Items: SERVICE SPARES CUSTOMER: FILTER & PART SAMPLE PIPE		
DataBase Checks	Jobcard(s) completed and signed	P			
	Jobcard(s) booked off database	P			
	Calibration certificate completed	P			
	Complete & print QI record	N/A			
Label Checks	No. of Calibration label fitted	12216	Comments		
	MCERTS label not displayed	P			
	Warranty label fitted	P			
H2S Range	H2S Range from SO	5000 ppm			
	H2S Range from cal cert	5000 ppm			
	Over-range value correct?	P			

TEST DATE AND CONDITIONS	
Date	18/1/23
Atmospheric pressure	985mb
Ambient Temp	22.2°C
Environics Serial No.	2633

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Seven Stars Estate
Coventry
CV3 4LJ, UK
+44 (0) 24 7630 3311

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GFM436-1 FINAL INSPECTION & CALIBRATION CHECK CERTIFICATE

INSTRUMENT DETAILS	
Serial No	Customer
13233	Brownfield Solutions Ltd

INSTRUMENT CHECKS			
Keyboard	✓	Pump Flow	500cc/min
Display Contrast	✓	Pump Flow @ -200mB	350cc/min
Clock Set / Running	✓	S/W Version	G436-00.0027/0010
Labels Fitted	✓	Recalibration Date	19/1/24

GAS CHECKS							
Calibration Gas		Instrument Gas Channels Read					
Gas Type	Applied Conc.	CH4 (%)	tol. (% vol.)	CO2 (%)	tol. (% vol.)	O2 (%)	tol. (% vol.)
N2	100%	0.0	0.0	0.0	0.0	0.0	+/-0.1
CH4	5%	5.0	+/-0.3	0.0	0.0	0.0	+/-0.1
	60%	60.3	+/-3.0	0.0	0.0	0.0	+/-0.1
CO2	5%	0.0	0.0	4.9	+/-0.3	0.0	+/-0.1
	40%	0.0	0.0	39.9	+/-3.0	0.0	+/-0.1
O2	20.9%	0.0	0.0	0.0	+0.1	20.9	+/-0.5

OPTIONAL GAS CHECKS								
Calibration Gas		Instrument Gas Channels Read						
Gas Type	Applied Conc.	Label	H2S	CO			Hexane	tol. (% vol.)
		Range	5000ppm	2000ppm			2.00%	
N2	100%		0	0			0.000	0.0
H2S	1500ppm		1510	0				+/- 5.0
CO	1000ppm		60	1000				+/- 5.0
Hexane	2.00%						1.935	+/- 10.0

PRESSURE CHECKS							
Calibration Pressure		Instrument Pressure Channels Read					
Pressure @	Applied Pressure	Atmospheric [Ap] (mB)	tol. (mB)				
All Ports	Current Atmospheric	986	+/-2.0				
Ap Port (Internal)	+800mB(a)	799	+/-5.0				
	+1200mB(a)	1198	+/-5.0				

TEST DATE AND CONDITIONS	
Date	18/1/23
Atmospheric pressure	985mb
Ambient Temp	22.2°C
Environics Serial No.	2633

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GFM436-1 FINAL INSPECTION & CALIBRATION CHECK CERTIFICATE

FLOW CHECKS					
Calibration Flow		Instrument Flow Channels Read			
Applied Flow (l/hour)	Applied Pressure (Pa)	Flow [Flow] (l/hour)	tol. (l/hour)	Differential Pressure [Dp] (Pa)	tol. (Pa)
-30.0	-405	30.0	+/-3.0	-406	+/-50
-3.0	-17	-3.0	+/-1.0	-18	+/-6
0.0	0	0.0	0.0	0	0.0
+3.0	15	3.1	+/-0.5	16	+/-3
+30.0	321	30.1	+/-3.0	320	+/-50
+60.0	961	60.0	+/-6.0	960	+/-130
+90.0	1906	90.7	+/-9.0	1949	+/-250

TEMPERATURE CHECK		
Calibration Temperature	Instrument Temperature Channel Read	
Applied Equivalent Temperature (°C)	Temperature [Temp] (°C)	tol. (°C)
-10.0	-10.0	+/- 2.0
0.0	0.0	+/- 1.0
30.0	29.5	+/- 1.0
60.0	59.5	+/- 1.0
100.0	99.0	+/- 1.0

Notes:

The instrument identified by the serial number stated above has been tested by Gas Data personnel for calibration accuracy on the date and under the ambient conditions stated. Gas Data Ltd internal BS EN ISO9001:2015, BS EN ISO 14001:2015 and BS EN ISO 45001:2018 compliant workshop procedures were followed to apply known calibration test gases, gas flow rates, pressures and temperatures of the values stated. The results displayed on the instrument at each stage are recorded above.

