Expanded

REMEDIATION STRATEGY
VALIDATION REPORT

PROJECT

The Factory
Water Street
Manchester
M3 4JQ

1	18/05/23	S. Siddorn	D. Ryan		Completion of works
0	05/11/18	S. Siddorn	D. Ryan		Original Issue
y	Date	Originator	Reviewed by	Approved by	Description
ntrolled Copy	1				

Contents

1. Purpose and Overview 3

2. Validation Sampling and Laboratory Process 3

3. Methodology – Enabling Works 4

4. Methodology – Main Works 5

4.1. Methodology – Main Works, Lift Pit Suspected Contamination 6

5. Control of contaminated groundwater 7

6. Compliance with the remediation strategy and earthworks specification 8

APPENDIX A – Ground Investigation 9

APPENDIX B – Remediation Strategy/Specification 9

APPENDIX C – Phasing Plans 9

APPENDIX D – Encountered Hotspots 9

APPENDIX E – Imported Aggregate 9

APPENDIX F – Imported Top Soil 10

APPENDIX G - Muckaway Tracker 10

APPENDIX H - Additonal Tesintg Reports 10

1. Purpose and Overview

The following information provides details of the identification and testing of chemical ground conditions at The Factory, Water Street. It also provides information on the earthworks methodology used to mitigate any outstanding risks and the lines of evidence required to establish that any potential contamination has been dealt with correctly.

Expanded Ltd. Is a works contractor undertaking an enabling scope and a concrete substructure works under a management contract administered by Laing O'Rourke (LOR). The Client for the Factory project is Manchester City Council (MCC).

As part of the preconstruction period a desk study, ground investigation and additional chemical testing has been carried out to examine geo-environmental and geotechnical risks associated with the site. Details of the investigation works carried out are principally provided in the following documents and are supplemented by additional testing as listed in Appendix A.

- ESG Report entitled 'The Factory Factual Report on Ground Investigation' dated October 2016. Report No. A6053-16
- ESG Report entitled 'The Factory Site, Manchester. Factual Report on Additional Ground Investigations' dated May 2017. Report No. A60131-16.

Following the desk study and intrusive ground investigation, a remediation strategy (included in Appendix B) was compiled, submitted, and agreed with MCC.

The following document summarises the activities and supporting information available in respect of verifying the remediation strategy was implemented throughout construction works.

2. Validation Sampling and Laboratory Process

All validation sampling works were undertaken by a suitably qualified Engineer/Scientist appointed by LOR. Soil samples should be collected using a shovel, spade, trowel, rock pick or coring device. The sample collection device should be made of a material that is compatible with the material to be sampled and the purpose of the testing in order to avoid cross-contamination of the sample during collection (i.e. stainless steel or PTFE-coated tools).

Sample containers were compatible with the material sampled and the planned analyses to avoid cross-contamination or loss of contaminants after collection.

Samples were clearly labelled in accordance with BS5930 and measures taken to ensure that all sampling equipment is decontaminated at the start and end of the investigation and between sample locations. Where it was necessary to obtain samples directly from the excavator bucket, all traces of existing material were removed from the bucket by high pressure hosing prior to excavation of material for sampling.

All laboratory testing was undertaken by facilities holding MCERTS and UKAS accreditation for all soil tests.

3. Methodology – Enabling Works

This section details the ground works undertaken to mitigate the risks identified in the initial ESG report dated October 2016. The reports (Appendix A) identifies four areas which need to be addressed in the enabling works methodology:

- MTP03
- WS09
- MTP05
- HTP01

The ground surrounding the above trial holes was identified and demarcated on site at the start of the enabling works. The materials in these areas were excavated to a depth consummate to the depth of the samples in the first instance and secondly ensuring that the following minimum depths were achieved:

- Below Concrete Ground Floor Slabs: 600mm below underside of slab

- Below External or hard landscaped areas: 1200mm below design ground level

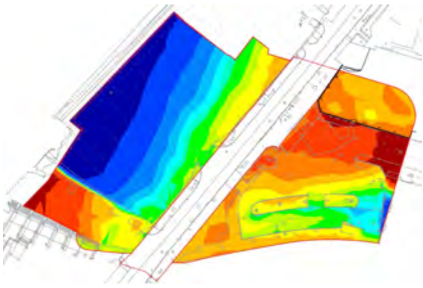
The materials arising from these excavations was re-used on site as a compliant general backfill as shown in the excavation and fill plan in Appendix B. The areas where the material was placed is entirely below a ground floor slab in the final design and depths to the top of this material comply with the 600mm limit as detailed above.

- Appendix C: Enabling and Main Works Earthworks Phasing and material movements

These remediation enabling works were undertaken between October – December 2018 and had been completed prior to the commencement of the main works and any disposal of other material offsite to ensure that all of the material identified within the ESG report remained on site.

4. Methodology – Main Works

The main works did not comprise any significant bulk earthworks activities and can be summarised as follows:



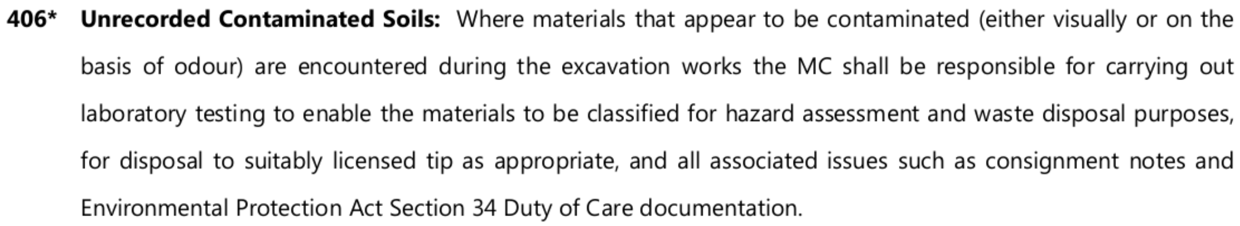
- Cut and fill to the site following enabling works to establish piling platform levels resulting in net cut and disposal offsite of 500m3. November – December 2018
- Pile arisings removed from site as works progressed, refer to appendices for test results. January 2019 – March 2019
- Pile caps excavated and spoil used to backfill adjacent excavations. January 2019 – March 2019.
- Drainage and service trench arisings. January 2019 – August 2020 & September 2022 - March 2023
- Quarried Type 1 imported to public realm locations
- Quarried Type 1 imported to ground floor slab subbase
- Topsoil imported to soft landscaping areas

The material movement plans shown in the appendices indicate the locations of each of the above steps.

- Appendix C Enabling and Main Works Earthworks Phasing and material movements

4.1. Methodology – Main Works, Lift Pit Suspected Contamination

Throughout the undertaking of the main works only one instance of suspected contamination was identified in line with the below clause from the Buro Happold Earthworks specification.



406* **Unrecorded Contaminated Soils:** Where materials that appear to be contaminated (either visually or on the basis of odour) are encountered during the excavation works the MC shall be responsible for carrying out laboratory testing to enable the materials to be classified for hazard assessment and waste disposal purposes, for disposal to suitably licensed tip as appropriate, and all associated issues such as consignment notes and Environmental Protection Act Section 34 Duty of Care documentation.

In this instance the suspected material was encountered at a depth of approximately 2.5m below existing ground level whilst excavating a lift pit as shown in Appendix D.

- Appendix D: Location of suspected contamination in Lift Pit 2, test results and statement from Buro Happold.

The suspect material was identified through both olfactory and visual means which suggested the presence of hydrocarbons.

A bunded stockpile was established using impermeable visqueen and the extents of the visually contaminated material was removed from the excavation. This resulted in the excavation being extended approximately 600mm deeper and 2.5m wider than originally intended. Soil samples were taken from a cross section of the material retained in the stockpile as well as from the sides and base of the excavation. Works in the area were paused whilst chemical testing was completed.

Testing showed that the samples taken from the suspected contaminated material were below the commercial threshold criteria identified in the remediation strategy and was also within the minimum and maximum limits identified by the GI. The material was therefore considered in line with the findings of the GI and construction activities progressed as planned. A full report of the action taken and test results obtained can be found in the appendices.

- Appendix D: Buro Happold Note, Contaminated ground LF2

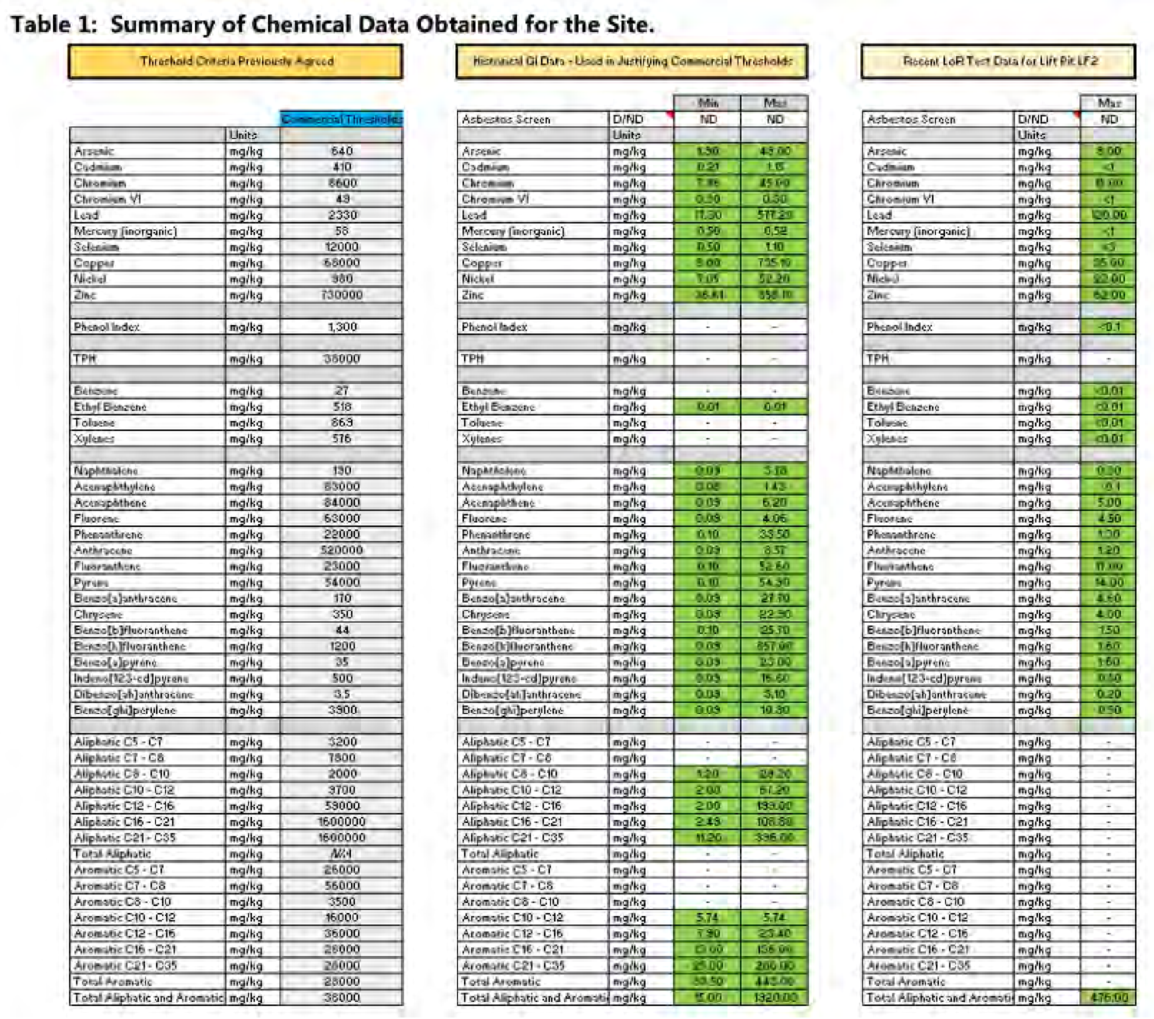


Table 1: Summary of Chemical Data Obtained for the Site.

		Threshold Criteria Previously Agreed	Historical GI Data - Used in Justifying Commercial Thresholds		Recent LoR Test Data for Lift Pit LF2
	Units	Commercial Thresholds	Min	Max	Max
Asbestos Screen	D/ND		ND	ND	ND
Arsenic	mg/kg	640	1.50	45.00	9.00
Cadmium	mg/kg	410	0.21	1.15	<1
Chromium	mg/kg	8600	7.86	45.00	8.00
Chromium VI	mg/kg	43	0.30	0.30	<1
Lead	mg/kg	2330	11.30	517.20	120.00
Mercury (inorganic)	mg/kg	58	0.50	0.52	<1
Selenium	mg/kg	12000	0.50	1.10	<3
Copper	mg/kg	68000	5.00	735.10	35.00
Nickel	mg/kg	980	7.05	52.20	22.00
Zinc	mg/kg	730000	36.61	558.10	62.00
Phenol Index	mg/kg	1,300	-	-	<0.1
TPH	mg/kg	38000	-	-	-
Benzene	mg/kg	27	-	-	<0.01
Ethyl Benzene	mg/kg	518	0.01	0.01	<0.01
Toluene	mg/kg	863	-	-	<0.01
Xylenes	mg/kg	576	-	-	<0.01
Naphthalene	mg/kg	190	0.09	3.10	0.30
Acenaphthylene	mg/kg	83000	0.08	1.43	<0.1
Acenaphthene	mg/kg	84000	0.09	6.20	5.00
Fluorene	mg/kg	63000	0.08	4.06	4.50
Phenanthrene	mg/kg	22000	0.10	33.50	1.00
Anthracene	mg/kg	520000	0.09	8.57	1.20
Fluoranthene	mg/kg	23000	0.10	52.60	11.00
Pyrene	mg/kg	54000	0.10	54.30	14.00
Benzo[a]anthracene	mg/kg	170	0.09	27.70	4.60
Chrysene	mg/kg	350	0.08	22.30	4.00
Benzo[b]fluoranthene	mg/kg	44	0.10	25.30	1.50
Benzo[k]fluoranthene	mg/kg	1200	0.09	857.00	1.60
Benzo[a]pyrene	mg/kg	35	0.09	23.00	1.60
Indeno[123-cd]pyrene	mg/kg	500	0.09	15.60	0.50
Dibenzo[ah]anthracene	mg/kg	3.5	0.09	5.10	0.20
Benzo[ghi]perylene	mg/kg	3900	0.09	10.30	0.50
Aliphatic C5 - C7	mg/kg	3200	-	-	-
Aliphatic C7 - C8	mg/kg	7800	-	-	-
Aliphatic C8 - C10	mg/kg	2000	1.20	28.20	-
Aliphatic C10 - C12	mg/kg	9700	2.00	61.20	-
Aliphatic C12 - C16	mg/kg	59000	2.00	133.00	-
Aliphatic C16 - C21	mg/kg	1600000	2.43	108.80	-
Aliphatic C21 - C35	mg/kg	1600000	11.20	336.00	-
Total Aliphatic	mg/kg	N/A	-	-	-
Aromatic C5 - C7	mg/kg	26000	-	-	-
Aromatic C7 - C8	mg/kg	56000	-	-	-
Aromatic C8 - C10	mg/kg	3500	-	-	-
Aromatic C10 - C12	mg/kg	16000	5.74	5.74	-
Aromatic C12 - C16	mg/kg	36000	7.90	23.40	-
Aromatic C16 - C21	mg/kg	28000	13.00	156.00	-
Aromatic C21 - C35	mg/kg	28000	25.00	260.00	-
Total Aromatic	mg/kg	28000	33.50	443.00	-
Total Aliphatic and Aromatic	mg/kg	38000	15.00	1320.00	476.00

5. Control of contaminated groundwater

As indicated in the factual reports and the remediation strategy contaminated groundwater was not identified prior to commencement on site. During the isolation and testing of the suspected contaminated material in the lift pit (see section 4.1) water treatment and monitoring was established to control and dispose of rainwater within the excavation that may have been contaminated by the suspect material. In this instance testing was undertaken along with the soil samples which showed that the water in the excavation was within the limits advised in the remediation strategy. Following confirmation of the non-hazardous nature of the soils and collected rainwater the water was treated through a Siltbuster system and disposed of into the Foul Sewer network in line with the project dewatering strategy. No further contaminated groundwater was encountered during the works.

6. Compliance with the remediation strategy and earthworks specification

All earthworks have been undertaken in compliance with the Buro Happold remediation strategy and earthworks specification listed below:

- Remediation strategy MF-BHE-XX-XX-RP-CG-0002
- Earthworks specification MF-BHE-XX-XX-SP-CG-00-0001

APPENDIX A – Ground Investigation

- Buro Happold Ground Engineering Desk Study
- ESG Factual Report – The Factory Factual Report on Ground Investigation dated October 2016. Report No. A6053-16.
- ESG Additional Testing – The Factory Site, Manchester. Factual Report on Additional Ground Investigation, dated May 2017. Report No. A60131-16.
- Buro Happold Earthworks specification
- Buro Happold Remediation strategy

APPENDIX B – Remediation Strategy/Specification

- Buro Happold Earthworks & Fill Specification
- Buro Happold Remediation Strategy

APPENDIX C – Phasing Plans

- Enabling works Phasing Plan
- Main Works Phasing Plan

APPENDIX D – Encountered hotspots

- Location plan of suspected contaminated material in LF2
- Original test results from LF2 samples
- Buro Happold technical note on LF2

APPENDIX D – Additional sampling of subsoils

- Sampling locations of additional testing of subsoils for disposal offsite
- Test results for additional testing of subsoils for disposal offsite
- Records of material exported offsite

APPENDIX E – Imported Aggregate

- Test results for imported aggregates
    - Type 1
    - 6F5
- Records of imported aggregates

- Statement on testing if imported material

APPENDIX F – Imported Topsoil

- Test results for imported topsoil
- Records of imported topsoil

APPENDIX G – Muckaway Tracker

- Tracker showing the monthly removals and quantities of muckaway
- Annual Waste Transfer Notes (AWTNs) and sample of waste transfer notes

APPENDIX H – Additional Testing Reports

- Several additional test reports
    - 785341 – N3844 - WacLeachate
    - 798987 – THE_FACTORY-DioxinStandardDigital
    - 807719 0 The Factory - abridgedstandard
    - Classification report 23/04/2020
    - Classification report – Factory pile arisings and excavation
    - Factory A7064-17

Appendix A

Factory, Manchester

Ground Engineering Desk Study Report

034933

6 September 2016

Revision 01

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.

Revision	Description	Issued by	Date	Checked
00	Ground Engineering Desk Study Report	GM	19/07/16	CoH, RF
01	Ground Engineering Desk Study Report	GM	06/09/16	CoH, RF

O:\034933 The Factory, Manchester\F9 Ground Engineering - Site Investigation\03 Reports\Desk Study\160906 GM 034933 Ground Engineering Desk Study Report 01.docx

This report has been prepared for the sole benefit, use and information of Manchester City Council for the purposes set out in the report or instructions commissioning it. The liability of Buro Happold Limited in respect of the information contained in the report will not extend to any third party.

author	**George Mitchell**
Date	**6 September 2016**
approved	**Chris O'Hara and Rob Frost**
Signature	silc SPECIALIST IN LAND CONDITION Rob Frost Reg No. 71596
date	**6 September 2016**

..

Contents

1 Introduction **1**

2 The Site **4**

2.1 Site Location 4

2.2 Site Description 4

2.3 Site Utilities 5

2.4 Site History 5

2.5 Archaeology 5

3 Ground Conditions **8**

3.1 General 8

3.2 Published Geology 8

3.2.1 Drift Geology 8

3.2.2 Solid Geology 8

3.3 Unpublished Geology 9

3.4 Hydrology 11

3.5 Hydrogeology 11

3.5.1 Groundwater Vulnerability 11

3.5.2 Groundwater 12

3.5.3 Mining Activity 12

3.6 Ground Instability and Geo-Hazard 12

3.7 Trees 13

4 Environmental Setting **14**

4.1 General 14

4.2 Potential Contaminative Land Uses 14

4.3 Potential Contaminants of Concern 15

4.4 Landfill Entries 15

4.5 Ground Gas 16

4.6 Radon Affected Areas 17

4.7 Japanese Knotweed **Error! Bookmark not defined.**

4.8 Unexploded Ordnance 17

4.9 Pollution Incidents 17

4.10 Radioactive Substances 18

4.11 Nitrate Vulnerability 18

4.12 Area of Conservation 18

4.13 Contemporary Trade Directory Entries 18

4.14 Fuel Station Entries 18

5 Proposed Development 19

6 Preliminary Conceptual Site Model 20

6.1 Ground Model 20

6.2 Geoenvironmental Risk Assessment – General Approach 20

6.3 Potential Sources of Contaminants 21

6.4 Receptors and Pathways 21

6.5 Risk Assessment 21

7 Ground Investigation 24

7.1 Scope and Objectives 24

7.2 Methodology 24

7.3 Constraints 25

Figures

Appendix A – Proposed Development Details

Appendix B – Information Source Summary

Appendix C – Utilities Information

Appendix D – Historical Maps

Appendix E – Historical Borehole Logs

Appendix F – Indicative Fluvial Floodplain Map

Appendix G – Groundwater Vulnerability Map

Appendix H – Coal Authority Report

Appendix I – Zetica Unexploded Bomb Map

Appendix J – Manchester Bomb Damage Map

Appendix K – PLANIT Explosive Ordnance Threat Assessment

Appendix L – Hazard Checklist

1 Introduction

BuroHappold Engineering Limited has been appointed by Manchester City Council to undertake site investigation works for the proposed development of a new build cultural venue ('Factory') within the St John's Masterplan, Water Street, Manchester, herein referred to as 'the Site'.

The Site is located in Manchester City Centre, approximately 550 m northwest of Deansgate Railway Station and forms part of the St. John's Masterplan area (St. John's comprises the former ITV Quay Street estate in Manchester City Centre). The site was acquired in March 2014 by Manchester Quays Limited (MQL), a joint venture between Allied London and Manchester City Council, and is the subject of long term regeneration proposals that involve both conversion of existing buildings and redevelopment of other plots to create a new neighbourhood of the City. The redevelopment of the site is supported by the St. John's Masterplan and Strategic Regeneration Framework (SRF), which were formally adopted by Manchester City Council's Executive Committee in February 2015. An update to the SRF was presented to Manchester City Council's Executive Committee in July 2016.

The site boundaries can be broadly defined as the River Irwell and surface car parking (currently in use for construction of the Ordsall Chord) to the west, Grape Street and the Bonded Warehouse to the east, the Museum of Science and Industry (MSI) complex, including the 1830 Warehouse (Grade I Listed) to the south and Water Street and surface car parking to the north. The area around the Site is defined by a mix of leisure, commercial and residential uses including Spinningfields to the north, the Great Northern Warehouse and Deansgate to the east and MSI to the south. It is also situated 750m from the Deansgate / Castlefield Metrolink stop and a range of bus and Metroshuttle services.

The proposals relate to an area located within the south western part of the St. John's Masterplan which is currently occupied by surface car parking (the western extent is currently occupied by Network Rail/Skanska as a construction site compound), the Starlight Theatre (overlying railway arches) and a number of structures and buildings associated with the formerly use by ITV for filming and events (including the 5 storey 19th century Bonded Warehouse), Water Street (running centrally through the Site (oriented SW-NE)) and the Grade II Listed Colonnaded Railway Viaduct (in part), which was also in use by ITV for filming and storage. For the purposes of this report the two sets of adjacent railway arches present on site are referred to as the 'St Johns arches' (northern) and the 'Museum of Science and Industry (MoSI) arches' (southern). A site location plan is included as Figure 1 and an aerial photograph is included as Figure 2.

The current development proposal for the Site consists of a new build cultural venue. The proposed building will overlie the existing car park in front of the St Johns railway arches, and will also sit directly on the St Johns arches. The Starlight Theatre building currently overlying the arches will be demolished. The building will also span across Water Street, where vehicular access is to be maintained, landing in the car park to the west of Water Street. The proposed development (circa 13,000 sq. m.) comprises two flexible auditorium spaces to be used for theatre, music, dance, art and other performance-related events and potentially conferences and associated facilities, including retail and restaurant use, office, administrative and back of house function, training and educational facilities, servicing and access arrangements, circulation and external landscaped areas.

An architect's impression of the proposed development and associated layout is included as Appendix A.

This desk study has been undertaken to allow an appropriate ground investigation to be designed and to optimize, as far as possible, the positioning of the exploratory holes. The purpose of this report is to collate and summarize the information for the Site and immediate surrounding area, including:

- The general physical constraints of the Site such as topography, landscape and existing structures;
- An assessment of the generalized past and present usage of the Site;
- An assessment of the anticipated ground conditions in respect of geology, hydrology, hydrogeology, mining activity and geohazards, if any;
- An assessment of the environmental setting of the Site, including the possibility of encountering ground gas as well as potentially contaminating substances; and
- A summary of current development proposals.

The principal source of information relied upon is an Envirocheck® Report[1], which provides a database of information within a 1 km radius of the site as supplied by different statutory authorities and other relevant bodies.

A summary of all the information sources used in this report is included as Appendix B and a Site Constraints Plan is included as Figure 3. Other references include:

- The British Geological Survey (BGS);
- Manchester Central Library Archive;
- Published technical reports;
- RoC Consulting Report, 'Phase 1 Desktop Study on St Johns' Core Development Sites, Manchester for Manchester Quays Limited'. Dated July 2015.
- Stephen Levrant Heritage Architecture Limited Report, 'Heritage Appraisal: St John's Quarter, Manchester'. Dated May 2014;
- Stephen Levrant Heritage Architecture Limited Report, 'Heritage Statement: Significance and Impact. Factory, St John's, Manchester'. Dated August 2016;
- Salford Archaeology report, 'Archaeological Desk-Based Assessment and Watching Brief: The Factory, Water Street, Manchester. Dated September 2016.
- ERAP Limited report, 'Ecological Survey and assessment (Including a Licensed Bat Survey) – The Factory, Manchester. Dated July 2016.
- Coal Authority Report, 'Non-Residential Coal Authority Mining Report 51001098500001'. Dated February 2016.
- PLANIT UXB Report, 'Explosive Ordnance (UO) Threat Assessment (EOTA), Manchester City Centre'(Ref: 0123 EOTA MCC Factory 170216). Dated 17 February 2016;
- Documents found during internet searches; and
- Any information provided by the Client i.e. previous desk study or ground investigation / utilities information.

---

[1] Envirocheck Report Order Number 79633581_1_1 (10 February 2016) 121 Water Street, Manchester. Landmark Information Group Service.

A site specific geotechnical and geoenvironmental ground investigation has been scoped and is contained within Section 7 of this report. The proposed ground investigation will provide information on the ground conditions, degree of ground contamination (if any), geometry and load capacity of existing foundations (St Johns arches, Bonded Warehouse), the structural integrity and profile of the arches and groundwater and ground gas regimes for the site area. Based on the currently available data a preliminary assessment of the likely ground conditions has been undertaken in order to assess potential foundation solutions and to identify key issues likely to affect the groundworks associated with the current development proposal.

It should be noted that the preliminary assessment is based on some information in respect of works undertaken in the general vicinity of the Site as opposed to the specific site area. Such information has been taken to be representative of the ground conditions underlying the footprint of the Site supported by the site specific data thus some of the assumptions made may need to be reviewed after the site specific ground investigation has been undertaken.

In addition it should be noted that groundwater conditions summarized are those observed as part of previous ground investigations and take no account of fluctuations due to seasonal, local drainage, the River Irwell or any other localized effects.

2 The Site

2.1 Site Location

The Site is located in Manchester City Centre, approximately 550 m northwest of Deansgate Railway Station and forms part of the St. John's Masterplan area. The Ordnance Survey (OS) National Grid Reference (NGR) for the centre of the site is ^{3}83005 E, ^{3}97965 N. The site location is shown in Figure 1.

2.2 Site Description

The proposed development site is roughly L-shaped and measures approximately 55 m to 110 m in length (E-W) and 35 m to 80 m in width (N-S). The total area for Factory Site is approximately 0.73 hectares (7,300 m^{2}), which sits within the wider development masterplan (REF Roc).

The proposals relate to an area located within the south western part of the St. John's Masterplan which is currently occupied by surface car parking (the western extent is currently occupied by Network Rail/Skanska as a construction site compound), the Starlight Theatre (overlying railway arches) and a number of structures and buildings associated with the formerly use by ITV for filming and events (including the 5 storey 19th century Bonded Warehouse), Water Street (running centrally through the Site (oriented SW-NE)) and the Grade II Listed Colonnaded Railway Viaduct (in part), which was also in use by ITV for filming and storage. For the purposes of this report the two sets of adjacent railway arches present on site are referred to as the 'St Johns arches' (northern) and the 'Museum of Science and Industry (MoSI) arches' (southern). Access to the Site is currently via entrances on Quay Street to the north, Water Street to the west and Atherton Street to the east. The area around the Site is defined by a mix of leisure, commercial and residential uses including Spinningfields to the north, the Great Northern Warehouse and Deansgate to the east and MSI to the south. It is also situated 750m from the Deansgate / Castlefield Metrolink stop and a range of bus and Metroshuttle services.

The existing site layout is presented in Figure 2 and the site boundaries can be described as follows:

- To the north - The wider St Johns masterplan development.
- To the south/southeast - The Museum of Science and Industry.
- To the west/northwest - Princes Bridge and car parking with the River Irwell beyond.
- To the east - The Bonded Warehouse (5 storey 19th century warehouse) with the wider St Johns masterplan development beyond.

The Site consists of two levels: an upper level on top of the St Johns arches, and a lower level comprising the remainder of the site. The topographical survey by Survey Operations Ltd (Ref: 16A267/002) indicates that the Site is predominantly flat with a gentle slope in a north-easterly direction from approximately 26.50 m AOD along the eastern edge of Water Street in the centre of the site to approximately 27.00 m AOD in the north-eastern corner of the Site. There is currently a ~0.50 m difference in height across the proposed development site. The upper floor level (top of St Johns arches) was surveyed and is roughly flat at approximately 32.50 m AOD.

2.3 Site Utilities

A GPR utilities survey was undertaken by L&M Survey Services in order to obtain information on the expected position and extent of buried and overground cables, pipes, wires etc., which may present constraints on future site development works. The drawing produced by L&M Survey Services (Ref: 11543 Draft) is included as Appendix C. Please note, access into the Skanska compound to the west of Water Street was not possible, so this area was not surveyed.

Please note, several services including comms cables, a gas pipe, electricity cables and surface water drainage are shown to run beneath the northern/central portion of the Site, and numerous services run along Water Street in the western portion of the Site (running southwest to northeast) (Appendix C refers).

Guidance issued by the individual service providers should be followed at all times when excavating in the vicinity of buried services. Where appropriate, the service providers should be consulted to mark their equipment in the vicinity of any proposed excavation works.

2.4 Site History

Historical Ordnance Survey (OS) maps covering the Site have been studied to detail the historical development of the Site and the immediate surrounding area (~100 m radius of the site). Extracts of historical maps as provided in the Envirocheck Report[1] are included in Appendix D. Key features are identified in Tables 1 and 2 in chronological order.

2.5 Archaeology

Manchester is an area of archaeological interest with developments taking place within the city from the Roman period, but the major interest is in industrial archaeology. The potential archaeological remains that exist on or adjacent to the Site may include the remains of various warehouses, wharfs and stores. A scheme specific archaeological Desk Based Assessment (DBA) has been completed by Salford Archaeology[2] (SA) and should be read in conjunction with this report. Given the finding within the SA report, further scheme specific archaeological investigation may be required for this Site. Any such investigation is beyond the scope of this report.

A site wide Heritage Appraisal[3] and scheme specific Heritage Appraisal[4] were undertaken by Stephen Levrant Heritage Architecture Limited. The reports identify a number of Grade II Listed structures within the confines of the Site including the St Johns arches, the 1830 Warehouse (Grade I Listed), as well as the former Liverpool Road Station Master's House (Grade I Listed) and the Railway Bridge over the River Irwell (Grade I Listed) to the south, the MSI Warehouse to the east (Grade II Listed).. The aforementioned structures will need to be considered in the development proposals.

---

[2] Salford Archaeology Report, Archaeological Desk-Based Assessment and Watching Brief: The Factory, Water Street, Manchester. Dated September 2016.

[3] Stephen Levrant Heritage Architecture Limited Report, 'Heritage Appraisal: St John's Quarter, Manchester'. Dated May 2014.

[4] Stephen Levrant Heritage Architecture Limited Report, Heritage Statement: Significance and Impact. Factory, St John's, Manchester'. Dated August 2016;

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.

Table 1: Site History

Historical Map	**Key features recorded**
1851 (OS 1:1,056)	'Charles Street' (oriented E-W) crosses the northern portion of the site; 'Water Street' (oriented SW-NE) crosses the eastern portion of the site. A 'Cotton Stores' is recorded in the south-eastern corner of the Site; 'Slate Wharf' is recorded along the northern edge of the Site immediately north of Charles Street, extending offsite to the north and east; a 'Warehouse' with adjacent unnamed buildings and a yard area is recorded along the western boundary of the Site, extending offsite to the west ; unnamed buildings are recorded on the southern boundary immediately east of Water Street. The remainder of the site appears undeveloped.
1891 (OS 1:500)	A railway viaduct with 2 sets of tracks is shown to cross the southern portion of the Site, replacing the 'Cotton Stores' and unnamed buildings previously present; 3 No. additional buildings are recorded to the immediate east of Water Street including a 'Chimney'; an additional building is recorded in the northern portion of the Site directly south of Charles Street; 'Slate Wharf' has now been replaced by a 'Timber Yard'; a 'Goods Shed' is shown immediately to the east of the Site with a small 'Store' present onsite immediately south of Charles Street; 'Princes Bridge' is recorded in the southwestern corner of the Site, extending to the west across the River Irwell.
1908 (OS 1:2,500)	An additional building is recorded to the immediate east of Water Street in the central portion of the Site; 'Charles Street' has been renamed 'Grape Street'; an additional building is recorded along the northern site boundary, immediately north of Grape Street; the northern area of the Site is no longer recorded as a 'Timber Yard'. The remainder of the Site appears unchanged.
1922 (OS 1:2,500)	The additional building to the east of Water Street shown in 1908 is no longer recorded; the warehouse along the western site boundary is now recorded as the 'New Botany Warehouse'. The remainder of the Site appears unchanged.
1931-1932 (OS 1:10,560)	No changes are recorded within the Site.
1948-1949 (OS 1:1,250)	The yard area adjacent to the warehouse in the western boundary of the Site has been developed with an additional building (another 'Warehouse') shown to cross the western site boundary. The 'New Botany Warehouse' is again recorded as a 'Warehouse' and a new building, labelled 'Pineapple Hotel', is present to its immediate east.
1950-1951 (OS 1:2,500)	No changes are recorded within the Site.
1953-1957 (OS 1:1,250)	No changes are recorded within the Site.
1956-1965 (OS 1:2,500)	No changes are recorded within the Site.
1962-1980 (OS 1:1,250)	A building, named 'Liverpool Road Goods Depot', is shown overlying the railway tracks along the central southern site boundary; the area to the immediate north of Princes Bridge is now recorded as a 'Builder's Yard'; the buildings adjacent to Water Street to the east are no longer recorded.
1973-1981 (OS 1:1,250)	No changes are recorded within the Site.
1978-1984 (OS 1:1,250)	A new building, the 'Granada Television Centre', is shown to cover the area north of Grape Street. The remainder of the site remains unchanged.
1986-1990 (OS 1:1,250)	The building covering the railway tracks in the southern area of the Site has been extended eastwards; the warehouses and the 'Pineapple Hotel' building in the area to the west of Water Lane are no longer recorded, with only one unnamed building remaining; the Site is now recorded as a 'TV Centre'.
1990 (OS 1:1,250)	All buildings to the west of Water Lane have been demolished; 3 No. new buildings (unnamed) are recorded immediately to the east of Water Lane; landscaping is shown across the centre of the site. No changes are recorded within the Site on subsequent maps.

Table 2: History of the immediate surrounding area (~100 m radius)

Ordnance Survey Map	Key features recorded
1851 (OS 1:1,056)	The 'Manchester and Salford Junction Canal' (oriented NW-SE) is recorded approx. 50 m north of the Site, shown to enter a 'Tunnel' approx. 100 m east of the Site; the River Irwell is recorded approx. 30 m west of the Site; a 'Lock' is recorded approx. 80 m north of the Site where the river and canal meet; railway tracks are shown approx. 50 m south of the Site with various adjacent 'Stores'; a 'Timber Yard', 'Cotton Stores' and 'Pig Station' are recorded east of the Site; 'New Botany Yard Wharf' with numerous buildings including warehouses is shown between Water Lane and the River Irwell west of the site (also recorded as 'The Old Quay); 'Slate Wharf' is shown immediately north of the Site; a 'Coal Yard' is shown approx. 120 m to the east; a 'Tank' and various 'Chimneys' are recorded approx. 70 m to the northeast.
1891 (OS 1:500)	'Slate Wharf' is now recorded as a 'Timber Yard'; a 'Goods Shed' is recorded to the immediate east of the Site; a 'Timber Yard' is shown approx. 50 m to the east (adjacent to the 'Goods Shed'); new railway tracks which cross the Site extend east, replacing the buildings previously present; a 'Pig Market' and 'Works' are recorded approx. 80 m southwest of the Site; the 'Coal Yard' is no longer shown.
1908 (OS 1:2,500)	The 'Timber Yard' to the east has been built over with unspecified buildings.
1922 (OS 1:2,500)	No major changes are recorded near the Site.
1931-1932 (OS 1:10,560)	No major changes are recorded near the Site.
1948-1949 (OS 1:1,250)	Various 'Works' are recorded north of the Site, including 'Engineering Works' immediately to the north and approx. 90 m to the northeast, and 'Compound Works' approx. 80 m to the northeast; 'Ruins' are shown approx. 100 m to the south and 120 m to the east; 'Engineering Works' are recorded approx. 90 m the south; a 'Saw Mill' is recorded approx. 100 m to the southeast; the 'Tank' and 'Chimneys' to the northeast are no longer recorded.
1950-1951 (OS 1:2,500)	No major changes are recorded near the Site.
1953-1957 (OS 1:1,250)	The 'Manchester and Salford Junction Canal' and 'Lock' are no longer recorded; the 'Granada Television Centre' is recorded immediately to the north of the former canal, approx. 80 m northeast of the Site; a 'Gland Factory' is shown approx. 110 m the south; the 'Saw Mill' to the south has been replaced by 'Ladder Works'; a 'Ready Mixed Concrete Depot' (later referred to as 'Depot') is recorded approx. 120 m to the southeast.
1956-1965 (OS 1:2,500)	No major changes are recorded near the Site.
1962-1980 (OS 1:1,250)	Structures have been built over the railway tracks to the west and southwest of the Site; the 'Granada Television Centre' has been extended to the west with several new buildings.
1973-1981 (OS 1:1,250)	A 'Garage' is shown approx. 130 m to the southeast; the 'Ladder Works' to the southeast are no longer present.
1978-1984 (OS 1:1,250)	The 'Granada Television Centre' has been extended to the west and is shown to encroach onto the northern portion of the Site.
1986-1990 (OS 1:1,250)	The buildings to the south of the Site are now recorded as 'Liverpool Road Station (Museum of Science and Industry)'; the buildings to the west/northwest of the Site have been demolished.
1990 (OS 1:1,250)	The 'Depot' to the southeast is no longer recorded.
1993-1995 (OS 1:1,250)	A substation is recorded approx. 100 m to the south. No major changes are recorded near the Site on subsequent maps.

3 Ground Conditions

3.1 General

The anticipated ground conditions underlying the Site have been assessed on the basis of both published and unpublished data available for the Site and the immediate surrounding area. The available data has been summarized in the following sections and has been combined to establish as accurate a ground model as possible.

3.2 Published Geology

The British Geological Survey (BGS) Maps[5] [6], and Regional Geology Guides[7] have been obtained and reviewed as part of this study, with relevant information presented below.

