



**BROWNFIELD
SOLUTIONS LTD**

GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

DOMIS CONSTRUCTION LTD

Back Turner Street, Manchester

Verification Report

MS/C3967/10941

March 2022

PROJECT QUALITY CONTROL DATA SHEET

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DRAWINGS

Drawing Number	Rev	Title
05593_MP_02_2200	J	General Arrangement – Ground Floor
C4704/01	-	Site Location Plan
C4704/02	C	Exploratory Hole Location Plan
C4704/03	-	VOC Hotspot Removal

APPENDICES

Appendix	Title
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Appendix B	Quality Control Methodology and Material Chemical Criteria
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1.0 INTRODUCTION

1.1 Context

This Verification Report has been produced by Brownfield Solutions Limited (BSL) on behalf of Domis Construction Ltd for a site off Back Turner Street, Manchester.

1.2 Objectives

The objective of the verification work is to provide evidence demonstrating implementation of appropriate remediation measures and suitable investigation to assess the VOC hotspot in the basement of Block B. The remedial works were carried out in order to make the site suitable for the proposed commercial end use, as per BSL's Remedial Strategy (ref. NS/C3967/9956, dated February 2021).

1.3 Development

The proposed development is a commercial office / retail end-use comprising three adjoining buildings, Block A to C. This will comprise erection of a part 17 storey (Block A – north), part 6 storey building (Block C – south) and the conversion with single-storey rooftop extension of the existing building (Block B – centre) with associated hard landscaping as shown on the Ground Floor General Arrangement Plan drawing ref. 05593_MP_02_2200_J as provided to BSL by the client. It should be noted that no soft landscaping is proposed.

1.4 Previous Reports

The following reports have been produced for the site and should be read in conjunction with this verification report:

- BSL, Desk Study Assessment Report, reference GP/C3967/7731, dated 13th July 2018.
- BSL, Geo-Environmental Assessment Report, reference BM/C3967/7815 Rev C, dated 22nd October 2021.
- BSL, Ground Gas Risk Assessment Report, reference PG/C3967/9779, dated 14th December 2020.
- BSL, Piling Risk Assessment Report, reference JM/C3967/9487, dated 13th August 2020.
- BSL, Remedial Strategy, reference NS/C3967/9956, dated 19th February 2021.

1.5 Limitations

This report has been prepared in accordance with the relevant current legislative framework, guidance and risk assessment methodology. Current UK guidance and legislation has been used in the environmental assessment of the site, 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.

This report has been prepared for the sole use and reliance of the Client, Domis Construction Ltd. This report shall not be relied upon or transferred to any other parties without the express written authorisation of BSL. If an unauthorised third party comes into possession of this report they rely on it at their risk and the authors owe them no duty of care or skill.

BSL have used reasonable skill, care and diligence in the production of this report. 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.

The investigations carried out on the site have 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 within this report are based upon the proposed site end use provided to BSL at the time of writing. If the end use or development layout changes from the proposal, then the recommendations may change or become invalid. It is assumed 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.

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.

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 GROUND MODEL SUMMARY

2.1 Description of Site

The site is located off Back Turner Street, Manchester, M4 1EZ. It is situated within the Central Business District of Manchester City Centre, centred on National Grid Reference 384297, 398667 as shown on the Site Location Plan, Drawing No. C3967/01.

The main site features and potential issues identified during the site walkover undertaken in June 2018 and updated for the site at present are detailed below.

Feature	Description
Site Area	The site covers approximately 0.06 hectares.
Site Access	Access to the site is gained off Back Turner Street to the west of the site.
Current Land Use and Site Features	The site is elongate in shape and has a gentle slope from the south east down to the north west and sits in a commercial/retail area of Manchester and is surrounded by a mixture of shops and restaurants. The site comprised two distinct areas of development; with buildings occupying the northern and central areas, whilst a car park was present in the south. The northern part of the site is occupied by single story commercial units some of which were disused at the time of the walkover. These also appears to have a basement. The middle is occupied by a disused building of between four and five storeys in height which is in a very poor state of repair with collapsed ceilings and stair wells in places. The building has a basement with limited access. The southern part has no buildings present and is used as a rough surfaced car park bordered by concrete bollards and posts. It is apparent that the site had a building present previously and that it also very likely contained a basement which has now been backfilled to pavement level. Since the date of the first investigation the building in the north of the site has been demolished. The only structure remaining is one in the centre of the site, referred to as Block B.
Potential Sources of Gross Contamination	No evidence of sources of gross contamination were identified onsite.
Vegetation	There is no vegetation in proximity to the site.
Topography	The site rises from the north to the south.
Site Boundaries	The site is bordered by Back Turner Street to the south and Soap Street to the north. High Street borders the site to the east with Shudehill bordering to the west.
Surrounding Area	The site is set within Manchester's Central Business District within Manchester's Northern Quarter. The site is surrounded by a Metrolink Station, Multistorey car parking, retail units comprising shops, bars and restaurants, hotels and offices.

2.2 Environmental Setting

Site History

The earliest available mapping of 1848 and 1851 indicated the site to be occupied by back-to-back residential terraced properties fronting onto Back Turner Street to the west and Back Thomas Street to the east.

By 1891 the terraced buildings had been demolished and entirely occupied by four large adjoining buildings; two located in the north of the site, one in the centre and one in the south-east.

By 1948 the four adjoining buildings had been merged into two; with only the one in the south-east of the site remaining unaffected. Between 1990 and 1992 the building in the south-eastern area of the site had been demolished and the site took its current form.

Published Geology

From the Phase 1 Assessment and published geology, it was anticipated that ground conditions would comprise the following sequence of strata (top down):

-
- Made ground; over
 - Glacial Till; over
 - Chester Pebble Beds Formation.
-

Hydrogeology

The glacial Till beneath the site are classified by the Environment Agency as a Secondary Aquifer (Undifferentiated), whilst the Chester Pebble Peds Formation is classified by the Environment Agency as a Principal Aquifer.

The site does not lie within 500m of a Source Protection Zone.

There are no groundwater abstraction licences within 0.5km of the study site. The nearest active licence is located 578m to the west and pertains to abstraction from a borehole in Chapel Street, Salford by British Telecommunications PLC, for the purpose of general cooling.

There are no active potable water abstraction licences within 2km of the site. The nearest historical licence is located 685m to the north west, with the borehole's water being used for drinking, cooking, sanitary and washing purposes.

Hydrology

The River Irk is indicated to be present 353m to the west of the site and confluences with the River Irwell approximately 470m to north-west.

Radon

Information from the environmental database report indicates the property is not in a radon affected area and therefore no radon protective measures are necessary in accordance with BRE Report 211 'Radon – Guidance on protective measures for new dwellings' 2015 Edition.