Gas Data Ltd is certified to: BS EN ISO 9001:2015
BS EN ISO 14001:2015
BS EN ISO 45001:2018

APPENDIX F

Waste Assessment Report

BROWNFIELD SOLUTIONS LTD

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

AWP6R-A9TLX-C8MH4

Job name

St Michaels, Manchester

Description/Comments

Project

C5128

Site

Classified by

Name:
Jake Wheaton
Date:
06 Jan 2023 15:44 GMT
Telephone:
01606334844

Company:
Brownfield Solutions Limited
Brownfield Solutions Ltd
173-183 Witton Street
Northwich
CW9 5LP

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	Date
Hazardous Waste Classification	07 Oct 2021

Next 3 year Refresher due by Oct 2024

Purpose of classification

2 - Material Characterisation

Address of the waste

Land between Bootle Street and Jackson's Row, Manchester **Post Code** M2 5NH

SIC for the process giving rise to the waste

41100 Development of building projects

Description of industry/producer giving rise to the waste

Redevelopment of a derelict Synagogue and associated car park.

Description of the specific process, sub-process and/or activity that created the waste

Waste created during a site investigation and during excavation of soils for development of a 41 storey mixed use building including basement complex.

Description of the waste

Mix of made ground and natural strata comprising predominantly gravelly sand with varying cobble content.

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS01	0.50-0.70	Hazardous	HP 7, HP 10, HP 14	3
2	WS02	0.30-0.50	Non Hazardous		6
3	BH01	0.30-0.50	Hazardous	HP 7, HP 10, HP 14	8
4	BH01[2]	2.00-2.20	Hazardous	HP 7, HP 10, HP 14	11
5	BH02	1.30-1.50	Hazardous	HP 14	14
6	BH03	1.50-1.70	Non Hazardous		16
7	BH04	1.20-1.40	Non Hazardous		18
8	BH05	0.30-0.50	Non Hazardous		20
9	WS03	1.50-1.70	Non Hazardous		22
10	BH05[2]	1.20-1.40	Non Hazardous		24

Related documents

#	Name	Description
1	BSL Suite	waste stream template used to create this Job

Report

Created by: Jake Wheaton

Created date: 06 Jan 2023 15:44 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	26
Appendix B: Rationale for selection of metal species	27
Appendix C: Version	27

Classification of sample: WS01

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

Sample details

Sample name:
WS01
Sample Depth:
0.50-0.70 m
Moisture content:
20%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

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

Hazard Statements hit:

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

Because of determinand:

lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 0.416%)

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

Hazard Statements hit:

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

Because of determinand:

lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 0.416%)

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

Hazard Statements hit:

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

Because of determinand:

lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 0.416%)

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		pH			PH		8.5	pH		8.5	pH	8.5 pH		
2		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		24	mg/kg	1.32	25.35	mg/kg	0.00254 %	✓	
3		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1.4	mg/kg	1.285	1.439	mg/kg	0.000112 %	✓	
4		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		**<LOD**
5		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		22	mg/kg	1.462	25.723	mg/kg	0.00257 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
6		copper { dicopper oxide; copper (I) oxide }				100	mg/kg	1.126	90.071	mg/kg	0.00901 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	5200	mg/kg		4160	mg/kg	0.416 %	✓	
		082-001-00-6											
8		mercury { mercury dichloride }				0.4	mg/kg	1.353	0.433	mg/kg	0.0000433 %	✓	
		080-010-00-X	231-299-8	7487-94-7									
9		nickel { nickel dihydroxide }				18	mg/kg	1.579	22.745	mg/kg	0.00227 %	✓	
		028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
		034-002-00-8											
11		zinc { zinc chloride }				310	mg/kg	2.085	516.961	mg/kg	0.0517 %	✓	
		030-003-00-2	231-592-0	7646-85-7									
12		naphthalene				0.18	mg/kg		0.144	mg/kg	0.0000144 %	✓	
		601-052-00-2	202-049-5	91-20-3									
13		acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-917-1	208-96-8									
14		acenaphthene				0.08	mg/kg		0.064	mg/kg	0.0000064 %	✓	
			201-469-6	83-32-9									
15		fluorene				0.14	mg/kg		0.112	mg/kg	0.0000112 %	✓	
			201-695-5	86-73-7									
16		phenanthrene				1.4	mg/kg		1.12	mg/kg	0.000112 %	✓	
			201-581-5	85-01-8									
17		anthracene				0.31	mg/kg		0.248	mg/kg	0.0000248 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				2	mg/kg		1.6	mg/kg	0.00016 %	✓	
			205-912-4	206-44-0									
19		pyrene				2	mg/kg		1.6	mg/kg	0.00016 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				1.2	mg/kg		0.96	mg/kg	0.000096 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.98	mg/kg		0.784	mg/kg	0.0000784 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.84	mg/kg		0.672	mg/kg	0.0000672 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.56	mg/kg		0.448	mg/kg	0.0000448 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.89	mg/kg		0.712	mg/kg	0.0000712 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.35	mg/kg		0.28	mg/kg	0.000028 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.53	mg/kg		0.424	mg/kg	0.0000424 %	✓	
			205-883-8	191-24-2									
28		TPH (C6 to C40) petroleum group				12	mg/kg		9.6	mg/kg	0.00096 %	✓	
				TPH									
29		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
30		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
31		ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
										Total:	0.486 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00096%)