The geological map indicates the Site is directly underlain by Triassic Sherwood (Bunter) Sandstone. No Made Ground is recorded within the site boundary on the map, however, given the urban setting and development history of the site, a reasonable thickness of Made Ground is anticipated. Made Ground material due to its nature is likely to be very variable in both composition and characteristics.

3.2.1 Drift Geology

The 1" to 1 mile British Geological Survey (BGS) map[5] was studied to determine the probable nature and extent of any drift deposits under the site and in the surrounding area. The maps indicate that no drift deposits are present onsite, although Boulder Clay is recorded to the immediate west of the Site. The Envirocheck Report[1] also indicates that no drift deposits are present onsite, although Alluvium is recorded to the immediate west of the Site. The total thickness of the drift deposits is not recorded on either the geological map or within the Envirocheck Report.

3.2.2 Solid Geology

The 1" to 1 mile and 1:50,000 British Geological Survey (BGS) maps[5] [6] indicate the solid geology on site to be Triassic Sherwood Sandstone (formerly Bunter Sandstone). The Envirocheck Report[1] indicates the solid geology to be the Triassic Chester Pebble Beds Formation (part of the Sherwood Sandstone Group). The Sherwood Sandstone Group typically comprises well cemented medium and coarse grained sandstones and pebbly sandstones/conglomerates with occasional red brown mudstones. The Sherwood Sandstone is indicated to be underlain by the Manchester Marls (mudstone) over the Collyhurst Sandstone lying unconformably over Carboniferous Upper Coal Measures (Westphalian C) typically comprising a mixture of mudstones, siltstones and sandstones with coal seams. Four named coal seams (Openshaw, Charlotte, Bradford Three-quarter and Bradford Four Foot) are indicated to outcrop between 3.0 km and 3.5 km northeast of the Site. The geological map cross-section indicates that productive coal measures strata are at least 1000 m beneath the proposed development site.

---

[5] BGS (1970). Manchester. England and Wales Sheet 85. Solid and Drift Geology. 1" to 1 mile. British Geological Survey.

[6] BGS (1975). Manchester. England and Wales Sheet 85. Solid Geology, 1: 50,000, British Geological Survey.

[7] BGS (2002) British Regional Geology: The Pennines and Adjacent Areas, (4th Ed), British Geological Survey Nottingham.

The Site is located between two faults both trending northwest-southeast, namely, the West Manchester Fault which is indicated to run approximately 500 m northeast of the Site, downthrown to the northeast by approximately 250 m, and the Pendleton Fault approximately 250 m southwest of the Site, downthrown to the northeast by an unknown magnitude. The angle and direction of dip of the bedrock strata between these faults is recorded to be approximately 8˚ to the southwest.

3.3 Unpublished Geology

As part of this study the BGS Geoscience Database has been consulted to ascertain whether any exploratory hole records exist for the site or the immediate surrounding area. Borehole records from this source have been obtained and examined as part of this study.

The relevant BGS records are listed in Table 3 and included as Appendix E herein. The stratigraphic succession and indicative depths and thicknesses encountered by the boreholes listed in Table 3 are summarized in Table 4. Please note, no site specific historic borehole data is available.

Table 3: Summary of BGS Borehole Data

Record Type	BGS Reference	Location	Ground Level (m AOD)	Depth (m BGL)	Year
Borehole	SJ89NW/641	~100 m to the south	Not given	3.10	1992
Borehole	SJ89NW/642	~110 m to the south	Not given	3.70	1992
Borehole	SJ89NW/643	~130 m to the south	Not given	4.70	1992
Trial Pit	SJ89NW/644	~90 m to the south	Not given	4.90	1992
Borehole	SJ89NW/2270	~130 m to the southeast	Not given	9.00	1991
Borehole	SJ89NW/2271	~170 m to the southeast	Not given	5.50	1991
Borehole	SJ89NW/3428	~170 m to the southeast	Not given	12.70	1984

Table 4: Summary of Ground Conditions in BGS Boreholes

Depth to Top of Strata (m BGL)	Typical Thickness (m)	Generalized Description
0.00	1.20 – 6.50	Black and dark brown clayey SAND with ash, brick, coal, pottery and sandstone. AND Soft to firm black and dark brown slightly gravelly sandy silty CLAY with ash, brick, clinker, coal and wood. AND Soft brown sandy silty CLAY with sandstone and brick. [MADE GROUND]
3.00 – 6.50 (Encountered in 3 No. of 7 No. boreholes)	0.70 – 1.90	Soft to firm black organic silty CLAY with occasional wood and peat. AND Soft to firm brown silty sandy CLAY with sandstone. AND Loose to dense brown clayey SAND/GRAVEL with sandstone. [ALLUVIUM]
1.20 – 2.50 (Encountered in 2 No. of 7 No. boreholes)	0.40 – 1.80	Stiff to very stiff brown sandy CLAY with sandstone and coal. AND Dense brown gravelly clayey SAND. [GLACIAL TILL]
2.10 – 8.40	>9.25	Dense red brown fine to medium SAND with sandstone fragments. Completely weathered. AND Weak to moderately weak red brown fine to medium grained SANDSTONE. Moderately to highly weathered. [CHESTER PEBBLE BEDS FORMATION - SHERWOOD SANDSTONE GROUP]

Note: Groundwater was not recorded in any BGS boreholes.

It is considered that the succession recorded in Table 4 (Made Ground overlying Alluvium (cohesive/granular) or Glacial Till (cohesive/granular) overlying sandstone strata) does not generally accord with the site specific published geology insofar as no drift deposits are recorded onsite. However it does generally accord with the published geology of the wider area.

3.4 Hydrology

The hydrology relevant to the Site has been reviewed based on information provided on current and historical OS maps. The nearest surface water feature to the Site is the River Irwell, located to the immediate northwest of the Site. The river flows to the southwest.

A disused branch of the Manchester & Salford Junction Canal is located approximately 50 m to the north of the Site, to the west of Water Street. Historically, the canal continued further east, beyond Water Street, and entered a tunnel approximately 100 m east of the Site (Section 2.4 refers). Section 2.11 and Drawing ES01 S1 (Figure 4 refers) within the RoC Desk Study for the wider St Johns masterplan development[8], states that the canal basin to the east of Water Street was infilled in the 1950s, and *'several historic tunnels are known to remain further to the east'*.

The Bridgewater Canal is located approximately 175 m south of the Site.

The central and western portions of the Site are indicated to be within Flood Zone 2 as presented in the Envirocheck Report[1], based on the relevant Environment Agency information and reproduced in Appendix F.

Certain areas of the Site are recorded to undergo surface water flooding, namely, the centre (low risk – 1000 year return), the majority of Water Lane (western portion of Site; low risk – 1000 year return) and along the central eastern boundary (medium risk – 100 year return), as presented in as presented in the Envirocheck Report[1], based on the relevant Environment Agency information and reproduced in Appendix F. Please also refer to the RoC Consulting Flood Risk Assessment[9] for further details in terms of the proposed site levels strategy for the mitigation of fluvial and pluvial flood risk.

3.5 Hydrogeology

3.5.1 Groundwater Vulnerability

The Environment Agency Groundwater Vulnerability Map Sheet 17 (Derbyshire and North Staffordshire) indicates that the Site is underlain by a *'Major Aquifer* with '*Soils of High Leaching Potential (U)*' (Appendix G refers). It should be noted that the site is labelled 'U' for urban and a note is normally included on the maps explaining that such a classification means that '*Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) is assumed until proved otherwise*'.

The Envirocheck Report[1] also records the Site to be underlain by a '*Principal Aquifer*' (formerly termed a '*Major Aquifer)*' and is defined as '*highly permeable formations usually with a known or probable presence of significant fracturing. They may be highly productive and able to support large abstractions for public water supply and other purposes.*' This is considered to refer to the Chester Pebble Beds Formation (Sherwood Sandstone Group) beneath the Site. The Envirocheck Report[1] also records that the Site is underlain by a '*Secondary A Aquifer*'. This is considered to refer to the Alluvial Deposits recorded in close proximity to the Site.

---

[8] RoC Consulting Report, 'Phase 1 Desktop Study on St Johns' Core Development Sites, Manchester for Manchester Quays Limited'. Dated July 2015.

[9] RoC Consulting Report, FRA & Surface Water Drainage Statement, The Factory. Dated August 2016.

The Envirocheck Report[1] records no water abstractions within the site boundary or within 250 m of the Site. There are 5 No. abstraction locations within 1 km of the Site namely: Her Majesty's Court Service (427 m NE), CDS Computer Design Systems Ltd (688 m SW), Threlfalls (Salford) Ltd (821 m NNW), Cemex Uk Materials Ltd (829 m NW) and British Telecommunications Plc (961 m NE).

3.5.2 Groundwater

Examination of the general topography and hydrology of the locality, based on the current and historic OS maps indicates that the prevailing direction of groundwater flow is likely to be towards the west/southwest, towards and in the direction of flow of the nearest watercourse as summarized in Section 3.4.

Localized groundwater may be encountered in the Made Ground deposits perched on underlying low permeability cohesive Glacial Till or Alluvium (where/if present). Deeper groundwater conditions within the weathered and intact sandstone bedrock are likely to be controlled by the hydraulic conductivity of the sandstone (degree of cementation, degree of fissuring, faults etc).

3.5.3 Mining Activity

The Envirocheck Report[1] states that the site is *'in an area which may be affected by coal mining activity'*. A Coal Authority (CA) Report[10] (Appendix H refers) has been obtained for the proposed development as the Site overlies coal bearing strata at depth and, as such, further assessment in respect of previous coal mining activity was considered necessary.

The CA Report states that:

- The Site is not the within the zone of likely physical influence on the surface from past underground workings. However, reserves of coal do exist in the locality which could be worked in the future subject to feasibility, licences and planning consents.
- There are no recorded mine entries within the Site or within 20 m of the site boundary.
- In respect of opencast mining, the Site is not within the boundary of any past or present workings. In addition, there is no licence to extract or proposed licence to extract coal by opencast methods within the immediate vicinity of the Site.
- No subsidence, in respect of the Coal Mining Subsidence Act 1991, has been recorded in respect of the immediate site area.

Given the published and unpublished geology of the Site, the site history and the CA Report information, it is considered that the risk arising from former coal mining operations can be considered to be low.

3.6 Ground Instability and Geo-Hazard

A summary of the anticipated risk in respect of typical causes of instability or geo-hazards specific to this Site which are not covered in other sections of this report is presented in Table 5.

---

[10] Coal Authority Report, 'Non-Residential Coal Authority Mining Report 51001098500001'. Dated February 2016.

Table 5: Summary of Natural Ground Subsidence Hazards at the Site

Subsidence Hazard Type	Applicable to this Site?		Comments
	No	*Yes*	
Collapsible Ground	✓	-	Envirocheck states *'Very Low Risk - No Hazard'*.
Compressible Ground	✓	-	Envirocheck states *'No Hazard'*.
Ground Dissolution	✓	-	Envirocheck states *'No Hazard'*.
Landslide	✓	-	Envirocheck states *'Very Low Risk'*.
Shrinking/Swelling Clay	✓	-	Envirocheck states *'Very Low Risk - No Hazard'*.
Running Sand	✓	-	Envirocheck states *'Low Risk - No Hazard'*.

On the basis of the desk study work undertaken and the nature of the strata likely to be encountered on site, collapsible or compressible ground, ground dissolution, landslides, shrinking/swelling clay and running sand are not considered to be issues for the proposed development.

3.7 Trees

The presence of existing trees and shrubs on the Site has been noted, namely several mature trees located along both sides of Water Street, which may need to be considered in the development proposals for the Site. An arboricultural survey may be required in order to identify tree species, tree maturity and tree heights. The presence of the existing trees may impact on the depth of the proposed foundations and service runs in the vicinity of any trees to be retained.

4 Environmental Setting

4.1 General

The environmental setting of the proposed development site has been reviewed on the basis of both published and unpublished data obtained for the Site and the immediate surrounding area. The available data is summarized in the following sections and has been combined to establish any ground or groundwater contamination as well as ground gas generation that may potentially be present to allow this to be targeted as part of the proposed site specific ground investigation.

4.2 Potential Contaminative Land Uses

A review of the historical development of the Site and surrounding area, as outlined in Section 2.4 of this report, has shown that the Site and the immediate surrounding area have been subject to a significant degree of historical development. Land uses considered to be potentially contaminative with respect to human health, controlled waters, ecosystems and/or the built environment can be summarized as follows.

Within the Site Boundary

- Various warehouses/goods sheds/stores.
- Railway tracks.
- Slate Wharf/Timber Yard.
- Builders Yard.
- Chimney (presumed industrial).
- Car park and any oil/petrol spills from car parking.

Outside the Site Boundary

- Various wharfs (slate, 'New Botany Yard') to the northwest and north.
- Tank to the northeast.
- Various works (engineering works, compound works, unspecified) to the north and south.
- Livestock (pig) markets to the east and southwest.
- Garage to the southeast.
- Concrete depot to the southeast.
- Coal yard to the east.
- Timber yard to the east.
- Saw mill/ladder works to the south.
- Factory to the south.
- Ruins to the south and east (UXO risk).

- Electricity substation to the south.
- Railway tracks and associated depot/stores to the south.
- Numerous warehouses, goods stores etc.

Given the types of land use specific to the Site and the close proximity of some off site facilities, it is considered possible that some contamination of the soils and groundwater may have occurred. The degree of contamination arising from previous land uses is typically a function of previous site practices, operational procedures and the degree/condition of any hardstanding that may have been in place when any specific land use was in operation. As such, the determination of the actual degree of contamination present, if any, will be assessed as part of the site specific investigation works.

4.3 Potential Contaminants of Concern

Due to the rich industrial site history of the proposed development site, it is considered likely that Made Ground is present. Further information on the extent of this will be obtained as part of the site specific ground investigation works. Further information regarding other potential sources of contamination is presented in Section 6.3.

Made Ground typically comprises reworked site material due to former development or material that has been imported onto the site from an external source. As such, any Made Ground present may represent a potential source of contamination. Urban fill commonly contains heavy metals, arsenic, and polycyclic aromatic hydrocarbons (PAHs) in background concentrations and can include locally elevated 'hotspots' which may pose a risk to human health and/or controlled waters. Made Ground can also contain asbestos fibres.

Potentially contaminative on-site historical land uses identified in Section 4.2 which are considered to have affected the Site include the industrial land uses such as various Wharfs (slate and unspecified), timber yard, builders yard, chimney, various warehouses, depots and stores (cotton and unspecified), and any oil/petrol spills from car parking. DOE Industry Profiles for some of these users can be consulted to indicate the potential contaminants that could be present.

At present there is no site specific chemical test data available.

Potential offsite historical sources which are considered to be up hydraulic gradient (i.e. located to the east/northeast of the proposed development site) include various goods sheds/warehouses/depots, a coal yard, a timber yard, a pig market and a tank.

4.4 Landfill Entries

The Envirocheck Report[1] identifies 1 No. historic landfill site, identified simply as Wilburn Street (122 m W). No further details about this historic landfill are provided. The landfill is located downstream on the opposite bank of the River Irwell from the site and as such there is unlikely to be an active pathway for contaminants including ground gas to migrate to the site. Also identified is 1 No. waste management site, namely Soil & Water Remediation Ltd (218 m SW); 2 No. waste transfer sites, namely Spray Shop Supplies Ltd (185 m S) and Supertune Automotive Ltd (486 m NNE); and 1 No. waste treatment/disposal site, namely Manchester Wharf Steel Ltd (Scrapyard; 200 m SW) within a 500 m radius of the site. Given distance of the majority of these facilities from the Site and the fact that only one is located directly

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.

up hydraulic gradient of the Site (Section 3.5.2 refers), the potential impact of contamination arising from the aforementioned facilities on the proposed development site is considered to be low.

4.5 Ground Gas

Ground gas typically consists of methane and carbon dioxide generated by the decomposition of organic materials. Although other gases are often associated with gas generation, methane and carbon dioxide are those which are typically measured during ground investigations, along with measurements for oxygen concentrations (to assess oxygen depletion) and flow rate. Ground gas is generally generated by and associated with the following ground conditions:

- Made Ground – typically non-engineered and poorly sorted material containing an organic component including soil, vegetation and timber;
- Alluvium/Peat – natural drift deposits often associated with river floodplains and generally having a high organic content sometimes with peat inclusions or peat layers;
- Coal Measures – 'mine' gas is often generated in such strata and can permeate through old workings and rock masses disturbed by mining activities; and
- Landfill – 'landfill' gas is often generated by the decomposition of organic materials placed in landfills. 'Inert' waste is similar to the Made Ground described above with the degree of gas generation dependent upon the amount of organic material present. Domestic waste, however, has a very high organic content and generates large quantities of gas over a sustained period (decades).

An appraisal of the likelihood of the above features affecting the proposed development is summarized below:

- There is Made Ground recorded within the unpublished geology as summarized in Section 3.3 which is of substantial thickness (1.20 – 6.50 m). However it should be noted that there is currently no site specific data. The offsite Made Ground encountered is predominantly comprised of rubble and ash, which are unlikely to represent a significant source of ground gas, however fragments of coal and clinker are recorded. Notwithstanding the above, the site has a long development history and as such, Made Ground is likely to be present across the site. Based on the available data (i.e. due to the lack of site specific data), the likelihood of ground gas being present within the Made Ground materials can be considered to be medium at this time.
- The published and unpublished geology as summarized in Sections 3.2 and 3.3 respectively indicates that alluvium is present near the Site and organic alluvial material is recorded in 2 No. of 7 No. BGS boreholes located offsite. As such, the likelihood of ground gas being encountered arising from alluvial materials can be considered to be medium at this time.
- The published and unpublished geology (Sections 3.2 and 3.3) indicate that productive coal bearing strata exist beneath the Site but are at a significant depth. As such the likelihood of ground gas being encountered arising from coal mining activities can be considered to be low.
- The Envirocheck Report[1] identifies 1 No. landfill site (historic; 122 m W) and 1 No. waste treatment or disposal site within 500 m of the Site (200 m SW) (Section 4.4 refers). Due to the distance of these facilities from the proposed development site and the presence of the River Irwell between the site and the recorded landfill, the likelihood of ground gas being encountered arising from landfill sites can be considered to be low.

Given the environmental setting of the Site, ground gas is considered to be a potential issue at this stage. Ground gas monitoring should be undertaken as part of the site specific ground investigation to clarify the ground gas regime beneath the Site and allow appropriate protection measures to be assessed and incorporated into any substructure designs as necessary.

4.6 Radon Affected Areas

The Envirocheck Report[1] records that '*the property is in a lower probability radon area, as less than 1% of homes are above the action level*' and the corresponding BRE[11] guidance document indicates that no radon protection measures are required for development undertaken in this area.

4.7 Invasive Species

The ERAP Limited Ecology report[12] states that *'small areas of the site support Montbretia and Virginia Creeper…both species are listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended)'*. Please refer to the report for full details.

4.8 Unexploded Ordnance

The Zetica Unexploded Bomb Risk Map (Appendix I refers) shows the Site to be in an area of *'Moderate'* risk. Post-war historical maps show 2 No. *'Ruins'* near site – approx. 100 m to the south and 120 m to the east. Furthermore, the Manchester Bomb Damage Map[13] (Appendix J) records a high explosive bomb impact within the area adjacent to Princes Bridge to the south and indicates damage to the railway arches. The Site has also been significantly redeveloped since World War II. Given the forgoing, the risk from unexploded ordnance is considered to be moderate, therefore requiring a more detailed UXO assessment.

Based on the above, an Explosive Ordnance Threat Assessment (EOTA)[14] has been undertaken for the Site by PLANIT UXB Limited. The EOTA concludes that UXO threat management is required only in the southwestern corner of the Site (Appendix K refers).

4.9 Pollution Incidents

The Envirocheck Report[1] records that there have been no pollution incidents to controlled waters on the Site or within 500 m of the Site. The potential impact of contamination from pollution incidents to controlled waters on the proposed development site is therefore considered to be low.

---

[11] BRE 1999. Radon. Guidance on protective measures for new dwellings. British Research Establishment. 1999.

[12] ERAP Ecology report – Ecological Survey & Assessment, The Factory, Manchester. Dated July 2016.

[13] Manchester Libraries, Information and Archives, Manchester City Council (2013) Record of location of aerial bombs on the City of Manchester 1940-1941.

[14] PLANIT UXB Report, 'Explosive Ordnance (UO) Threat Assessment (EOTA), Manchester City Centre'(Ref: 0123 EOTA MCC Factory 170216). Dated 17 February 2016.

4.10 Radioactive Substances

No registered Radioactive Substances have been identified to be present within a 500 m radius of the Site. The risk to the proposed development site from Radioactive Substances can therefore be considered to be low.

4.11 Nitrate Vulnerability

Given the urban location of the proposed development site, nitrate vulnerability is not considered to pose a significant constraint on the proposed development.

4.12 Area of Conservation

The site is located with the Castlefield Conservation area and approximately 500m to the west of the St John Street Conservation Area.

The Envirocheck Report[1] records that the Site is not located within a National Park or a RAMSAR site. Nor is the Site recorded to be in a Site of Special Scientific Interest (SSSI). As such, it is not considered that this will pose a constraint on the Proposed Development.

4.13 Contemporary Trade Directory Entries

The Envirocheck Report[1] indicates that there are 2 No. Contemporary Trade Directory Entries within 100 m of the Site of which both are Inactive, namely:

• Atlantis	Dry Cleaners	Inactive	40 m to the SW.
• Atlantis Piccadilly Laundry Services	Laundries & Laundrettes	Inactive	87 m to the S.

Given the commercial nature of the facilities, the fact that both are inactive, and the fact that both are along/down hydraulic gradient, the risk of contamination arising from these sources can be considered to be low.

4.14 Fuel Station Entries

The Envirocheck Report[1] records 2 No. Fuel Stations within 500 m of the Site, namely:

• Sainsburys Salford	Open	418 m to the WSW	Down hydraulic gradient
• Castlefield Travellers Check	Obsolete	489 m to the SSW	Along hydraulic gradient

Given the distance of both facilities from the site and the fact that neither are located directly up hydraulic gradient of the site (Section 3.5.2 refers), the potential impact of contamination from these sources on the proposed development site is considered to be low.

5 Proposed Development

The current development proposal for the Site consists of a new build cultural venue (Appendix A refers). The proposed building will overlie the existing car park in front of the St Johns railway arches, and will also sit directly on the St Johns arches. The Starlight Theatre building currently overlying the arches will be demolished. The building will also span across Water Street, where vehicular access is to be maintained, landing in the car park to the west of Water Street.

The proposed development (circa 13,000 sq. m.) comprises two flexible auditorium spaces to be used for theatre, music, dance, art and other performance-related events and potentially conferences and associated facilities, including retail and restaurant use, office, administrative and back of house function, training and educational facilities, servicing and access arrangements, circulation and external landscaped areas.

Key Design Considerations

The key elements of the proposed development in respect of the ground investigation works undertaken can be summarized as follows:

- Geometry of existing foundations (St Johns railway arches, bonded warehouse and retaining walls in western portion of site).
- Structural integrity of existing St Johns arches, which may be subject to loading by proposed development.
- Bearing capacity of ground beneath existing St Johns arch piers.
- Current loading regime on existing St Johns arches (i.e. thickness of overlying material/tracks).
- Column loadings associated with proposed development including plant loadings.
- The presence of existing services onsite. Exact location/dimensions etc. to be confirmed by GPR survey and localized trenches.
- Material assessment for bulk earthworks.
- UXO risk mitigation procedures for any intrusive site or construction works.
- Excavation and removal of any buried obstructions.
- Ground gas and groundwater regime.
- Contamination assessment in respect of both human health and waste disposal.
- Geotechnical assessment.

6 Preliminary Conceptual Site Model

6.1 Ground Model

The anticipated ground conditions underlying the Site based on the information available can be summarized as follows. It is worthy of note that no historic borehole data was available beneath the Site, and as such the following information should be treated as indicative.

Made Ground: recorded as black and dark brown clayey SAND; soft to firm black and dark brown slightly gravelly sandy silty CLAY; and soft brown sandy silty CLAY. Gravel comprises various materials including sandstone, ash, brick, clinker, coal and wood. Highly variable thickness and distribution (1.20 m to 6.50 m BGL).

Alluvium: recorded as soft to firm black organic silty CLAY with occasional wood and peat; soft to firm brown silty sandy CLAY with sandstone fragments; and loose to dense brown clayey SAND/GRAVEL with sandstone fragments. Only encountered in 3 No. of 7 No. historic boreholes.

Glacial Till: recorded as stiff to very stiff brown sandy CLAY with sand and coal fragments; and dense brown gravelly clayey SAND. Thicknesses vary between 0.40 and 1.80 m. Only encountered in 2 No. of 7 No. historic boreholes.

Chester Pebble Beds Formation (Sherwood Sandstone Group): recorded as dense red brown fine to medium grained SAND with sandstone fragments – completely weathered; and weak to moderately weak red brown fine to medium grained SANDSTONE – moderately to highly weathered. Rockhead between 2.10 and 8.40 m BGL.

The River Irwell is situated to the immediate northwest of the Site and flows in a south-westerly direction. Perched water may also be present within any Made Ground, Glacial Till or Alluvium encountered, particularly overlying low permeability clayey layers or buried obstructions within the Made Ground. The hydraulic connectivity within the Made Ground, Glacial Till and Alluvium materials is expected to be highly variable and any perched water is likely to be present in localized pockets of granular fill. A regional groundwater regime is likely to be present within the Chester Pebble Beds (Principal Aquifer). It should be noted that the nearby River Irwell may impact on the local groundwater regime.

6.2 Geoenvironmental Risk Assessment – General Approach

In the UK, the assessment of risk from contamination follows the source-pathway-receptor approach. If one of these three elements is absent, it is considered that there is no potential for harm. If, however, there is considered to be a linkage between any given source and any given receptor, then a risk-based approach is used to assess the significance of impact of any such linkage.

Risks are defined as the probability of an event occurring combined with the severity of the consequence of that event. Particularly, to assess the risks to site end users posed by any given source, the sensitivity of each receptor is considered. For example, the concentration of contamination acceptable at a site to be developed as a residential property with a garden used to grow vegetables and accessible to young children is set lower than that for a commercial site where soil is exposed only in minor areas of landscaping and the only long-term users of the site are adults. Similarly, a site overlying a Principal Aquifer supplying potable water to a large population will be considered more stringently than a site overlying an impermeable geology with only minor seepages of groundwater.

6.3 Potential Sources of Contaminants

Potential contamination sources from review of regulatory data and historical maps have been identified and are summarized in Table 6. The 'Contaminants of Concern' in this risk assessment are based primarily on information from the review of historical information.

Table 6: Potential sources of contamination

Potential Source	Location	Likely Age	Potential Contaminants of Concern
Historical industrial land uses (various works, warehouses, depots, railway lines).	On site / off site	From ~1800s to present.	Metals, inorganics, organics, fuel oils, petroleum hydrocarbons, PAHs, sulphates.
Historic buildings.	On site	From ~1800s to ~1960s	Asbestos.
Fuel and oil spills from car parking retained within site soils.	On site / off site	Approx. 100 years to present	Petroleum hydrocarbons, oils.
Ground gas sourced from Made Ground and Alluvium.	On site / off site	-	Methane, carbon dioxide.

6.4 Receptors and Pathways

Site specific pathway-receptor linkages have been identified in Table 7 with respect to the sources outlined in Table 6 and with respect to the anticipated future uses.

Table 7: Potential Receptors

Receptor		Pathway
Human Health	Future site users / visitors.	Direct/dermal contact. Inhalation of contaminated dusts, gas & vapour.
	Offsite land users.	Inhalation / ingestion of contaminated dust.
	Investigation and construction workers.	Direct/ dermal contact. Ingestion/ inhalation of contaminated soils. Inhalation of gas / vapour.
Controlled Waters	Principal Aquifer within the Chester Pebble Beds.	Migration via preferential pathways (e.g. piling), overland flow.
Below ground infrastructure	Buried concrete foundations. Services pipework.	Direct contact.

6.5 Risk Assessment

The qualitative risk assessment of the potential pollutant linkages described above is presented in Table 8. Based on the assessment, the likelihood of potential ground contamination affecting the proposed development is considered to be low to medium.

A site specific ground investigation and associated laboratory testing is considered necessary for both geotechnical design purposes and to clarify the geo-environmental considerations in terms of the Proposed Development (Section 7 refers).

Table 8: Qualitative Risk Assessment

Pollutant Linkage				**Risk Assessment**			**Description of source [bold text]** Comment on hazard realisation [normal text]
Source	Contaminants of Concern	Pathway	Receptor	Consequence	Probability	Risk	
Made Ground – historic industrial uses.	Metals, inorganics, organics, fuel oils, petroleum hydrocarbons, PCBs, PAHs, sulphates.	**The Site has been developed since at least 1851, comprising numerous industrial land uses including various warehouses/goods sheds/stores, a slate wharf, railway tracks, timber yard, builders yard and chimney, as well as car parking (oil/petrol spill risk). Made Ground is recorded in close proximity to site from BGS borehole logs (no historic ground investigation data for Site).**					
		Direct /dermal contact, ingestion, inhalation	Construction / Maintenance workers	Medium	Low Likelihood	Moderate / Low	Potential for direct contact with contaminated materials during excavation for foundations / service runs. Can be mitigated by good working practice, health and safety and use of PPE.
		Direct / dermal contact, ingestion, inhalation	Future site occupants and visitors	Medium	Unlikely	Low	Pathway will be removed in the end use as the entire site will be covered by the building or hard landscaping (concrete floor slab or hard landscaping with clean build-up).
		Ingestion / inhalation	Occupants and visitors of neighbouring properties	Medium	Low Likelihood	Moderate / Low	Residential / commercial neighbours surrounding and adjacent to the site. Good working practices i.e. dust suppression likely to be in place.
		Migration via permeable strata	Groundwater (Principal Aquifer – Chester Pebble Beds)	Medium	Low Likelihood	Moderate / Low	Downward leaching of contaminants due to infiltration will be prevented in the end use by the drainage network and cover by the building/hard landscaping. Procedures must be taken to avoid the creation of pathways during piling works.
		Migration via permeable strata, overland flow	River Irwell	Medium	Low Likelihood	Moderate / Low	Potential for infiltration and leaching during construction works due to removal of concrete cover; good construction practice would provide mitigation.
		Direct contact	Below ground services / infrastructure	Mild	Low Likelihood	Low	Any new services likely to be in clean corridors / trenches or appropriately specified.
Various potentially contaminative historic land uses up hydraulic gradient (east / northeast).	Leachable contaminants – organics, metals, fuels, oils, PAHs, petroleum hydrocarbons.	**Various warehouses, works and depots have been present at various times since at least 1851 and leachable contaminants may have migrated onto / beneath the Site, possibly within perched groundwater.**					
		Direct/dermal contact, ingestion, inhalation	Construction / Maintenance workers	Medium	Low likelihood	Moderate / Low	Potential for exposure to contaminated waters during foundation / service run excavation and ground works. Capable of mitigation by good working practice and use of PPE.
Asbestos fibres and fragments within Made Ground from historic buildings formerly onsite.	Asbestos	**ACM may be present in Made Ground beneath the Site from previous development.**					
		Inhalation	Construction / Maintenance workers	Severe	Low likelihood	Moderate / Low	If asbestos is present in Made Ground, mitigation by good working practice and use of PPE will be required and potentially special protective measures. Made Ground to be assessed for asbestos by the site investigation.
			Future site occupants and visitors	Severe	Unlikely	Low	Pathway between any asbestos in Made Ground and receptors will be broken by concrete floor slab/hard landscaping and clean build-up.
Made Ground. Organic material (Alluvium) near the Site.	Gas and vapour	**Made Ground is likely to be present onsite, and, with the historic industrial land uses, there is the potential for this to be contaminated and provide a source of hazardous gas and vapour beneath the Site. In addition, there is a potential for gas migration from neighbouring historic contaminative uses (works, depots) via permeable strata. BGS boreholes indicate that alluvial material is present close to the site and there is potential for alluvium to present beneath the site.**					
		Inhalation Explosion (methane)	Construction / maintenance workers	Severe	Unlikely	Moderate / Low	Potential for uncontrolled exposure to hazardous ground gas / vapour (if present) in confined unventilated excavations. Capable of mitigation by gas monitoring to define the risks from ground gas and good construction practice e.g. avoiding works in confined spaces, where required PPE and air quality monitoring.
			Future site occupants and visitors	Severe	Low Likelihood	Moderate	Potential for ingress of hazardous ground gas / vapour into the future development. Need for ground investigation to establish the extent of the risk.

7 Ground Investigation

7.1 Scope and Objectives

A site specific ground investigation (GI) has been scoped to obtain further information in respect of the ground conditions beneath the proposed development site and to allow foundation assessments to be made. The site specific GI is yet to be undertaken and will need to be reviewed once the final factual report becomes available. Based on the likely ground conditions and the nature of the engineering considerations of the proposed development, issues to be clarified include the following:

- Prove geological succession – including presence, thickness and nature of any Made Ground, Alluvium, Glacial Till and depth to rockhead.
- Determine geometry of existing foundations of St Johns arches, bonded warehouse and retaining walls within western portion of site.
- Determine indicative parameters for ground model - bearing capacity, ground stability, settlement etc.
- Determine groundwater levels and behaviour to characterize groundwater regime.
- Determine ground gas concentrations and flow rates.
- Determine structural integrity and current loading regime on St Johns arches.
- Contamination assessment in respect of end use, health and safety of workforce and waste disposal of arisings.
- Manage UXO risk during intrusive investigations (southwest of Site only – Section 4.8 refers).

7.2 Methodology

Given the foregoing and considering the information available for the Site, the following ground investigation works have been undertaken to address the issues outlined above. Please note, works are still ongoing in terms of monitoring and geotechnical/chemical testing:

- 5 No. boreholes (25 m deep) comprising cable percussive drilling with rotary core follow on to allow assessment of the deeper ground conditions and to allow the installation of instrumentation.
- 2 No. days machine dug trial pitting to allow an assessment of the ground conditions across the entire site, presence of below ground substructure, permeability testing and any ground contamination in respect of end use, health and safety considerations in addition to waste disposal categorization.
- A series of hand excavated trial pits to obtain foundation details/geometry of railway arch pier bases/bonded warehouse foundations/retaining wall foundations and the strength/composition of the bearing stratum, to establish the thickness of ballast overlying the arches and to establish the profile/thickness of the arches.
- A series of window sample boreholes to establish soil strength/bearing capacity at existing St Johns arch foundation level, to allow the installation of instrumentation and to determine any ground contamination in respect of end use, health and safety considerations in addition to waste disposal categorization.
- A series of concrete cores through the brick piers within the St Johns arches to establish thickness and construction of the piers and to obtain samples for laboratory strength testing of the brick and mortar.

- Geotechnical laboratory testing. To determine the physical properties and characteristics of the ground mass for foundation design purposes.
- Chemical laboratory testing to allow an assessment of any ground contamination in respect of end use, health and safety considerations in addition to waste disposal categorization.
- Installation of gas and groundwater monitoring wells in each exploratory hole to allow appropriate ground gas and groundwater monitoring to be undertaken.
- Programme of gas and groundwater monitoring to allow the ground gas and groundwater conditions beneath the site to be assessed.
- Attendance of a UXO specialist engineer to manage UXO risk for investigatory works for those areas identified as higher risk.

7.3 Constraints

The positions and programming of all exploratory holes will need to be agreed with the land owners as appropriate to minimize impact and disruption in the use of the Site.

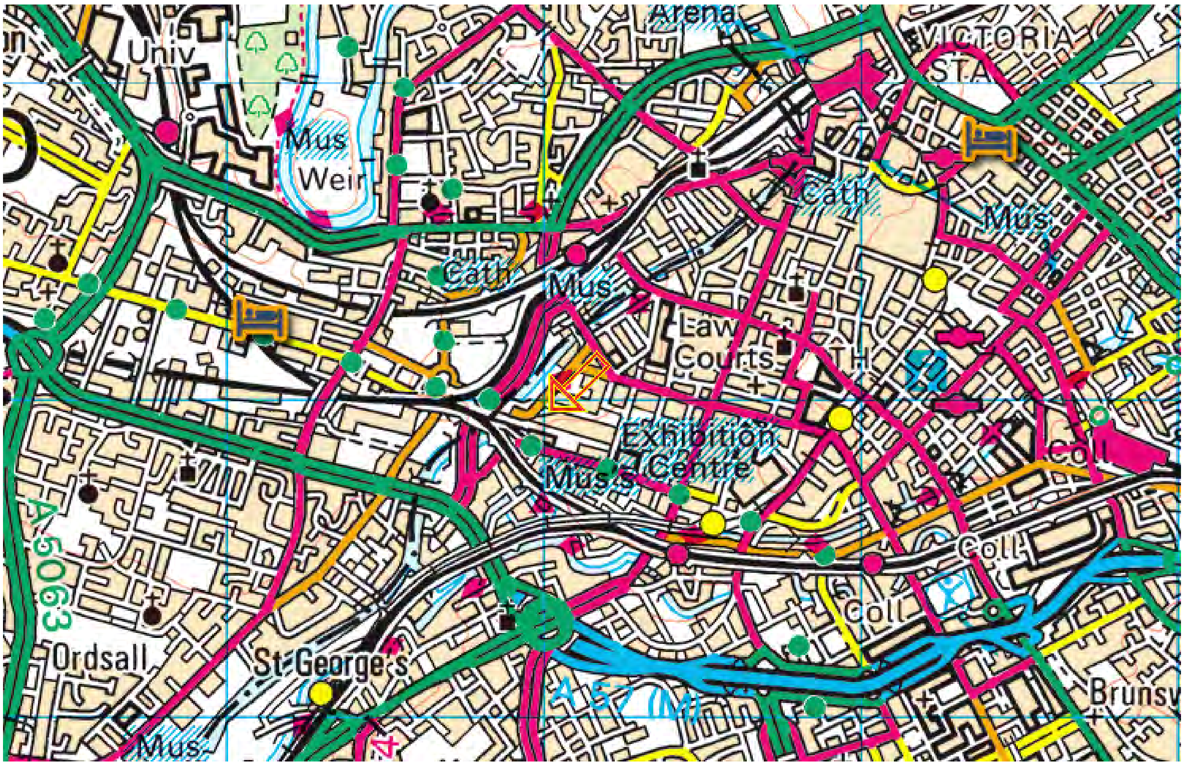
A utilities survey has been commissioned and completed, identifying services running through the site (Section 2.3 refers).