UXO Risk

There is no indication of former military use from the desk study. A non-specialist review of online Zetica mapping indicates the site to be in an area where the bomb risk is moderate and no further consideration of UXO is required.

BSL has reviewed an Explosive Ordnance Desk Top Study for the site prepared by EOD Contacts Limited dated 19 February 2018, which was prepared for and provided by the client. On the basis of the

information available to them, EOD Contacts limited concluded that there was a low risk of UXO being located within the site boundaries and that no further risk mitigation measures were required.

2.3 Ground Conditions

Observed Geology

From the ground investigations, made ground was encountered in all of the exploratory hole locations and was from 0.25m in thickness in the north of the site up to 3.40m in thickness in the south of the site. The strata generally comprised locally ashy sandy gravels / gravelly clays with frequent brick cobbles.

The natural strata underlying the made ground was comprised of glacial Till grading from slightly gravelly sandy clay to slightly sandy gravelly clay to a depth between 11.10m bgl and 11.80m bgl.

Underlying the glacial Till at a depth of 11.80m bgl in borehole BH01, a layer of dense gravelly sand was encountered extending to a depth of 13.60m bgl.

Weathered bedrock comprising red coarse-grained sandstone was encountered at a depth of 11.10m bgl and 13.60m bgl in boreholes BH02 and BH01 respectively, this became less weathered with depth.

2.4 Groundwater

Groundwater levels during site works ranged from 16.30m bgl and 17.10m bgl.

No groundwater was encountered in BH01 on the first three monitoring visits. On the following visits groundwater was encountered between 15.49m and 15.66m bgl. Groundwater was encountered in BH02 on all visits between 2.75m and 3.63m bgl. Groundwater was recorded within the response zones in BH01 and BH02 in the majority of visits. The depths and locations are shown in the table below:

Groundwater samples were obtained from three monitoring wells and submitted for chemical testing.

Location and Response Zone (m)	During Site Works	31/08/18	13/09/18	23/11/20	27/11/20	02/12/20	03/12/20	04/12/20	07/12/20	09/12/20	11/12/20
BH01 4.00 - 16.00	16.30	NGW	NGW	NGW	NGW	15.54	15.49	15.52	15.56	15.66	15.66
BH02 1.00 – 4.30	17.10	3.40	2.87	3.55	3.63	2.75	2.77	2.76	2.77	2.76	2.75

2.5 Evidence of Contamination

Observations

Localised deposits of ash were encountered within the made ground in BH01 and BH02 to depths of between 2.40m and 2.60m bgl, and within the shallow made ground in Block A and Block B.

Black staining with a strong sweet volatile odour was noted in made ground in S02 between 0.25m and 0.80m bgl.

3.0 OVERVIEW OF RISK ASSESSMENTS

3.1 General

The previous site investigation has confirmed the following:

- Localised heavy metal and PAH contamination within the made ground.
- Asbestos (loose fibres) with the made ground soils at numerous locations
- The presence of Volatile Organic Compounds (VOCs) presenting a risk via vapour migration into confined spaces.

3.2 Human Health Risks

Concentrations of contaminants including heavy metals and PAHs in excess of the screening criteria utilised (LQM/CIEH residential without homegrown produce S4UL/Defra C4SL values) were identified within the made ground. The localised presence of asbestos fibres has been identified within the made ground, but not at concentrations considered a risk to end-users or construction workers.

Given that the site will be covered in hardstanding, with no soft landscaping, the risks from heavy metals, PAHs and trace asbestos is considered to be very low and no specific remedial measures would be required in respect to these contaminants.

An isolated area of elevated p-isopropyltoluene was recorded within the basement of Block B which was considered to pose a moderate risk to end-users and remediation of the hotspot was recommended to mitigate the potential risk via vapour inhalation.

It was considered unlikely that the site is being affected by offsite contamination sources as the site is underlain by low permeability clay strata and therefore contamination is unlikely migrate onto the site.

3.3 Ground Gas and Vapours

A summary of the ground gas monitoring carried out by BSL is presented below:

- BSL conducted 10 monitoring visits over 2 years, above and beyond the recommended regime within CIRIA C665 guidance.
- Methane was not recorded above the detection limit of the monitoring equipment (i.e. <0.1% v/v).
- Carbon dioxide concentrations ranged between <0.1% v/v and 6.3% v/v, although were generally well below 5.0% v/v.
- Oxygen concentrations ranged between 15.7% v/v and 22.3% v/v.
- The maximum gas flow rate was 0.2 l/hr.

On the basis of the above, and in line with the Gas Risk Assessment undertaken by BSL, the site is classified to fall within Characteristic Situation 1 in accordance with CIRIA 665 and therefore no mitigation measures are required.

3.4 Risk to Controlled Waters

The site is underlain by Secondary (Undifferentiated) and Principal Aquifers within the superficial strata and bedrock, respectively. The site is not within a Source Protection Zone (SPZ) and there are no groundwater abstraction licences within 0.5km of the study site. The nearest active licence is located 578m to the west and pertains to abstraction from a borehole in Chapel Street, Salford by British Telecommunications PLC, for the purpose of general cooling.

The nearest surface watercourse to the site is the River Irk which is indicated to be present 353m to the west of the study site and confluences with the River Irwell approximately 470m to north-west. Given this, there are no significant sensitive water receptors within 250m of the site.

Given the ground conditions, aquifer designations, and absence of any abstractions or rivers in the immediate vicinity, the site is not considered to pose an unacceptable risk to controlled waters. Therefore, no specific remedial requirements for controlled waters are necessary.

3.5 Summary

A summary of the findings of the previous investigations and assessments where a risk is present (i.e. an unacceptable source-pathway-receptor linkage) which requires mitigation is presented in the table below.

Source	Receptor
<- Poses an unacceptable risk to ->	
Elevated concentrations of VOCs present within the made ground at a single locality	Human Health / construction workers and Property

Based on the above, it was recommended that a Remedial Strategy was prepared that identifies the specific remediation requirements for the site.

4.0 REMEDIATION STRATEGY

4.1 Outline

Based on the site investigations undertaken at the site and the contaminant sources identified within the CSM, the following require appraisal to determine the most suitable remedial options:

- Excavation of shallow VOC (p-isopropyltoluene) contamination soil from S02 in Block B.
- Utilise barrier pipe for potable water feeds.

4.2 Site Remediation and Verification Requirements.

Following an options appraisal in the Remedial Strategy (ref. NS/C3967/9956), remedial measures were selected for each of the identified sources. Full details are available within the Remedial Strategy, with the key requirements summarised in the table below.

Source	Remediation Method	Verification Requirements
VOC hotspot associated with S02 in Block B	Removal of VOC hotspot	VOC testing of the soils from the sides and base of excavation of hotspot around S02 in Block B.

Given the absence of screening values for the contaminant of concern, a significant reduction in levels over two orders of magnitude i.e. $<250\mu\text{g/kg}$ and an in-situ PID reading below 50ppm are considered to be appropriate remedial targets.