Classification of sample: WS02

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS02
Sample Depth:
0.30-0.50 m
Moisture content:
14%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.6	pH		7.6	pH	7.6 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		29	mg/kg	1.32	32.929	mg/kg	0.00329 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		19	mg/kg	1.462	23.882	mg/kg	0.00239 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		200	mg/kg	1.126	193.653	mg/kg	0.0194 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	980	mg/kg		842.8	mg/kg	0.0843 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		2.4	mg/kg	1.353	2.794	mg/kg	0.000279 %	✓	
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		42	mg/kg	1.579	57.052	mg/kg	0.00571 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
11	zinc { zinc chloride }	030-003-00-2	231-592-0	7646-85-7		610	mg/kg	2.085	1093.54	mg/kg	0.109 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.14	mg/kg		0.12	mg/kg	0.000012 %	✓	
13	acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
14	acenaphthene		201-469-6	83-32-9		0.13	mg/kg		0.112	mg/kg	0.0000112 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		fluorene				0.14	mg/kg		0.12	mg/kg	0.000012 %	✓	
			201-695-5	86-73-7									
16		phenanthrene				1.4	mg/kg		1.204	mg/kg	0.00012 %	✓	
			201-581-5	85-01-8									
17		anthracene				0.23	mg/kg		0.198	mg/kg	0.0000198 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				1.3	mg/kg		1.118	mg/kg	0.000112 %	✓	
			205-912-4	206-44-0									
19		pyrene				1.2	mg/kg		1.032	mg/kg	0.000103 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.54	mg/kg		0.464	mg/kg	0.0000464 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.58	mg/kg		0.499	mg/kg	0.0000499 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.39	mg/kg		0.335	mg/kg	0.0000335 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.35	mg/kg		0.301	mg/kg	0.0000301 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.4	mg/kg		0.344	mg/kg	0.0000344 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.2	mg/kg		0.172	mg/kg	0.0000172 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.29	mg/kg		0.249	mg/kg	0.0000249 %	✓	
			205-883-8	191-24-2									
										Total:	0.226 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH01

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

Sample details

Sample name:
BH01
Sample Depth:
0.30-0.50 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

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

Hazard Statements hit:

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

Because of determinand:

lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 1.577%)

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

Hazard Statements hit:

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

Because of determinand:

lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 1.577%)

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

Hazard Statements hit:

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

Because of determinands:

lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 1.577%)
zinc chloride: (compound conc.: 0.277%)

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1		pH			PH		8.2 pH		8.2 pH	8.2 pH		
2		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		69 mg/kg	1.32	75.615 mg/kg	0.00756 %	✓	
3		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
4		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.2 mg/kg	1.923	<2.308 mg/kg	<0.000231 %		<LOD

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
5		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		25	mg/kg	1.462	30.327	mg/kg	0.00303 %	✓	
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		770	mg/kg	1.126	719.555	mg/kg	0.072 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	19000	mg/kg		15770	mg/kg	1.577 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		1.1	mg/kg	1.353	1.236	mg/kg	0.000124 %	✓	
9		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		22	mg/kg	1.579	28.842	mg/kg	0.00288 %	✓	
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
11		zinc { zinc chloride }	030-003-00-2	231-592-0	7646-85-7		1600	mg/kg	2.085	2768.244	mg/kg	0.277 %	✓	
12		naphthalene	601-052-00-2	202-049-5	91-20-3		0.21	mg/kg		0.174	mg/kg	0.0000174 %	✓	
13		acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
14		acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
15		fluorene		201-695-5	86-73-7		0.05	mg/kg		0.0415	mg/kg	0.00000415 %	✓	
16		phenanthrene		201-581-5	85-01-8		0.5	mg/kg		0.415	mg/kg	0.0000415 %	✓	
17		anthracene		204-371-1	120-12-7		0.11	mg/kg		0.0913	mg/kg	0.00000913 %	✓	
18		fluoranthene		205-912-4	206-44-0		0.7	mg/kg		0.581	mg/kg	0.0000581 %	✓	
19		pyrene		204-927-3	129-00-0		0.7	mg/kg		0.581	mg/kg	0.0000581 %	✓	
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.41	mg/kg		0.34	mg/kg	0.000034 %	✓	
21		chrysene	601-048-00-0	205-923-4	218-01-9		0.36	mg/kg		0.299	mg/kg	0.0000299 %	✓	
22		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.32	mg/kg		0.266	mg/kg	0.0000266 %	✓	
23		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.26	mg/kg		0.216	mg/kg	0.0000216 %	✓	
24		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.27	mg/kg		0.224	mg/kg	0.0000224 %	✓	
25		indeno[123-cd]pyrene		205-893-2	193-39-5		0.14	mg/kg		0.116	mg/kg	0.0000116 %	✓	
26		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
27		benzo[ghi]perylene		205-883-8	191-24-2		0.19	mg/kg		0.158	mg/kg	0.0000158 %	✓	
28		TPH (C6 to C40) petroleum group			TPH		229	mg/kg		190.07	mg/kg	0.019 %	✓	
29		benzene	601-020-00-8	200-753-7	71-43-2		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
30		toluene	601-021-00-3	203-625-9	108-88-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
31		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<**LOD**
											Total:	1.959 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because Concentration too low to be considered flammable. Low concentrations of short chain hydrocarbons. Discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.019%)