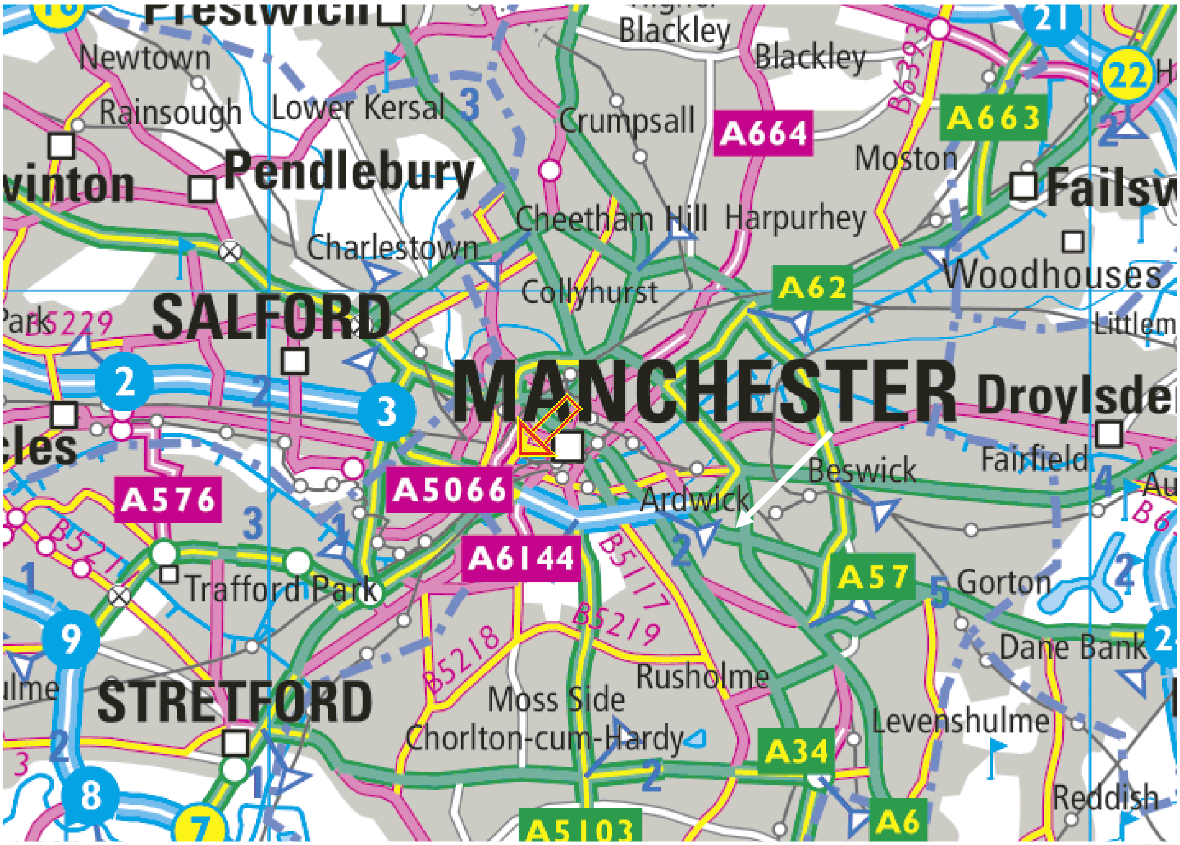
In addition, as detailed above, UXO detection equipment and survey techniques will be required within the southwestern portion of the site (Section 4.8 refers) as part of the ground investigation. It is anticipated that that similar techniques or geophysical surveys will be required to mitigate the UXO risk for the construction phase of works.

A Ground Engineering Hazard Checklist is included as Appendix L.

Figures

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.

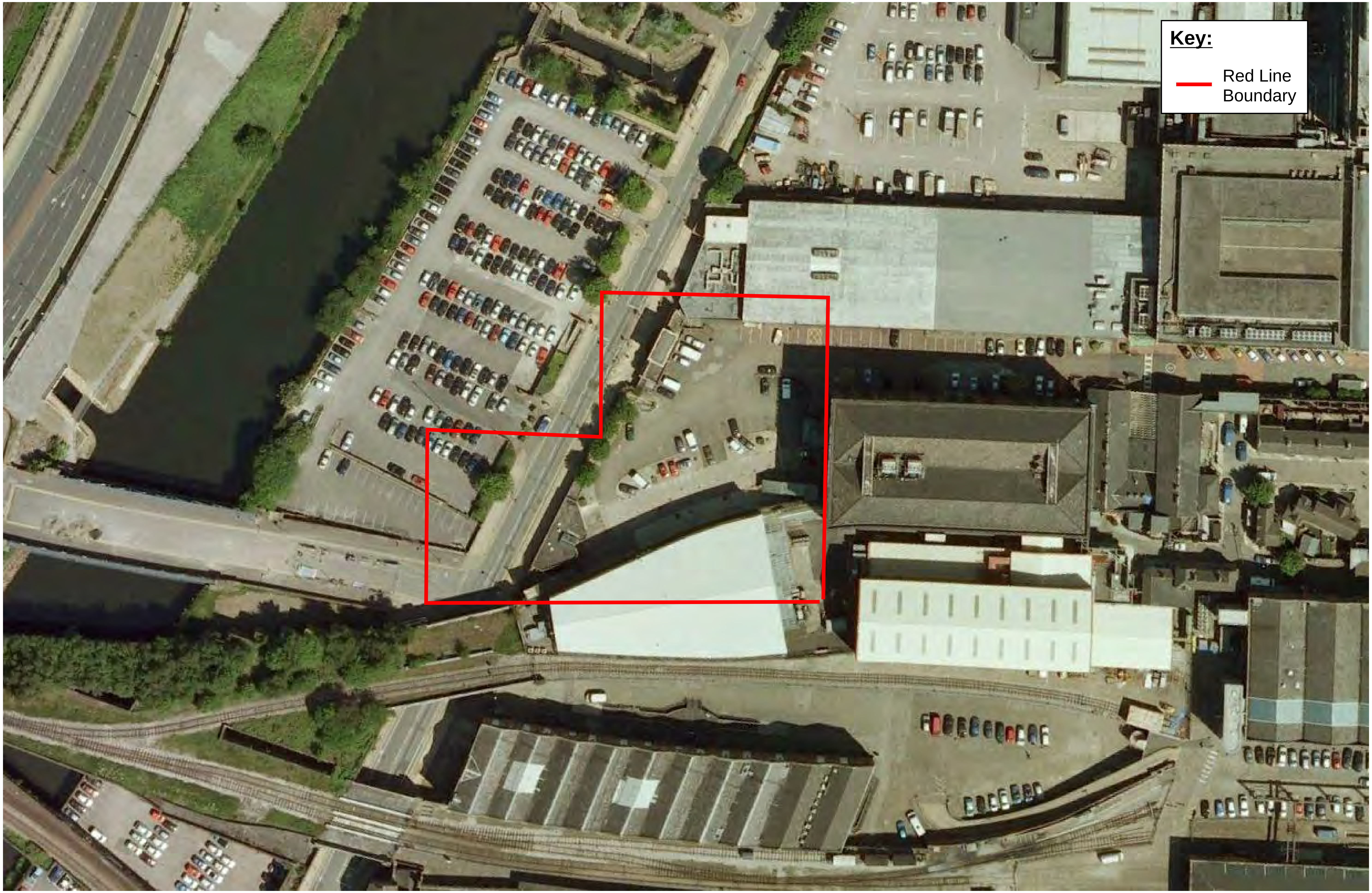

Univ
Mus
Weir
Arena
VICTORIA STA
Cath
Mus
Cath
Mus
Law Courts
T H
Exhibition Centre
Mus
Coll
Coll
A5063
Ordsall
St George's
A57(M)
Brunsw
Mus


Prestwich
Newtown
Rainsough
Lower Kersal
Pendlebury
vinton
Blackley
Blackley
Crumpsall
A664
B6393
A663
21
22
Moston
Failsw
Cheetham Hill
Harpurhey
Charlestown
Collyhurst
Woodhouses
A62
Park
B5229
SALFORD
2
3
MANCHESTER
Droylsde
Littlem
cles
A576
A5066
Beswick
Fairfield
Ardwick
A6144
B5117
B5219
B5218
A57
Gorton
Trafford Park
Dane Bank
9
STRETFORD
lme
Moss Side
Rusholme
Chorlton-cum-Hardy
Levenshulme
A34
8
7
A5103
A6
Reddish

Reproduced from Ordnance Survey by permission of ordnance survey® on behalf of the controller of Her Majesty's stationary office, Crown Copyright 2003 all rights reserved. Licence number: AL 100005517.

Project Name : The Factory, Manchester
Report Title : Ground Engineering Desk Study Report
Figure Title : Site Location Plan
Scale: NTS **Date:** July 2016 **Job No:** 034933 **Figure:** 1

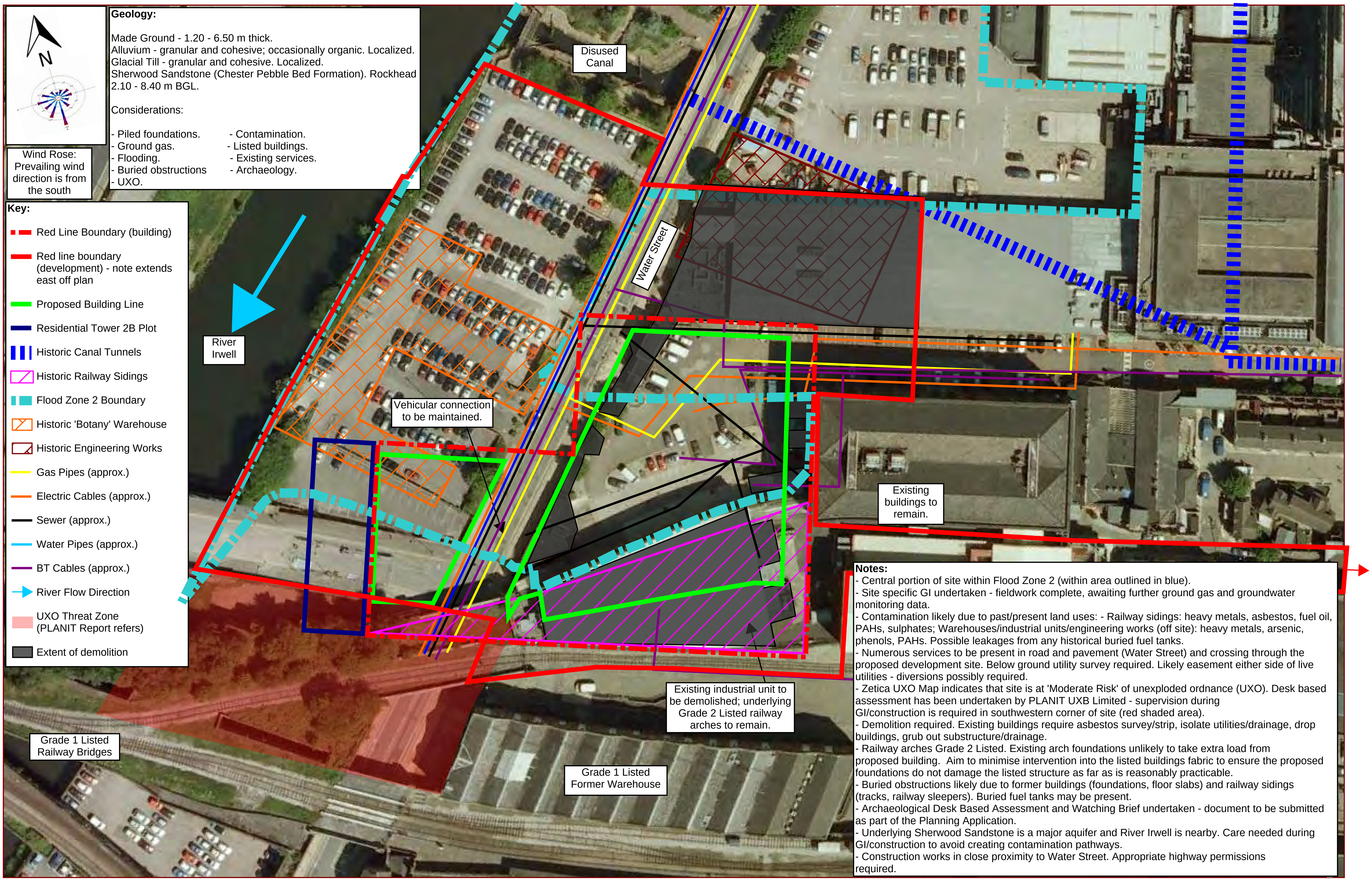
BUROHAPPOLD ENGINEERING



BUROHAPPOLD ENGINEERING

JOB TITLE:	The Factory, Manchester	JOB NUMBER:	034933	DATE:	July 2016
SKETCH TITLE:	Aerial Photograph	SKETCH NUMBER:	Figure 2	INITIALS:	GM

Copyright © 1976-2014 BuroHappold Engineering. All Rights Reserved.



Wind Rose: Prevailing wind direction is from the south

Geology:

Made Ground - 1.20 - 6.50 m thick.
Alluvium - granular and cohesive; occasionally organic. Localized.
Glacial Till - granular and cohesive. Localized.
Sherwood Sandstone (Chester Pebble Bed Formation). Rockhead 2.10 - 8.40 m BGL.

Considerations:

- Piled foundations.
- Ground gas.
- Flooding.
- Buried obstructions
- UXO.
- Contamination.
- Listed buildings.
- Existing services.
- Archaeology.

Key:

🟥	Red Line Boundary (building)
🟥	Red line boundary (development) - note extends east off plan
🟩	Proposed Building Line
🟦	Residential Tower 2B Plot
▮▮▮	Historic Canal Tunnels
▨	Historic Railway Sidings
▬	Flood Zone 2 Boundary
▨	Historic 'Botany' Warehouse
▨	Historic Engineering Works
—	Gas Pipes (approx.)
—	Electric Cables (approx.)
—	Sewer (approx.)
—	Water Pipes (approx.)
—	BT Cables (approx.)
→	River Flow Direction
■	UXO Threat Zone (PLANIT Report refers)
■	Extent of demolition

Vehicular connection to be maintained.

Existing buildings to remain.

Existing industrial unit to be demolished; underlying Grade 2 Listed railway arches to remain.

Grade 1 Listed Railway Bridges

Grade 1 Listed Former Warehouse

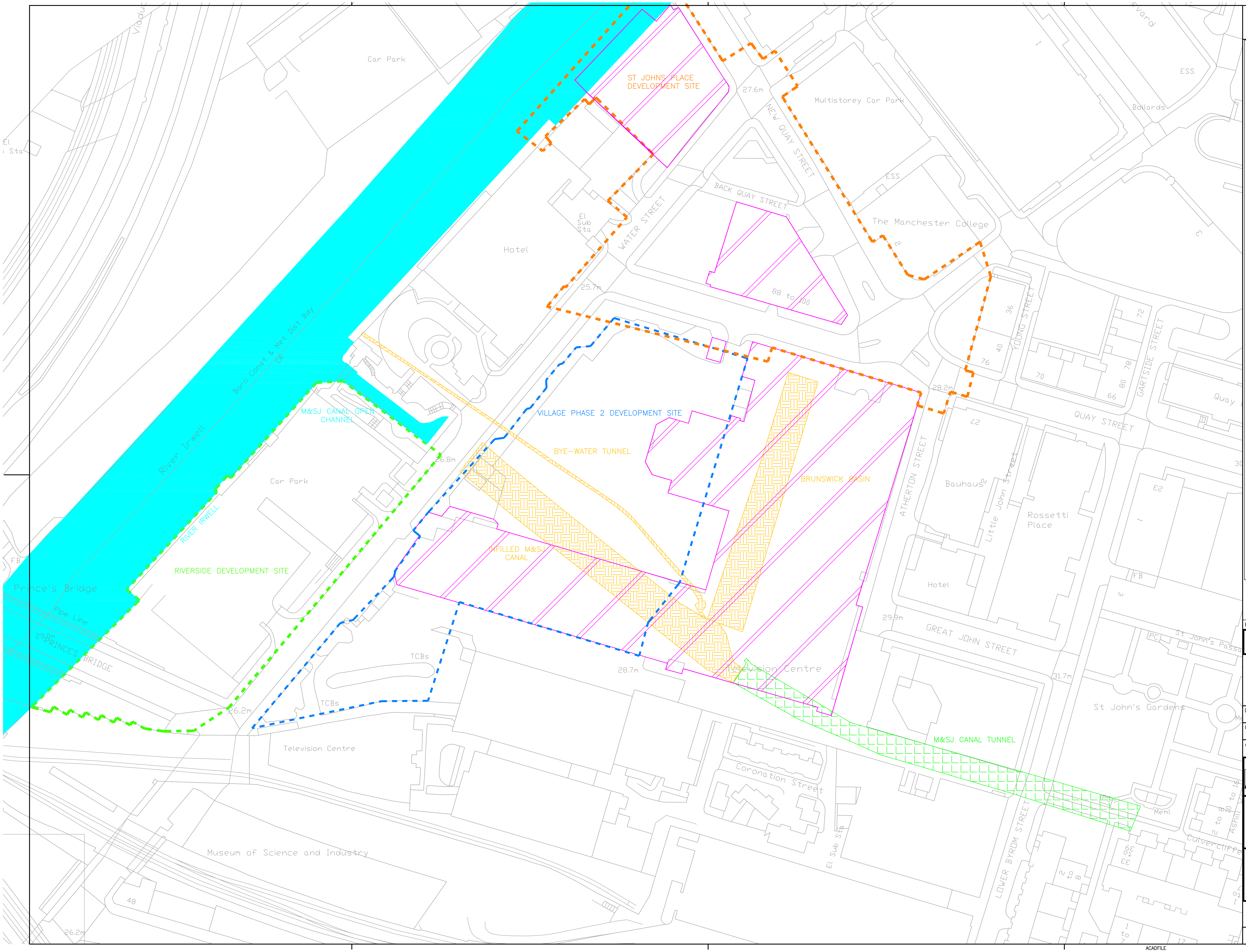
Notes:
- Central portion of site within Flood Zone 2 (within area outlined in blue).
- Site specific GI undertaken - fieldwork complete, awaiting further ground gas and groundwater monitoring data.
- Contamination likely due to past/present land uses: - Railway sidings: heavy metals, asbestos, fuel oil, PAHs, sulphates; Warehouses/industrial units/engineering works (off site): heavy metals, arsenic, phenols, PAHs. Possible leakages from any historical buried fuel tanks.
- Numerous services to be present in road and pavement (Water Street) and crossing through the proposed development site. Below ground utility survey required. Likely easement either side of live utilities - diversions possibly required.
- Zetica UXO Map indicates that site is at 'Moderate Risk' of unexploded ordnance (UXO). Desk based assessment has been undertaken by PLANIT UXB Limited - supervision during GI/construction is required in southwestern corner of site (red shaded area).
- Demolition required. Existing buildings require asbestos survey/strip, isolate utilities/drainage, drop buildings, grub out substructure/drainage.
- Railway arches Grade 2 Listed. Existing arch foundations unlikely to take extra load from proposed building. Aim to minimise intervention into the listed buildings fabric to ensure the proposed foundations do not damage the listed structure as far as is reasonably practicable.
- Buried obstructions likely due to former buildings (foundations, floor slabs) and railway sidings (tracks, railway sleepers). Buried fuel tanks may be present.
- Archaeological Desk Based Assessment and Watching Brief undertaken - document to be submitted as part of the Planning Application.
- Underlying Sherwood Sandstone is a major aquifer and River Irwell is nearby. Care needed during GI/construction to avoid creating contamination pathways.
- Construction works in close proximity to Water Street. Appropriate highway permissions required.

BUROHAPPOLD
ENGINEERING

JOB TITLE:	Factory, Manchester.	JOB NUMBER:	034933	DATE:	7/09/2016
SKETCH TITLE:	Site Constraints Plan Rev03	SKETCH NUMBER:	Figure 3	INITIALS:	GM/PH

Copyright © 1976-20

FIGURE 4


Viaduct
Car Park
El Sta
ST JOHNS PLACE DEVELOPMENT SITE
27.6m
Multistorey Car Park
Evard
ESS
Bollards
NEW QUAY STREET
BACK QUAY STREET
ESS
The Manchester College
Hotel
El Sub Sta
WATER STREET
25.7m
Boro Const & Met Dist Bdy
CR
88 to 100
36
40
76
YOUNG STREET
72
70
78
80
66
GARTSIDE STREET
Quay
QUAY STREET
28.2m
27
River Irwell
M&SJ CANAL OPEN CHANNEL
VILLAGE PHASE 2 DEVELOPMENT SITE
BYE-WATER TUNNEL
26.8m
Car Park
BRUNSWICK BASIN
ATHERTON STREET
Bauhaus
2
Little John Street
Rossetti Place
23
1
RIVER IRWELL
INFILLED M&SJ CANAL
RIVERSIDE DEVELOPMENT SITE
FB
Prince's Bridge
Pipe Line
29.0m
PRINCES BRIDGE
Hotel
FB
3
29.9m
GREAT JOHN STREET
St John's Passage
PC
TCBs
28.7m
Television Centre
31.7m
TCBs
26.2m
St John's Gardens
M&SJ CANAL TUNNEL
Television Centre
Coronation Street
El Sub Sta
LOWER BYROM STREET
2 to 8
Meml
Culvercliffe
Ashill
10 to 16
Museum of Science and Industry
48
26.2m
N

THIS DRAWING IS THE PROPERTY OF RoCp. COPYRIGHT IS RESERVED BY THEM AND THE DRAWING IS ISSUED ON THE CONDITION THAT IT IS NOT COPIED, REPRODUCED, RETAINED OR DISCLOSED TO ANY UNAUTHORISED PERSON EITHER WHOLLY OR IN PART WITHOUT THE WRITTEN CONSENT OF RoCp

NOTES

—	APPROX RIVERSIDE DEVELOPMENT BOUNDARY
—	APPROX VILLAGE PHASE 2 DEVELOPMENT BOUNDARY
—	APPROX ST JOHNS PLACE DEVELOPMENT BOUNDARY
▨	APPROX EXISTING BUILDING FOOTPRITNT
▦	INFILLED CANAL RELATED FEATURE
🟩	EXISTING CANAL TUNNELS
■	RIVER IRWELL

DRAWING NOTES

1) PLANNING APPLICATION AND DEVELOPMENT SITE BOUNDARIES INDICATED ON THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY AND MAY BE SUBJECT TO AMENDMENT. PLEASE REFER TO SIMPSONHAUGH ARCHITECTS DRAWINGS FOR DETAILED SITE BOUNDARY INFORMATION

2) THE LOCATION AND EXTENT OF HISTORICAL FEATURES HAS BEEN CONJECTURED FROM MAP RECORDS AND SHOULD BE CONSIDERED AS APPROXIMATE

REV.	DATE	DETAILS	DRN.	CHK.

DRAWING STATUS
INFORMATION

RoC CONSULTING
Civil & Structural Engineers
81 Chapel Street, Salford, M3 5DF
Tel: 0161 833 3794 Fax: 0161 819 5070

DRAWN as	DATE 10.2014	SCALES 1:1000
CHECKED	DATE	THE ABOVE SCALES APPLY WHEN PLOTTED AT A3 SIZE
APPRVD.	DATE	EMAIL FOR DRAWINGS drawings@rocconsulting.com

CLIENT
AlliedLondon

PROJECT TITLE
ST JOHN'S
VILLAGE PHASE 2
& RIVERSIDE SITES

DRAWING TITLE
APPROX
CANAL RELATED
FEATURES

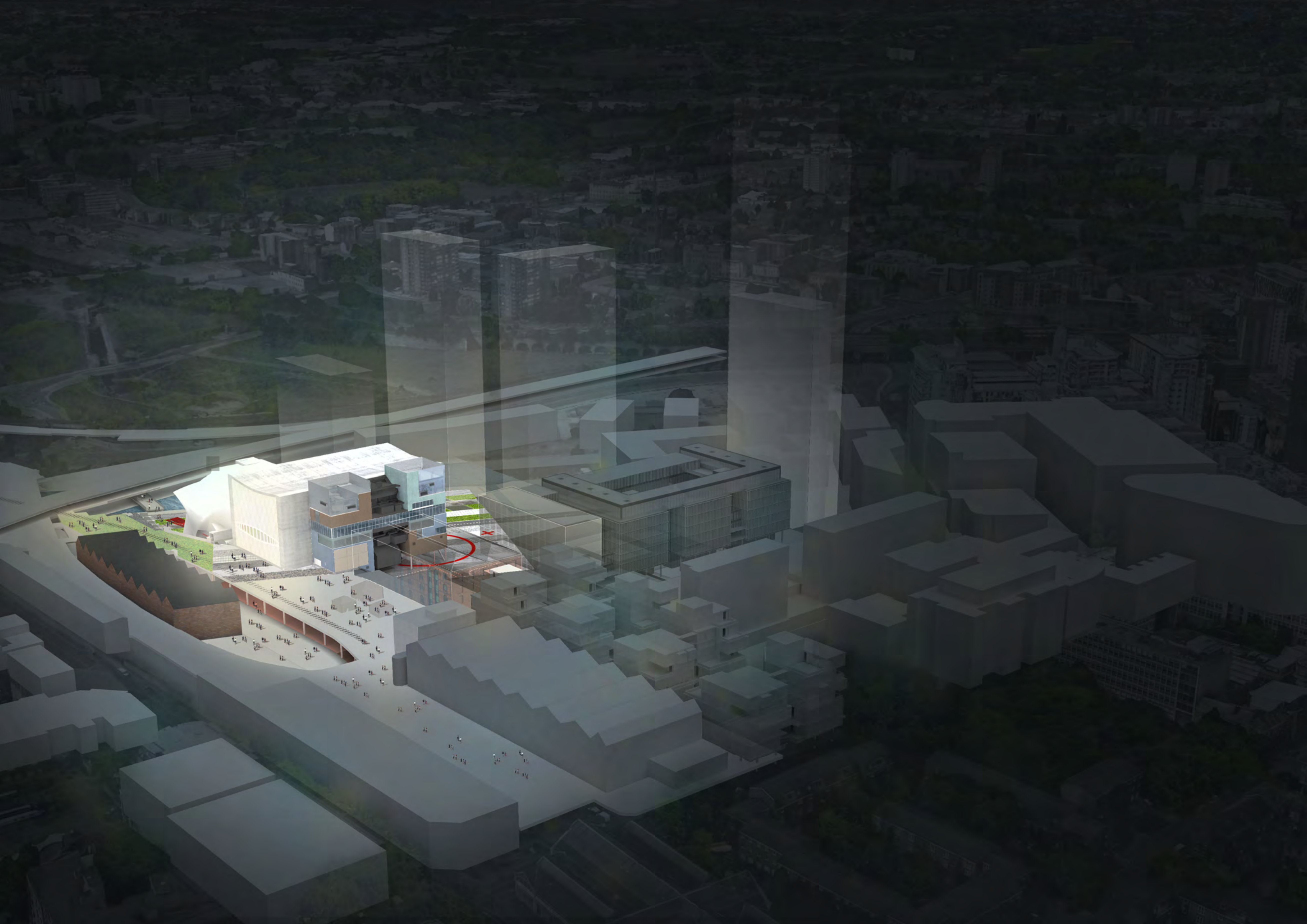
PROJECT No.	DRAWING No.	REV.
3233	ES01	S1

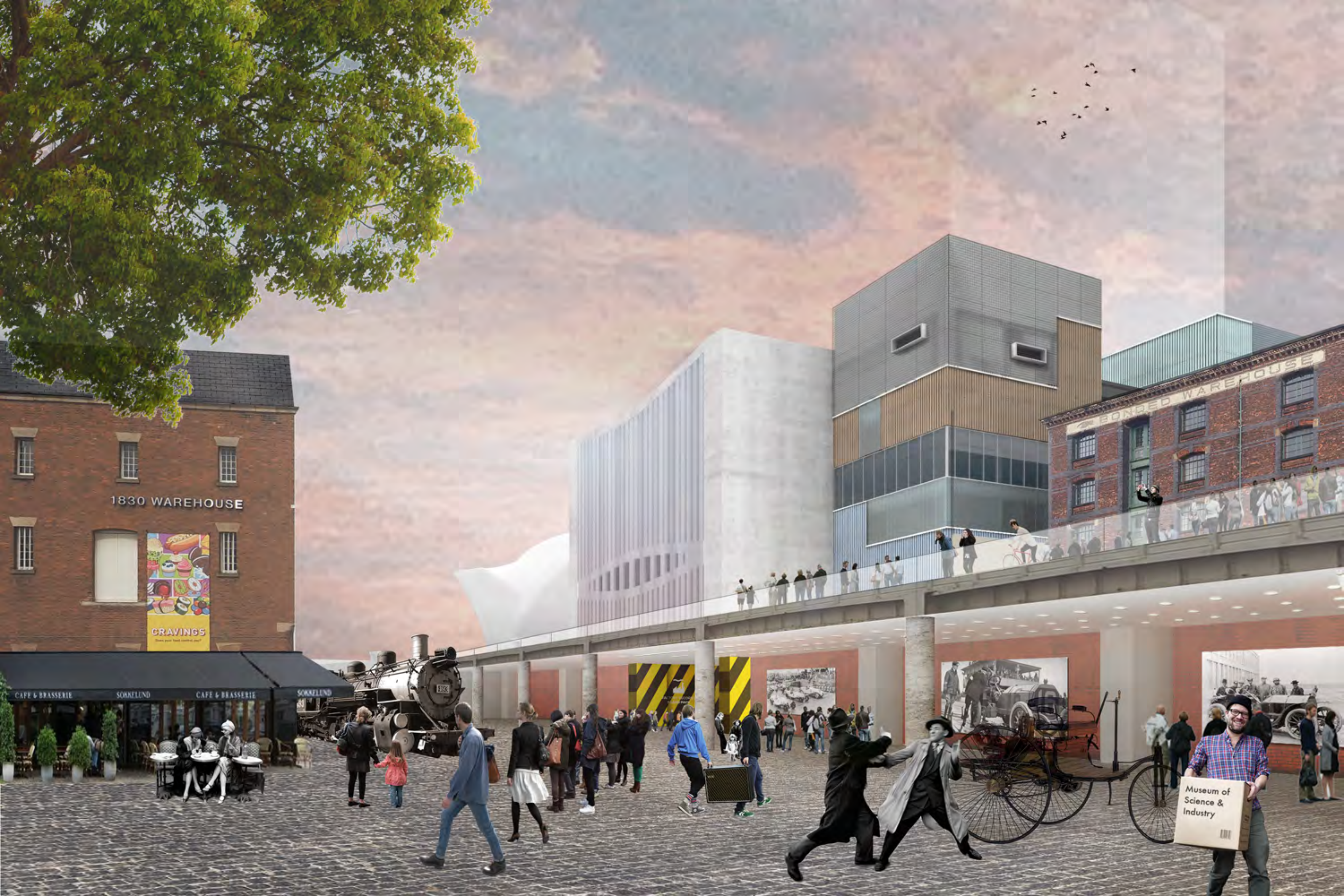
© RoCp Ltd.
RoC Consulting

ACADFILE

PLOT DATE: PLOTDATE

Appendix A – Proposed Development Details




1830 WAREHOUSE
CRAVINGS
CAFE & BRASSERIE
SOKKELUND
CAFE & BRASSERIE
SOKKELUND
BONDED WAREHOUSE
Museum of Science & Industry

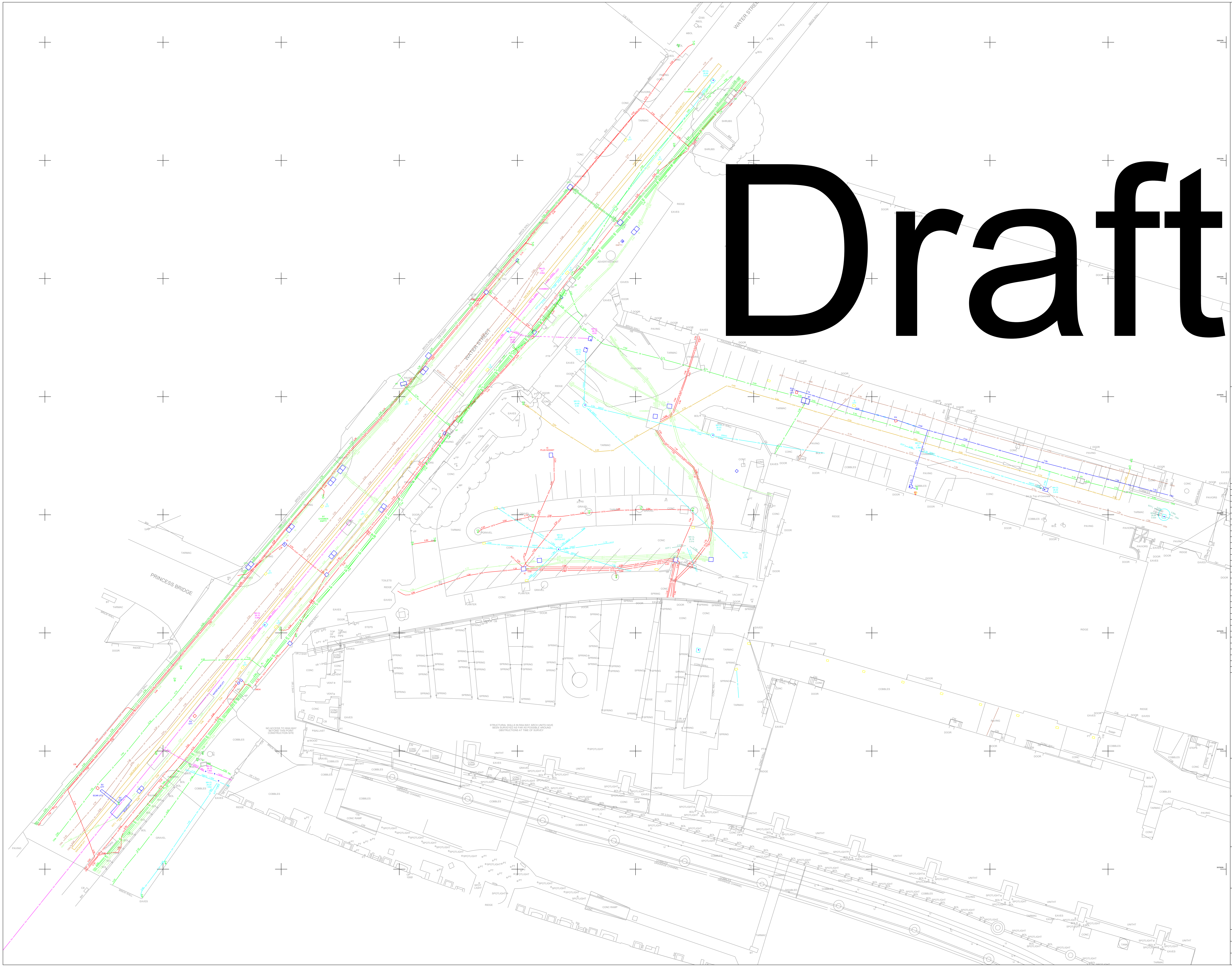
Appendix B – Information Source Summary

Information Sources	Information Obtained?		Comments
	YES	NO	
Environment Agency (e.g. for information on landfill sites, water abstraction, pollution incidents)	✓		Envirocheck® Report data.
The Local Authority (e.g. for information on environmental health & planning)	✓		Various reports and information for the St Johns masterplan.
Archaeological records	✓		Stephen Levrant Heritage Architecture Ltd Report (Heritage Appraisal).
Local history sources (e.g. libraries, museums, societies)	✓		Manchester Central Library Archive.
Coal Authority (coal mining records)	✓		Coal Authority Report Data.
British Geological Survey (maps and information about the geology of the area)	✓		BGS maps and memoirs.
Historical borehole information	✓		BGS data.
Aquifers (major and minor, and groundwater vulnerability)	✓		Envirocheck® Report data.
Hydrogeology (groundwater levels)	✓		Envirocheck® Report data and BGS data.
Ordnance Survey (current & previous editions of plans)	✓		Envirocheck® Report data & Manchester Central Library plans.
Newspaper reports		✓	---
Waste, Hazardous Substances	✓		Envirocheck® Report data.
Service/Utility Companies	✓		Combined service drawing covering majority of site(indicative) by Crookes Walker Consulting.
Existing site investigations		✓	---

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.

Appendix C – Utilities Information

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.


WATER STREET
WATER STREET
PRINCESS BRIDGE
NO ACCESS TO WALKWAY BEYOND THIS POINT CONSTRUCTION SITE
STRUCTURAL WALLS IN RAILWAY ARCH UNITS HAVE BEEN SURVEYED AS FAR AS POSSIBLE AROUND OBSTRUCTIONS AT TIME OF SURVEY
398040N
398020N
398000N
397980N
397960N
397920N
397900N

Draft

LEGEND

	Kerb	AV	Air Valve
	Low Kerb	BH	Borehole
	Safety Kerb	Bol	Bollard
	Verge	BT	British Telecom
	Fence	CTV	Cable T.V.
	Wall	CR	Cable Riser
	Wall (To scale)	CULV	Culvert
	Railway	DP	Down Pipe
	Pipeline	Dr	Drain
	Top of bank	EP	Electricity Pole
	Bottom of bank	ER	Earth Rod
	Ditch	FH	Fire Hydrant
	Channel (To scale)	G	Gully
	Overhead Line	GR	Gas Riser
BT	BT Cable	Gas	Gas Pipe
COM	General Comms. Cable	GV	Gas Valve
CTV	CTV Cable	IC	Small IC
CW	Combined Water Pipe	IC	Inspection Cover
ELEC	Electricity Cable	IC	Triangular IC
FO	Fibre Optic Cable	IRS	Illuminated Road Sign
FW	Foul Water Pipe	KO	Kerb Outlet
GAS	Gas Pipe	LP	Lamp Post
HV	High Voltage Cable	Met	Meter
LV	Low Voltage Cable	MH	Circular Manhole
MW	Mains Water Pipe	MH	Manhole
OXG	Oxygen Pipe	MH	Triangular Manhole
SW	Surface Water Pipe	MP	Marker Post
UN	Unknown Service	Pipe	Pipe
ABT	Assumed BT Cable	PIT	Trial Pit
ACOM	Assumed General Comms. Cable	RE	Rodding Eye
ACTV	Assumed CTV Cable	RS	Road Sign
ACW	Assumed Combined Water Pipe	SC	Stop Cock
AELEC	Assumed Electricty Cable	Stay	Stay
AFO	Assumed Fibre Optic Cable	Tap	Tap
AFW	Assumed Foul Water Pipe	TP	Telegraph Pole
AGAS	Assumed Gas Pipe	TS	Traffic Signal
AHV	Assumed High Voltage Cable	Vent	Vent
ALV	Assumed Low Voltage Cable	WR	Point Water Riser
		EOR	End of Record
AMW	Assumed Mains Water Pipe	EOT	End of Trace (Proceed with caution)
ASW	Assumed Surface Water Pipe	OSA	Outside Survey Area

X	Exit pipe	UTS	Unable to Survey	UTL	Unable To Locate
TFR	Taken From Records	SV	Sluice Valve	UTR	Unable to Raise
d	Depth Equals	VC	Vitrified Clay Pipe	UTT	Unable To Trace

A range of detection methods are used to obtain the underground information produced in this drawing. Variations in the ground conditions can affect the quality of the data and therefore an absolute affirmation cannot be guaranteed. The identification of any located service should not be treated as infallible. The originating source may not have been traced. The location and/or identification of a service will not necessarily indicate whether it is live or dead.

All depths of metallic features are to centre of the service, depths on drainage runs are to the pipe invert at the manhole and should be treated as an approximate indication. Underground drainage has been proven for position using traceable sonde methods, unless otherwise stated. No allowance has been made for sub surface entry into manholes or other chambers or voids below ground level, therefore any details relating to depths, sizes etc., are taken from above ground and as such will be approximate only.

Features not traceable by electromagnetic or sonde techniques, have not been located. These results are not infallible and trial excavations should be carried out to confirm service identification, position and particularly depths, where these are critical.

L & M Surveys Services Ltd is not liable for any topographical survey that has not been undertaken by us. Any inaccuracies relating to background mapping, that we have no control over, are the liability of the client.

The term end of trace signifies the last possible point of location and not the termination of the service. In these instances please proceed with caution.

CONTROL STATION COORDINATES

STN	EASTING	NORTHING	LEVEL

N

INDICATIVE OF NORTH

Notes:

All levels shown are relative to the existing site control supplied by client.

The co-ordinates shown on this plan are relative to a LOCAL GRID.
The survey is orientated approximately to grid north.