5.0 SITE REMEDIATION AND VALIDATION

5.1 Removal of Hydrocarbon Impacted Soils

BSL attended the site on 11th January 2022 to verify the removal of VOC impacted soils. A hotspot around S02 was identified in Block B, shown on the VOC Hotspot Location Plan (ref. C3967/03).

The soils encountered during the hotspot removal were stiff and very stiff slightly sandy clay with occasional black staining at shallow depths. An aromatic odour was within the area of the hotspot. The final excavations had dimensions of approximately 3.00m x 1.50m x 1.60m (length x width x depth) a total volume of VOC impacted soils of circa 7.2m³. Waste transfer notes are presented in Appendix E.

Soils from the base and sides of the hotspot excavation were sampled and scheduled for VOC analysis at a UKAS accredited laboratory. All samples were screened onsite with a Photo-Ionisation Detector (PID).

Of those recorded above the limit of detection, all three samples (S02-A, S02-D & S02E) were found to have concentrations of p-isopropyltoluene considerably lower than those detected in the samples tested from S02 during the initial investigation (over two orders of magnitude i.e. <250µg/kg.) A summary of the sample information, chemical testing and results is presented in the table below:

Sample reference	VOCs by PID (ppm)	Chemical Testing Scheduled	Concentration of p-isopropyltoluene (µg/ kg)
S02-A	203.4	VOCs	57
S02-B	12.8	VOCs	<1.0
S02-C	4.5	VOCs	<1.0
S02-D	1.0	VOCs	32
S02-E	0.0	VOCs	17

The PID measurements of the validation samples ranged between 0.0ppm and 203.4 ppm which would suggest VOCs are still present. However, the laboratory testing suggested that the VOC concentrations within the samples taken from the base and sides of the excavation were considerably lower than the concentrations of p-isopropyltoluene detected in soils taken from S02 during the original site investigation (25,000µg/kg), and that the extents of the hotspot had been suitably delineated. All other VOC species were found to be below the limit of detection (<1.0µg/kg).

Although elevated PID readings were still recorded in the base and sides of the excavation the concentrations recorded were considered to be sufficiently low, as detailed above. Additionally, a gas protection score of 1.5 points will be achieved with the installation of a cast in situ monolithic reinforced ground bearing raft slab which will offer some inherent protection against VOC vapour ingress. Additionally, it was noted that the excavation was infilled with concrete creating an even greater barrier for VOC vapours.

The chemical testing results are presented in Appendix A within i2 Analytical report number 22-35059. PID calibration certificates are presented in Appendix D. A photographic volume from the excavation is presented in Appendix C.

6.0 CONCLUSION

6.1 General

The remedial works described within this report were carried out on 11th January 2022 under the supervision of suitably experienced BSL geo-environmental engineers.

6.2 VOC Hotspot Excavations

In summary, based on the above remediation and validation works, the VOC hotspot in Block B is considered to have been suitably removed and the requirements of the Remedial Strategy are considered to have been met with respect to VOC impacted soils.

DRAWINGS

Copyright of this drawing is vested in Jon Matthews Architects and must not be copied or reproduced without written consent. All rights reserved. Any use of this drawing is to be made from the drawings as issued from this drawing.

All dimensions must be taken from the drawings and are responsible for taking and checking all dimensions related to their work. Jon Matthews Architects are to be advised of any variation between drawings and site conditions. All dimensions and levels should be read only from those values stated on the drawings.

CONSTRUCTION - It is considered that the proposed works are within the scope of a competent contractor and as such no special requests have been identified other than relevant key structural Design Team Assessment.

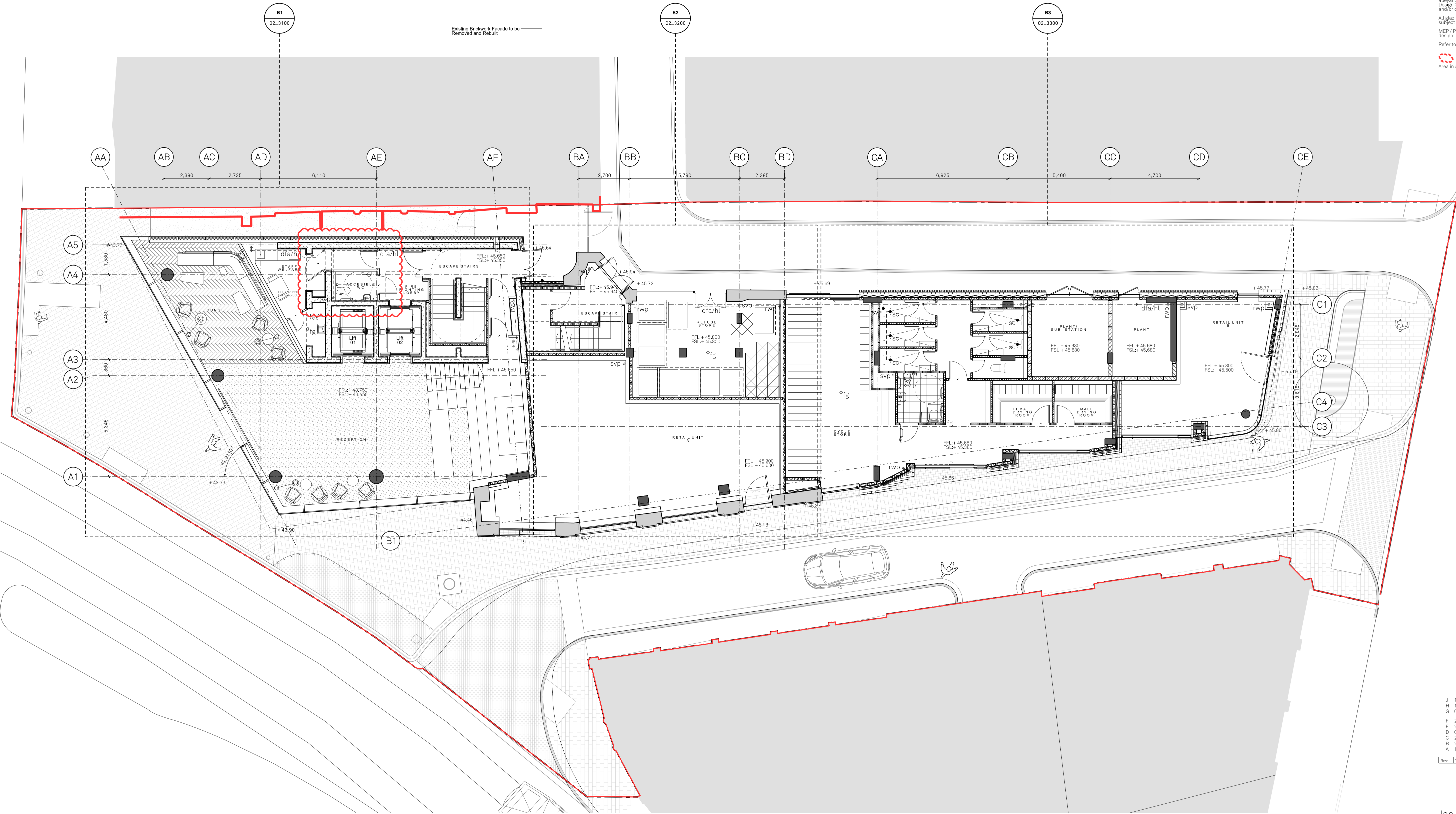
Key Plan:

— Planning Application Boundary
— Legal / Ownership Boundary

General Notes:
To be read in conjunction with all Design Consultant's drawings and reports:
• Structures
• MEP
• Fire Engineering
• Acoustics
• Landscapes

This documentation contains information that is in abeyance and subject to further information from Design Consultants and the client which may affect and/or change the design, specification and areas. All glazing modules to Block A (lower) in abeyance subject to Sub-Contractor design. MEP / Plant is indicative and subject to final MEP design. Refer to 04_3000 series for facade material scoping.

Area in abeyance

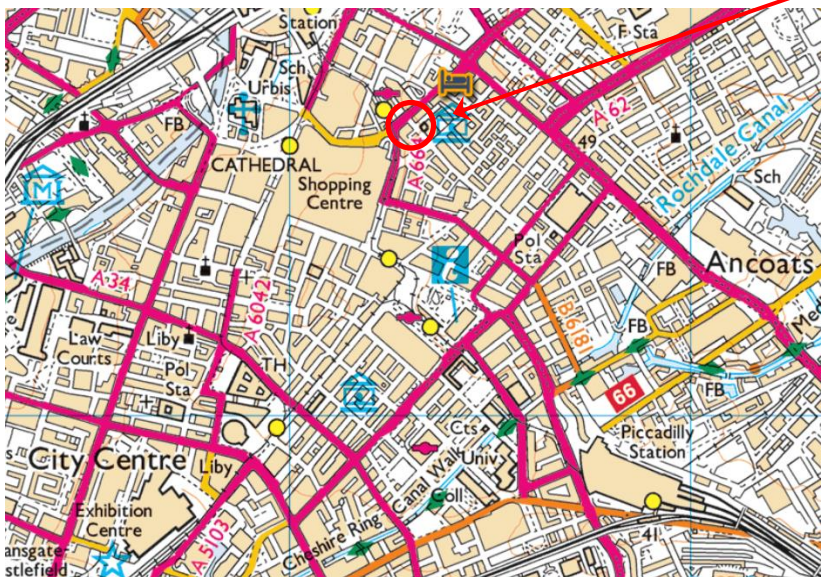


J	18/12/20	Stage 4 Issue
H	16/12/20	Issued for Contract
G	03/12/20	Issued for Stage 4 structural coordination
F	20/11/20	Interim Stage 4 Issue for Coordination
E	23/10/20	Stage 3 - Final Issue
D	04/09/20	Stage 3 Issue - Updated Column Location
C	28/08/20	Stage 3 Issue - Updated Drainage Pattern
B	24/08/20	Stage 3 Issue
A	18/03/20	Issued as part of Planning Application.