Classification of sample: BH01[2]

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

Sample details

Sample name:
BH01[2]
Sample Depth:
2.00-2.20 m
Moisture content:
15%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

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

Hazard Statements hit:

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

Because of determinand:

lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 0.706%)

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

Hazard Statements hit:

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

Because of determinand:

lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 0.706%)

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

Hazard Statements hit:

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

Because of determinands:

dicopper oxide; copper (I) oxide: (compound conc.: 0.402%)
lead compounds with the exception of those specified elsewhere in this Annex (worst case): (Note 1 conc.: 0.706%)
zinc chloride: (compound conc.: 0.283%)

Determinands

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

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1		pH				7.7	pH		7.7	pH	7.7 pH		
				PH									
2		arsenic { arsenic trioxide }				48	mg/kg	1.32	53.869	mg/kg	0.00539 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
3		cadmium { cadmium sulfide }			1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<**LOD**
		048-010-00-4	215-147-8	1306-23-6									
4		chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<**LOD**
		024-001-00-0	215-607-8	1333-82-0									

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		25 mg/kg	1.462	31.058 mg/kg	0.00311 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		4200 mg/kg	1.126	4019.421 mg/kg	0.402 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	8300 mg/kg		7055 mg/kg	0.706 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.7 mg/kg	1.353	0.805 mg/kg	0.0000805 %	✓	
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		36 mg/kg	1.579	48.333 mg/kg	0.00483 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<**LOD**
11	zinc { zinc chloride }	030-003-00-2	231-592-0	7646-85-7		1600 mg/kg	2.085	2834.949 mg/kg	0.283 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		0.27 mg/kg		0.23 mg/kg	0.000023 %	✓	
13	acenaphthylene		205-917-1	208-96-8		0.07 mg/kg		0.0595 mg/kg	0.00000595 %	✓	
14	acenaphthene		201-469-6	83-32-9		0.19 mg/kg		0.161 mg/kg	0.0000161 %	✓	
15	fluorene		201-695-5	86-73-7		0.31 mg/kg		0.264 mg/kg	0.0000264 %	✓	
16	phenanthrene		201-581-5	85-01-8		4 mg/kg		3.4 mg/kg	0.00034 %	✓	
17	anthracene		204-371-1	120-12-7		1 mg/kg		0.85 mg/kg	0.000085 %	✓	
18	fluoranthene		205-912-4	206-44-0		5.4 mg/kg		4.59 mg/kg	0.000459 %	✓	
19	pyrene		204-927-3	129-00-0		5.3 mg/kg		4.505 mg/kg	0.000451 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		2.8 mg/kg		2.38 mg/kg	0.000238 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9		2.4 mg/kg		2.04 mg/kg	0.000204 %	✓	
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		2.1 mg/kg		1.785 mg/kg	0.000179 %	✓	
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.8 mg/kg		1.53 mg/kg	0.000153 %	✓	
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		2.1 mg/kg		1.785 mg/kg	0.000179 %	✓	
25	indeno[123-cd]pyrene		205-893-2	193-39-5		0.82 mg/kg		0.697 mg/kg	0.0000697 %	✓	
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.19 mg/kg		0.161 mg/kg	0.0000161 %	✓	
27	benzo[ghi]perylene		205-883-8	191-24-2		1 mg/kg		0.85 mg/kg	0.000085 %	✓	
								Total:	1.407 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH02

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

Sample details

Sample name:
BH02
Sample Depth:
1.30-1.50 m
Moisture content:
17%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

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

Hazard Statements hit:

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

Because of determinands:

dicopper oxide; copper (I) oxide: (compound conc.: 0.206%)
zinc chloride: (compound conc.: 0.225%)