L&M Survey Services
LAND · MINERAL · HYDROGRAPHIC

Kilmarnock
Netherton House, West Netherton Street,
Kilmarnock, KA1 4BU
Tel: 01563 533368 Fax: 01563 533309
Email: kilmarnock@lmsurveyservices.com

Edinburgh
24 Canning Street, Haymarket,
Edinburgh, EH3 8EG
Tel: 0131 272 2706 Fax: 0131 272 2800
Email: edinburgh@lmsurveyservices.com

Newcastle
The Grainger Suite, Dobson House,
The Regent Centre, Newcastle, NE3 3PF
Tel: 0191 233 6314 Fax: 0191 233 6337
Email: newcastle@lmsurveyservices.com

Client :

BURRO HAPPOLD ENGINEERING
2 CASTLE STREET
MANCHESTER
M3 4LZ

Project Title :

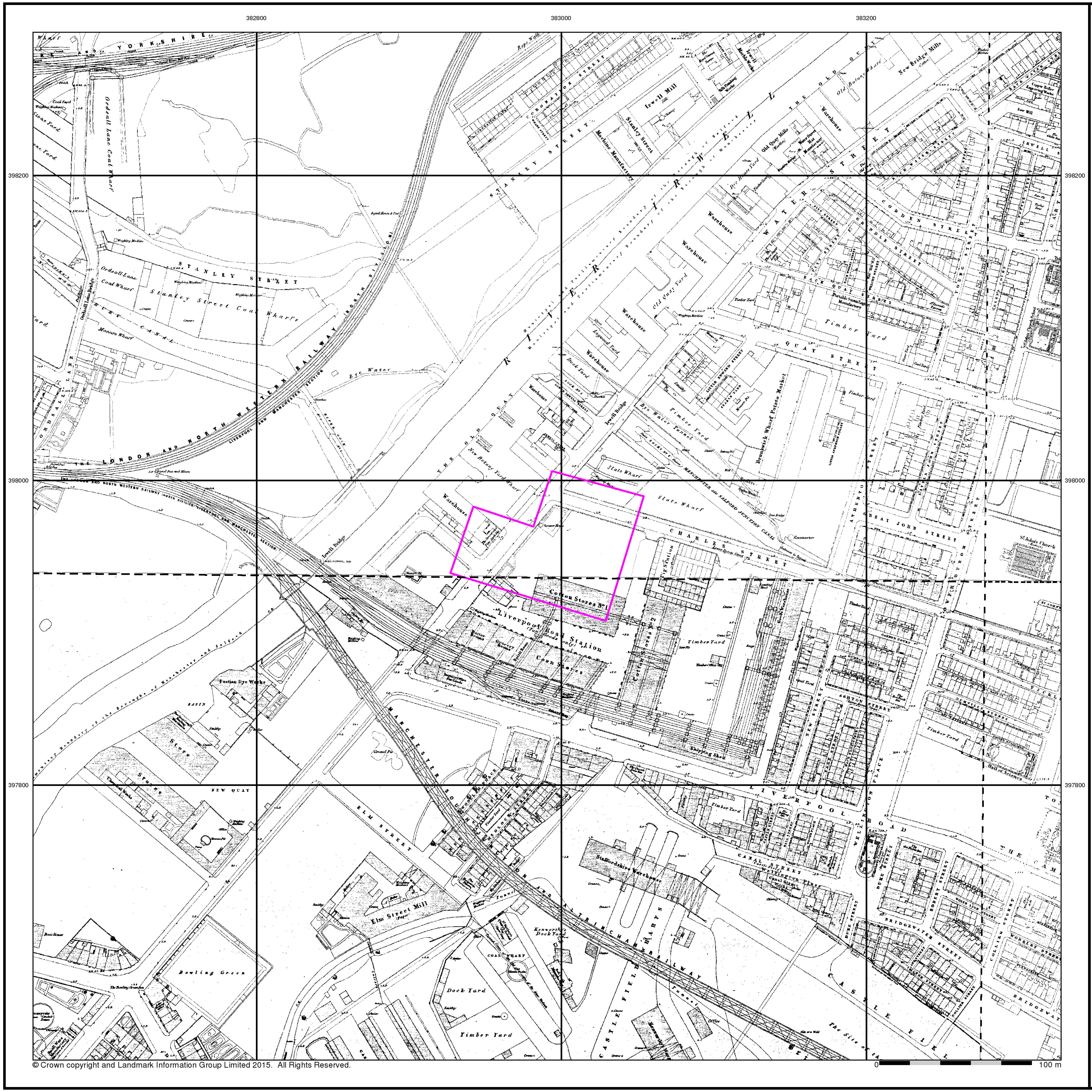
UTILITY SURVEY
THE FACTORY
WATER STREET
MANCHESTER

Sheet Title : SHEET 1 OF 1		Scale : 1:200	
Surveyed date : 10/04/16	Issued date : 22/04/16	Enquiry No : 18333	Project No : 11543 Draft
Surveyed by : GL	Processed by : GL	Checked by : PW	Approved by : JMK

A0 Sheet

Appendix D – Historical Maps

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.


382800
383000
383200
398200
398000
397800
River Irwell
Water Street
Stanley Street
Liverpool Road Station
Charles Street
Slate Wharf
Cotton Stores No 1
Timber Yard
Liverpool Road
Manchester South Junction and Altrincham Railway
Elm Street
Bowling Green
Dock Yard
Castle Field
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®
Historical

Lancashire And Furness

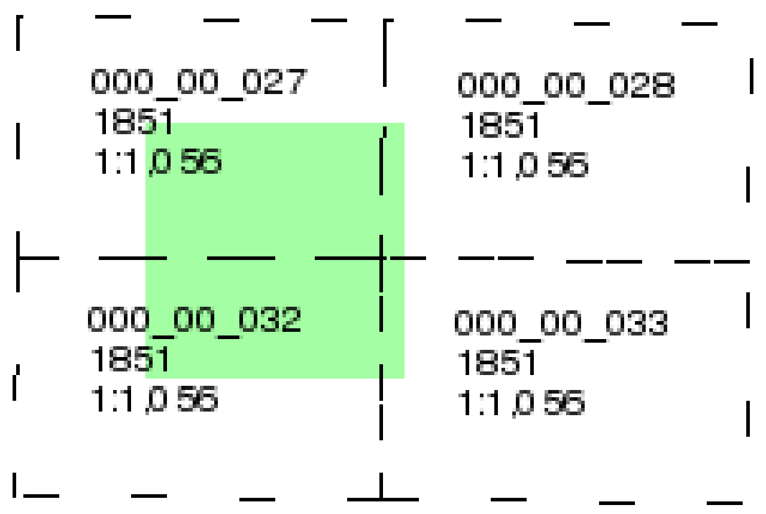
Published 1851

Source map scale - 1:1,056

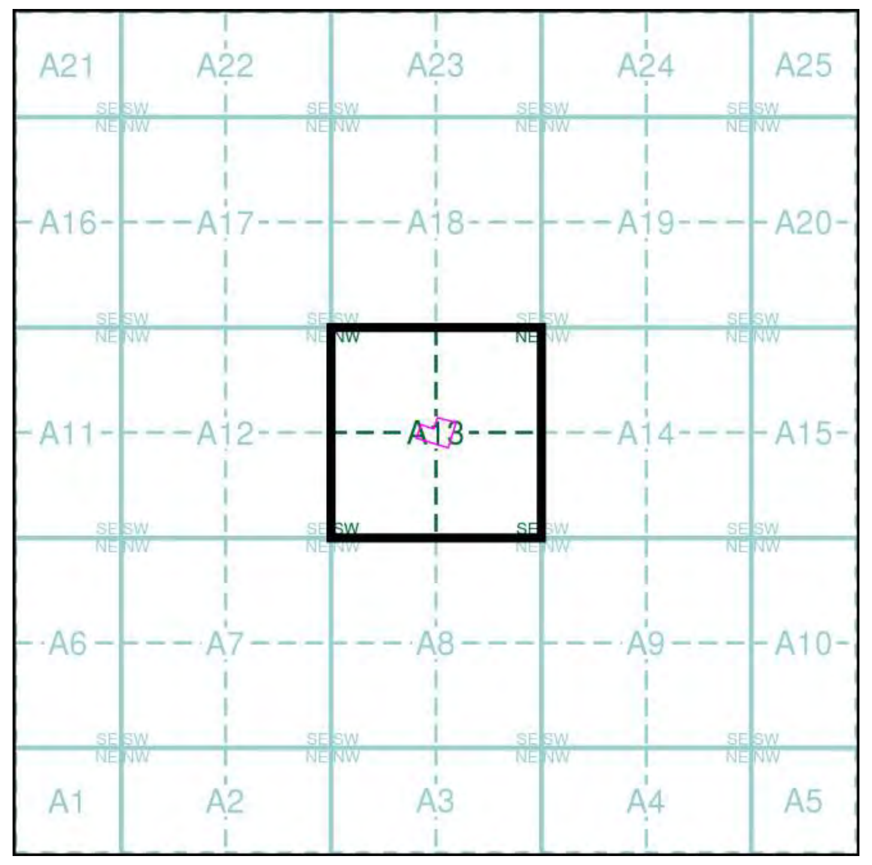
The 1:1056 scale of Ordnance Survey mapping was adopted from Ireland in 1848 and was used to survey towns with a population of over 4000, plus county towns of lesser population, in those counties mapped at the six-inch scale in 1841-55. The scale was the largest scale at which London was mapped by the Ordnance Survey and a 'skeleton' survey of the capital, showing little more than streets, street names, frontages and altitudes, was undertaken between 1848 and 1850. The majority of the 1:1056 surveys were later replaced by 1:500 surveys; although almost all the remainder were revised at this scale, sometimes more than once before 1895. The type of detail shown on the 1:1056 scale is broadly similar to that on 1:500; the apparent omission of minor details such as sewer access points and street lights may be as much a reflection of the generally earlier date of these plans, as of the specification of the map.

Please note: Due to the partial coverage of Historical Town Plans, it is possible that not all segments within an order will contain mapping. Only the segments that have Town Plan coverage will be generated.

Map Name(s) and Date(s)


000_00_027
1851
1:1,056
000_00_028
1851
1:1,056
000_00_032
1851
1:1,056
000_00_033
1851
1:1,056

Historical Town Plan - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

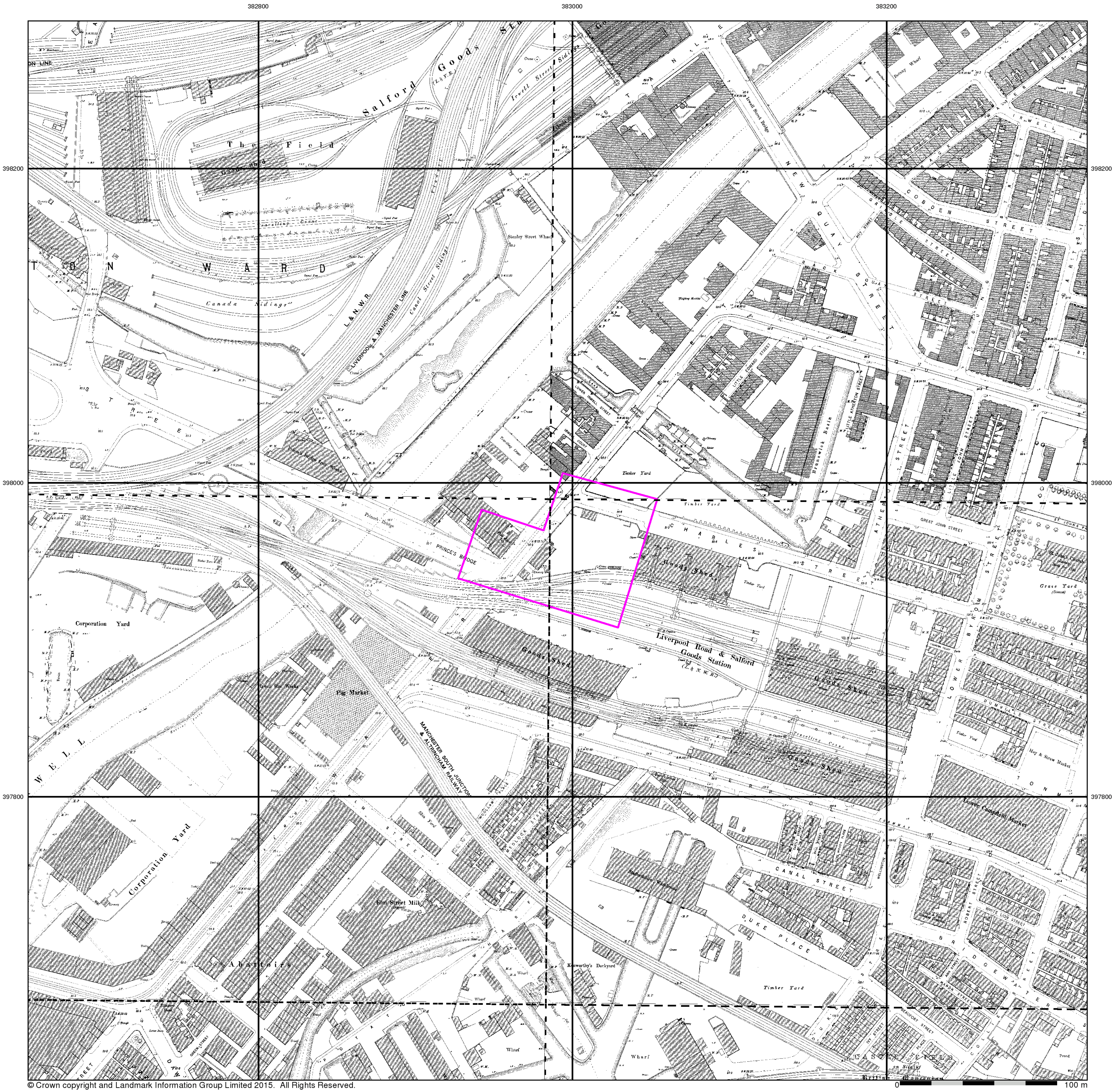
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	0

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Salford Goods
The Field
L. & N. W. R.
Liverpool & Manchester Line
Canal Street Sidings
Canada Sidings
Stanley Street Wharf
Irwell Street Sidings
New Quay Street
Cobden Street
Timber Yard
Princes Bridge
Charles Street
Goods Shed
Great John Street
Liverpool Road & Salford Goods Station
Corporation Yard
Pig Market
Manchester South Junction & Altrincham Railway
Grave Yard
Lower Byrom Street
Hay & Straw Market
Lower Campfield Market
Canal Street
Duke Place
Elm Street Mill
Abattoirs
Kenworthy's Dockyard
Wharf
Bridgewater Street
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®
Historical

Lancashire And Furness

Published 1891

Source map scale - 1:500

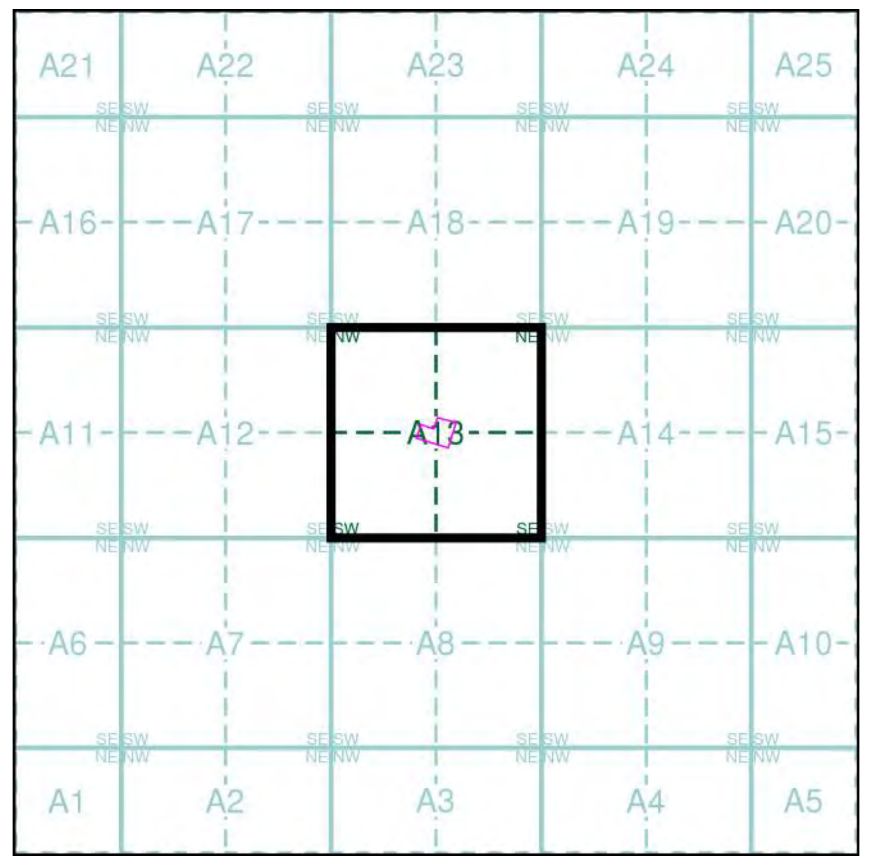
The 1:500 scale Ordnance Survey mapping was introduced in 1855 as a replacement for the 1:528 scale and to compliment the 1:2500 scale that had been implemented in 1853. By 1895, the 1:500 scale covered most towns over a population of about 4000 at the time of survey, although very few towns were mapped more than once at this scale, and none have been since 1910. The 1:500 scale gives particular emphasis to such features as lamp posts, man holes, arched passages and minor building projections. Also often featured are divisions between tenements, interior ground floor layouts of public buildings, and on earlier plans, the functions of the various parts of larger industrial premises are also indicated. Content of the plans does vary however, from one town to the next in terms of, for example, the completeness of railway tracks and the coverage of public buildings.

Please note: Due to the partial coverage of Historical Town Plans, it is possible that not all segments within an order will contain mapping. Only the segments that have Town Plan coverage will be generated.

Map Name(s) and Date(s)

104_10_002 1891 1:500	104_10_003 1891 1:500
104_10_007 1891 1:500	104_10_008 1891 1:500
104_10_012 1891 1:500	104_10_013 1891 1:500

Historical Town Plan - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	0

Site Details

121, Water Street, Manchester, M3 4JU

Landmark®
Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

Quarry
Gravel Pit
Sand Pit
Clay Pit
Shingle
Refuse Heap
Sloping Masonry
Flat Rock
Marsh
Reeds
Osiers
Rough Pasture
Furze
Wood
Mixed Wood
Brushwood
Orchard
Fir
Ford
Stepping Stones
Ferry
Waterfall
Lock
Trig. Station
507 Altitude at Trig. Station
B.M.325·9 Bench Mark
342 Surface Level
Arrow denotes flow of water
Antiquities (site of)
Cutting
Embankment
Railway crossing Road
Level Crossing
Road crossing Railway
Railway crossing River or Canal
B.R. Road over single stream
Road over River or Canal

County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)

B P B S	Boundary Post or Stone	*P.C.B*	Police Call Box
B.R.	Bridle Road	*P*	Pump
E.P	Electricity Pylon	*S.P*	Signal Post
F.B.	Foot Bridge	*Sl.*	Sluice
F.P.	Foot Path	*Sp.*	Spring
G.P	Guide Post or Board	*T.C.B*	Telephone Call Box
M.S	Mile Stone	*Tr.*	Trough
M.P M.R	Mooring Post or Ring	*W*	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250

or Inactive Quarry, Chalk Pit or Clay Pit
Active Quarry, Chalk Pit or Clay Pit
Rock
Boulders
Cliff
Slopes Top Top
Roofed Building
Glazed Roof Building
Top Sloping Masonry
Archway
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
B M Bench Mark
Antiquity (site of)
Cave Entrance
Triangulation Station
Electricity Pylon
E T L Electricity Transmission Line

County Boundary (Geographical)
County & Civil Parish Boundary
Civil Parish Boundary
Admin. County or County Bor. Boundary
L B Bdy London Borough Boundary
Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250

Cliff
Slopes Top Top
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Positioned Boulder
Scree
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
Triangulation Station
Antiquity (site of)
E T L Electricity Transmission Line
Electricity Pylon
BM 231.60m Bench Mark
Buildings with Building Seed
Roofed Building
Glazed Roof Building

Civil parish/community boundary
District boundary
County boundary
Boundary post/stone
Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

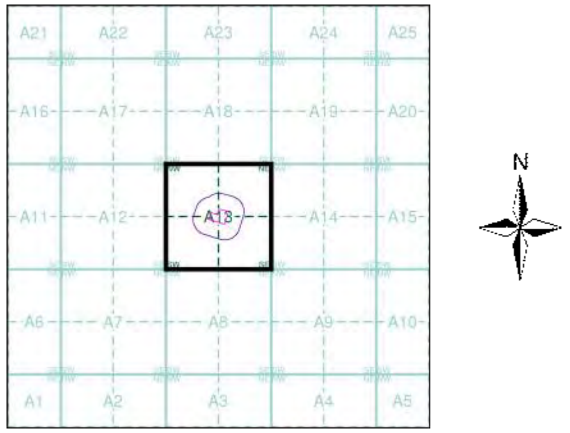
Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

Envirocheck®

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Lancashire And Furness	1:2,500	1908	2
Lancashire And Furness	1:2,500	1922	3
Ordnance Survey Plan	1:1,250	1948 - 1949	4
Ordnance Survey Plan	1:2,500	1950 - 1951	5
Ordnance Survey Plan	1:1,250	1953 - 1957	6
Ordnance Survey Plan	1:2,500	1956 - 1965	7
Ordnance Survey Plan	1:1,250	1962 - 1980	8
Ordnance Survey Plan	1:2,500	1963 - 1965	9
Ordnance Survey Plan	1:2,500	1971	10
Ordnance Survey Plan	1:1,250	1973 - 1981	11
Supply of Unpublished Survey Information	1:1,250	1974 - 1975	12
Additional SIMs	1:1,250	1978 - 1984	13
Additional SIMs	1:1,250	1986 - 1990	14
Additional SIMs	1:1,250	1990	15
Additional SIMs	1:1,250	1990	16
Large-Scale National Grid Data	1:1,250	1992	17
Large-Scale National Grid Data	1:1,250	1993 - 1994	18
Large-Scale National Grid Data	1:1,250	1993 - 1995	19
Large-Scale National Grid Data	1:1,250	1994 - 1995	20
Large-Scale National Grid Data	1:1,250	1995	21
Large-Scale National Grid Data	1:1,250	1996	22

Historical Map - Segment A13



Order Details

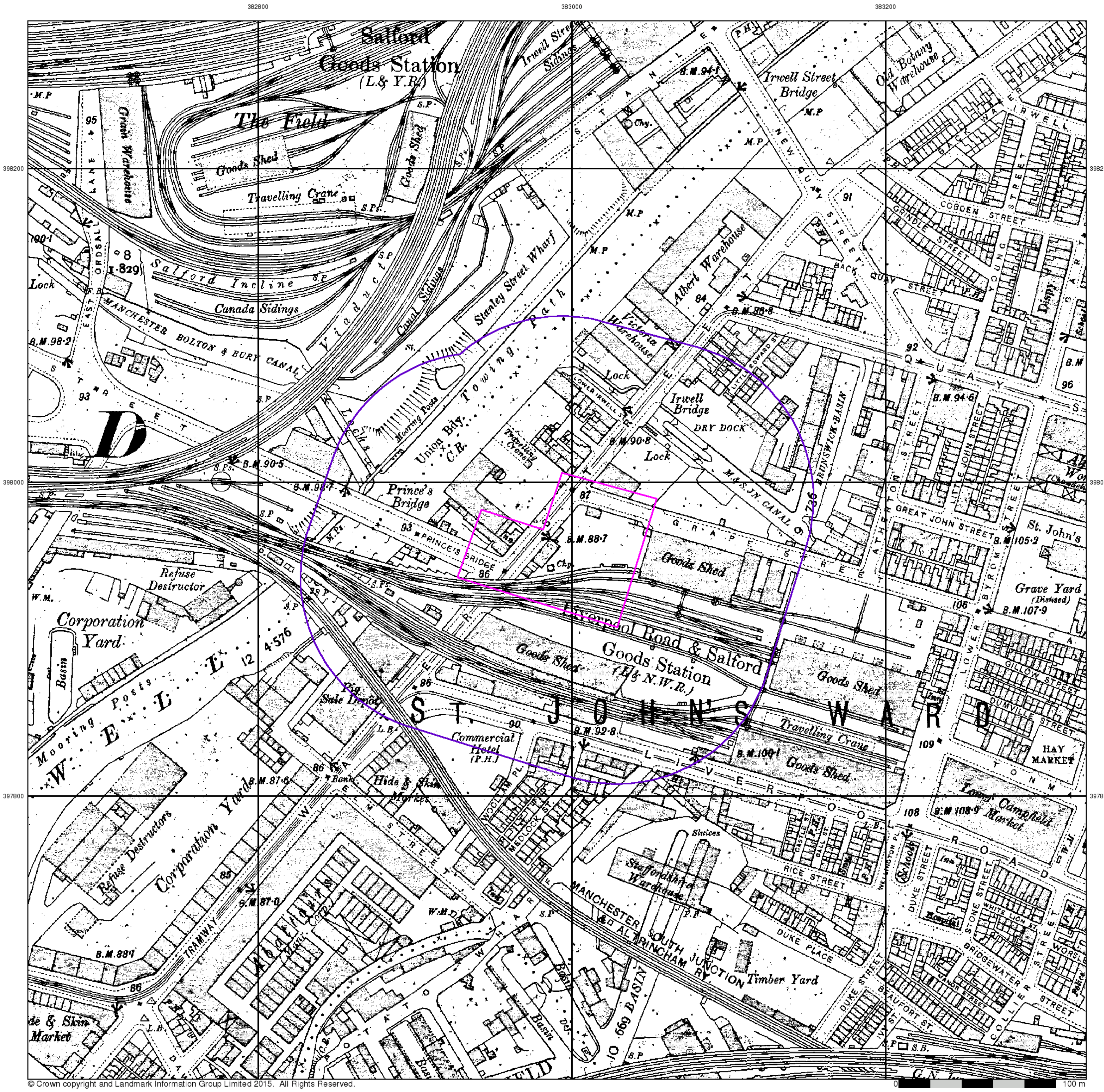
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



382800
383000
383200
398200
398000
397800
Salford Goods Station (L.& Y.R.)
The Field
Goods Shed
Grain Warehouse
Travelling Crane
Salford Incline
Canada Sidings
Manchester Bolton & Bury Canal
Viaduct
Canal Sidings
Stanley Street Wharf
Towing Path
Irwell Street Sidings
Irwell Street Bridge
Old Bolany Warehouse
New Quay Street
Albert Warehouse
Victoria Warehouse
Lock
Lower Irwell
Irwell Bridge
Dry Dock
Brunswick Basin
Mersey & Irwell Canal
Union Bay C.B.
Travelling Cranes
Prince's Bridge
Grape Street
Goods Shed
Liverpool Road & Salford Goods Station (L.& N.W.R.)
St. John's Ward
Refuse Destructor
Corporation Yard
Basin
Mooring Posts
Pig Sale Depot
Commercial Hotel (P.H.)
Hide & Skin Market
Travelling Crane
Liverpool Road
Great John Street
St. John's
Grave Yard (Disused)
Cobden Street
Quay Street
Hay Market
Lower Campfield Market
Staffordshire Warehouse
Manchester South Junction and Altrincham Ry.
Timber Yard
Duke Place
Rice Street
Duke Street
Bridgewater Street
Water Street
Corporation Yard
Refuse Destructor
Tramway
Basin
D

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

0 100 m

Envirocheck®

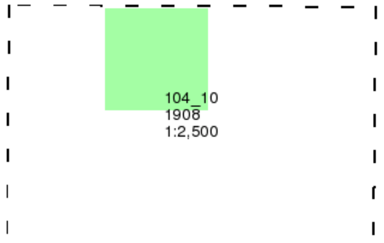
Lancashire And Furness

Published 1908

Source map scale - 1:2,500

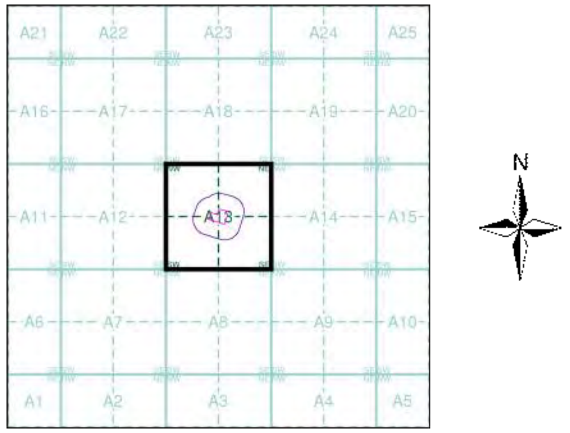
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



104_10
1908
1:2,500

Historical Map - Segment A13



A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

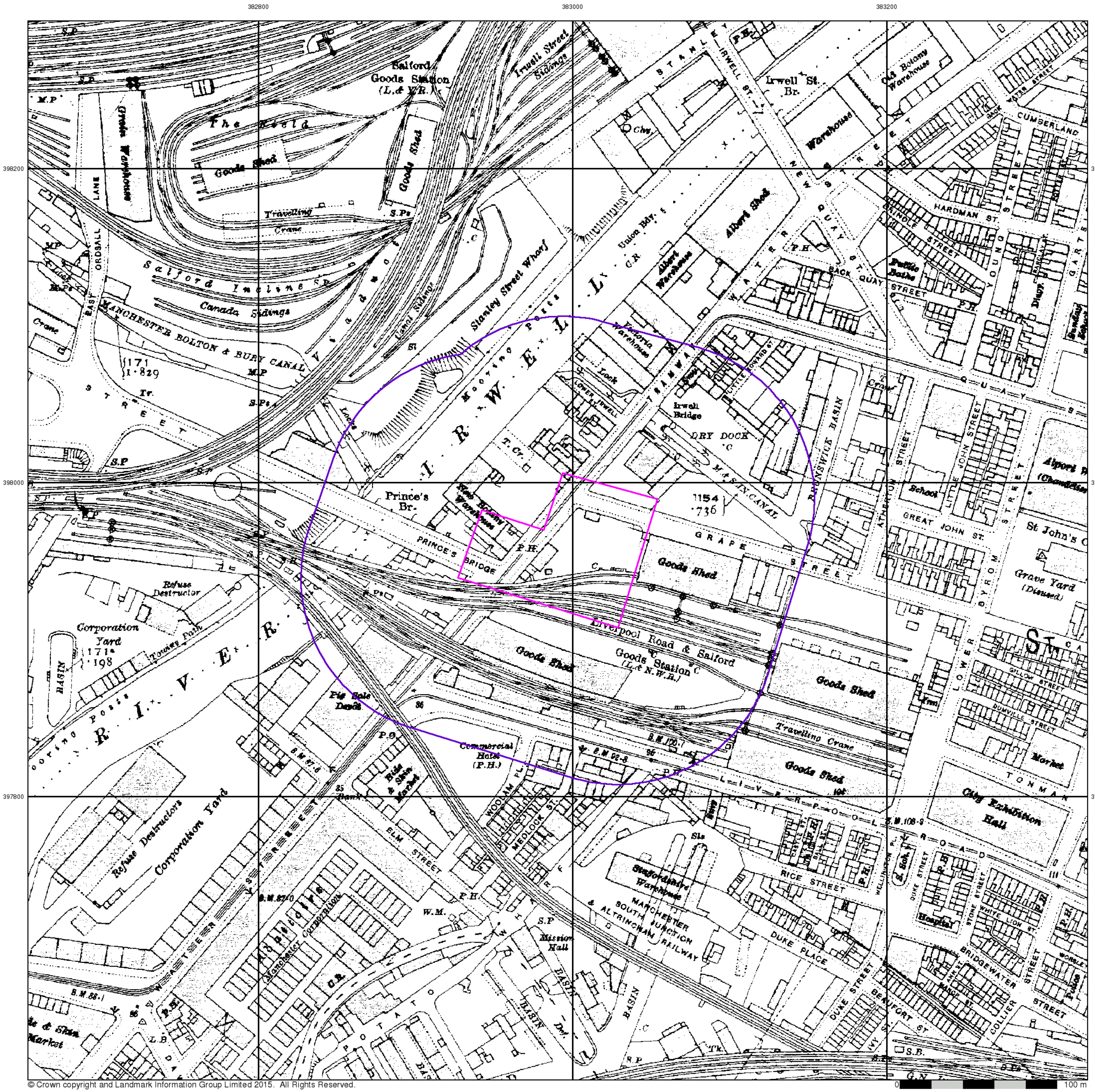
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Salford Goods Station (L.& Y.R.)
Irwell Street Sidings
The Field
Goods Shed
Travelling Crane
Salford Incline
Canada Sidings
Manchester Bolton & Bury Canal
Stanley Street Wharf
River Irwell
Union Bdy.
Irwell St. Br.
Warehouse
Albert Shed
Albert Warehouse
Victoria Warehouse
Irwell Bridge
Dry Dock
Brunswick Basin
Prince's Br.
Prince's Bridge
New Bailey Warehouse
Grape Street
Goods Shed
Liverpool Road & Salford Goods Station (L.& N.W.R.)
Refuse Destructor
Corporation Yard
Pig Sale Depôt
Commercial Hotel (P.H.)
Travelling Crane
Liverpool Road
Water Street
New Quay Street
Stanley Street
Cumberland Street
Hardman St.
Atherton Street
Little John Street
Great John St.
Byrom Street
Lower Byrom Street
St John's
Grave Yard (Disused)
Gillow Street
Dunville Street
Market
City Exhibition Hall
Staffordshire Warehouse
Manchester South Junction & Altrincham Railway
Rice Street
Duke Place
Duke Street
Elm Street
Medlock St.
Woolam Pl.
Mission Hall
Refuse Destructors
Corporation Yard
Bridgewater Street
Potato
East Ordsall Lane
School
Baths
1154
·736
171
1·829
171·
·198
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

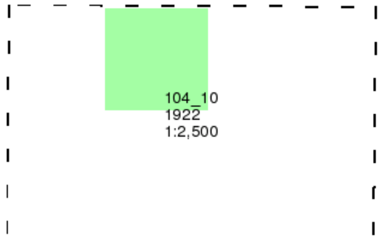
Lancashire And Furness

Published 1922

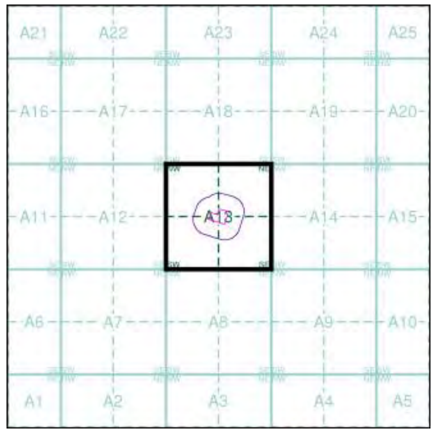
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)


104_10
1922
1:2,500

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

Order Details

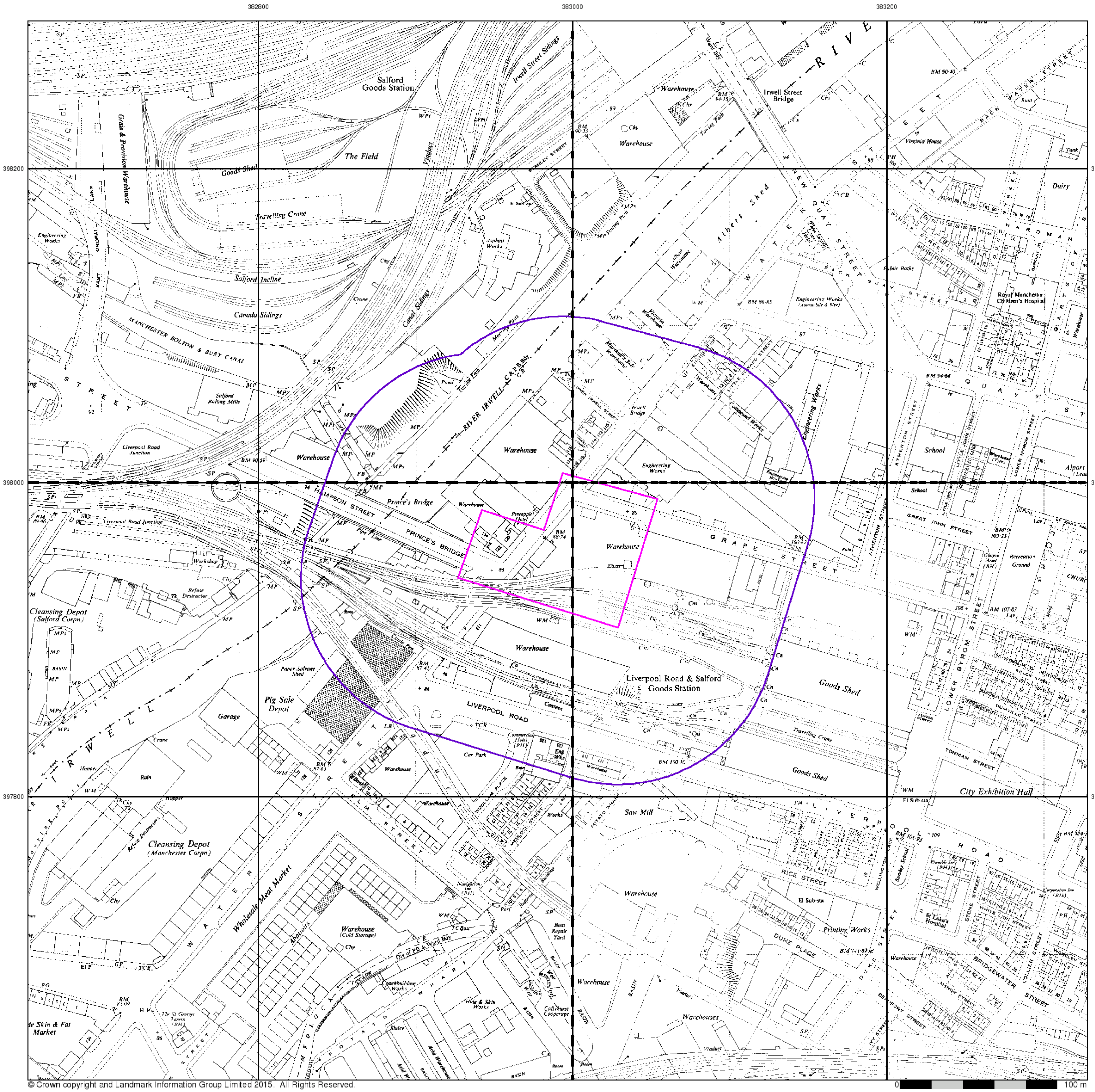
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Salford Goods Station
Irwell Street Sidings
Grain & Provision Warehouse
The Field
Viaduct
Goods Shed
Travelling Crane
Salford Incline
Canada Sidings
Canal Sidings
Manchester Bolton & Bury Canal
Salford Rolling Mills
Liverpool Road Junction
River Irwell
Warehouse
Irwell Street Bridge
Albert Shed
Water Street
New Quay Street
Engineering Works
Compound Works
Prince's Bridge
Hampson Street
Pineapple Hotel
Grape Street
Liverpool Road & Salford Goods Station
Liverpool Road
Goods Shed
Cleansing Depot (Salford Corpn)
Refuse Destructor
Paper Salvage Shed
Pig Sale Depot
Garage
Irwell
Cleansing Depot (Manchester Corpn)
Wholesale Meat Market
Abattoirs
Warehouse (Cold Storage)
Saw Mill
Rice Street
Duke Place
Printing Works
St Luke's Hospital
Bridgewater Street
Lower Byrom Street
Atherton Street
Great John Street
School
Recreation Ground
City Exhibition Hall
Tonman Street
Royal Manchester Children's Hospital
Dairy
Quay Street
Car Park
Medlock
Viaduct
Warehouses
Basin
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

Ordnance Survey Plan

Published 1948 - 1949

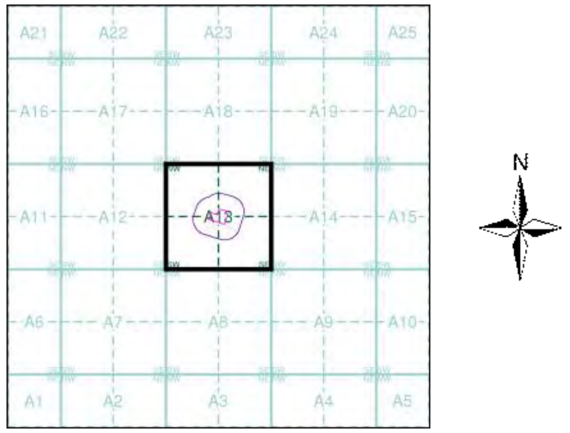
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ8298SE 1948 1:1,250	SJ8398SW 1948 1:1,250
SJ8297NE 1949 1:1,250	SJ8397NW 1948 1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