Rev.	Date	Details



SITE



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GEO-ENVIRONMENTAL ENGINEERING EXCELLENCE

**DOMIS
CONSTRUCTION LTD**

Back Turner Street, Manchester

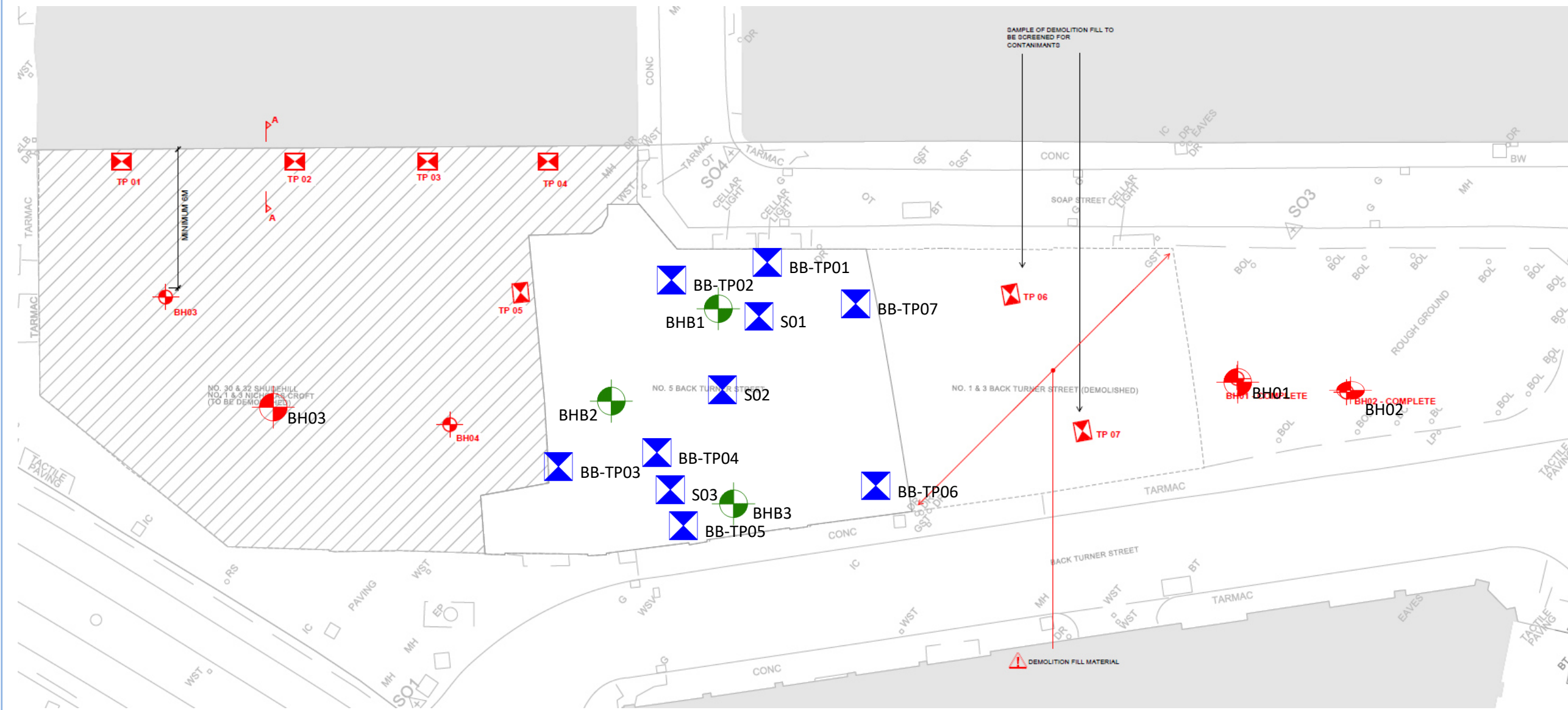
Site Location Plan

Drawing Number C3967/01

Scale: NTS

Drawn By: BM

Checked By: JMJ



BHXX ROTARY BOREHOLE

 HPXX HAND EXCAVATED TRIAL PIT

 HAND EXCAVATED TRIAL PIT
BB-TPXX (BLOCK B) – VISIT 1

 SXX HAND EXCAVATED TRIAL PIT
(BLOCK B) – VISIT 2

 WINDOW SAMPLE BOREHOLE

REV	DATE	DESCRIPTION	BY	CKD



CLIENT
DOMIS CONSTRUCTION LTD

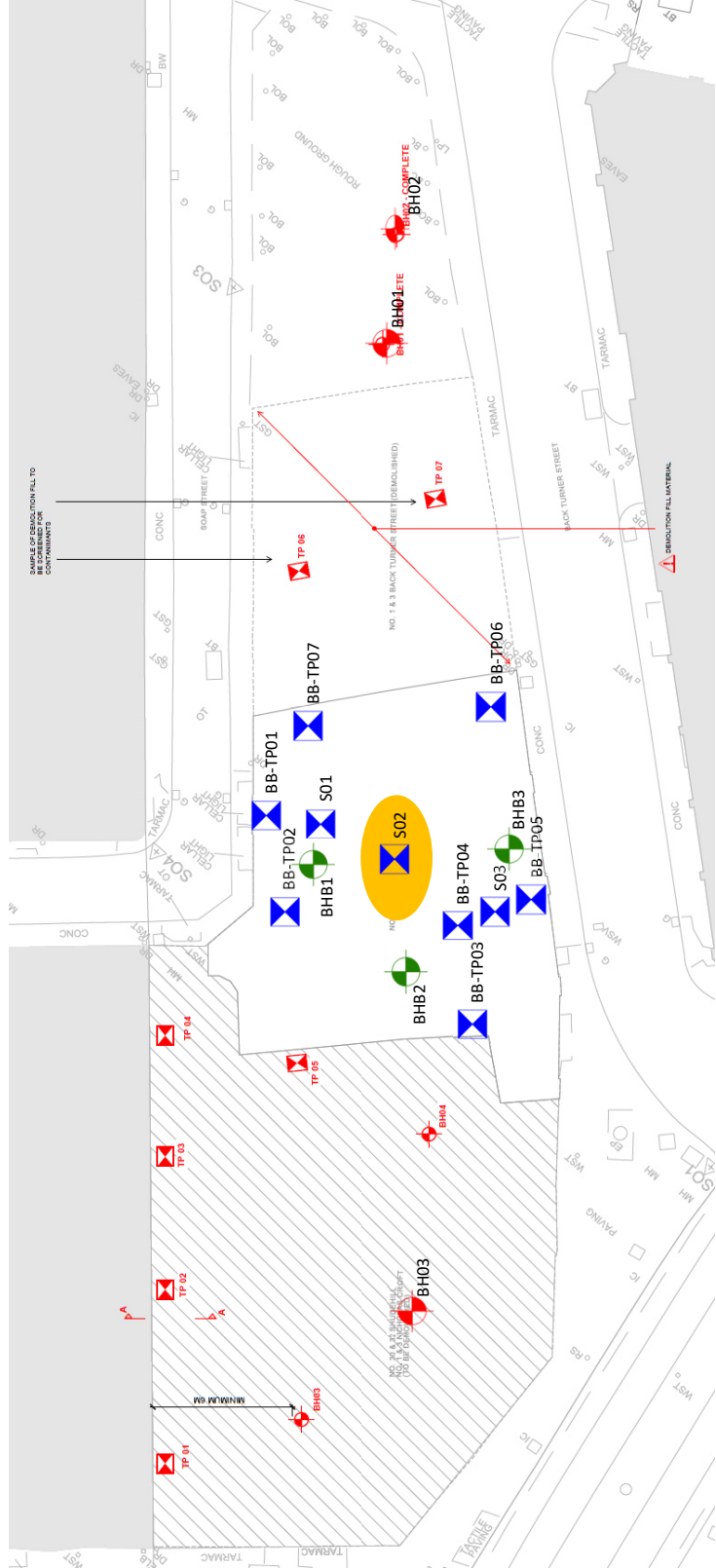
PROJECT TITLE
**BACK TURNER STREET,
MANCHESTER**

DRAWING TITLE

EXPLORATORY HOLE LOCATION

PLAN

DRAWING No. C3967/02	REVISION C	SCALE NTS	DATE 21/10/21
DRAWN BY NS		CHECKED BY AJS	


BHXX ROTARY BOREHOLE

 HPXX HAND EXCAVATED TRIAL PIT

 HAND EXCAVATED TRIAL PIT
BB-TPXX (BLOCK B) – VISIT 1

 SXX



BHBX

WINDOW SAMPLE BOREHOLE

APPROXIMATE LOCATION OF
VOC HOTSPOT

REV	DATE	DESCRIPTION	BY	CKD



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CLIENT

DOMIS CONSTRUCTION LTD

PROJECT TITLE
**BACK TURNER STREET,
MANCHESTER**

DRAWING TITLE

VOC HOTSPOT LOCATION PLAN

DRAWING NO. C3967/03	REVISION -	SCALE NTS	DATE 10/01/22
DRAWN BY MS		CHECKED BY NS	

VOC Hotspot Removal Excavation



REV	DATE	DESCRIPTION	BY	CKD



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CLIENT
DOMIS CONSTRUCTION LTD

PROJECT TITLE
**BACK TURNER STREET,
MANCHESTER**

DRAWING TITLE
VOC HOTSPOT LOCATION PLAN

DRAWING No.	REVISION	SCALE	DATE
C3967/03	-	NTS	10/01/22

DRAWN BY	CHECKED BY
MS	NS

APPENDIX A

Chemical Testing Results

**Matthew Shore**

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Analytical Report Number : 22-35059

Project / Site name:	Back Turner Street, Manchester	Samples received on:	24/01/2022
Your job number:	C3967	Samples instructed on/ Analysis started on:	24/01/2022
Your order number:	C3967-2762-MS	Analysis completed by:	31/01/2022
Report Issue Number:	1	Report issued on:	31/01/2022
Samples Analysed:	5 soil samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 22-35059
Project / Site name: Back Turner Street, Manchester
Your Order No: C3967-2762-MS

Lab Sample Number				2147810	2147811	2147812	2147813	2147814
Sample Reference				S02-A	S02-B	S02-C	S02-D	S02-E
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
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	13	13	13	13	12
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.40	0.40

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Analytical Report Number: 22-35059

Project / Site name: Back Turner Street, Manchester

Your Order No: C3967-2762-MS

Lab Sample Number				2147810	2147811	2147812	2147813	2147814
Sample Reference				S02-A	S02-B	S02-C	S02-D	S02-E
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	57	< 1.0	< 1.0	32	17
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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

Analytical Report Number : 22-35059

Project / Site name: Back Turner Street, 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 *
2147810	S02-A	None Supplied	None Supplied	Brown clay.
2147811	S02-B	None Supplied	None Supplied	Brown clay.
2147812	S02-C	None Supplied	None Supplied	Brown clay.
2147813	S02-D	None Supplied	None Supplied	Brown clay.
2147814	S02-E	None Supplied	None Supplied	Brown clay with gravel.