Determinands

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

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.9	pH		7.9	pH	7.9 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		41	mg/kg	1.32	44.931	mg/kg	0.00449 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	3.8	mg/kg	1.285	4.054	mg/kg	0.000315 %	✓	
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		22	mg/kg	1.462	26.688	mg/kg	0.00267 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		2200	mg/kg	1.126	2055.872	mg/kg	0.206 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	760	mg/kg		630.8	mg/kg	0.0631 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		1.4	mg/kg	1.353	1.573	mg/kg	0.000157 %	✓	
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		74	mg/kg	1.579	97.013	mg/kg	0.0097 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
11		zinc { zinc chloride }				1300	mg/kg	2.085	2249.198	mg/kg	0.225 %	✓	
		030-003-00-2	231-592-0	7646-85-7									
12		naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-052-00-2	202-049-5	91-20-3									
13		acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			205-917-1	208-96-8									
14		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-469-6	83-32-9									
15		fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
			201-695-5	86-73-7									
16		phenanthrene				0.83	mg/kg		0.689	mg/kg	0.0000689 %	✓	
			201-581-5	85-01-8									
17		anthracene				0.17	mg/kg		0.141	mg/kg	0.0000141 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				1.4	mg/kg		1.162	mg/kg	0.000116 %	✓	
			205-912-4	206-44-0									
19		pyrene				1.4	mg/kg		1.162	mg/kg	0.000116 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.79	mg/kg		0.656	mg/kg	0.0000656 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.62	mg/kg		0.515	mg/kg	0.0000515 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.67	mg/kg		0.556	mg/kg	0.0000556 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.47	mg/kg		0.39	mg/kg	0.000039 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.77	mg/kg		0.639	mg/kg	0.0000639 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				0.4	mg/kg		0.332	mg/kg	0.0000332 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				0.5	mg/kg		0.415	mg/kg	0.0000415 %	✓	
			205-883-8	191-24-2									
										Total:	0.512 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH03

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH03
Sample Depth:
1.50-1.70 m
Moisture content:
13%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		8.6	pH		8.6	pH	8.6 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		12	mg/kg	1.32	13.784	mg/kg	0.00138 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.7	mg/kg	1.285	0.783	mg/kg	0.0000609 %	✓	
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		15	mg/kg	1.462	19.073	mg/kg	0.00191 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		29	mg/kg	1.126	28.406	mg/kg	0.00284 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	120	mg/kg		104.4	mg/kg	0.0104 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		11	mg/kg	1.579	15.116	mg/kg	0.00151 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
11	zinc { zinc chloride }	030-003-00-2	231-592-0	7646-85-7		180	mg/kg	2.085	326.436	mg/kg	0.0326 %	✓	
12	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
13	acenaphthylene		205-917-1	208-96-8		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
14	acenaphthene		201-469-6	83-32-9		0.28	mg/kg		0.244	mg/kg	0.0000244 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		fluorene				0.23	mg/kg		0.2	mg/kg	0.00002 %	✓	
			201-695-5	86-73-7									
16		phenanthrene				3.7	mg/kg		3.219	mg/kg	0.000322 %	✓	
			201-581-5	85-01-8									
17		anthracene				0.79	mg/kg		0.687	mg/kg	0.0000687 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				5.2	mg/kg		4.524	mg/kg	0.000452 %	✓	
			205-912-4	206-44-0									
19		pyrene				4.5	mg/kg		3.915	mg/kg	0.000392 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				2.1	mg/kg		1.827	mg/kg	0.000183 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				2	mg/kg		1.74	mg/kg	0.000174 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				1.9	mg/kg		1.653	mg/kg	0.000165 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.1	mg/kg		0.957	mg/kg	0.0000957 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				2.1	mg/kg		1.827	mg/kg	0.000183 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				1	mg/kg		0.87	mg/kg	0.000087 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.2	mg/kg		0.174	mg/kg	0.0000174 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				1.2	mg/kg		1.044	mg/kg	0.000104 %	✓	
			205-883-8	191-24-2									
										Total:	0.0535 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH04