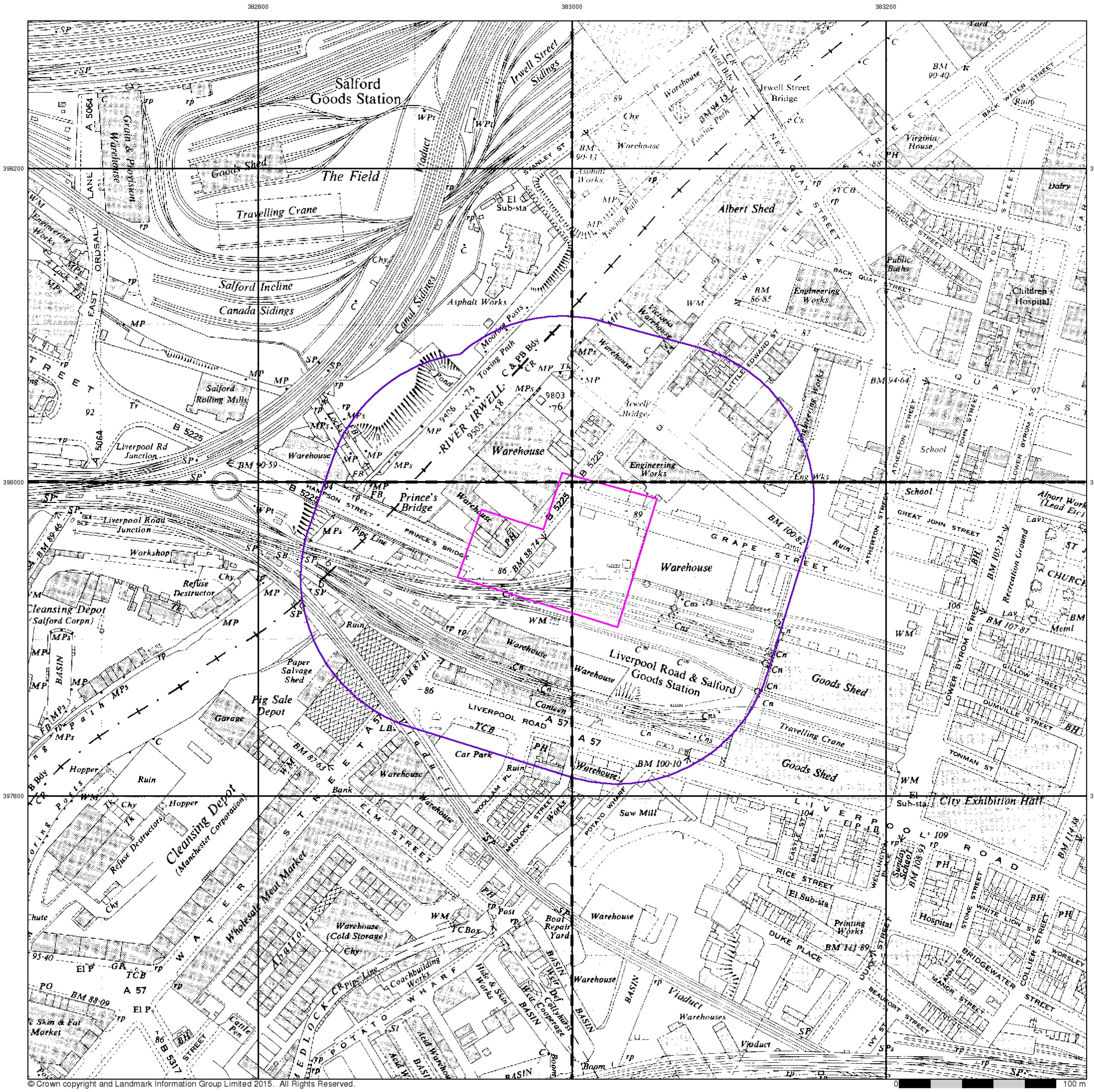
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Salford Goods Station
The Field
Travelling Crane
Salford Incline
Canada Sidings
Goods Shed
Grain & Provision Warehouse
ORDSALL LANE
Engineering Works
Salford Rolling Mills
Liverpool Rd Junction
Liverpool Road Junction
Irwell Street Sidings
Canal Sidings
Viaduct
Asphalt Works
RIVER IRWELL
Towing Path
Mooring Posts
Albert Shed
Irwell Street Bridge
NEW QUAY STREET
WATER STREET
BACK QUAY STREET
Engineering Works
Public Baths
Children's Hospital
Virginia House
Dairy
LITTLE EDWARD ST
QUAY STREET
School
ATHERTON STREET
LITTLE JOHN STREET
LOWER BYROM ST
GREAT JOHN STREET
Alport Works (Lead Etc)
Prince's Bridge
PRINCE'S BRIDGE
HAMPSON STREET
Warehouse
Irwell Bridge
GRAPE STREET
Liverpool Road & Salford Goods Station
Goods Shed
Travelling Crane
LIVERPOOL ROAD
Canteen
Car Park
Cleansing Depot (Salford Corpn)
Refuse Destructor
Workshop
Paper Salvage Shed
Pig Sale Depot
Garage
BASIN
Ruin
Hopper
Cleansing Depot (Manchester Corporation)
Wholesale Meat Market
Abattoirs
Warehouse (Cold Storage)
Coachbuilding Works
WATER STREET
POTATO WHARF
ELM STREET
WOOLAM PL
MEDLOCK STREET
Boat Repair Yard
Saw Mill
Warehouse
Viaduct
Warehouses
City Exhibition Hall
LIVERPOOL ROAD
RICE STREET
DUKE PLACE
DUKE STREET
Printing Works
Hospital
Sunday School
BRIDGEWATER STREET
COLLIER STREET
MANCHESTER STREET
GILLOW STREET
DUMVILLE STREET
TONMAN ST
Recreation Ground
ST JOHN'S CHURCH
Meml
City Exhibition Hall
B 5225
A 57
A 5064
B 5317
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

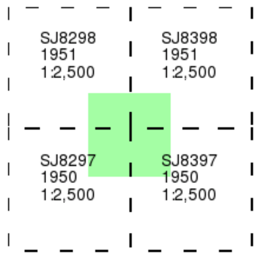
Ordnance Survey Plan

Published 1950 - 1951

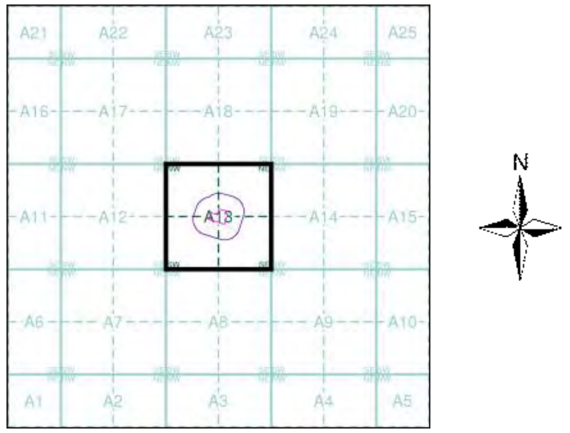
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)


SJ8298
1951
1:2,500
SJ8398
1951
1:2,500
SJ8297
1950
1:2,500
SJ8397
1950
1:2,500

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

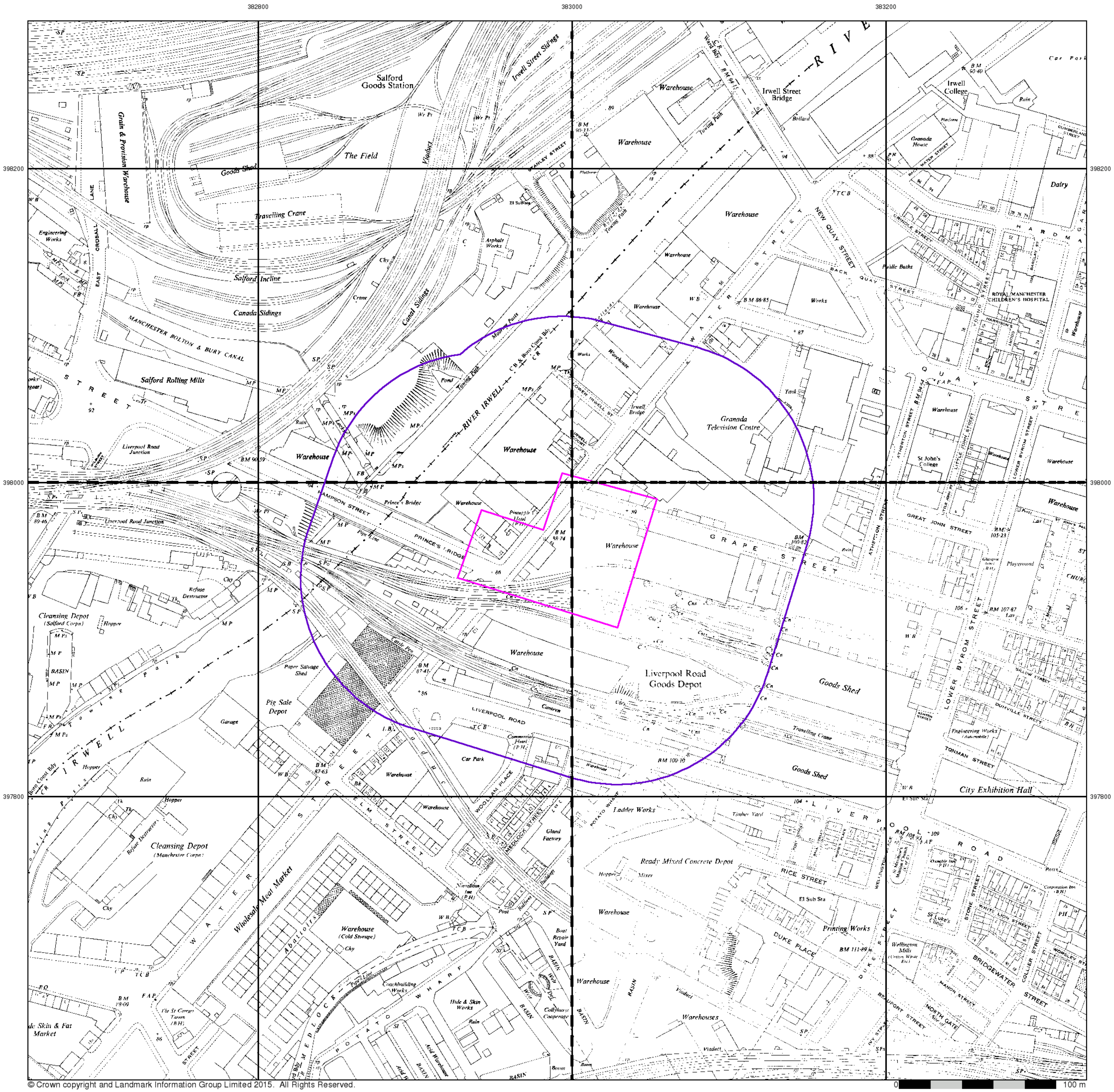
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Salford Goods Station
Grain & Provision Warehouse
Goods Shed
The Field
Travelling Crane
Irwell Street Sidings
Viaduct
Salford Incline
Canada Sidings
Canal Sidings
Engineering Works
Asphalt Works
Crane
MANCHESTER BOLTON & BURY CANAL
Salford Rolling Mills
Liverpool Road Junction
RIVER IRWELL
Towing Path
Pond
Warehouse
Irwell Street Bridge
Irwell Bridge
Granada Television Centre
NEW QUAY STREET
WATER STREET
Works
Irwell College
Granada House
Dalry
Public Baths
ROYAL MANCHESTER CHILDREN'S HOSPITAL
QUAY STREET
St John's College
ATHERTON STREET
LOWER BYROM STREET
GREAT JOHN STREET
Playground
Prince's Bridge
PRINCE'S BRIDGE
GRAPE STREET
Liverpool Road Junction
Refuse Destructor
Cleansing Depot (Salford Corpn)
BASIN
Paper Salvage Shed
Pig Sale Depot
Garage
Liverpool Road Goods Depot
Goods Shed
LIVERPOOL ROAD
Commercial Hotel (P H)
Car Park
Travelling Crane
Goods Shed
Engineering Works
TONMAN STREET
DUVILLE STREET
City Exhibition Hall
Cleansing Depot (Manchester Corpn)
Wholesale Meat Market
Abattoirs
Warehouse (Cold Storage)
Coachbuilding Works
Hide & Skin Works
Boat Repair Yard
Ladder Works
Ready Mixed Concrete Depot
RICE STREET
Printing Works
DUKE PLACE
Wellington Mills
St Luke's Clinic
BRIDGEWATER STREET
WHITE LION STREET
Warehouses
Viaduct
Hide Skin & Fat Market
POTATO WHARF
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

Ordnance Survey Plan

Published 1953 - 1957

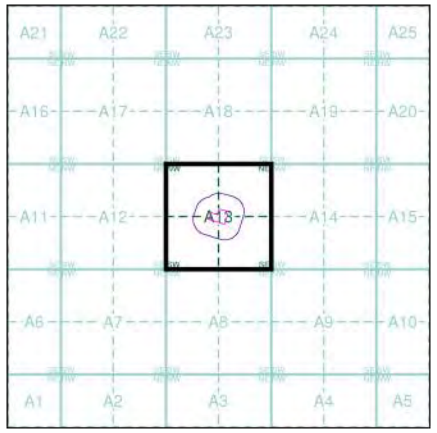
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ8298SE 1954 1:1,250	SJ8398SW 1957 1:1,250
SJ8297NE 1953 1:1,250	SJ8397NW 1955 1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

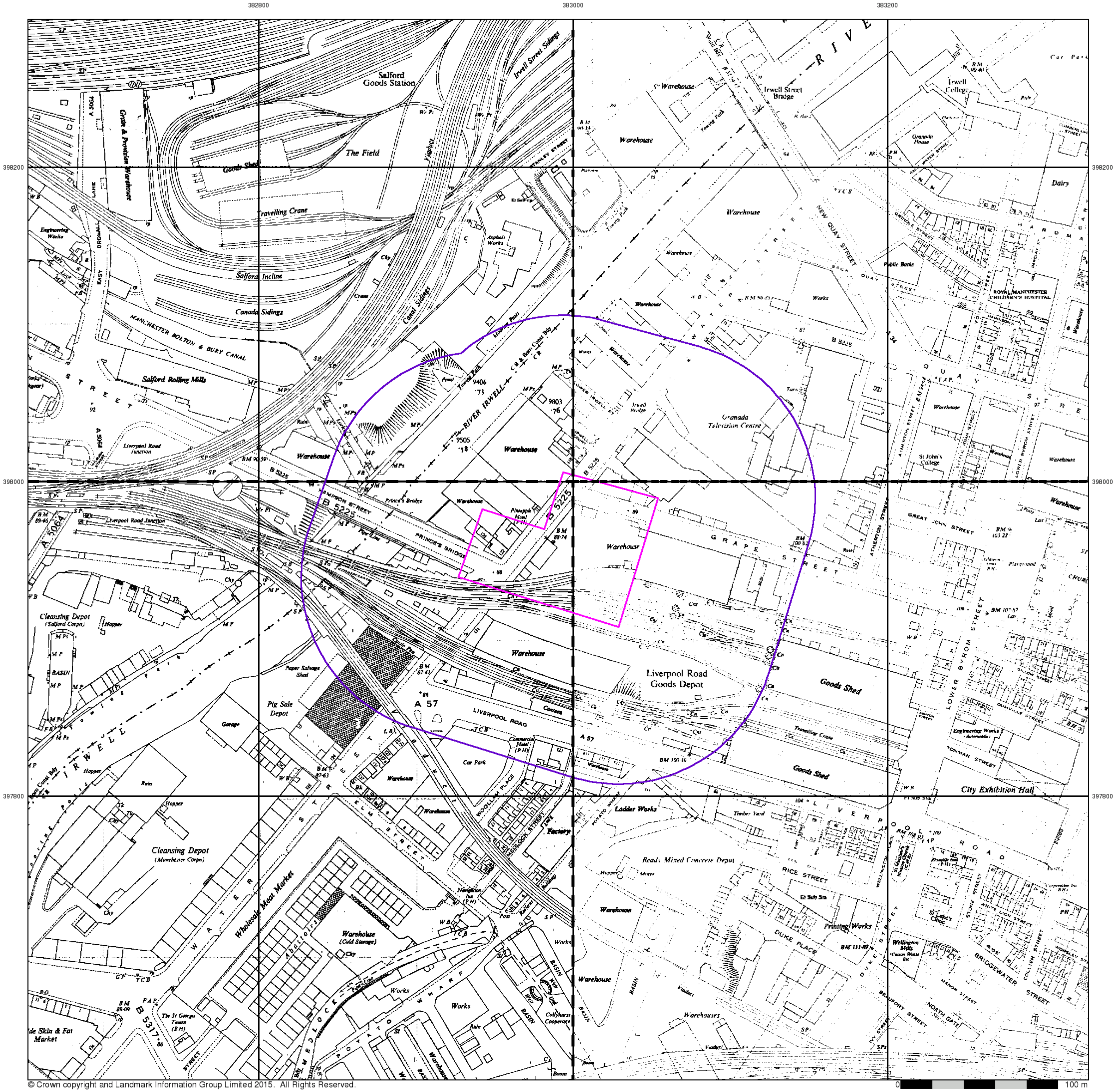
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Salford Goods Station
The Field
Irwell Street Sidings
Viaduct
Grain & Provision Warehouse
Travelling Crane
Salford Incline
Canada Sidings
Canal Sidings
Manchester Bolton & Bury Canal
Salford Rolling Mills
Liverpool Road Junction
River Irwell
Irwell Street Bridge
Warehouse
Irwell College
Granada House
Dairy
New Quay Street
Quay Street
Public Baths
Royal Manchester Children's Hospital
Granada Television Centre
St John's College
Great John Street
Water Street
Grape Street
Princes Bridge
Pineapple Hotel
B 5225
A 57
Liverpool Road
Liverpool Road Goods Depot
Goods Shed
Travelling Crane
City Exhibition Hall
Lower Byrom Street
Atherton Street
Engineering Works
Tonman Street
Cleansing Depot (Salford Corpn)
Paper Salvage Shed
Pig Sale Depot
Garage
Car Park
Ladder Works
Timber Yard
Ready Mixed Concrete Depot
Rice Street
Printing Works
Duke Place
Duke Street
Bridgewater Street
Cleansing Depot (Manchester Corpn)
Wholesale Meat Market
Warehouse (Cold Storage)
Abattoirs
Potato Wharf
Works
Hide Skin & Fat Market
Liverpool Road
Factory
Basin
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

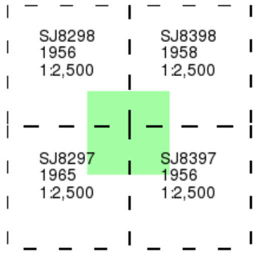
Ordnance Survey Plan

Published 1956 - 1965

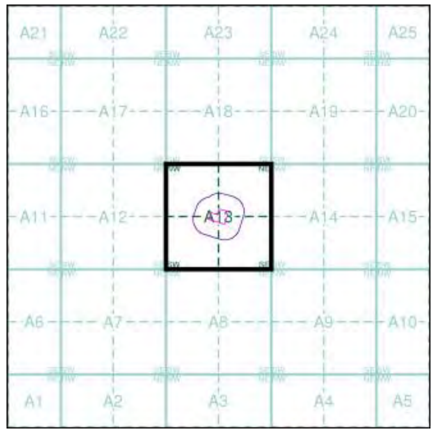
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)


SJ8298
1956
1:2,500
SJ8398
1958
1:2,500
SJ8297
1965
1:2,500
SJ8397
1956
1:2,500

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

N

Order Details

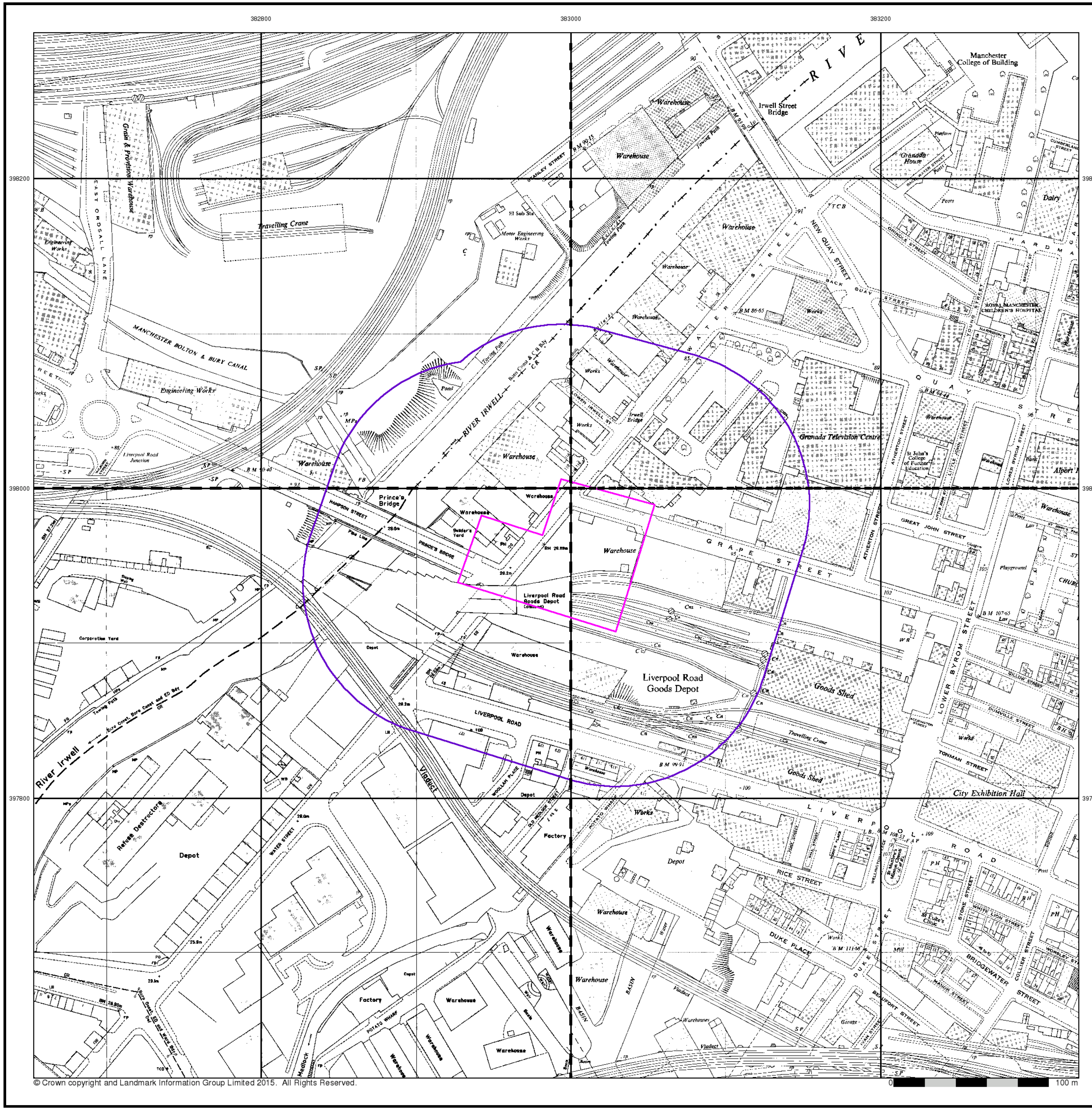
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



382800
383000
383200
398200
398000
397800
RIVER IRWELL
River Irwell
Irwell Street Bridge
Manchester College of Building
Warehouse
Towing Path
Grain & Provision Warehouse
EAST ORDSALL LANE
Travelling Crane
El Sub Sta
Motor Engineering Works
MANCHESTER BOLTON & BURY CANAL
Engineering Works
Liverpool Road Junction
Pool
Boro Const & C B Bdy
Works
LOWER IRWELL ST
Irwell Bridge
WATER STREET
NEW QUAY STREET
QUAY STREET
BACK QUAY
Granada Television Centre
Granada House
Dairy
ROYAL MANCHESTER CHILDREN'S HOSPITAL
HARDMAN
Prince's Bridge
HAMPSON STREET
PRINCE'S BRIDGE
Builder's Yard
PH
Liverpool Road Goods Depot
GRAPE STREET
GREAT JOHN STREET
St John's College of Further Education
ATHERTON STREET
LOWER BYROM STREET
Playground
CHURCH
Corporation Yard
Towing Path
Depot
Liverpool Road Goods Depot
Goods Shed
Travelling Crane
LIVERPOOL ROAD
Viaduct
City Exhibition Hall
TONMAN STREET
Refuse Destructors
Depot
WATER STREET
Factory
Works
Depot
RICE STREET
DUKE PLACE
DUKE STREET
BRIDGEWATER STREET
WHITE LION STREET
St Luke's Clinic
Mill
BASIN
Warehouse
Factory
POTATO WHARF
Medlock
Garage
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

Ordnance Survey Plan

Published 1962 - 1980

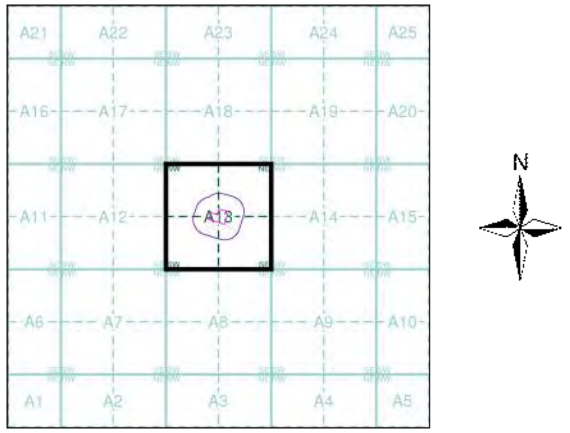
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SJ8298SE 1969 1:1,250	SJ8398SW 1962 1:1,250
SJ8297NE 1980 1:1,250	SJ8397NW 1963 1:1,250

Historical Map - Segment A13



A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

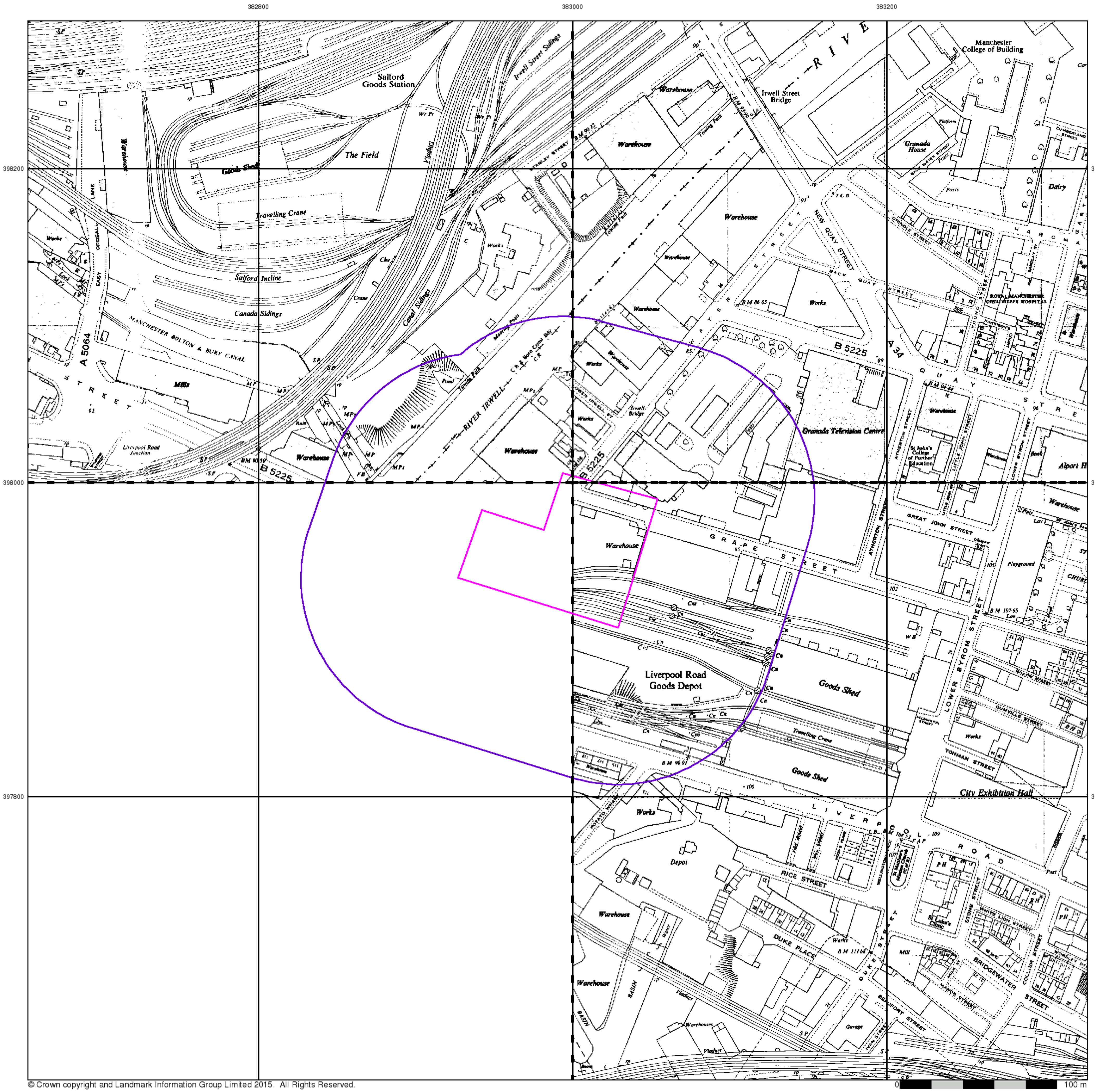
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Salford Goods Station
Irwell Street Sidings
The Field
Goods Shed
Travelling Crane
Salford Incline
Canada Sidings
Canal Sidings
Viaduct
MANCHESTER BOLTON & BURY CANAL
A 5064
STREET
Mills
Works
Warehouse
RIVER IRWELL
Towing Path
Irwell Street Bridge
Manchester College of Building
Granada House
Dairy
NEW QUAY STREET
QUAY STREET
WATER STREET
B 5225
A 34
Granada Television Centre
ROYAL MANCHESTER CHILDREN'S HOSPITAL
St John's College of Further Education
GREAT JOHN STREET
GRAPE STREET
Liverpool Road Goods Depot
Goods Shed
City Exhibition Hall
LIVERPOOL ROAD
LOWER BYROM STREET
ATHERTON STREET
RICE STREET
DUKE PLACE
DUKE STREET
BRIDGEWATER STREET
TONMAN STREET
Depot
Viaduct
Basin
Alport H
Playground
Liverpool Road Junction
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

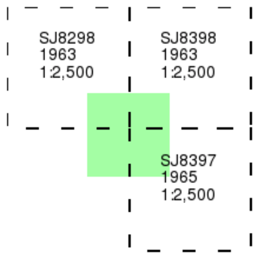
Ordnance Survey Plan

Published 1963 - 1965

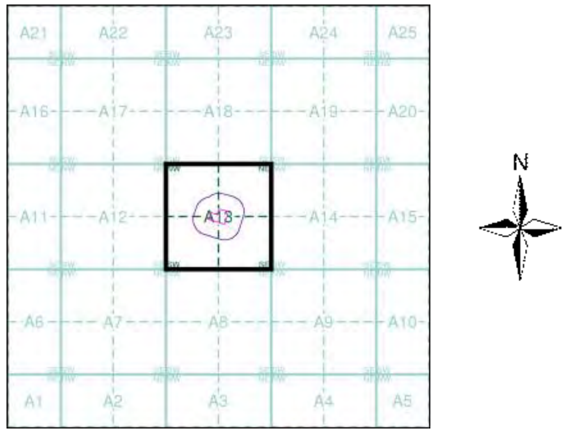
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)


SJ8298
1963
1:2,500
SJ8398
1963
1:2,500
SJ8397
1965
1:2,500

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

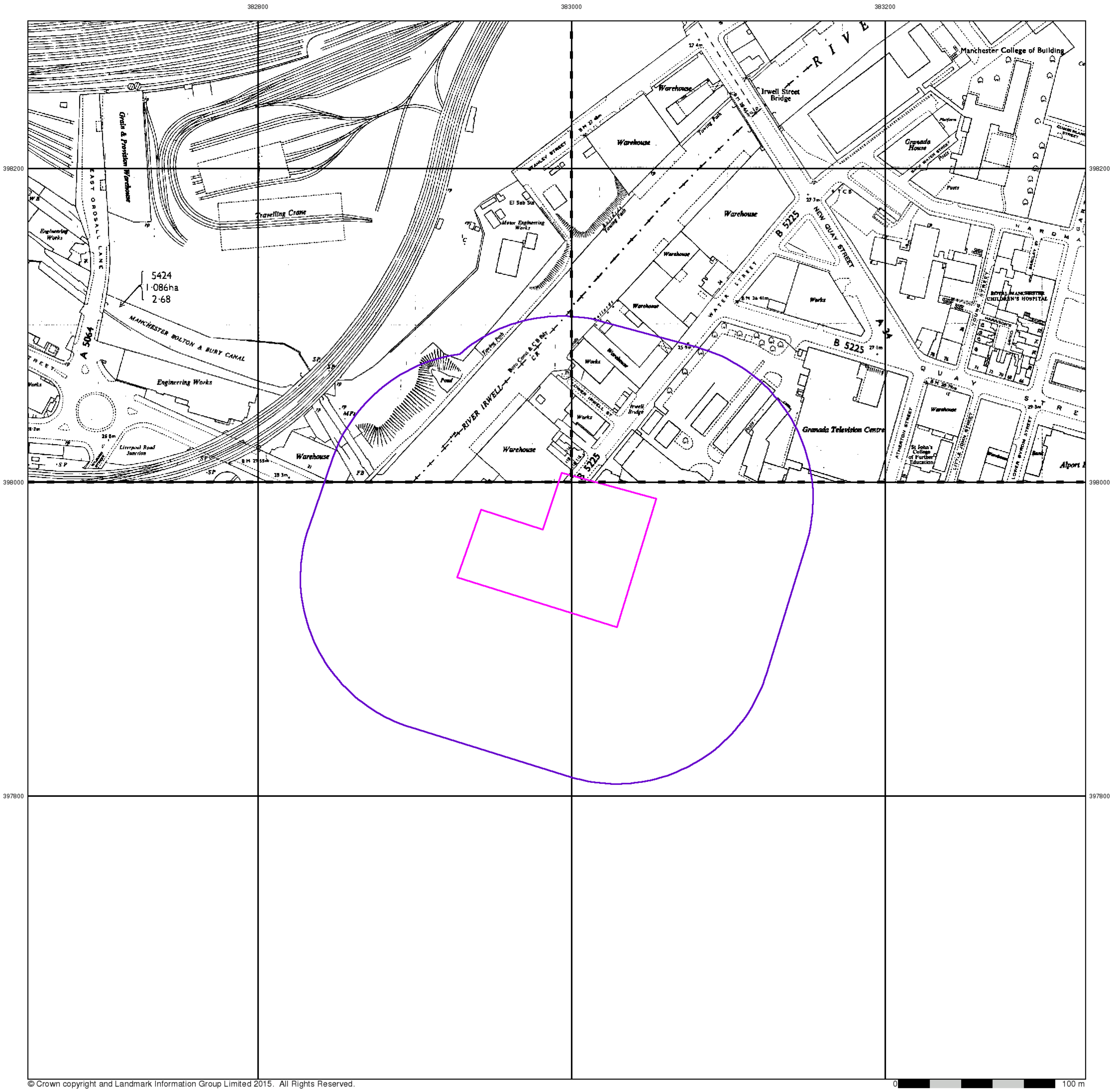
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Grain & Provision Warehouse
Travelling Crane
EAST ORDSALL LANE
Engineering Works
5424
1·086ha
2·68
MANCHESTER BOLTON & BURY CANAL
A 5064
Engineering Works
Liverpool Road Junction
Warehouse
RIVER IRWELL
Towing Path
Boro Const & C B Bdy
El Sub Sta
Motor Engineering Works
Works
Warehouse
STANLEY STREET
Irwell Street Bridge
RIVER
Warehouse
B 5225
NEW QUAY STREET
WATER STREET
Works
A 34
Granada Television Centre
Manchester College of Building
Granada House
ROYAL MANCHESTER CHILDREN'S HOSPITAL
QUAY STREET
St John's College of Further Education
Alport
Pond
Irwell Bridge
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

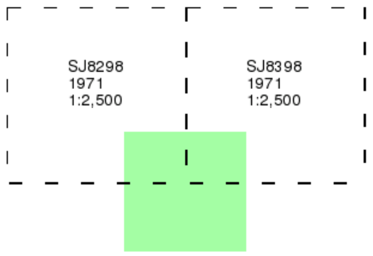
Ordnance Survey Plan

Published 1971

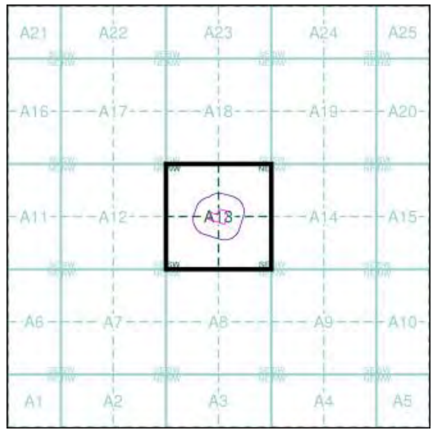
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)


SJ8298
1971
1:2,500
SJ8398
1971
1:2,500

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

N

Order Details

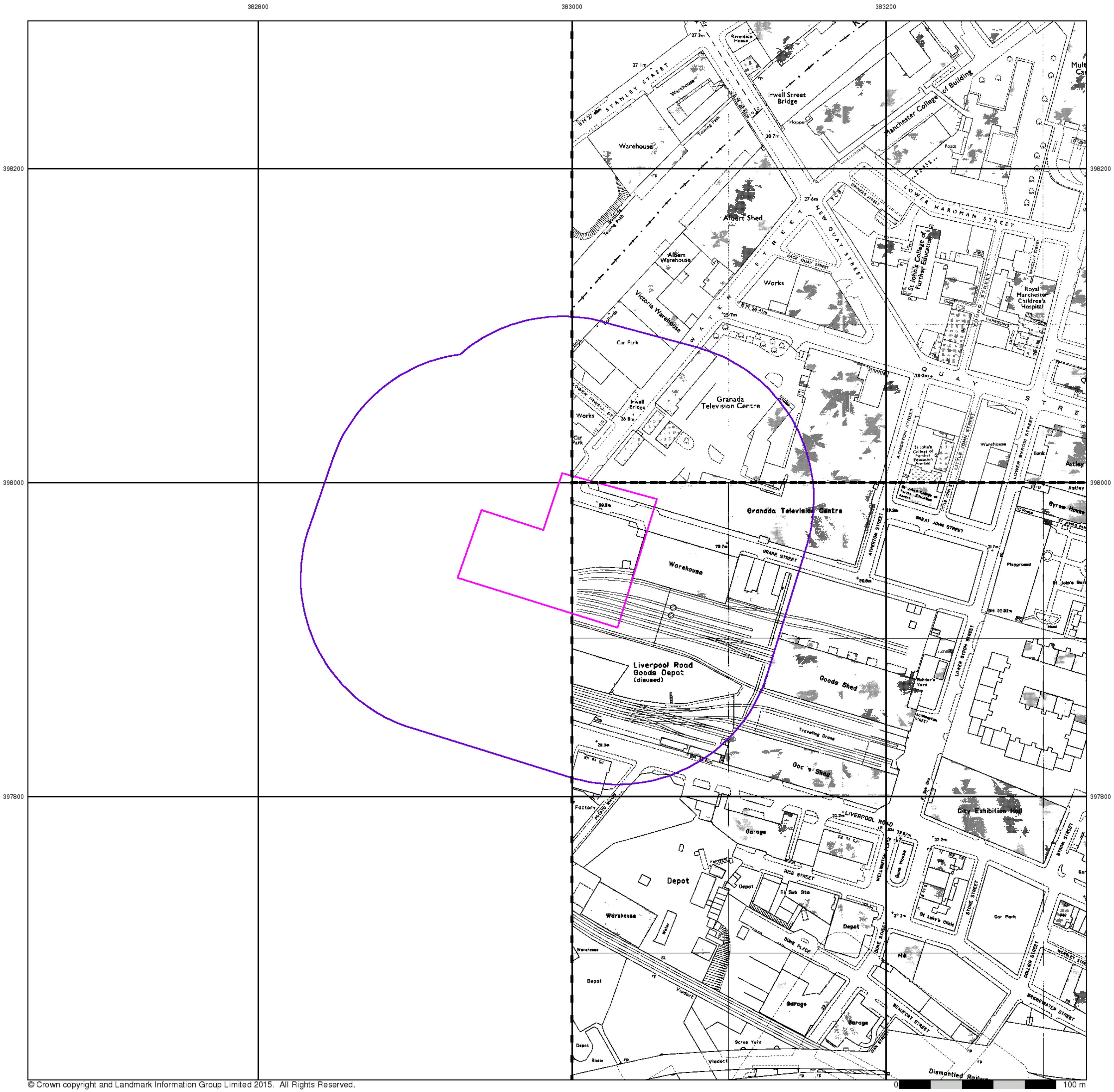
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group®