Analytical Report Number : 22-35059

Project / Site name: Back Turner Street, 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
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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 : 22-35059

Project / Site name: Back Turner Street, 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.

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
S02-A	None Supplied	S	2147810	a	None Supplied	None Supplied	None Supplied
S02-B	None Supplied	S	2147811	a	None Supplied	None Supplied	None Supplied
S02-C	None Supplied	S	2147812	a	None Supplied	None Supplied	None Supplied
S02-D	None Supplied	S	2147813	a	None Supplied	None Supplied	None Supplied
S02-E	None Supplied	S	2147814	a	None Supplied	None Supplied	None Supplied

APPENDIX B

Quality Control Methodology and Material Chemical Criteria

Quality Control Methodology for Imported and Re-used Soils

Prior to Importation and Re-use

Reliable testing results should be provided, or samples should be obtained at the source and tested prior to either importation to the subject site or re-use on site of origin as early as possible.

The frequency and scope of testing will vary depending on the source, the required testing for possible sources is provided below. These rates are based on professional judgement and acceptance of similar criteria used on similar sites to the satisfaction of the local regulatory authority. Results should be compared to the acceptance criteria also with this appendix.

Material Use	Testing Frequency*	Suite of Analysis					
		1	2	3	4	5	6
General Fill**							
Site Won Made Ground	1 per 500m³						
	1 per 1000m³						
Imported or Site Won Natural Arisings on Brownfield Site	1 per 1500m³						
Imported or Site Win Natural Arisings on Greenfield Site	1 per 2000m³						
Other							
Hydrocarbon Hotspot Validation	1 sample per 10m of linear excavation to sidewall and 50m² base.						

Notes

1 – BSL Default Suite - *Arsenic, Cadmium, Chromium (total and hex), Copper, Nickel, Mercury, Lead, Zinc, Selenium, speciated polycyclic hydrocarbons (PAH 16), total phenol, free cyanide, water soluble sulphate (2:1 Extract), soil organic matter, and pH.*

2 – Asbestos ID (and Quantification if detected).

3 – TPH Analysis - *Speciated Total Petroleum Hydrocarbons (TPH CWG) including BTEX and MTBE.*

4 – VOC Analysis - *Volatile Organic compounds (VOCs) by GC-MS (ex TIC).*

5 – SVOC Analysis - *Semi-Volatile Organic compounds (SVOCs) by GC-MS (ex TIC).*

6 – Visual Inspection & on-site screening for VOC using calibrated PID.

* - Minimum of 3 samples per source.

** To be used at depths >600m bgl or below building/hardstanding.

The testing should be undertaken at a UKAS accredited laboratory and be MCERTS accredited and all results should be below existing residential guideline values which are presented in Appendix A.

Site Won Crushed Hardcore/Concrete (for use below building/hardstanding only)

In addition to the above sampling frequencies and testing; for re-use of hardcore/concrete (Grade 6) on the site of origin, BSL proposes the following inspection criteria:

- No visual contamination (oil staining etc).
- Limited deleterious material (organics, wood, etc).
- Limited metal.
- No visible asbestos containing material (ACM).

-
- Quantifiable Asbestos at or <0.001 w/w%.
-

Production of Grade 6 materials should be done under WRAP quality protocols or similar. Inspections and sampling would need to be carried out by a qualified geo-environmental engineer. For geotechnical performance, reference should be made to Series 600 Earthworks Guidance.

If the above criteria for asbestos is exceeded, then further consideration and assessment will be required. Works would need to be undertaken in compliance with the Control of Asbestos Regulations (CAR) 2012 and an Asbestos Plan of Works may be required.

Post Importation

The imported soils should be inspected on site to confirm it is the same material inspected at source and it is suitable for use. Once imported to site, tests should also be undertaken to confirm the batch is suitable prior to use and has not been contaminated in transit.

A management plan should be in place on site for storage and transportation. The material should be stockpiled separately and well segregated on site to prevent cross contamination in accordance with good site practice.

Accurate records of movement of soils should be kept in order to be incorporated in the final verification report.

Approval should be obtained from the Local Authority prior to use on site.

Validation and Verification Report

Site

A final verification report should be issued to the Local Authority/Warranty Provider (e.g. NHBC) detailing records of the re-use and importation of soils, alongside their use on the site.