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH04
Sample Depth:
1.20-1.40 m
Moisture content:
19%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		pH			PH		7.8	pH		7.8	pH	7.8 pH		
2		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	17.111	mg/kg	0.00171 %	✓	
3		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
4		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
5		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		10	mg/kg	1.462	11.839	mg/kg	0.00118 %	✓	
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		33	mg/kg	1.126	30.095	mg/kg	0.00301 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	95	mg/kg		76.95	mg/kg	0.0077 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.8	mg/kg	1.353	0.877	mg/kg	0.0000877 %	✓	
9		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		9.5	mg/kg	1.579	12.154	mg/kg	0.00122 %	✓	
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<LOD
11		zinc { zinc chloride }	030-003-00-2	231-592-0	7646-85-7		38	mg/kg	2.085	64.162	mg/kg	0.00642 %	✓	
12		naphthalene	601-052-00-2	202-049-5	91-20-3		0.61	mg/kg		0.494	mg/kg	0.0000494 %	✓	
13		acenaphthylene		205-917-1	208-96-8		2.6	mg/kg		2.106	mg/kg	0.000211 %	✓	
14		acenaphthene		201-469-6	83-32-9		0.53	mg/kg		0.429	mg/kg	0.0000429 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		fluorene				0.75	mg/kg		0.608	mg/kg	0.0000608 %	✓	
			201-695-5	86-73-7									
16		phenanthrene				3.6	mg/kg		2.916	mg/kg	0.000292 %	✓	
			201-581-5	85-01-8									
17		anthracene				2.6	mg/kg		2.106	mg/kg	0.000211 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				28	mg/kg		22.68	mg/kg	0.00227 %	✓	
			205-912-4	206-44-0									
19		pyrene				40	mg/kg		32.4	mg/kg	0.00324 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				7.3	mg/kg		5.913	mg/kg	0.000591 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				8.1	mg/kg		6.561	mg/kg	0.000656 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				8.5	mg/kg		6.885	mg/kg	0.000689 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				3.4	mg/kg		2.754	mg/kg	0.000275 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				5	mg/kg		4.05	mg/kg	0.000405 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				2.1	mg/kg		1.701	mg/kg	0.00017 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.56	mg/kg		0.454	mg/kg	0.0000454 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				2.1	mg/kg		1.701	mg/kg	0.00017 %	✓	
			205-883-8	191-24-2									
										Total:	0.0311 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH05

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH05
Sample Depth:
0.30-0.50 m
Moisture content:
16%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 16% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		pH			PH		8.5	pH		8.5	pH	8.5 pH		
2		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		22	mg/kg	1.32	24.4	mg/kg	0.00244 %	✓	
3		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1.4	mg/kg	1.285	1.511	mg/kg	0.000118 %	✓	
4		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<**LOD**
5		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		34	mg/kg	1.462	41.742	mg/kg	0.00417 %	✓	
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		120	mg/kg	1.126	113.49	mg/kg	0.0113 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	350	mg/kg		294	mg/kg	0.0294 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		1	mg/kg	1.353	1.137	mg/kg	0.000114 %	✓	
9		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		31	mg/kg	1.579	41.13	mg/kg	0.00411 %	✓	
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
11		zinc { zinc chloride }	030-003-00-2	231-592-0	7646-85-7		210	mg/kg	2.085	367.71	mg/kg	0.0368 %	✓	
12		naphthalene	601-052-00-2	202-049-5	91-20-3		0.27	mg/kg		0.227	mg/kg	0.0000227 %	✓	
13		acenaphthylene		205-917-1	208-96-8		0.12	mg/kg		0.101	mg/kg	0.0000101 %	✓	
14		acenaphthene		201-469-6	83-32-9		0.88	mg/kg		0.739	mg/kg	0.0000739 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		fluorene				0.55	mg/kg		0.462	mg/kg	0.0000462 %	✓	
			201-695-5	86-73-7									
16		phenanthrene				6.4	mg/kg		5.376	mg/kg	0.000538 %	✓	
			201-581-5	85-01-8									
17		anthracene				1.4	mg/kg		1.176	mg/kg	0.000118 %	✓	
			204-371-1	120-12-7									
18		fluoranthene				8.1	mg/kg		6.804	mg/kg	0.00068 %	✓	
			205-912-4	206-44-0									
19		pyrene				7.7	mg/kg		6.468	mg/kg	0.000647 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				3.4	mg/kg		2.856	mg/kg	0.000286 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				2.8	mg/kg		2.352	mg/kg	0.000235 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				3.2	mg/kg		2.688	mg/kg	0.000269 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				1.5	mg/kg		1.26	mg/kg	0.000126 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				3	mg/kg		2.52	mg/kg	0.000252 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				1.6	mg/kg		1.344	mg/kg	0.000134 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.41	mg/kg		0.344	mg/kg	0.0000344 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				1.8	mg/kg		1.512	mg/kg	0.000151 %	✓	
			205-883-8	191-24-2									
										Total:	0.0925 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS03