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Stanley Street
Warehouse
Irwell Street Bridge
Manchester College of Building
Lower Hardman Street
Albert Shed
Albert Warehouse
Works
New Quay Street
St John's College of Further Education
Royal Manchester Children's Hospital
Victoria Warehouse
Water Street
Car Park
Granada Television Centre
Irwell Bridge
Quay Street
Atherton Street
Little John Street
Lower Byrom Street
Warehouse
Bank
Astley
Byrom House
Great John Street
Grape Street
Playground
Liverpool Road Goods Depot (disused)
Goods Shed
Travelling Crane
Builder's Yard
City Exhibition Hall
Liverpool Road
Factory
Garage
Depot
Rice Street
El Sub Sta
Duke Place
Car Park
Wellington Villa
St Luke's
Warehouse
Viaduct
Scrap Yard
Basin
Beaufort Street
Bridgewater Street
Dismantled Railway
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

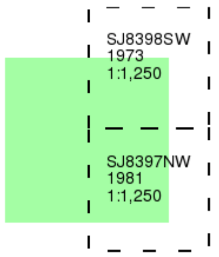
Ordnance Survey Plan

Published 1973 - 1981

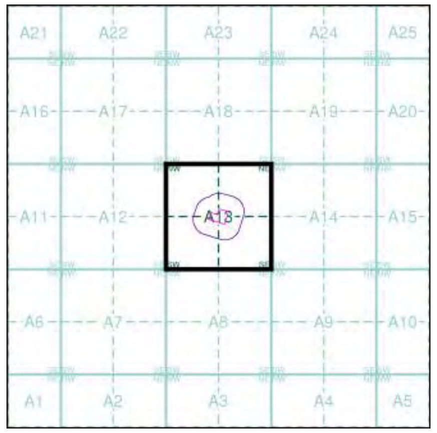
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)


SJ8398SW
1973
1:1,250
SJ8397NW
1981
1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

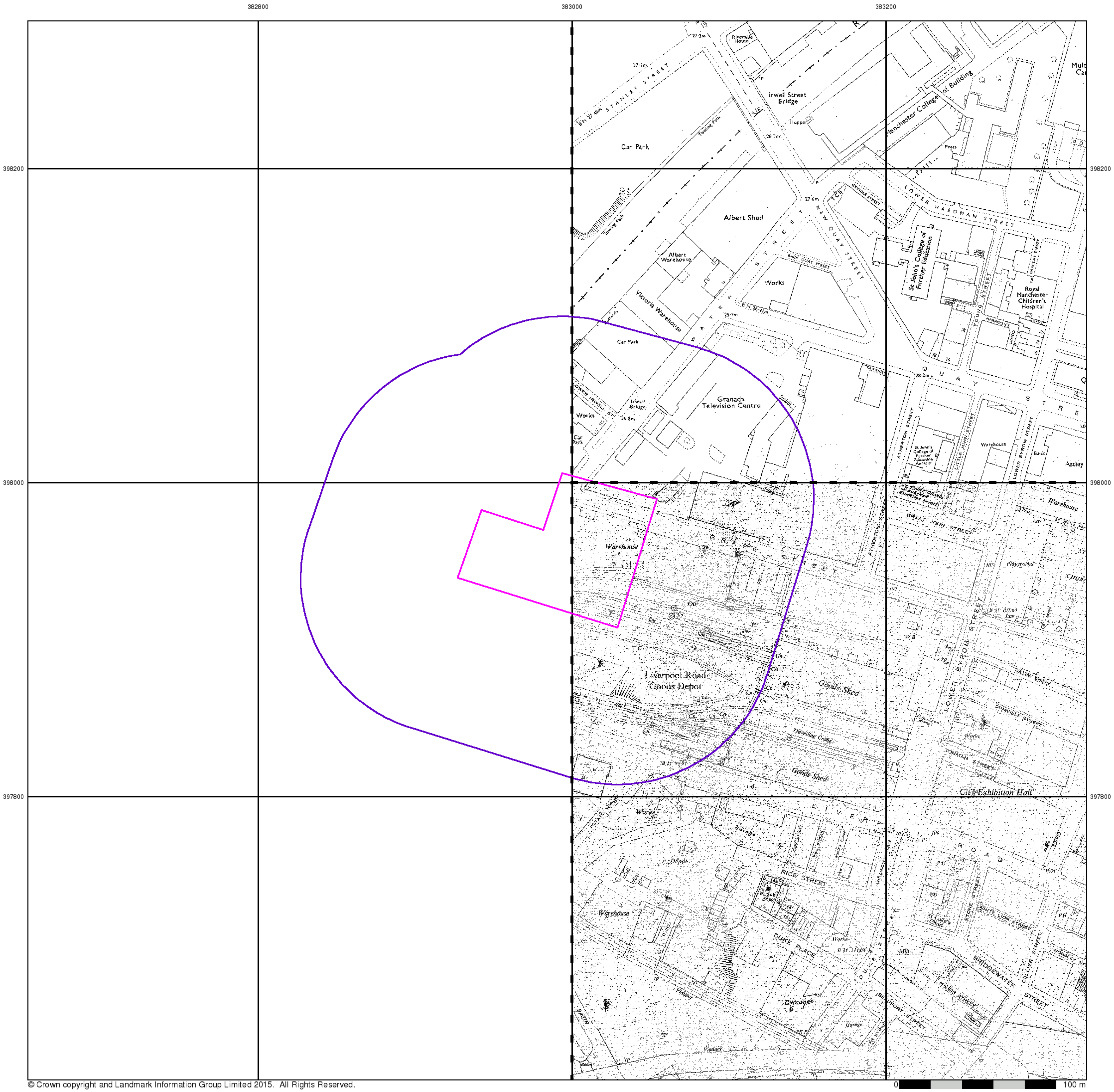
Order Details

Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Car Park
Irwell Street Bridge
Manchester College of Building
Albert Shed
Albert Warehouse
Works
Victoria Warehouse
WATER STREET
NEW QUAY STREET
LOWER HARDMAN STREET
St John's College of Further Education
Royal Manchester Children's Hospital
QUAY STREET
Granada Television Centre
Irwell Bridge
Works
ATHERTON STREET
Warehouse
Astley
GREAT JOHN STREET
Warehouse
Liverpool Road Goods Depot
Goods Shed
Goods Shed
LOWER BYROM STREET
City Exhibition Hall
Works
Garage
Depot
RICE STREET
DUKE PLACE
Warehouse
BRIDGEWATER STREET
Garages
Viaduct
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

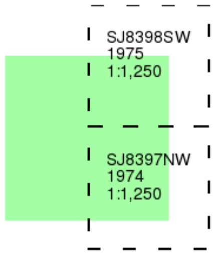
Supply of Unpublished Survey Information

Published 1974 - 1975

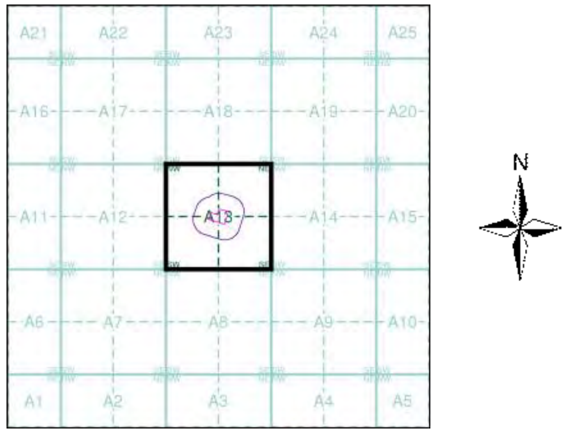
Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a `work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)


SJ8398SW
1975
1:1,250
SJ8397NW
1974
1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

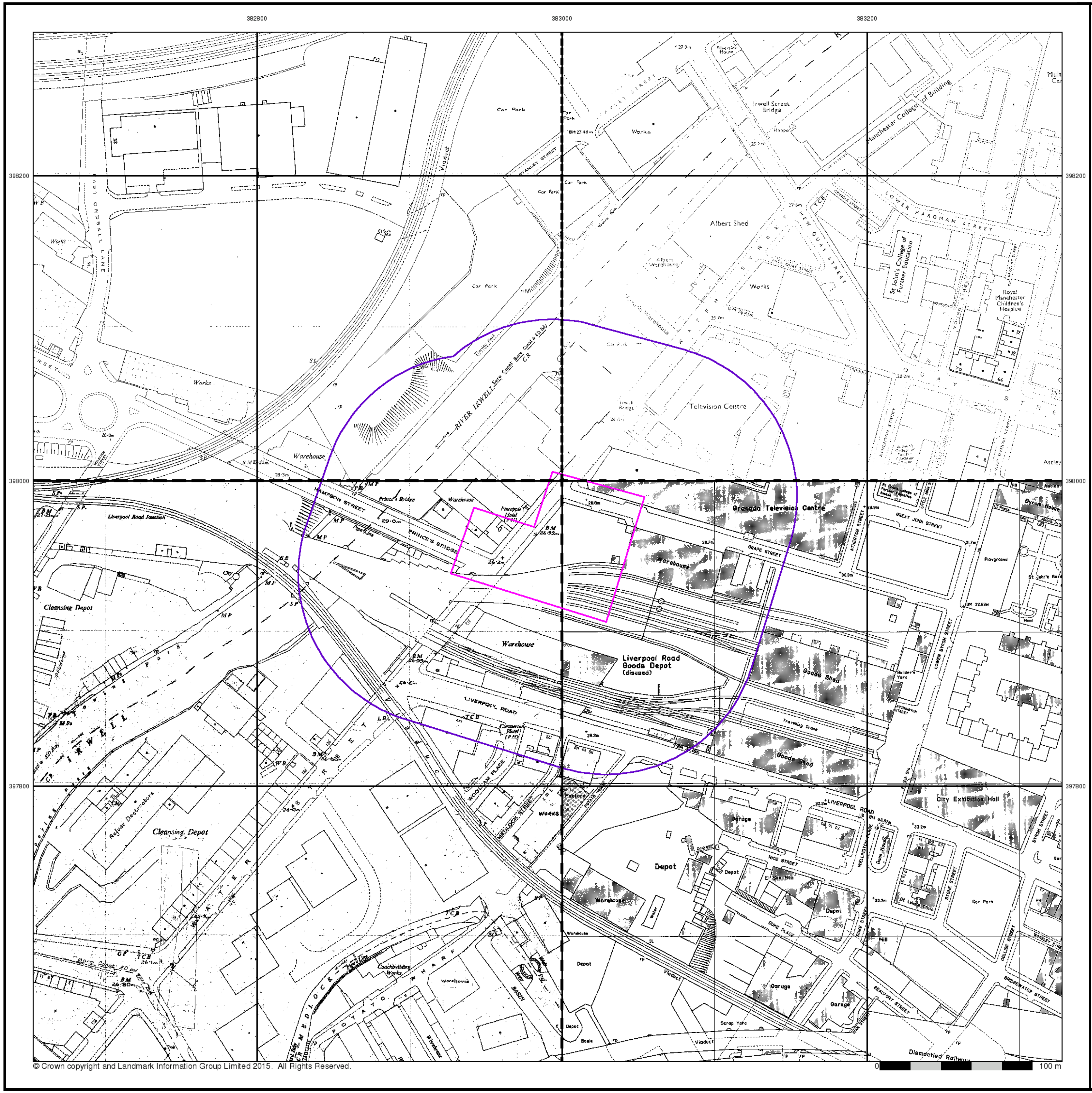
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Car Park
Works
Viaduct
Irwell Street Bridge
Manchester College of Building
ORDSALL LANE
Albert Shed
Albert Warehouse
NEW QUAY STREET
LOWER HARDMAN STREET
St John's College of Further Education
Royal Manchester Children's Hospital
RIVER IRWELL
Television Centre
Warehouse
HAMPSON STREET
Prince's Bridge
Pineapple Hotel (PH)
PRINCE'S BRIDGE
Granada Television Centre
GREAT JOHN STREET
GRAPE STREET
ATHERTON STREET
Liverpool Road Junction
Cleansing Depot
Liverpool Road Goods Depot (disused)
Goods Shed
LIVERPOOL ROAD
Travelling Crane
BYRON STREET
Playground
City Exhibition Hall
Refuse Destructors
Depot
Garage
Coachbuilding Works
POTATO WHARF
WOOLLAM PLACE
DUKE PLACE
Scrap Yard
Dismantled Railway
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

Additional SIMs

Published 1978 - 1984

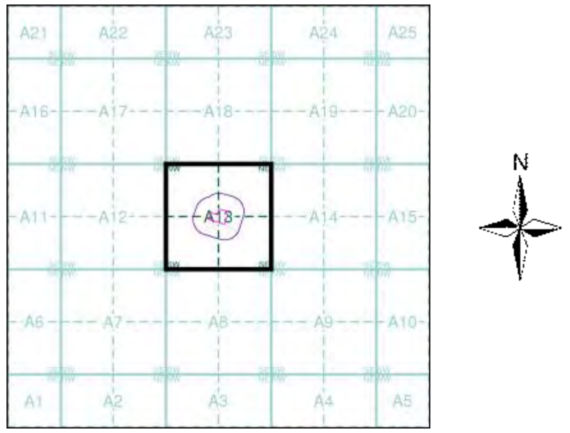
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SJ8298SE 1983 1:1,250	SJ8398SW 1984 1:1,250
SJ8297NE 1978 1:1,250	SJ8397NW 1981 1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

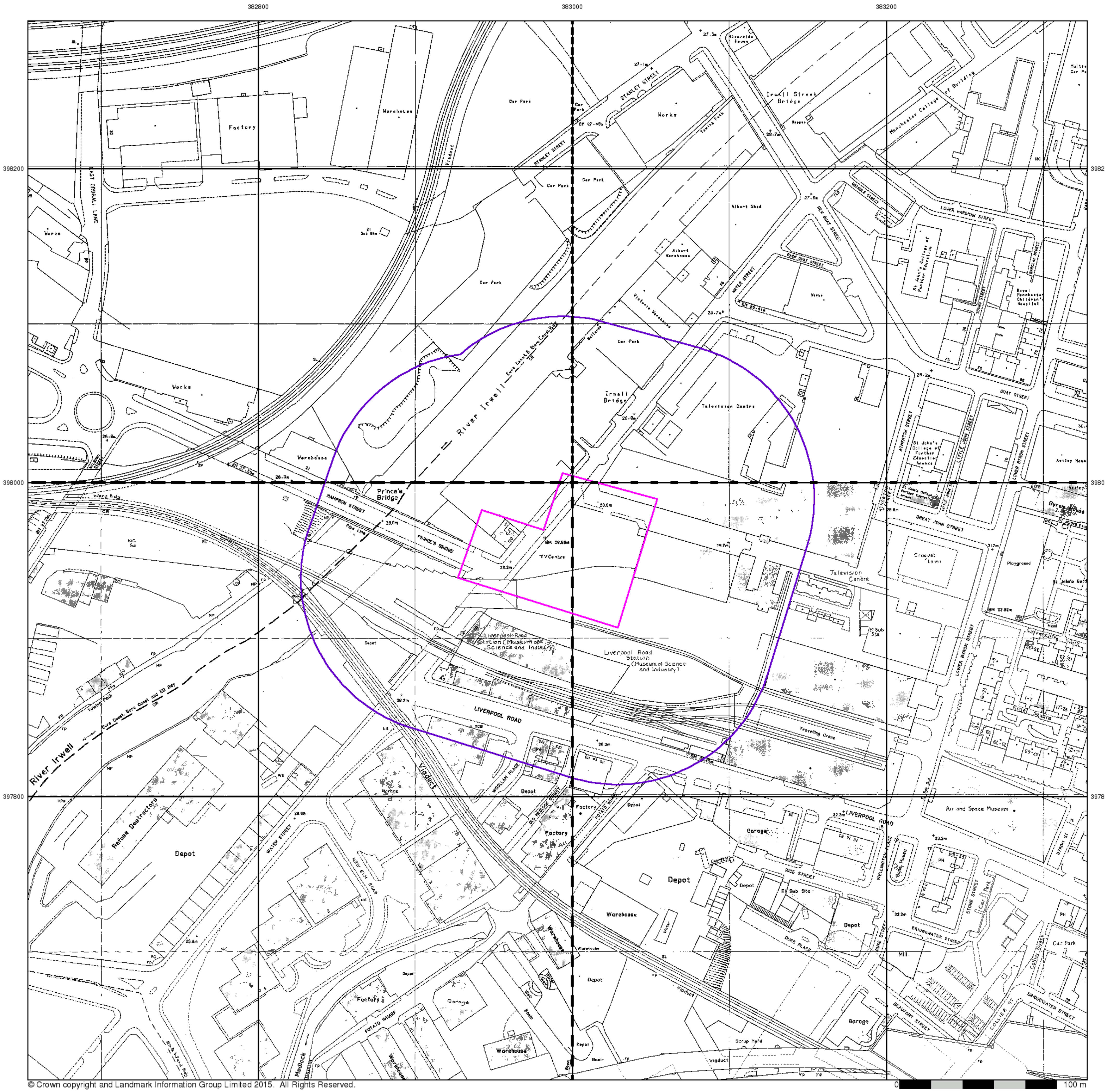
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
River Irwell
Irwell Bridge
Irwell Street Bridge
Prince's Bridge
Stanley Street
Water Street
Hampson Street
Liverpool Road
Liverpool Road Station (Museum of Science and Industry)
Television Centre
TV Centre
Car Park
Works
Factory
Warehouse
Depot
Garage
Viaduct
Refuse Destructor
Air and Space Museum
Granada Television Centre
Great John Street
Quay Street
Lower Byrom Street
St John's College of Further Education
Royal Manchester Children's Hospital
Albert Shed
Albert Warehouse
Victoria Warehouse
Manchester College of Building
Lower Hardman Street
New Quay Street
Left Bank
Byrom House
Atherton Street
Little John Street
St John's Gardens
Playground
Crescent Lawn
Travelling Crane
Potato Wharf
Medlock
Bridgewater Street
Duke Place
Rice Street
Wellington Place
Collier Street
Deansgate
Woollam Place
Mill
Scrap Yard
Astley House
Towing Path
Playground
Basin

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

0 100 m

Envirocheck®

Additional SIMs

Published 1986 - 1990

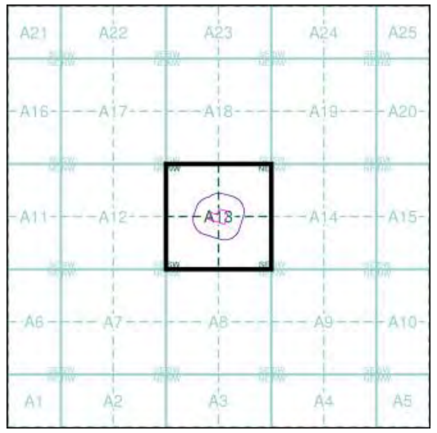
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SJ8298SE 1990 1:1,250	SJ8398SW 1990 1:1,250
SJ8297NE 1986 1:1,250	SJ8397NW 1986 1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

N

Order Details

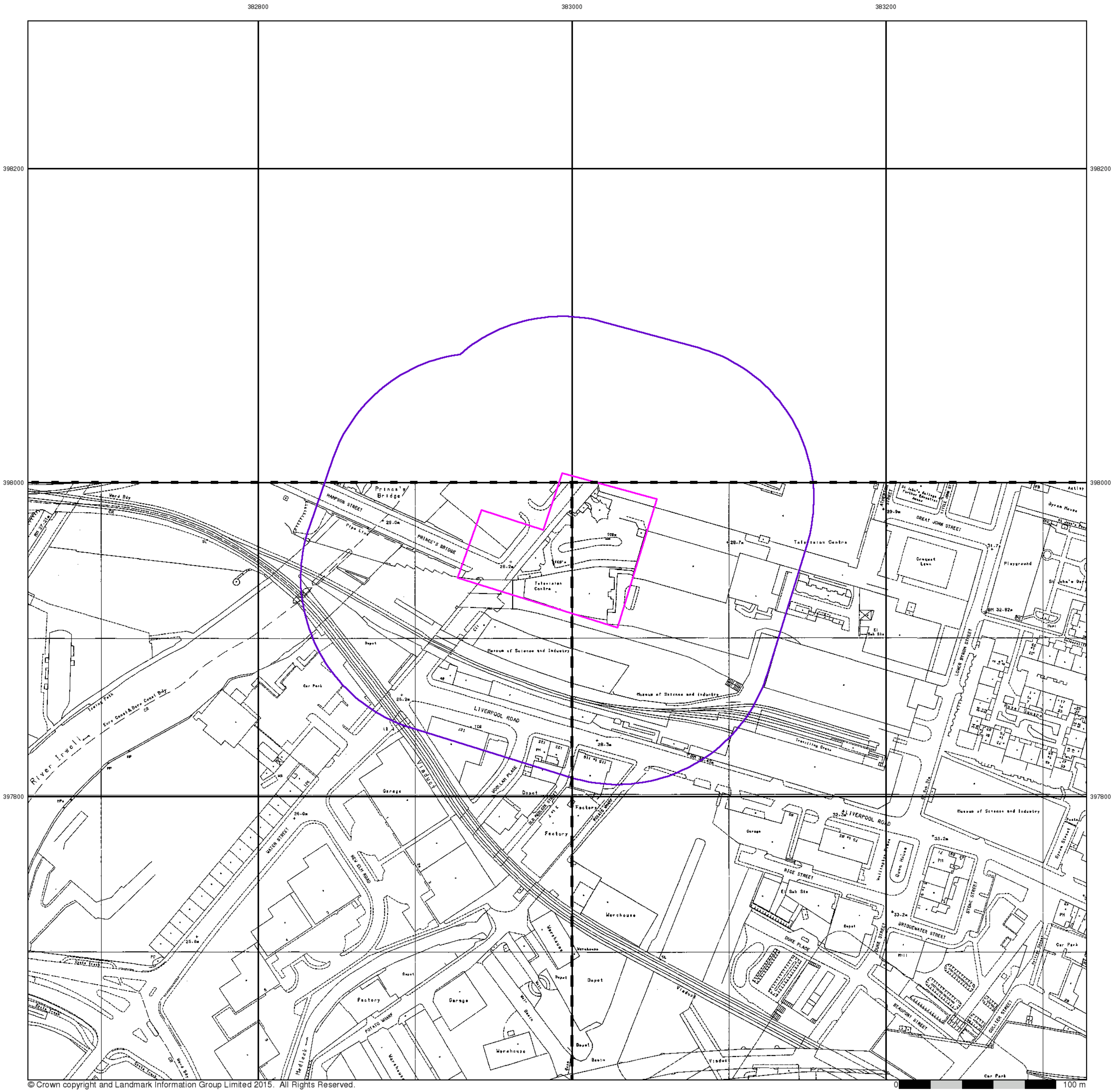
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



382800
383000
383200
398200
398000
397800
Prince's Bridge
HAMPSON STREET
PRINCE'S BRIDGE
Pipe Line
Television Centre
Television Centre
Museum of Science and Industry
LIVERPOOL ROAD
River Irwell
Towing Path
Bury Basin
GREAT JOHN STREET
Playground
Croquet Lawn
LOWER BYROM STREET
Travelling Crane
Viaduct
Garage
Depot
Car Park
Factory
Warehouse
WATER STREET
NEW ELM ROAD
POTATO WHARF
Medlock
RICE STREET
BRIDGEWATER STREET
DUKE PLACE
BEAUFORT STREET
Mill
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

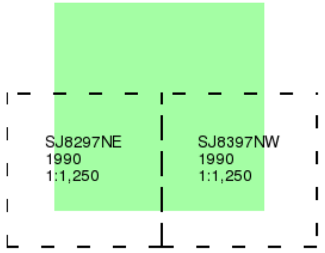
Additional SIMs

Published 1990

Source map scale - 1:1,250

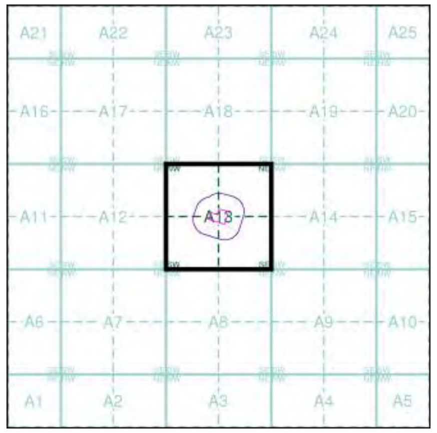
The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



SJ8297NE
1990
1:1,250
SJ8397NW
1990
1:1,250

Historical Map - Segment A13



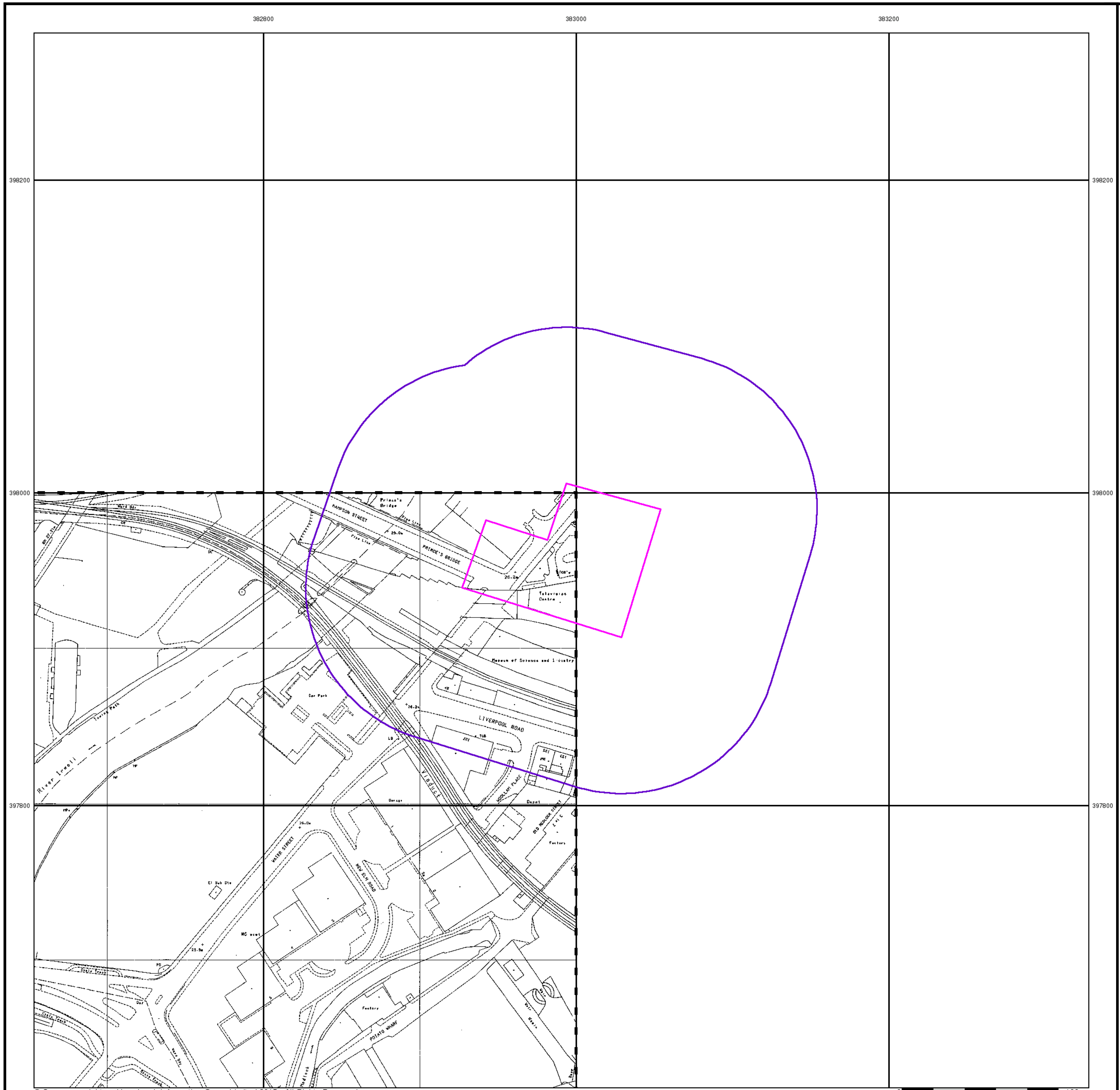
A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU


382800
383000
383200
398200
398000
397800
Prince's Bridge
HAMPSON STREET
PRINCE'S BRIDGE
Television Centre
Museum of Science and Industry
Car Park
LIVERPOOL ROAD
WOOLLAM PLACE
VIADUCT
OLD MEDLOCK STREET
Depot
Garage
WATER STREET
NEW ELM ROAD
Factory
POTATO WHARF
River Irwell
Towing Path
El Sub Sta
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

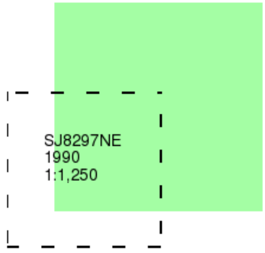
Additional SIMs

Published 1990

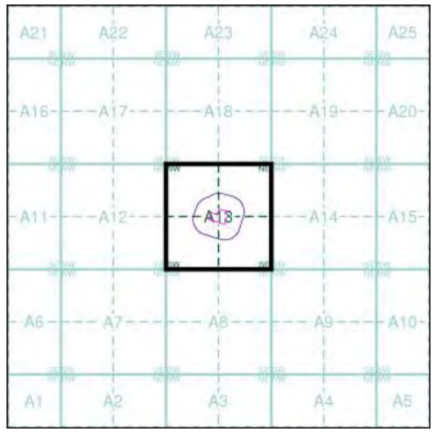
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)


SJ8297NE
1990
1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

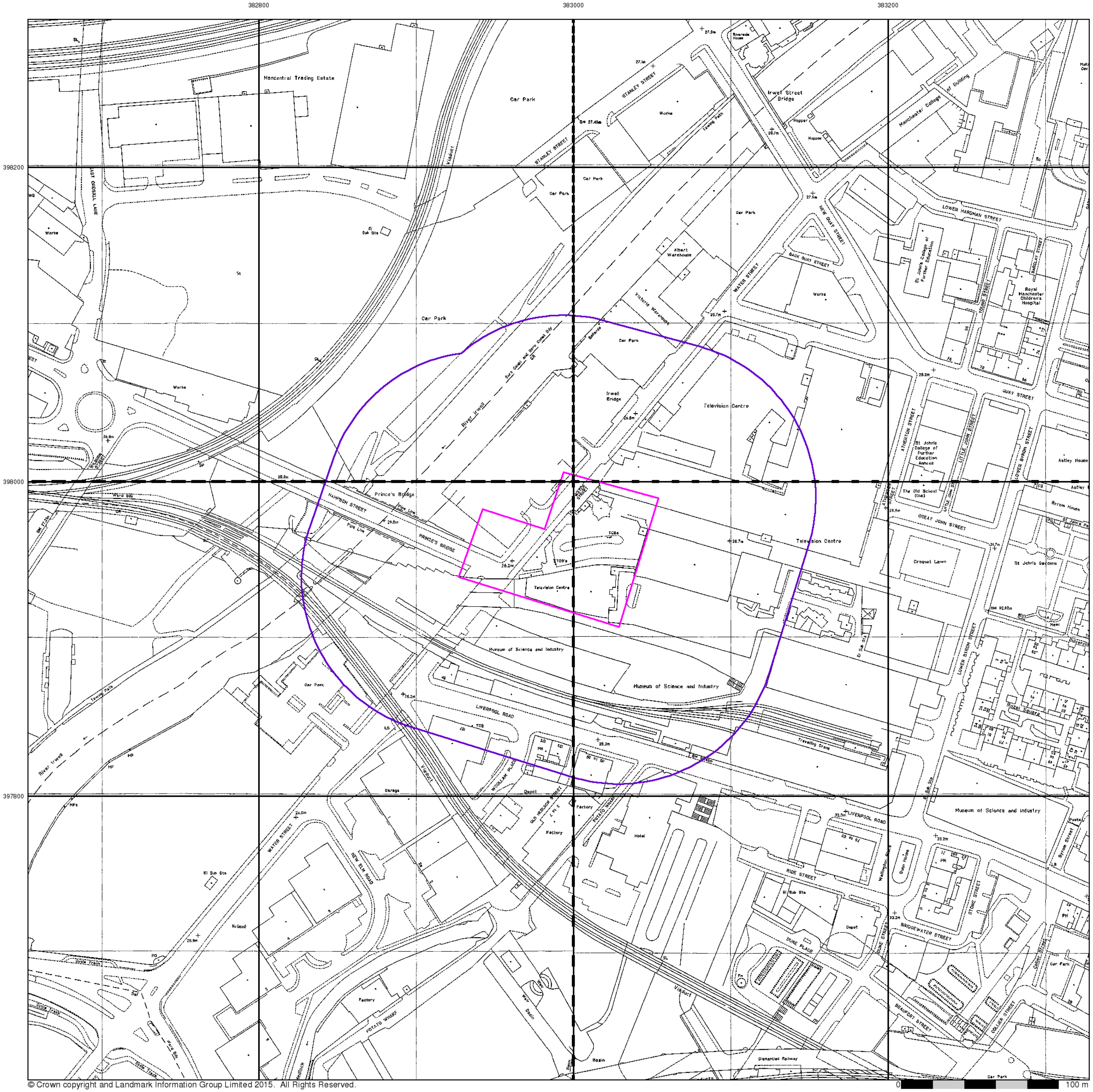
Order Details

Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Mancentral Trading Estate
Car Park
STANLEY STREET
Works
Irwell Street Bridge
Manchester College of Building
LOWER HARDMAN STREET
NEW QUAY STREET
Albert Warehouse
BACK QUAY STREET
WATER STREET
Victoria Warehouse
St John's College of Further Education
Royal Manchester Children's Hospital
QUAY STREET
Irwell Bridge
Television Centre
River Irwell
Prince's Bridge
HAMPSON STREET
PRINCE'S BRIDGE
ATHERTON STREET
LITTLE JOHN STREET
LOWER BYROM STREET
Astley House
Byrom House
The Old School
GREAT JOHN STREET
Croquet Lawn
St John's Gardens
Museum of Science and Industry
LIVERPOOL ROAD
Travelling Crane
Garage
Depot
Factory
Hotel
POTATO WHARF
WATER STREET
NEW ELM ROAD
Viaduct
Basin
Dismantled Railway
BRIDGEWATER STREET
DUKE PLACE
BEAUFORT STREET
Car Park
Works
Towing Path
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

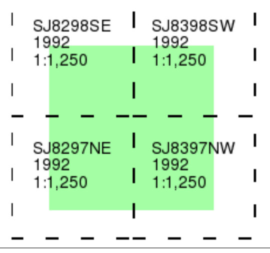
Large-Scale National Grid Data

Published 1992

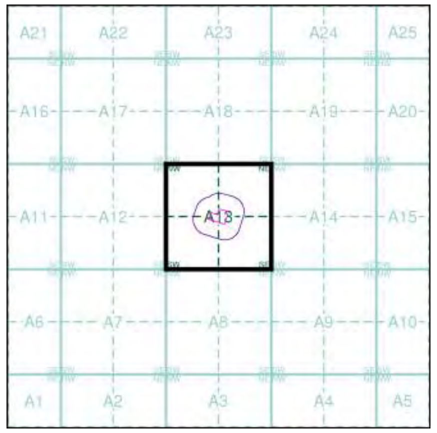
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)


SJ8298SE
1992
1:1,250
SJ8398SW
1992
1:1,250
SJ8297NE
1992
1:1,250
SJ8397NW
1992
1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

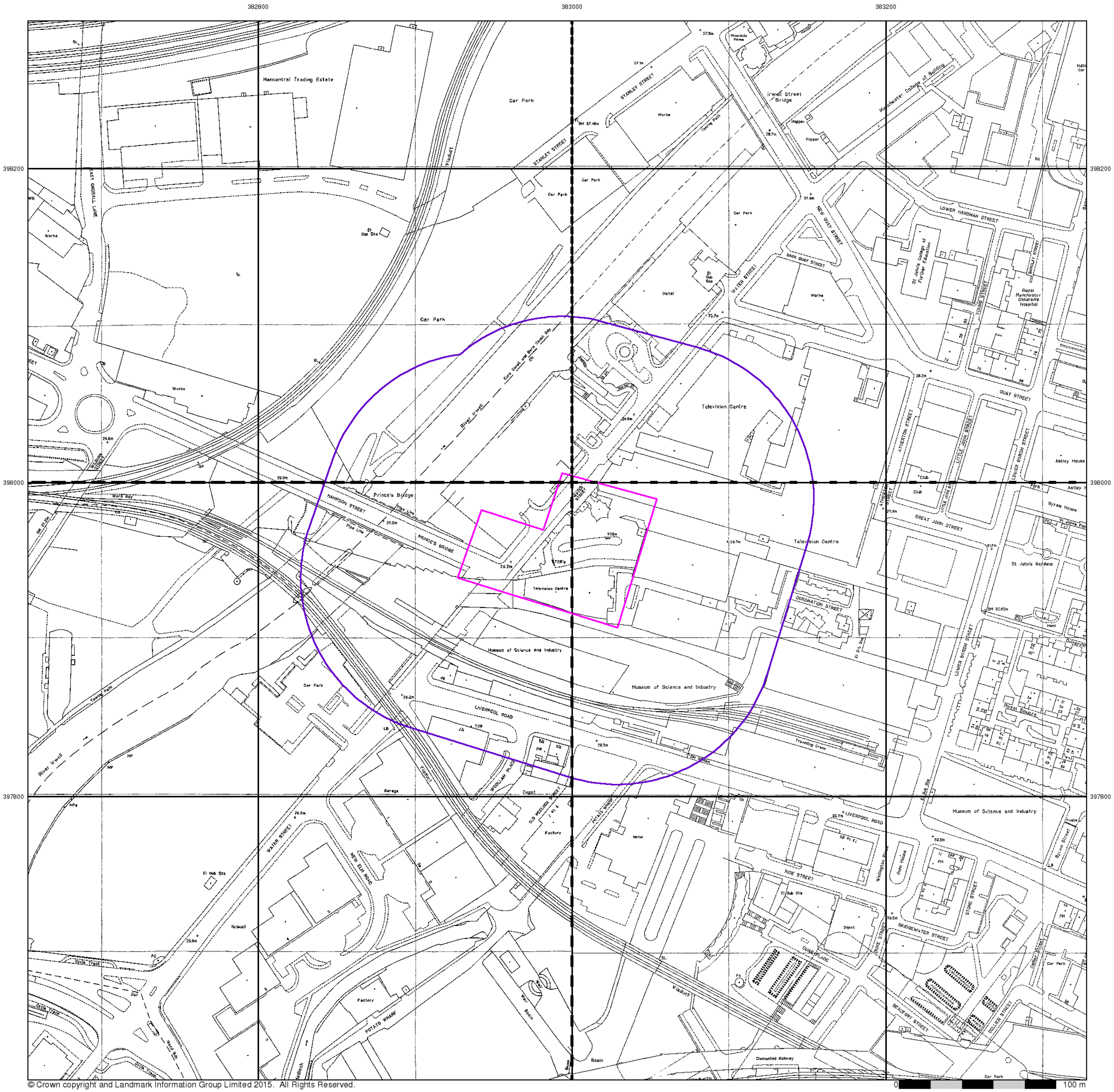
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Mancentral Trading Estate
Car Park
Works
STANLEY STREET
Irwell Street Bridge
Manchester College of Building
LOWER HARDMAN STREET
NEW QUAY STREET
BACK QUAY STREET
WATER STREET
Hotel
St John's College of Further Education
Royal Manchester Children's Hospital
QUAY STREET
Television Centre
River Irwell
Prince's Bridge
HAMPSON STREET
PRINCE'S BRIDGE
ATHERTON STREET
LITTLE JOHN STREET
LOWER BYRON STREET
Astley House
Byrom House
GREAT JOHN STREET
St John's Gardens
ORDINATION STREET
Museum of Science and Industry
LIVERPOOL ROAD
Travelling Cranes
Viaduct
WOOLLAM PLACE
Depot
OLD MEDLOCK STREET
POTATO WHARF
Garage
WATER STREET
NEW ELM ROAD
Factory
Towing Path
Royal Square
El Sub Sta
RIDE STREET
Wellington Place
BRIDGEWATER STREET
DUKE PLACE
DUKE STREET
STONE STREET
BEAUFORT STREET
COLLIER STREET
Basin
Dismantled Railway
Car Park
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