Human Health Remediation Targets			Import criteria - Based on human health without homegrown produce (1% SOM)
Source	Contaminant	Unit	
LQM S4UL	Arsenic	mg/kg	40
LQM S4UL	Cadmium	mg/kg	85
LQM S4UL	Chromium (III)	mg/kg	910
LQM S4UL	Chromium (VI)	mg/kg	6
LQM S4UL	Copper	mg/kg	7100
C4SL	Lead	mg/kg	330
LQM S4UL	Mercury, Elemental	mg/kg	1.2
LQM S4UL	Nickel	mg/kg	180
LQM S4UL	Selenium	mg/kg	430
LQM S4UL	Zinc	mg/kg	40000
LQM S4UL	Phenol (total)	mg/kg	750
LQM S4UL	Acenaphthene	mg/kg	3000
LQM S4UL	Acenaphthylene	mg/kg	2900
LQM S4UL	Anthracene	mg/kg	31000
LQM S4UL	Benz(a)anthracene	mg/kg	11
LQM S4UL / DEFRA C4SL	Benzo(a)pyrene	mg/kg	3.2
LQM S4UL	Benzo(b)fluoranthene	mg/kg	3.9
LQM S4UL	Benzo(ghi)perylene	mg/kg	360
LQM S4UL	Benzo(k)fluoranthene	mg/kg	110
LQM S4UL	Chrysene	mg/kg	30
LQM S4UL	Dibenz(a,h)anthracene	mg/kg	0.31
LQM S4UL	Fluoranthene	mg/kg	1500
LQM S4UL	Fluorene	mg/kg	2800
LQM S4UL	Indeno(1,2,3,cd)pyrene	mg/kg	45
LQM S4UL	Naphthalene	mg/kg	2.3
LQM S4UL	Phenanthrene	mg/kg	1300
LQM S4UL	Pyrene	mg/kg	3700
LQM S4UL	TPH Aliphatic EC 5 - 6*	mg/kg	42
LQM S4UL	TPH Aliphatic EC 6 - 8*	mg/kg	100
LQM S4UL	TPH Aliphatic EC 8 - 10*	mg/kg	27
LQM S4UL	TPH Aliphatic EC 10 - 12*	mg/kg	130
LQM S4UL	TPH Aliphatic EC 12 - 16*	mg/kg	1100
LQM S4UL	TPH Aliphatic EC 16 - 35*	mg/kg	65000
LQM S4UL	TPH Aliphatic EC 35 - 44*	mg/kg	65000
LQM S4UL	TPH Aromatic EC 5 - 7*	mg/kg	370
LQM S4UL	TPH Aromatic EC 7 - 8*	mg/kg	860
LQM S4UL	TPH Aromatic EC 8 - 10*	mg/kg	47
LQM S4UL	TPH Aromatic EC 10 - 12*	mg/kg	250
LQM S4UL	TPH Aromatic EC 12 - 16*	mg/kg	1800
LQM S4UL	TPH Aromatic EC 16 - 21*	mg/kg	1900
LQM S4UL	TPH Aromatic EC 21 - 35*	mg/kg	1900
LQM S4UL	TPH Aromatic EC 35 - 44*	mg/kg	1900
LQM S4UL	Benzene	mg/kg	0.38
LQM S4UL	Toluene	mg/kg	880
LQM S4UL	Ethyl Benzene	mg/kg	83
LQM S4UL	Xylene - o	mg/kg	88
LQM S4UL	Xylene - m	mg/kg	82
LQM S4UL	Xylene - p	mg/kg	79
CL:AIRE 2010	MTBE (methyl tert-butyl ether)	mg/kg	49
Professional Judgement	p-Isopropyltoluene	mg/kg	0.25
NA	Asbestos (No visual ACM)	% w/w	<0.001%
pH	BS3882	pH Units	NA

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See LQM/CIEH S4ULs Human Health Risk Assessment document for notes regarding derivation.

Criteria for PAH and TPH assumes an SOM of 1%.

*Soil matrix should contain no free product.

All imported material to have chemical concentrations less than the above levels for the site, with the exception of pH which is a range.

Test results to be provided to the engineer prior to placing soils, where appropriate.

All tests result to be undertaken by a UKAS Laboratory holding accreditation for the relevant tests.

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 if 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.

Alternatives include the EA U1 exemption (soils and stones <1000 tonnes and aggregates <5000 tonnes) and the Waste Framework Directive, which applies to naturally occurring soils used on site of origin only. Aggregates can also fall under the EA WRAP Quality Protocols.

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	
	Below inert WAC limit values:	Above inert WAC limit values:	Below hazardous WAC limit values	Above hazardous WAC limit values
WAC testing				
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).

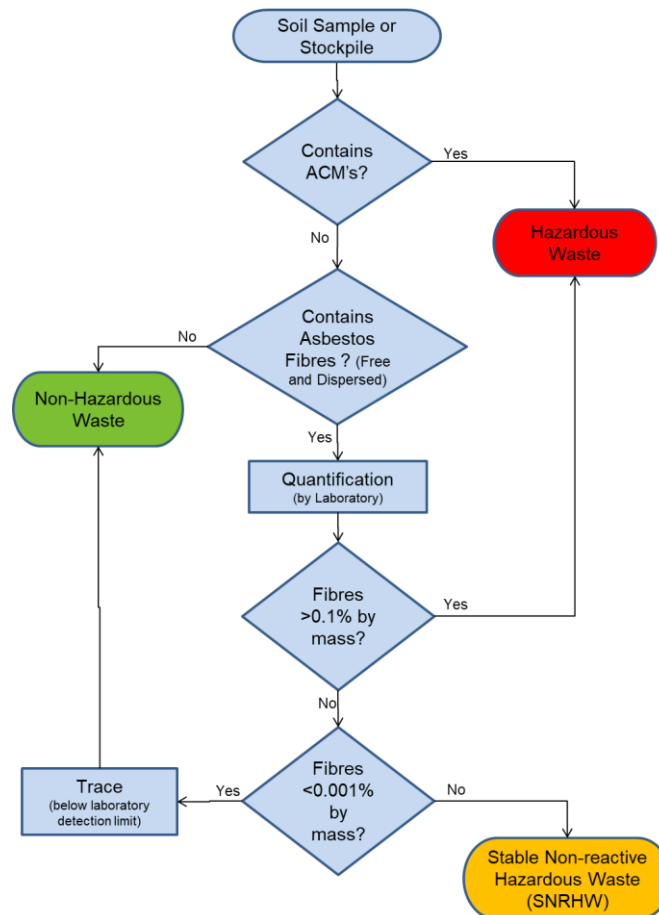
Additional Asbestos Guidance Notes

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 site¹. 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/m³.
- 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 (eg 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. These are at a "Beta" test stage and further publications will be provided in due course.

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.