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS03
Sample Depth:
1.50-1.70 m
Moisture content:
21%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 21% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		8	pH		8	pH	8pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		24	mg/kg	1.32	25.033	mg/kg	0.0025 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	1.9	mg/kg	1.285	1.929	mg/kg	0.00015 %	✓	
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		15	mg/kg	1.462	17.319	mg/kg	0.00173 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		200	mg/kg	1.126	177.89	mg/kg	0.0178 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	800	mg/kg		632	mg/kg	0.0632 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		1.3	mg/kg	1.353	1.39	mg/kg	0.000139 %	✓	
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		27	mg/kg	1.579	33.691	mg/kg	0.00337 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
11	zinc { zinc chloride }	030-003-00-2	231-592-0	7646-85-7		280	mg/kg	2.085	461.096	mg/kg	0.0461 %	✓	
										Total:	0.135 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH05[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
BH05[2]
Sample Depth:
1.20-1.40 m
Moisture content:
16%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 16% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.9	pH		7.9	pH	7.9 pH		
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9.7	mg/kg	1.32	10.758	mg/kg	0.00108 %	✓	
3	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.2	mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<**LOD**
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<**LOD**
5	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		13	mg/kg	1.462	15.96	mg/kg	0.0016 %	✓	
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		15	mg/kg	1.126	14.186	mg/kg	0.00142 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	20	mg/kg		16.8	mg/kg	0.00168 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<**LOD**
9	nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		7.9	mg/kg	1.579	10.482	mg/kg	0.00105 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	1.405	<1.405	mg/kg	<0.000141 %		<**LOD**
11	zinc { zinc chloride }	030-003-00-2	231-592-0	7646-85-7		29	mg/kg	2.085	50.779	mg/kg	0.00508 %	✓	
										Total:	0.0123 %		

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

- **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

- **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **lead compounds with the exception of those specified elsewhere in this Annex (worst case)**

GB MCL index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case species based on hazard statements

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Absence of hexavalent chromium indicates it unlikely that zinc chromate is present within the site soils. Therefore next worst case has been selected. No matter the species selected, all samples still remain classified as hazardous.

mercury {mercury dichloride}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Worst case species based on hazard statements

zinc {zinc chloride}

Absence of hexavalent chromium indicates it unlikely that zinc chromate is present within the site soils. Next worst case compound with possible link to historic site use (police station) has been selected.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2023.4.5471.10145 (04 Jan 2023)
HazWasteOnline Database: 2023.4.5471.10145 (04 Jan 2023)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
GB MCL List - version 1.1 of 09 June 2021

Jack Mather
Brownfield Solutions Ltd
William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP

e: j.mather@brownfield-solutions.co.uk

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

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

Analytical Report Number : 22-95737

Project / Site name:	St Michaels, Manchester	**Samples received on:**	09/11/2022
Your job number:	C5128	**Samples instructed on/ Analysis started on:**	09/11/2022
Your order number:	C5128 3693 JM	**Analysis completed by:**	25/11/2022
Report Issue Number:	1	**Report issued on:**	25/11/2022
Samples Analysed:	3 10:1 WAC Samples		

Signed:

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

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

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**22-95737**						
					Client:	**BSL**	
Location	**St Michaels, Manchester**						
Lab Reference (Sample Number)	2494223 / 2494224				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	07/11/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS01						
Depth (m)	0.50-0.70						
Solid Waste Analysis							
TOC (%)**	1.9				3%	5%	6%
Loss on Ignition (%) **	4.9				--	--	10%
BTEX (µg/kg)	< 10				6000	--	--
Sum of PCBs (mg/kg)	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	8.19				100	--	--
pH (units)**	8.2				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	9.3				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0021			0.0182	0.5	2	25
Barium *	0.0907			0.773	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.016			0.13	0.5	10	70
Copper *	0.015			0.12	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0024			0.0203	0.5	10	30
Nickel *	0.0014			0.012	0.4	10	40
Lead *	0.034			0.29	0.5	10	50
Antimony *	0.57			4.8	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.018			0.15	4	50	200
Chloride *	0.63			5.3	800	15000	25000
Fluoride*	0.97			8.3	10	150	500
Sulphate *	35			300	1000	20000	50000
TDS*	96			820	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	5.40			46.1	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.90						
Dry Matter (%)	80						
Moisture (%)	20						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**22-95737**						
					Client: BSL		
Location	**St Michaels, Manchester**						
Lab Reference (Sample Number)	2494225 / 2494226				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	07/11/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	WS02						
Depth (m)	0.30-0.50						
Solid Waste Analysis							
TOC (%)**	1.4				3%	5%	6%
Loss on Ignition (%) **	4.0				--	--	10%
BTEX (µg/kg)	< 10				6000	--	--
Sum of PCBs (mg/kg)	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	6.60				100	--	--
pH (units)**	8.2				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	9.0				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0132			0.111	0.5	2	25
Barium *	0.0111			0.0927	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0045			0.038	0.5	10	70
Copper *	0.023			0.19	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0242			0.203	0.5	10	30
Nickel *	0.0015			0.012	0.4	10	40
Lead *	0.0034			0.029	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.0075			0.063	4	50	200
Chloride *	6.2			52	800	15000	25000
Fluoride*	0.99			8.3	10	150	500
Sulphate *	29			250	1000	20000	50000
TDS*	120			1000	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	7.99			66.9	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.90						
Dry Matter (%)	86						
Moisture (%)	14						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