Large-Scale National Grid Data

Published 1993 - 1994

Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

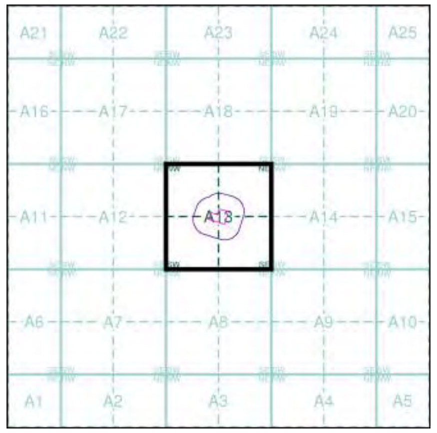
SJ8298SE
1993
1:1,250

SJ8398SW
1994
1:1,250

SJ8297NE
1993
1:1,250

SJ8397NW
1994
1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

Order Details

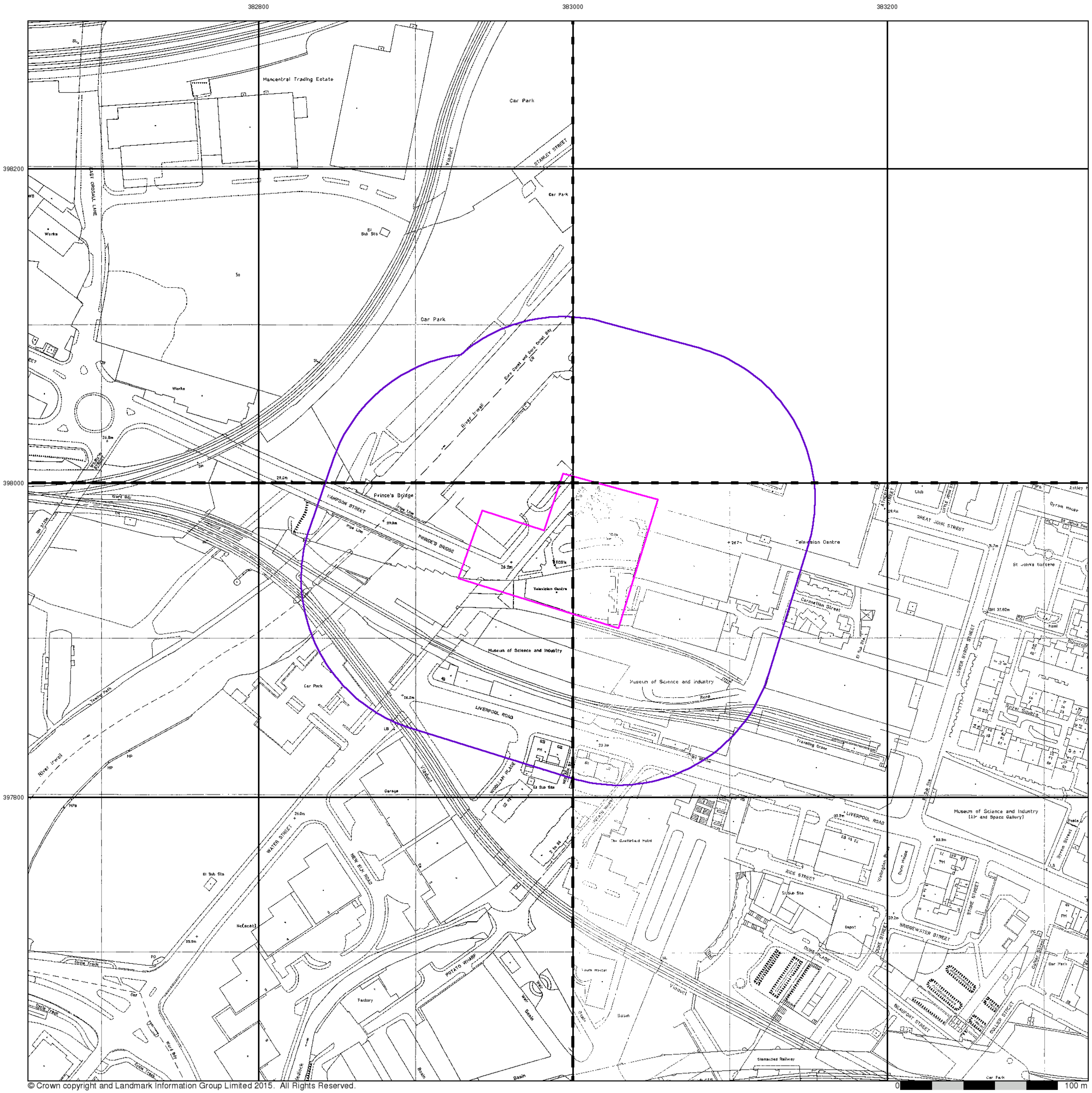
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark®
Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk



382800
383000
383200
398200
398000
397800
Mancentral Trading Estate
Car Park
STANLEY STREET
Viaduct
EAST ORDSALL LANE
Works
El Sub Sta
Car Park
Works
River Irwell
Prince's Bridge
HAMPSON STREET
PRINCE'S BRIDGE
Television Centre
GREAT JOHN STREET
Carnarvon Street
St John's Gardens
LOWER BYROM STREET
Museum of Science and Industry
LIVERPOOL ROAD
Car Park
WOOLLAM PLACE
El Sub Sta
Travelling Crane
Towing Path
Garage
WATER STREET
NEW ELM ROAD
LIVERPOOL ROAD
Museum of Science and Industry (Air and Space Gallery)
RICE STREET
El Sub Sta
BRIDGEWATER STREET
BEAUFORT STREET
Car Park
Cycle Track
POTATO WHARF
Factory
Basin
Youth Hostel
Dismantled Railway
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

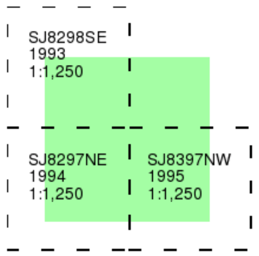
Large-Scale National Grid Data

Published 1993 - 1995

Source map scale - 1:1,250

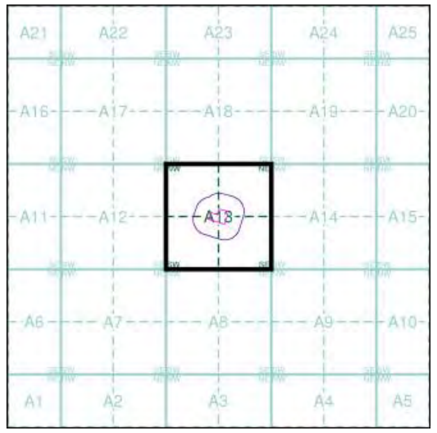
'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



SJ8298SE
1993
1:1,250
SJ8297NE
1994
1:1,250
SJ8397NW
1995
1:1,250

Historical Map - Segment A13



A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

N

Order Details

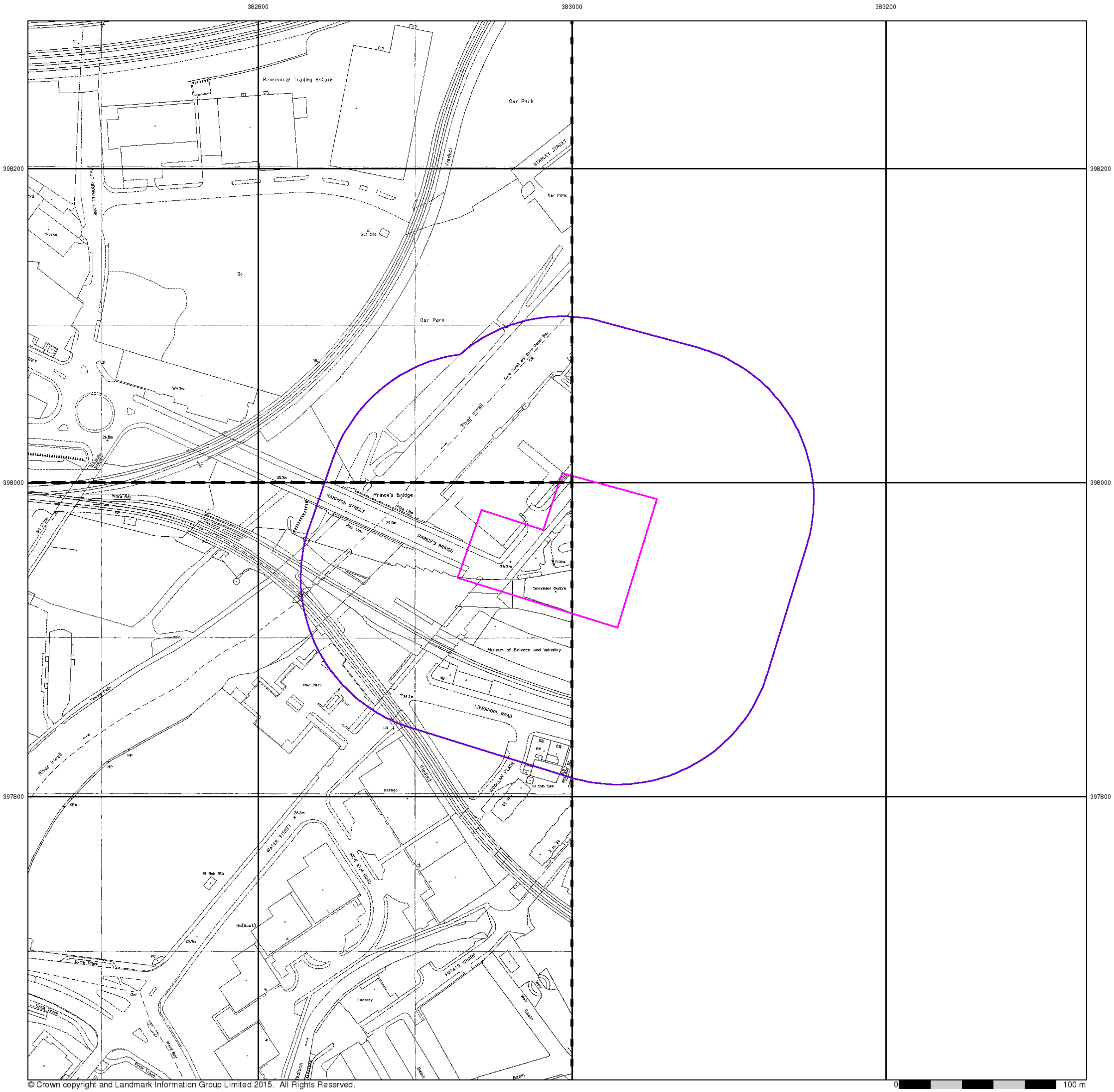
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Mancentral Trading Estate
Car Park
Stanley Street
Works
Car Park
Hampson Street
Prince's Bridge
Television Centre
Museum of Science and Industry
Liverpool Road
Viaduct
River Irwell
Towing Path
Garage
Water Street
New Elm Road
Potato Wharf
Factory
El Sub Sta
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

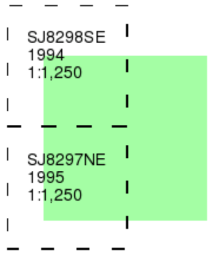
Large-Scale National Grid Data

Published 1994 - 1995

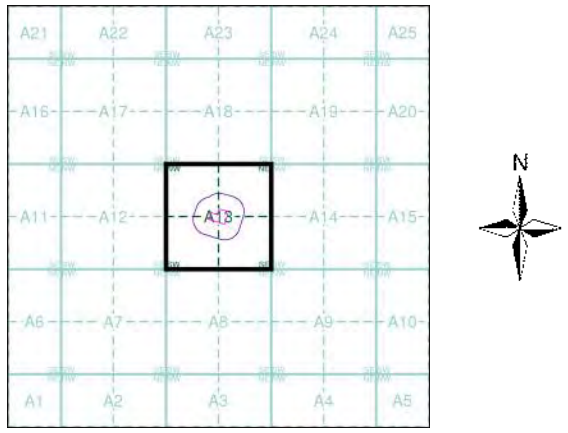
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)


SJ8298SE
1994
1:1,250
SJ8297NE
1995
1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

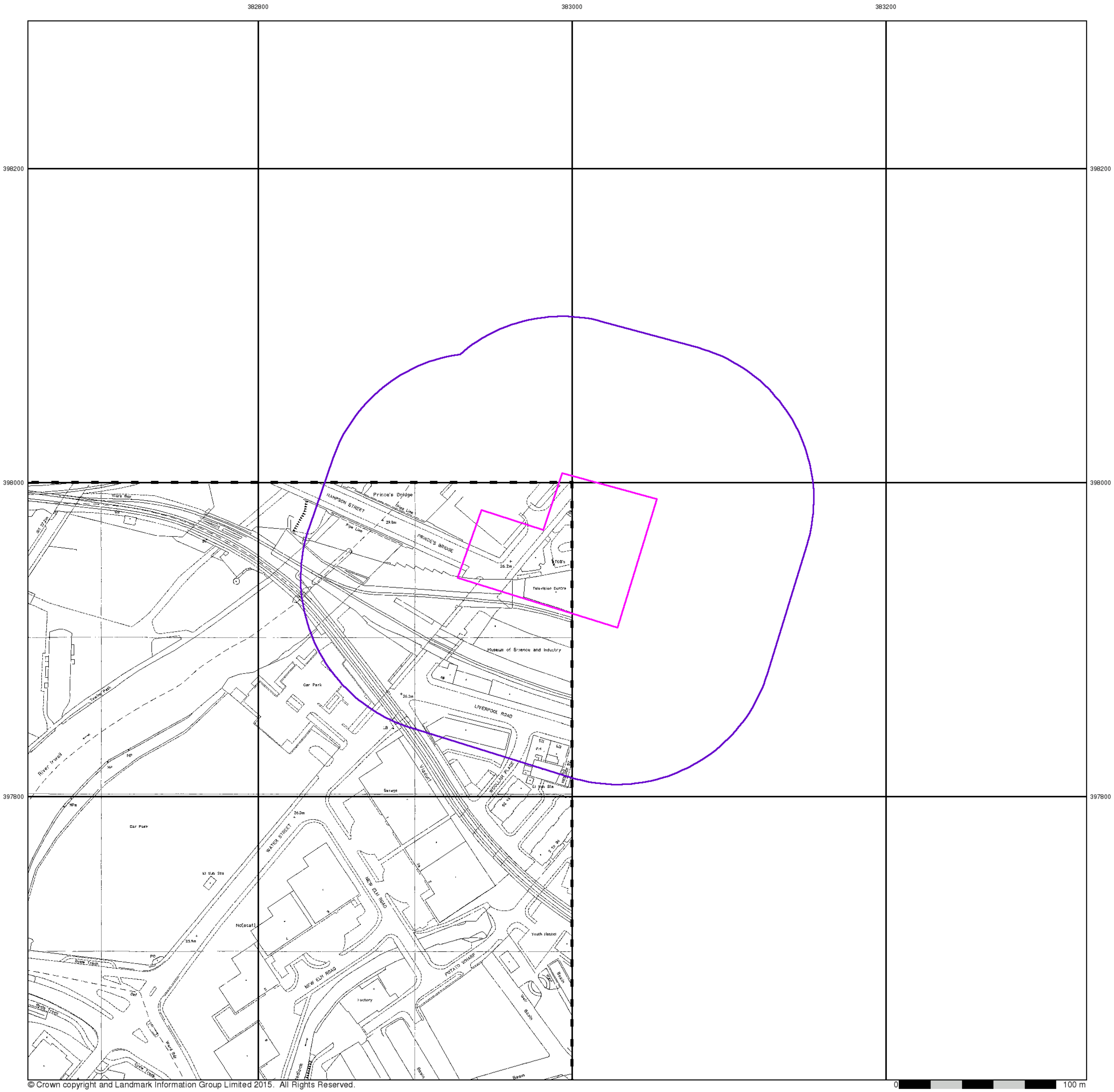
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


382800
383000
383200
398200
398000
397800
Prince's Bridge
HAMPSON STREET
PRINCE'S BRIDGE
Television Centre
Museum of Science and Industry
Car Park
LIVERPOOL ROAD
River Irwell
Towing Path
Viaduct
WATER STREET
NEW ELM ROAD
El Sub Sta
Car Park
Youth Hostel
POTATO WHARF
Factory
Basin
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

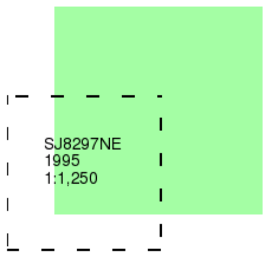
Large-Scale National Grid Data

Published 1995

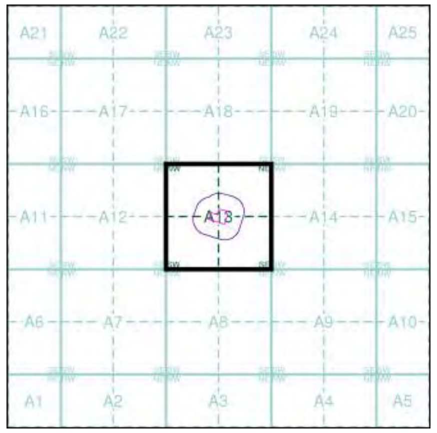
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)


SJ8297NE
1995
1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

Order Details

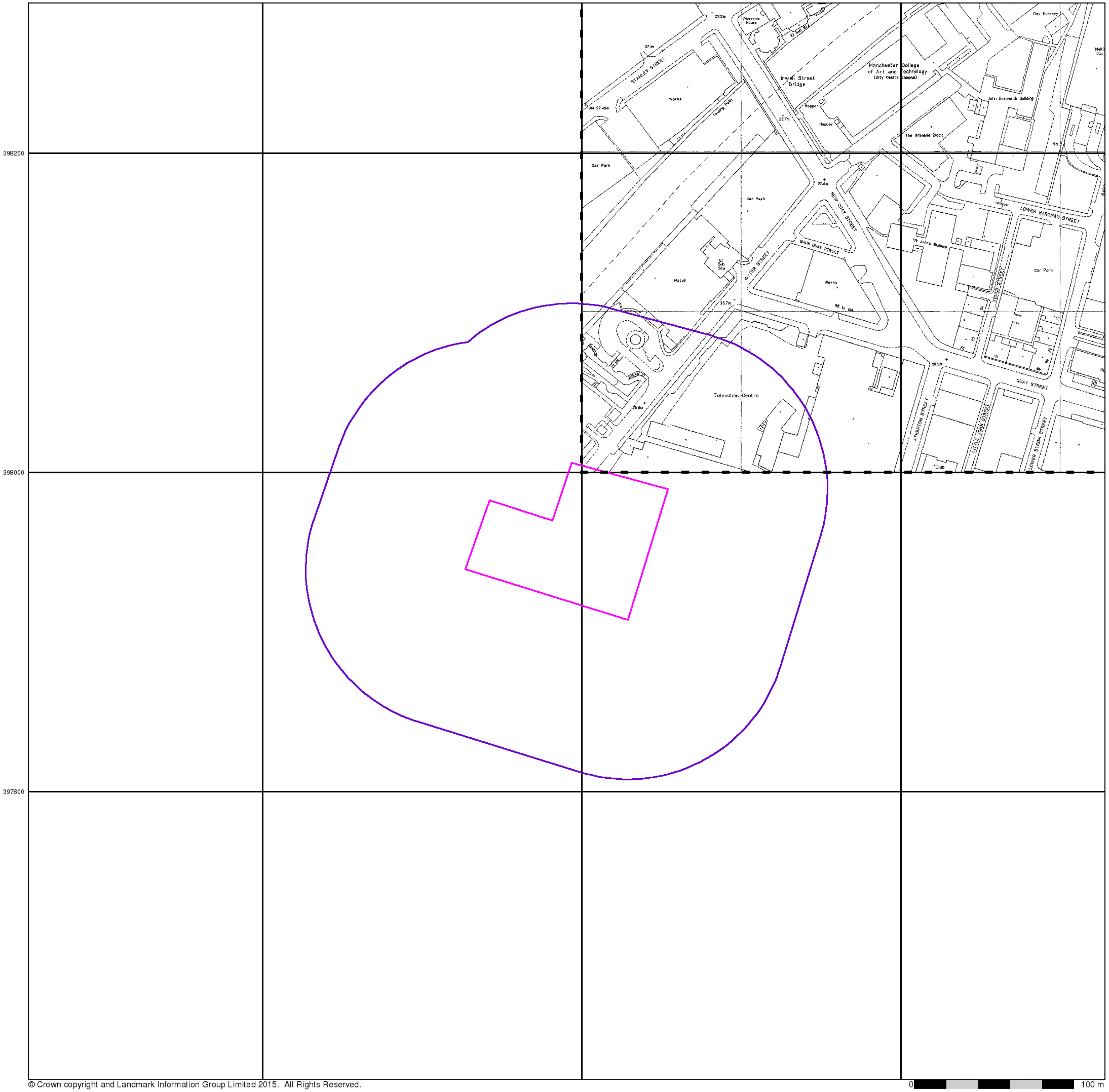
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


398200
398000
397800
Car Park
Hotel
Works
Television Centre
WATER STREET
NEW QUAY STREET
BACK QUAY STREET
QUAY STREET
LOWER HARDMAN STREET
STANLEY STREET
Irwell Street Bridge
Manchester College of Art and Technology (City Centre Campus)
John Unsworth Building
The Granada Block
St John's Building
ATHERTON STREET
LITTLE JOHN STREET
LOWER BYROM STREET
YOUNG STREET
Day Nursery
0
100 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

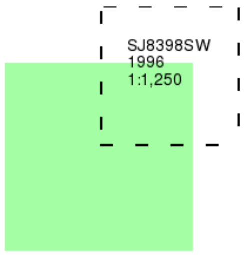
Large-Scale National Grid Data

Published 1996

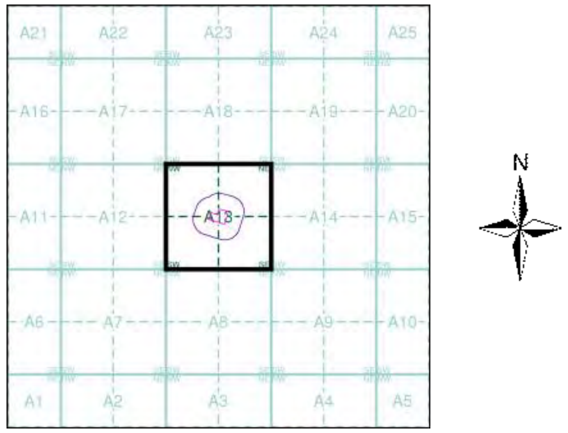
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)


SJ8398SW
1996
1:1,250

Historical Map - Segment A13


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	100

Site Details

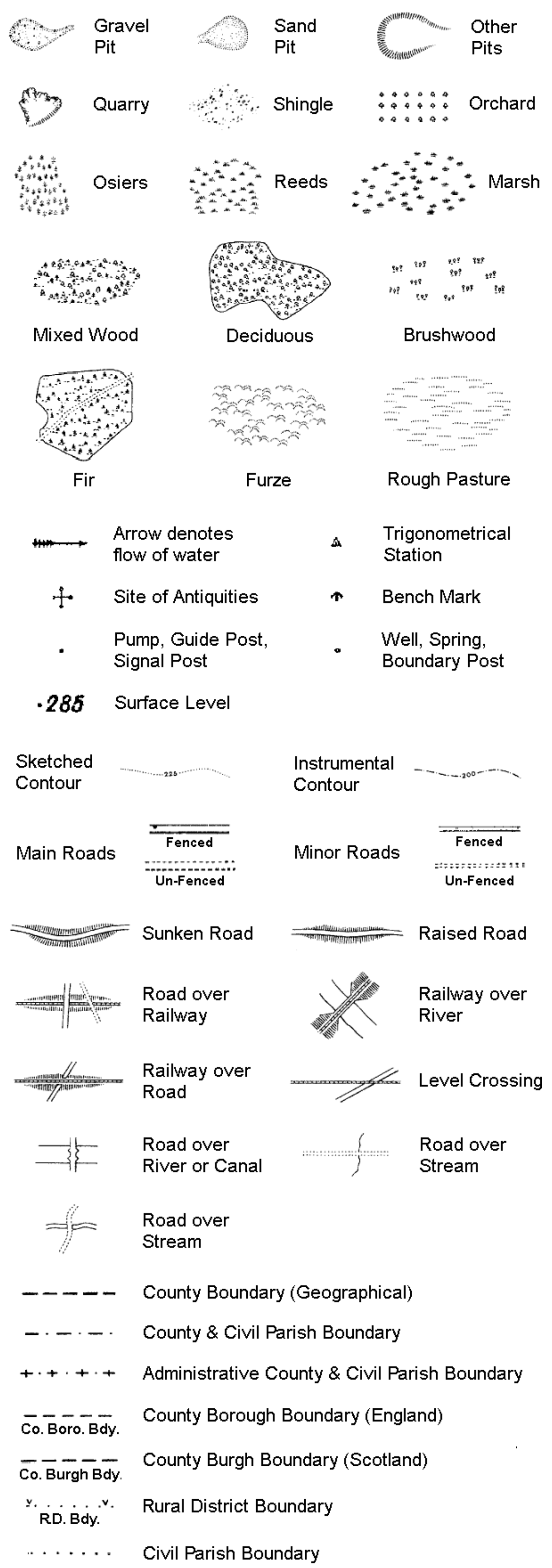
121, Water Street, Manchester, M3 4JU

Landmark®
Information Group

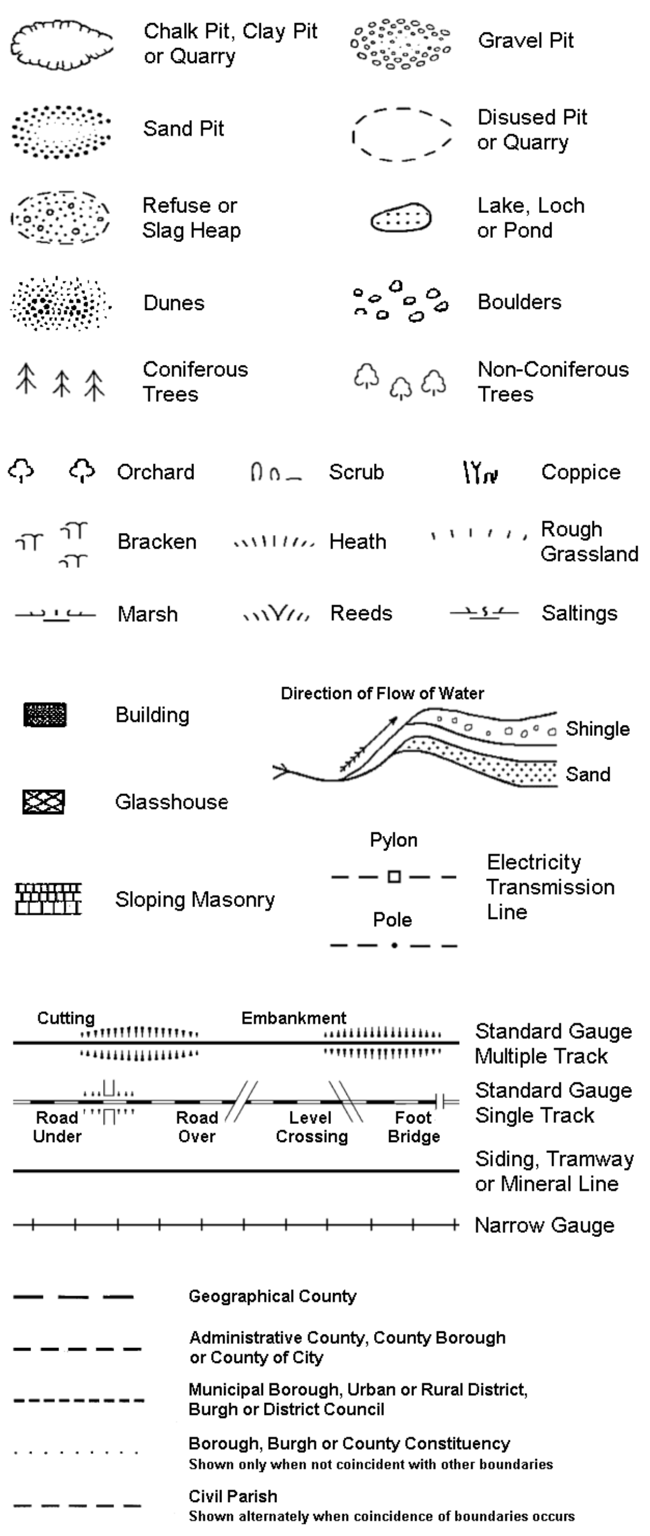
Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

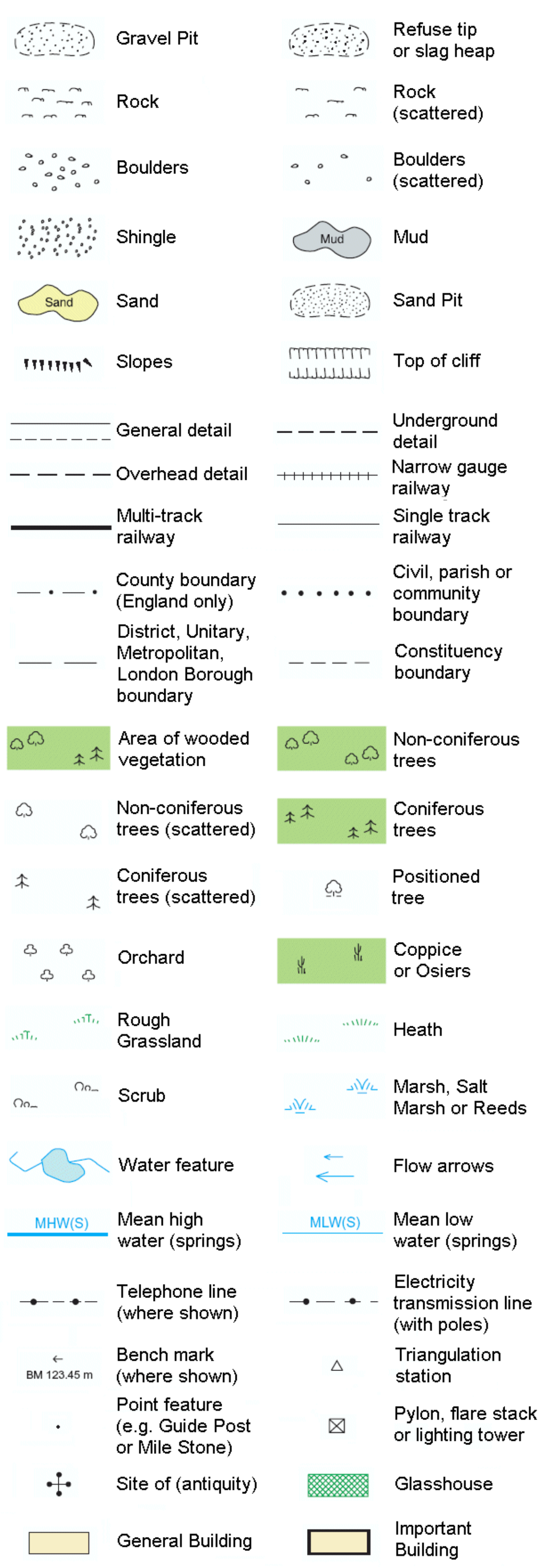

Gravel Pit
Sand Pit
Other Pits
Quarry
Shingle
Orchard
Osiers
Reeds
Marsh
Mixed Wood
Deciduous
Brushwood
Fir
Furze
Rough Pasture
Arrow denotes flow of water
Trigonometrical Station
Site of Antiquities
Bench Mark
Pump, Guide Post, Signal Post
Well, Spring, Boundary Post
·285
Surface Level
Sketched Contour
Instrumental Contour
Main Roads
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
Sunken Road
Raised Road
Road over Railway
Railway over River
Railway over Road
Level Crossing
Road over River or Canal
Road over Stream
Road over Stream
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy.
County Borough Boundary (England)
Co. Burgh Bdy.
County Burgh Boundary (Scotland)
RD. Bdy.
Rural District Boundary
Civil Parish Boundary

Ordnance Survey Plan 1:10,000


Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Electricity Transmission Line
Sloping Masonry
Pole
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
Standard Gauge Single Track
Siding, Tramway or Mineral Line
Narrow Gauge
Geographical County
Administrative County, County Borough or County of City
Municipal Borough, Urban or Rural District, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

1:10,000 Raster Mapping

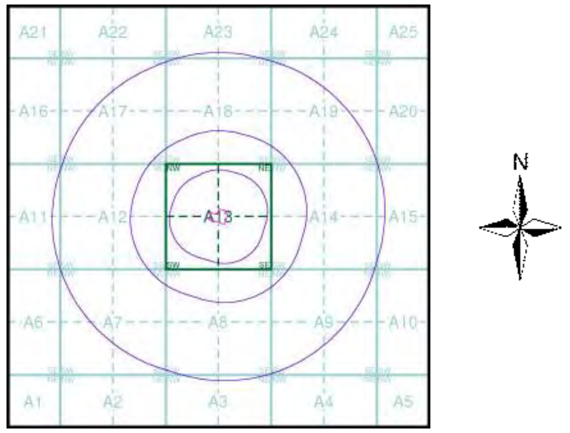

Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Mud
Sand
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S)
Mean high water (springs)
MLW(S)
Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m
Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

Envirocheck®

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Lancashire And Furness	1:10,560	1848	3
Cheshire	1:10,560	1882	4
Lancashire And Furness	1:10,560	1894 - 1896	5
Lancashire And Furness	1:10,560	1909	6
Lancashire And Furness	1:10,560	1923	7
Lancashire And Furness	1:10,560	1931 - 1932	8
Lancashire And Furness	1:10,560	1938	9
Ordnance Survey Plan	1:10,000	1956	10
Ordnance Survey Plan	1:10,000	1972	11
Manchester	1:25,000	1975	12
Ordnance Survey Plan	1:10,000	1980	13
Ordnance Survey Plan	1:10,000	1985	14
Ordnance Survey Plan	1:10,000	1989	15
Ordnance Survey Plan	1:10,000	1994	16
10K Raster Mapping	1:10,000	2006	17
VectorMap Local	1:10,000	2015	18

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

Order Number: 79633581_1_1
Customer Ref: 034933
National Grid Reference: 382990, 397960
Slice: A
Site Area (Ha): 0.73
Search Buffer (m): 1000

Site Details

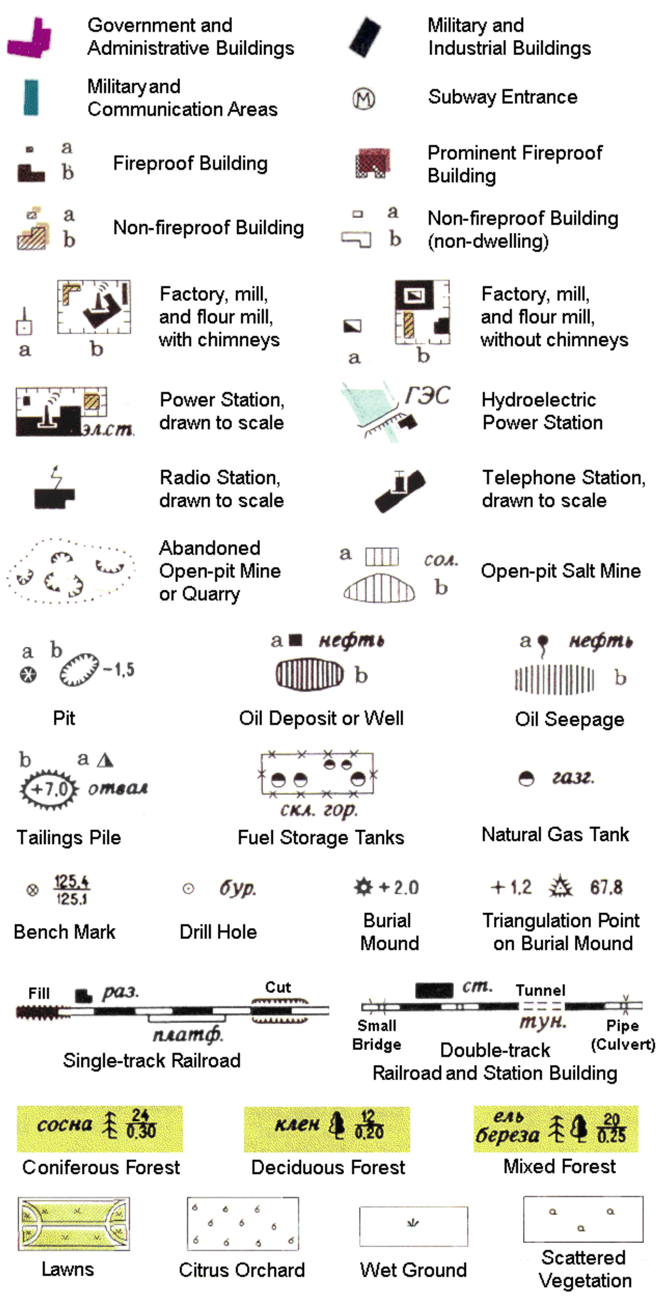
121, Water Street, Manchester, M3 4JU

Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale


Government and Administrative Buildings
Military and Industrial Buildings
Military and Communication Areas
Subway Entrance
a
b
Fireproof Building
Prominent Fireproof Building
a
b
Non-fireproof Building
a
b
Non-fireproof Building (non-dwelling)
a
b
Factory, mill, and flour mill, with chimneys
a
b
Factory, mill, and flour mill, without chimneys
эл.ст.
Power Station, drawn to scale
ГЭС
Hydroelectric Power Station
Radio Station, drawn to scale
Telephone Station, drawn to scale
Abandoned Open-pit Mine or Quarry
a
b
сол.
Open-pit Salt Mine
a b
–1,5
Pit
a нефть
b
Oil Deposit or Well
a нефть
b
Oil Seepage
b a
+7,0
отвал
Tailings Pile
скл. гор.
Fuel Storage Tanks
газг.
Natural Gas Tank
125,4
125,1
Bench Mark
бур.
Drill Hole
+2,0
Burial Mound
+1,2
67,8
Triangulation Point on Burial Mound
Fill
раз.
Cut
платф.
Single-track Railroad
ст.
Tunnel
тун.
Small Bridge
Pipe (Culvert)
Double-track Railroad and Station Building
сосна 24/0,30
Coniferous Forest
клен 12/0,20
Deciduous Forest
ель береза 20/0,25
Mixed Forest
Lawns
Citrus Orchard
Wet Ground
Scattered Vegetation