APPENDIX C

Photographic Volume- Excavation

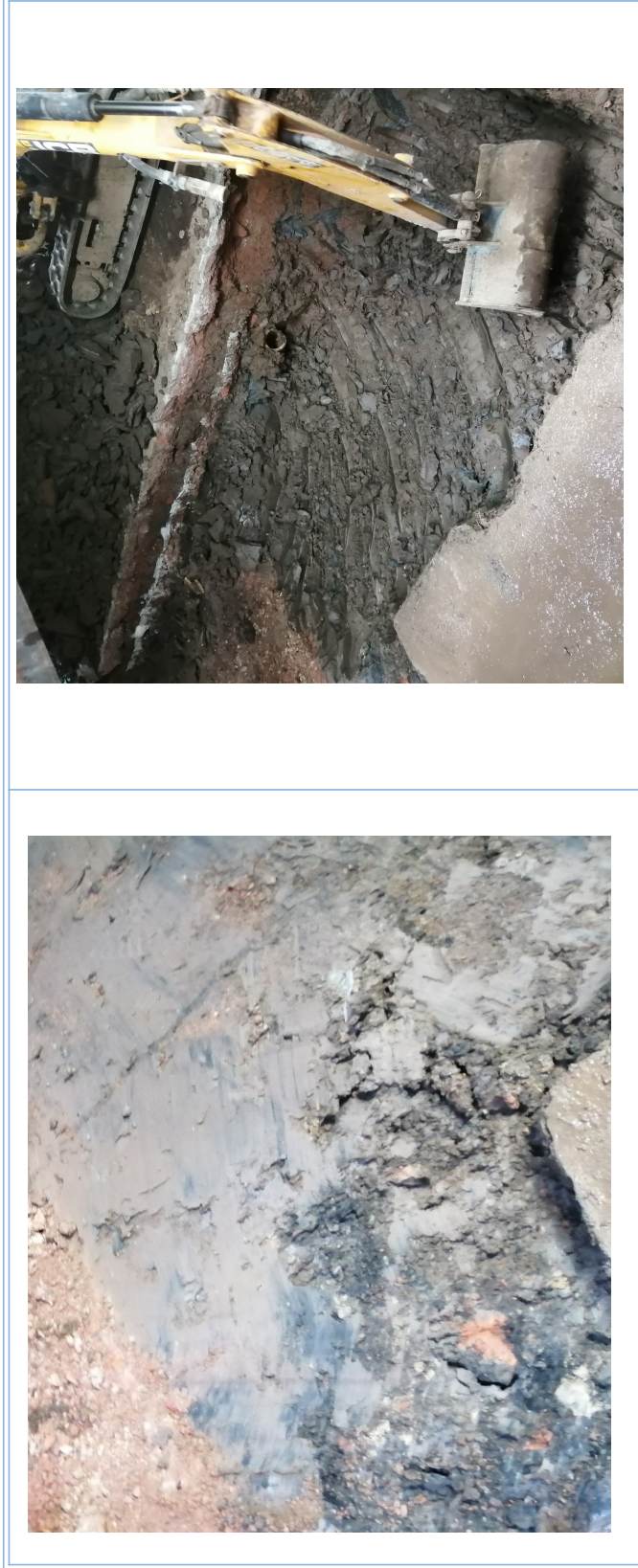


PHOTO 1



PHOTO 3



PHOTO 4

PHOTO 2

Photo Descriptions			
PHOTO NO.	DETAILS		
1	Black Staining around S02		
2	Digging out VOC impacted soils		
3	Stockpile of VOC impacted soils to be taken off site		
4	Extent of excavation		
REV	DATE	DESCRIPTION	BY
			CKD
 BROWNFIELD SOLUTIONS LTD ECO-ENVIRONMENTAL ENGINEERING EXCELLENCE			
CLIENT DOMIS CONSTRUCTION LTD			
PROJECT TITLE BACK TURNER STREET, MANCHESTER			
TITLE VOC HOTSPOT REMOVAL PHOTOBOARD			
Associated Document Ref No.		PAGE	
MS/C3967/10941		1 of 3	
COMPILED BY	MS	CHECKED BY	NS



PHOTO 5



PHOTO 7



PHOTO 6



PHOTO 8

Photo Descriptions			
PHOTO NO.		DETAILS	
5		PID Result – S02-A	
6		PID Result – S02-B	
7		PID Result – S02-C	
8		PID Result – S02-D	
REV	DATE	DESCRIPTION	BY
			CKD
 BROWNFIELD SOLUTIONS LTD ECO-ENVIRONMENTAL ENGINEERING EXCELLENCE			
CLIENT DOMIS CONSTRUCTION LTD			
PROJECT TITLE BACK TURNER STREET, MANCHESTER			
TITLE VOC HOTSPOT REMOVAL PHOTOBOARD			
Associated Document Ref No.		PAGE	
MS/C3967/10941		2 of 3	
COMPILED BY	MS	CHECKED BY	NS



PHOTO 9

Photo Descriptions

PHOTO NO.	DETAILS
9	PID Result – S02-A

REV	DATE	DESCRIPTION	BY	CKD



**BROWNFIELD
SOLUTIONS LTD**
GEOTECHNICAL ENGINEERING EXCELLENCE

CLIENT
DOMIS CONSTRUCTION LTD

PROJECT TITLE
BACK TURNER STREET,
MANCHESTER

TITLE
VOC HOTSPOT REMOVAL
PHOTOBOARD

Associated Document Ref No. | PAGE
MS/C3967/10941 | 3 of 3

COMPLIED BY
MS

CHECKED BY
NS

APPENDIX D

PID Calibration Certificates



ESS SafeForce

Dedicated to your Safety

Certificate of Conformity

certify that the equipment detailed has been inspected and Otherwise stated conforms in all respects to the manufactures' original Specifications or company works instructions.

BROWNFIELD

Certificate No: 21001803

ENCE PHOCHECK TIGER PID

Serial No: T-108655

CATION OF

CERTIFICATION OF

RATION

CONFORMITY

MENT DETAILED

THE INSTRUMENT DETAILED ABOVE

BEEN CALIBRATED

HAS BEEN TESTED & CALIBRATED

T PRINCIPLES IN

AGAINST THE MANUFACTURERS

CE WITH ISO 10012: 2003

SPECIFICATION USING EQUIPMENT

LLIMATOR MWS2 MV1061

TRACEABLE TO THE MANUFACTURERS

D TO NATIONAL AND

STANDARDS AND IN ACCORDANCE WITH

NAL STANDARDS BY

ISO 10012: 2003

REDITED LABORATORY

ON NO. 0026

19/01/2021

Expiry Date: 19/07/2021

FOR AND ON BEHALF OF ESS SAFEFORCE

ESS SAFEFORCE IS CERTIFIED TO ISO 9001 : 2015

Certificate of Calibration

Calibration Gas	Cylinder Reference	Concentration	Alarm Levels
ISOBUTYLENE	955-312824	100 PPM	High: 100 PPM Low: 50 PPM

19 JAN 2021

19 JUL 2021

APPENDIX E

Waste Transfer Notes



Premier Waste Services (UK) Ltd.

Pride House, Sheffield Road, Newton, Hyde, SK14 2JP
Tel: 0161 351 0022 | Email: traffic@premierwasteuk.co.uk
Company Reg No: 04014556. | VAT No: 757 945 376.

Proof of Delivery/Exchange/Collection

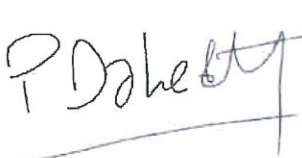
Customer / Site Address: Mayo Civil Engineering 5 Back Turner Street Manchester M4 1FR		Account Name: MAYO Job Number: 26918 Order Number: 0000006700 Job Date: 20/01/2022 Customer ID: Mayo Civil Engineering SIC Code: 41201	
ITEM CODE	DESCRIPTION	ACTION	QTY
8 Yard Crane Tested Skip	8 Yard TD Mixed C & D - E.W.C 17 09 04	Exchange	1
Terms of Service	No Fires - Level load only - No Asbestos. Skips containing more than 50% landfill material will be subject to surcharge.		

Instructions:

Disposal Site - EAWML Code: 50222

Signed by Paul Doherty Tony Claffey

Weight: 2,660



I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011

Carrier Reg No: CBDU72343

Waste Permit No: EAWML/50222

North West

**William Smith House
173 – 183 Witton Street
Northwich
Cheshire
CW9 5LP**

Tel: 01606 334 844

Midlands

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www.brownfield-solutions.com