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** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**22-95737**						
					Client: BSL		
Location	**St Michaels, Manchester**						
Lab Reference (Sample Number)	2494227 / 2494228				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	07/11/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH01						
Depth (m)	0.30-0.50						
Solid Waste Analysis							
TOC (%)**	2.3				3%	5%	6%
Loss on Ignition (%) **	5.6				--	--	10%
BTEX (µg/kg)	< 10				6000	--	--
Sum of PCBs (mg/kg)	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	98				500	--	--
Total PAH (WAC-17) (mg/kg)	8.49				100	--	--
pH (units)**	8.4				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	14				--	To be evaluated	To be evaluated
Eluate Analysis (BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1 mg/l			10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	0.0083			0.0689	0.5	2	25
Barium *	0.0585			0.487	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0013			0.011	0.5	10	70
Copper *	0.016			0.14	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0044			0.0367	0.5	10	30
Nickel *	0.0007			0.0061	0.4	10	40
Lead *	0.11			0.93	0.5	10	50
Antimony *	1.4			12	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.018			0.15	4	50	200
Chloride *	0.92			7.7	800	15000	25000
Fluoride*	0.40			3.3	10	150	500
Sulphate *	14			120	1000	20000	50000
TDS*	62			520	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	6.24			52.0	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.90						
Dry Matter (%)	83						
Moisture (%)	17						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

*= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Analytical Report Number : 22-95737
Project / Site name: St Michaels, Manchester

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2494223	WS01	None Supplied	0.50-0.70	Grey clinker with rubble.
2494225	WS02	None Supplied	0.30-0.50	Grey sand with rubble.
2494227	BH01	None Supplied	0.30-0.50	Gray sand with clinker

Analytical Report Number : 22-95737
Project / Site name: St Michaels, Manchester

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270.	L064-PL	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	NONE
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	NONE
Total BTEX in soil (Poland)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073-PL	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by EC probe using a factor of 0.6.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031	W	ISO 17025

Analytical Report Number : 22-95737
Project / Site name: St Michaels, Manchester

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

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

Jack Mather
Brownfield Solutions Ltd
William Smith House
173 - 183 Witton Street
Northwich
Cheshire
CW9 5LP

e: j.mather@brownfield-solutions.co.uk

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

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

Analytical Report Number : 22-98009

Project / Site name:	St Michaels, Manchester	**Samples received on:**	21/11/2022
Your job number:	C5128	**Samples instructed on/ Analysis started on:**	21/11/2022
Your order number:	C5128 3693 JM	**Analysis completed by:**	30/11/2022
Report Issue Number:	1	**Report issued on:**	30/11/2022
Samples Analysed:	10:1 WAC sample		

Signed:

Anna Goc
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing

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

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**22-98009**						
					Client:	**BSL**	
Location	**St Michaels, Manchester**						
Lab Reference (Sample Number)	2507028 / 2507029				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	17/11/2022				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	BH04						
Depth (m)	1.20-1.40						
Solid Waste Analysis							
TOC (%)**	1.4				3%	5%	6%
Loss on Ignition (%) **	2.8				--	--	10%
BTEX (µg/kg)	< 10				6000	--	--
Sum of PCBs (mg/kg)	< 0.007				1	--	--
Mineral Oil (mg/kg) EH_1D_CU_AL	75				500	--	--
Total PAH (WAC-17) (mg/kg)	108				100	--	--
pH (units)**	8.0				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	28				--	To be evaluated	To be evaluated
Eluate Analysis	10:1			10:1	Limit values for compliance leaching test		
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.0010			< 0.0100	0.5	2	25
Barium *	0.0099			0.0757	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	0.0006			0.0043	0.5	10	70
Copper *	0.016			0.12	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0070			0.0535	0.5	10	30
Nickel *	0.0026			0.020	0.4	10	40
Lead *	0.0060			0.046	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.012			0.089	4	50	200
Chloride *	0.68			5.3	800	15000	25000
Fluoride*	0.16			1.2	10	150	500
Sulphate *	2.3			17	1000	20000	50000
TDS*	50			380	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	9.41			72.3	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.70						
Dry Matter (%)	81						
Moisture (%)	19						

Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation ** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Analytical Report Number : 22-98009
Project / Site name: St Michaels, Manchester

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2507028	BH04	None Supplied	1.20-1.40	Brown gravelly clay with brick.

Analytical Report Number : 22-98009
Project / Site name: St Michaels, Manchester

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance""	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270.	L064-PL	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	NONE
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	NONE
Total BTEX in soil (Poland)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073-PL	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil""	L039-PL	W	ISO 17025
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by EC probe using a factor of 0.6.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031	W	ISO 17025

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Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
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Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

North West

William Smith House
173 – 183 Witton Street
Northwich
Cheshire
CW9 5LP

Tel: 01606 334 844

Midlands

Unit 5, Alfred Court
Saxon Business Park
Stoke Prior
Bromsgrove
Worcestershire
B60 4AD

Tel: 01215 729 014

www.brownfield-solutions.com