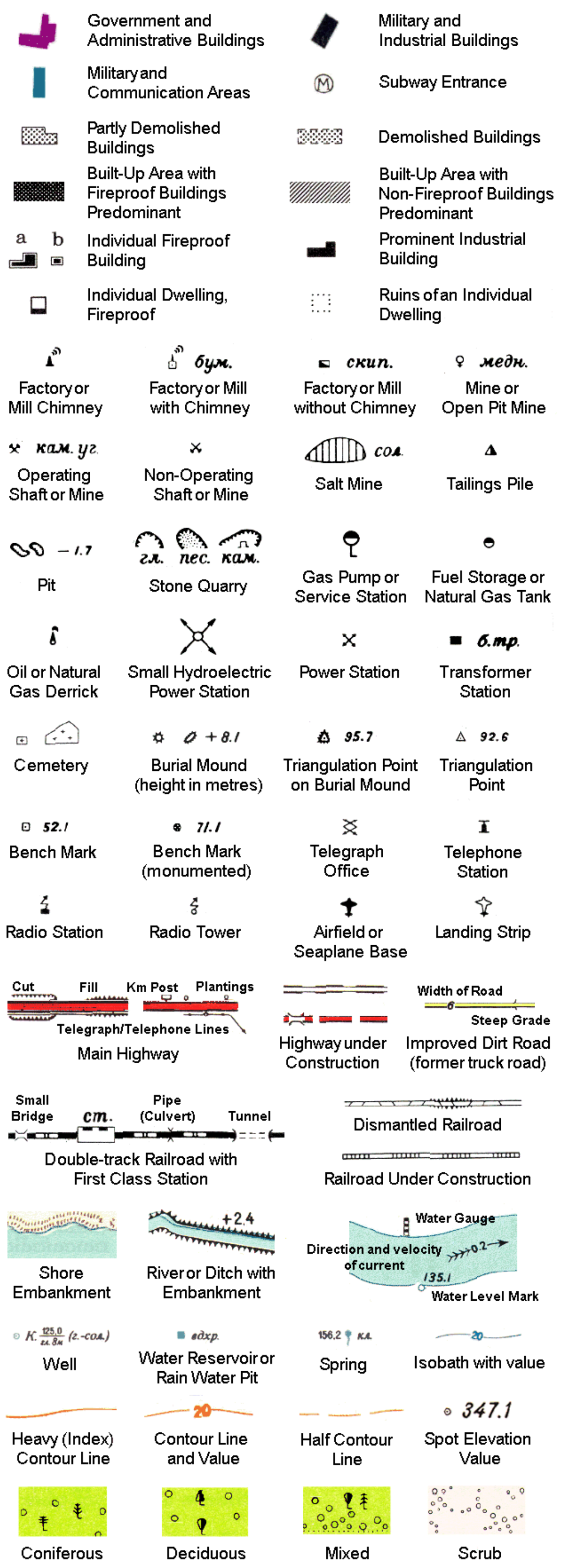
243,8	Values for prominent elevations
186,0	Numbers for spot elevations, depth soundings, contour lines, etc.
0,2	Velocity of the current, width of river bed, depth of river
$\frac{180}{12}$ $\frac{180}{12}$	Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A)
Б б (B)
В в (V)
Г г (G)
Д д (D)
Е е (E)
Ё ё (YO)
Ж ж (ZH)
З з (Z)
И и (I)
Й й (Y)
К к (K)
Л л (L)
М м (M)
Н н (N)
О о (O)
П п (P)
Р р (R)
С с (S)
Т т (T)
У у (U)
Ф ф (F)
Х х (KH)
Ц ц (TS)
Ч ч (CH)
Ш ш (SH)
Щ щ (SHCH)
ъ (–)
ы (Y)
ь (')
Э э (E)
Ю ю (YU or IU)
Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale


Government and Administrative Buildings
Military and Industrial Buildings
Military and Communication Areas
Subway Entrance
Partly Demolished Buildings
Demolished Buildings
Built-Up Area with Fireproof Buildings Predominant
Built-Up Area with Non-Fireproof Buildings Predominant
a b
Individual Fireproof Building
Prominent Industrial Building
Individual Dwelling, Fireproof
Ruins of an Individual Dwelling
Factory or Mill Chimney
бум.
Factory or Mill with Chimney
скип.
Factory or Mill without Chimney
медн.
Mine or Open Pit Mine
кам. уг.
Operating Shaft or Mine
Non-Operating Shaft or Mine
сол.
Salt Mine
Tailings Pile
–1.7
Pit
гл. пес. кам.
Stone Quarry
Gas Pump or Service Station
Fuel Storage or Natural Gas Tank
Oil or Natural Gas Derrick
Small Hydroelectric Power Station
Power Station
б.тр.
Transformer Station
Cemetery
+8.1
Burial Mound (height in metres)
95.7
Triangulation Point on Burial Mound
92.6
Triangulation Point
52.1
Bench Mark
71.1
Bench Mark (monumented)
Telegraph Office
Telephone Station
Radio Station
Radio Tower
Airfield or Seaplane Base
Landing Strip
Cut
Fill
Km Post
Plantings
Telegraph/Telephone Lines
Main Highway
Highway under Construction
Width of Road
Steep Grade
Improved Dirt Road (former truck road)
Small Bridge
ст.
Pipe (Culvert)
Tunnel
Double-track Railroad with First Class Station
Dismantled Railroad
Railroad Under Construction
Shore Embankment
+2.4
River or Ditch with Embankment
Water Gauge
Direction and velocity of current
0.2
135.1
Water Level Mark
Well
вдхр.
Water Reservoir or Rain Water Pit
156.2
кл.
Spring
20
Isobath with value
Heavy (Index) Contour Line
20
Contour Line and Value
Half Contour Line
347.1
Spot Elevation Value
Coniferous
Deciduous
Mixed
Scrub

Key to Numbers on Mapping

SJ89_Manchester

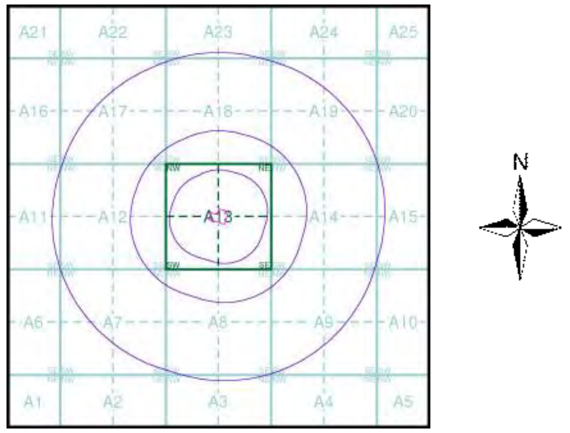
No.	Description
1	Airfield/Airport
6	Railway Station
62	Factory (Gas)
66	Factory (Gas)
94	Factory (Metal Works)
158	Police Station/Headquarters
197	Railway Station

Envirocheck®

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Lancashire And Furness	**1:10,560**	**1848**	**3**
Cheshire	**1:10,560**	**1882**	**4**
Lancashire And Furness	**1:10,560**	**1894 - 1896**	**5**
Lancashire And Furness	**1:10,560**	**1909**	**6**
Lancashire And Furness	**1:10,560**	**1923**	**7**
Lancashire And Furness	**1:10,560**	**1931 - 1932**	**8**
Lancashire And Furness	**1:10,560**	**1938**	**9**
Ordnance Survey Plan	**1:10,000**	**1956**	**10**
Ordnance Survey Plan	**1:10,000**	**1972**	**11**
Manchester	**1:25,000**	**1975**	**12**
Ordnance Survey Plan	**1:10,000**	**1980**	**13**
Ordnance Survey Plan	**1:10,000**	**1985**	**14**
Ordnance Survey Plan	**1:10,000**	**1989**	**15**
Ordnance Survey Plan	**1:10,000**	**1994**	**16**
10K Raster Mapping	**1:10,000**	**2006**	**17**
VectorMap Local	**1:10,000**	**2015**	**18**

Russian Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

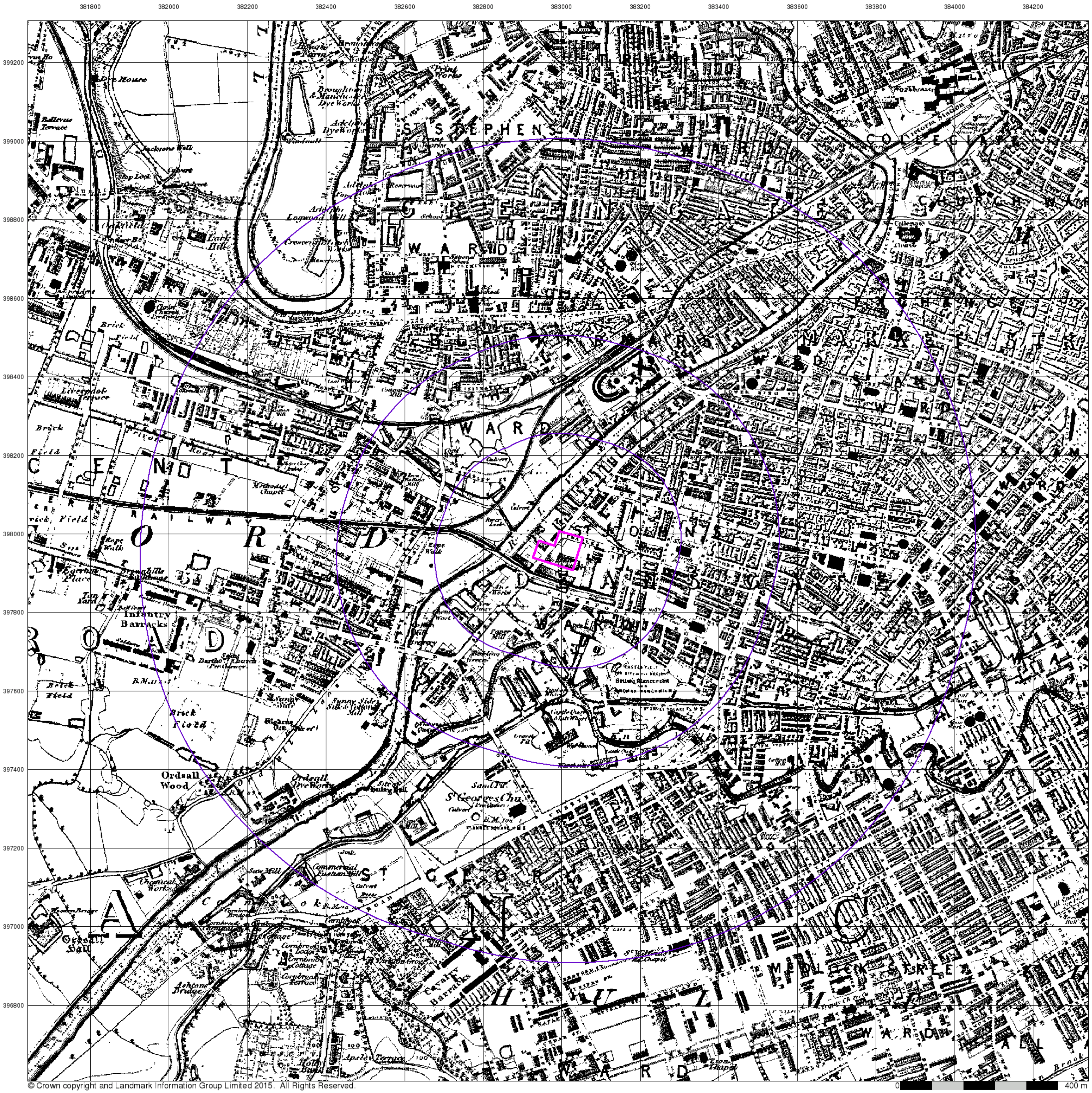
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
ST STEPHENS
WARD
COLLEGIATE
CHURCH WARD
EXCHANGE
MARKET STREET
ST JOHNS WARD
ORDSALL
Infantry Barracks
Ordsall Wood
St Georges Chu.
Cavalry Barracks
Ordsall Hall
MEDLOCK STREET
0
400 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

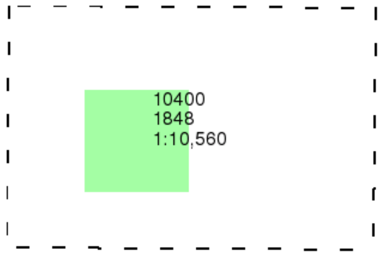
Lancashire And Furness

Published 1848

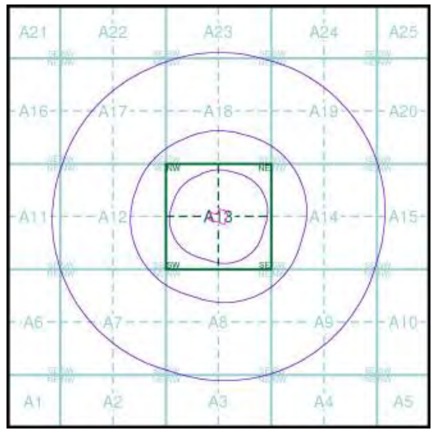
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)


10400
1848
1:10,560

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

N

Order Details

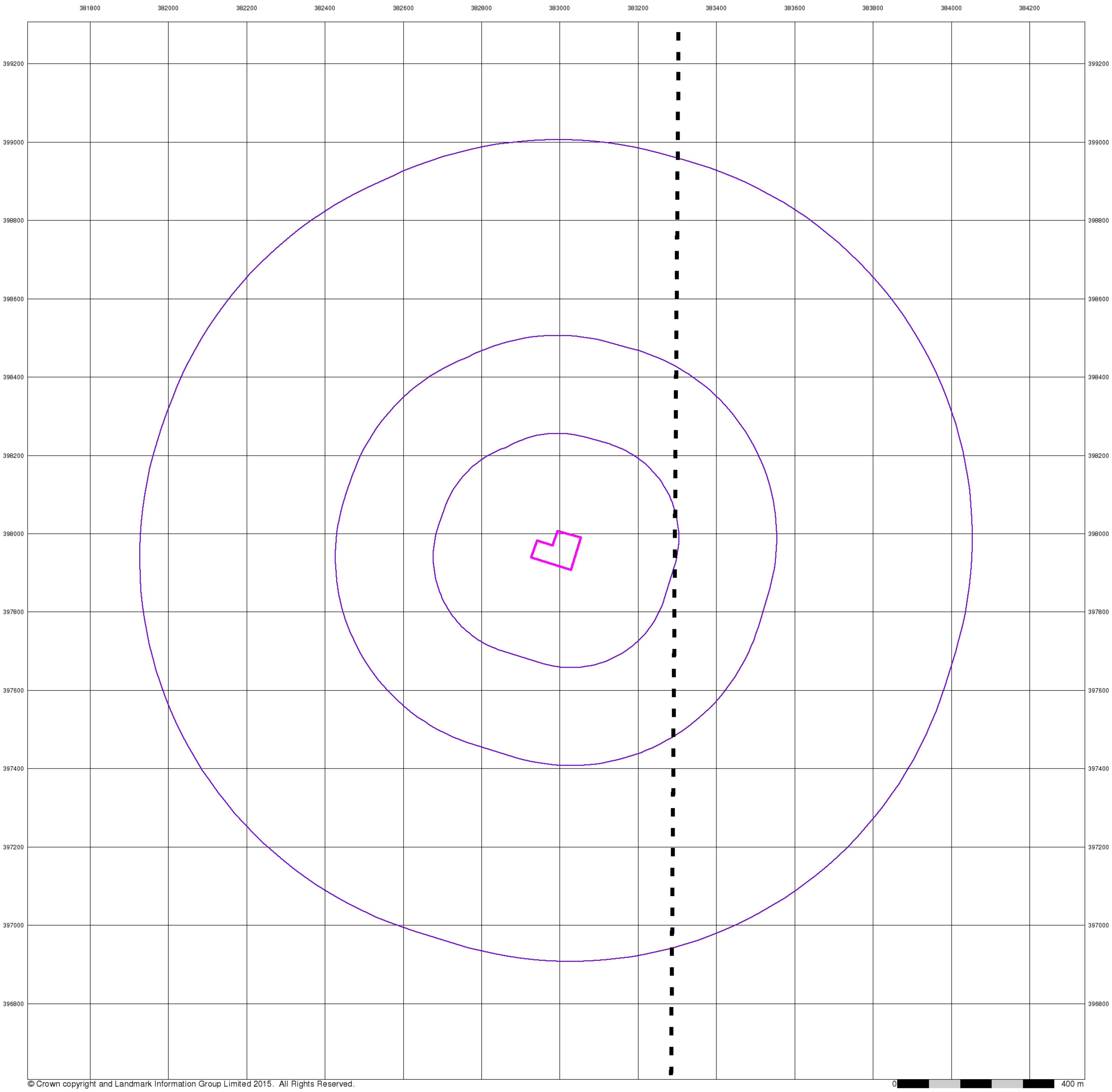
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
0
400 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

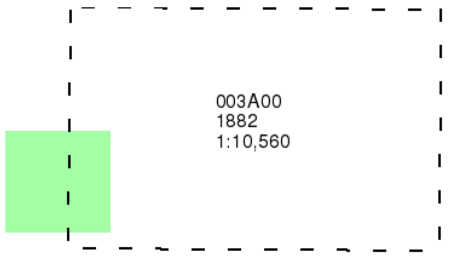
Cheshire

Published 1882

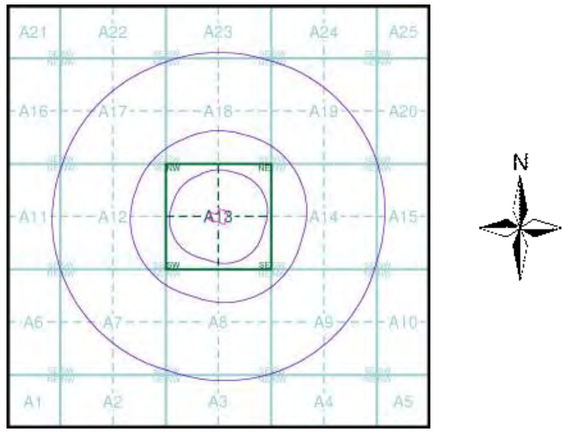
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)


003A00
1882
1:10,560

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

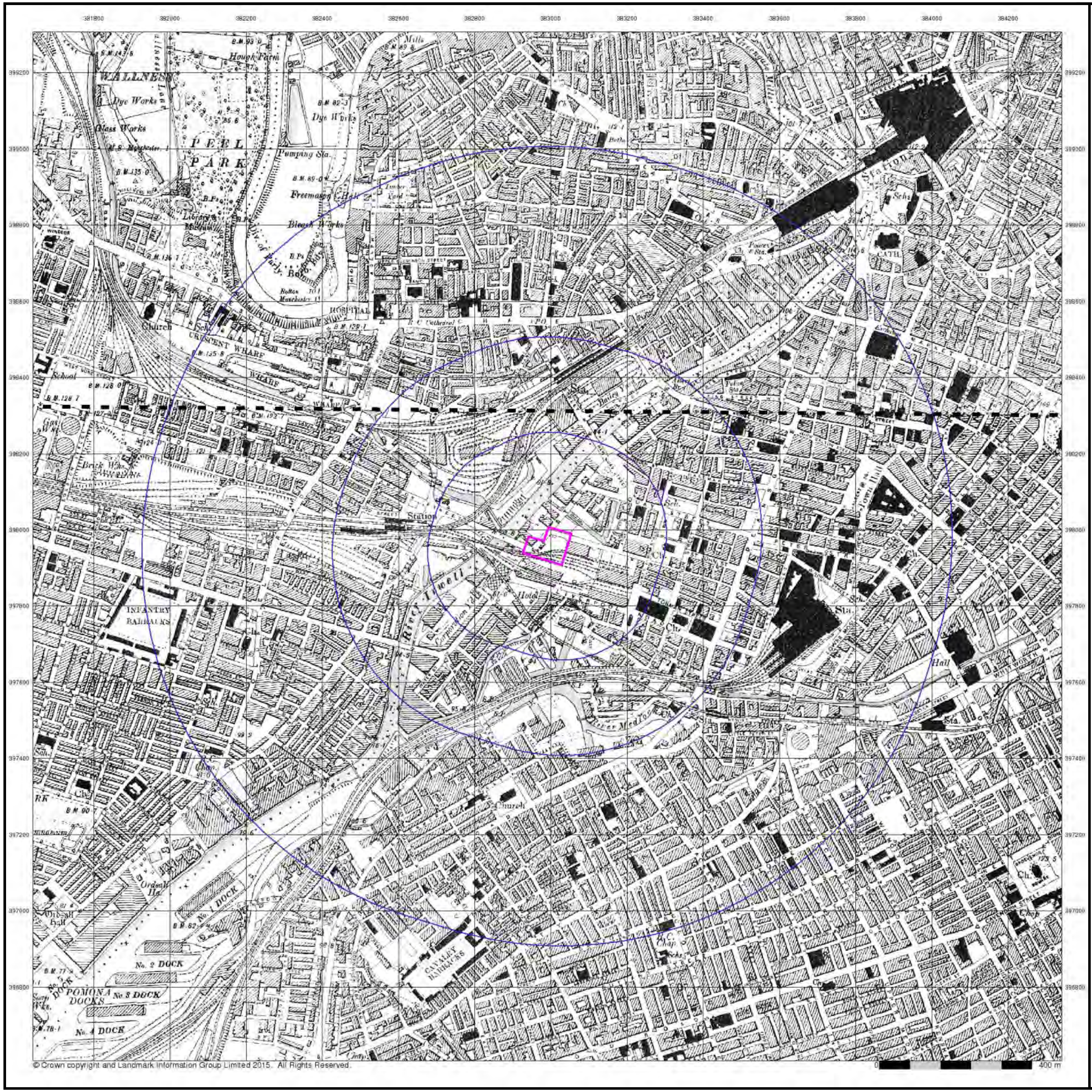
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
WALLNESS
Dye Works
Glass Works
PEEL PARK
Pumping Sta.
Freemasons' Hall
Bleach Works
Hough Farm
Dye Works
HOSPITAL
R C Cathedral
CRESCENT WHARF
WHARF
School
Church
Station
River Irwell
Hotel
INFANTRY BARRACKS
Stations
CATH.
Sta.
Hall
Church
Ordsall Ha.
No. 1 DOCK
No. 2 DOCK
POMONA DOCKS
No. 3 DOCK
No. 4 DOCK
CAVALRY BARRACKS
Chap.
0
400 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

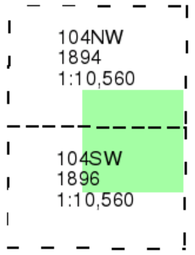
Lancashire And Furness

Published 1894 - 1896

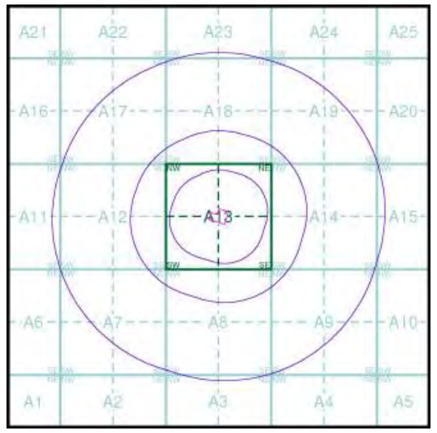
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)


104NW
1894
1:10,560
104SW
1896
1:10,560

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

Order Details

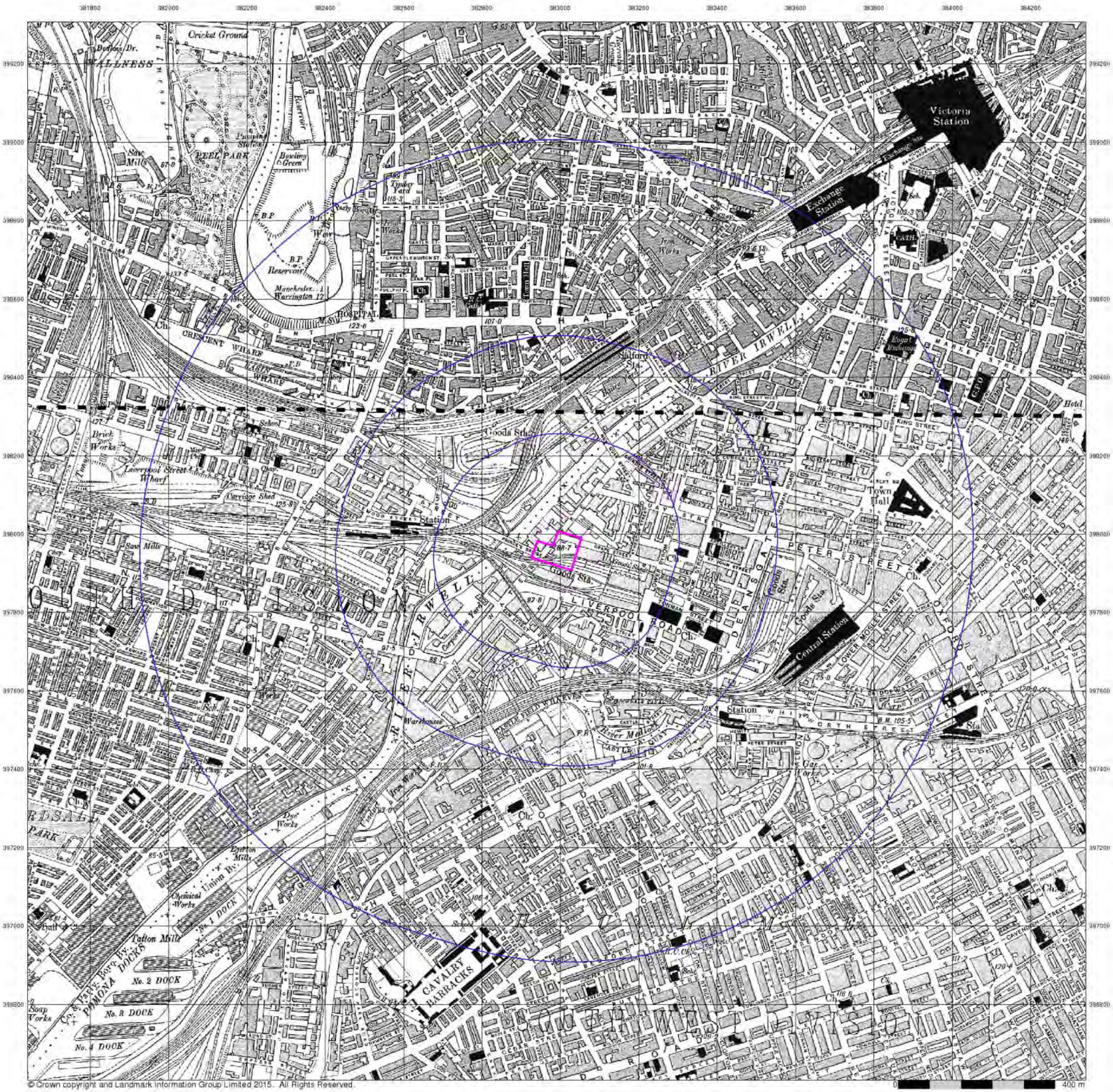
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
Cricket Ground
Peel Park
Bowling Green
Reservoir
Crescent Wharf
Victoria Station
Exchange Station
Salford Sta.
Chapel Street
River Irwell
Goods Sta.
Liverpool Road
Central Station
Goods Sta.
Town Hall
Royal Exchange
Peter Street
Deansgate
Oxford Street
King Street
Market Street
Liverpool Street Wharf
Brick Works
Saw Mills
Carriage Shed
Station
Castle Field Wharves
River Medlock
Gas Works
Dye Works
Chemical Works
Tatton Mills
Pomona Docks
No. 2 Dock
No. 3 Dock
No. 4 Dock
Cavalry Barracks
Ordsall Park
Soap Works
Hospital
Manchester & Warrington
Hotel
G.P.O.
0
400 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

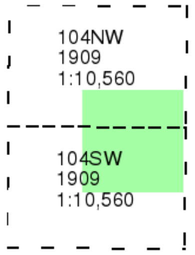
Lancashire And Furness

Published 1909

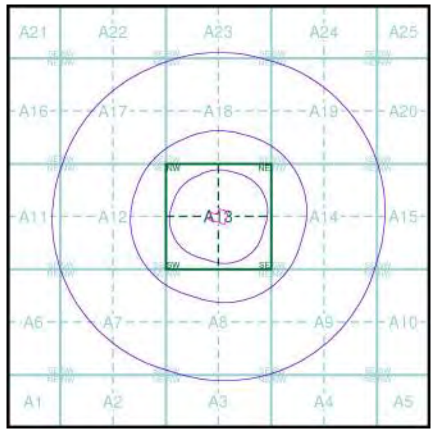
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)


104NW
1909
1:10,560
104SW
1909
1:10,560

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

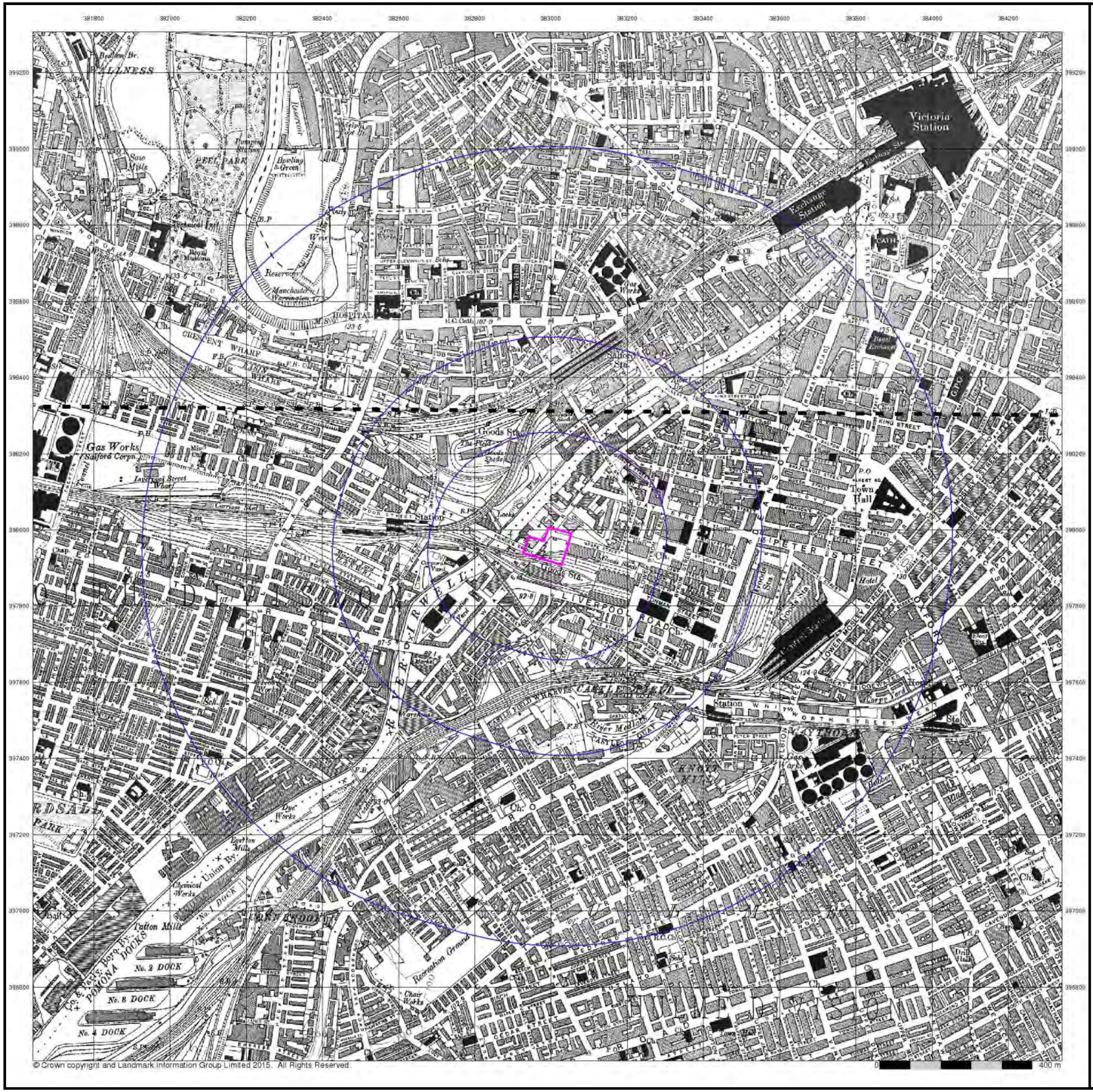
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
Victoria Station
Exchange Station
PEEL PARK
Gas Works Salford Corpn
Goods Sta.
LIVERPOOL ROAD
PETER STREET
Town Hall
Royal Exchange
No. 2 DOCK
No. 3 DOCK
No. 4 DOCK
POMONA DOCKS
0
400 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

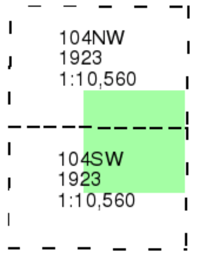
Lancashire And Furness

Published 1923

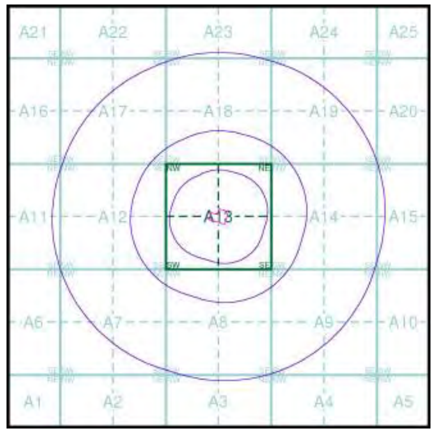
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)


104NW
1923
1:10,560
104SW
1923
1:10,560

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

Order Details

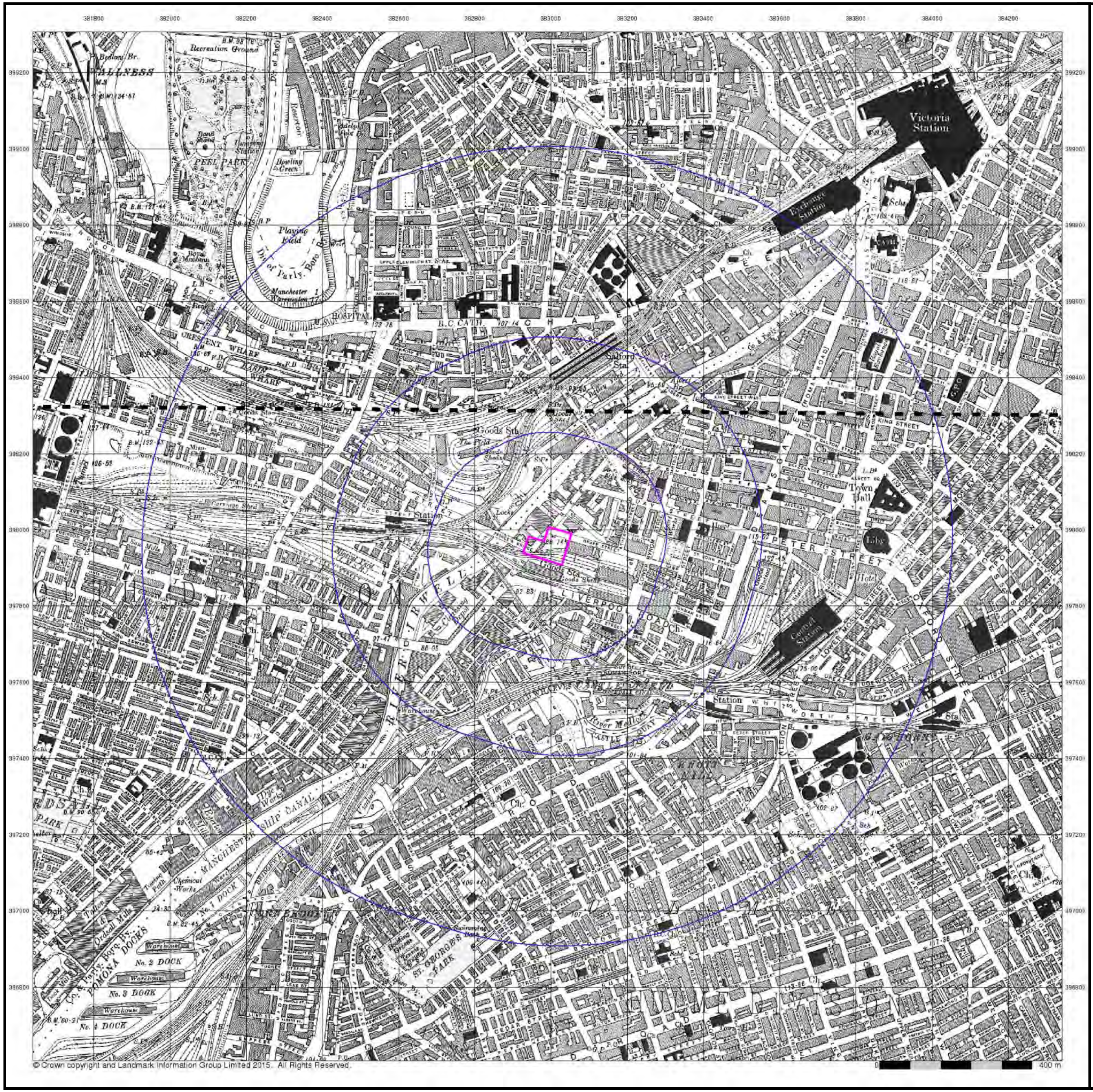
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


Victoria Station
Exchange Station
Salford Stn
Central Station
Station
PEEL PARK
Playing Field
Recreation Ground
HOSPITAL
B. C. CATH
KING STREET
LIVERPOOL ROAD
PETER STREET
Town Hall
Liby
MANCHESTER SHIP CANAL
POMONA DOCKS
No. 2 DOCK
No. 3 DOCK
No. 4 DOCK
Warehouse
ST. GEORGE'S PARK
Chemical Works
CRESCENT WHARF
Goods Sta
381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
0
400 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

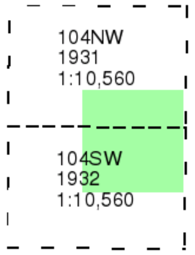
Lancashire And Furness

Published 1931 - 1932

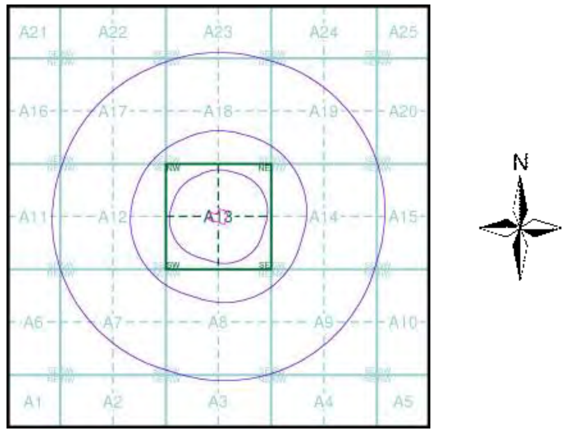
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)


104NW
1931
1:10,560
104SW
1932
1:10,560

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

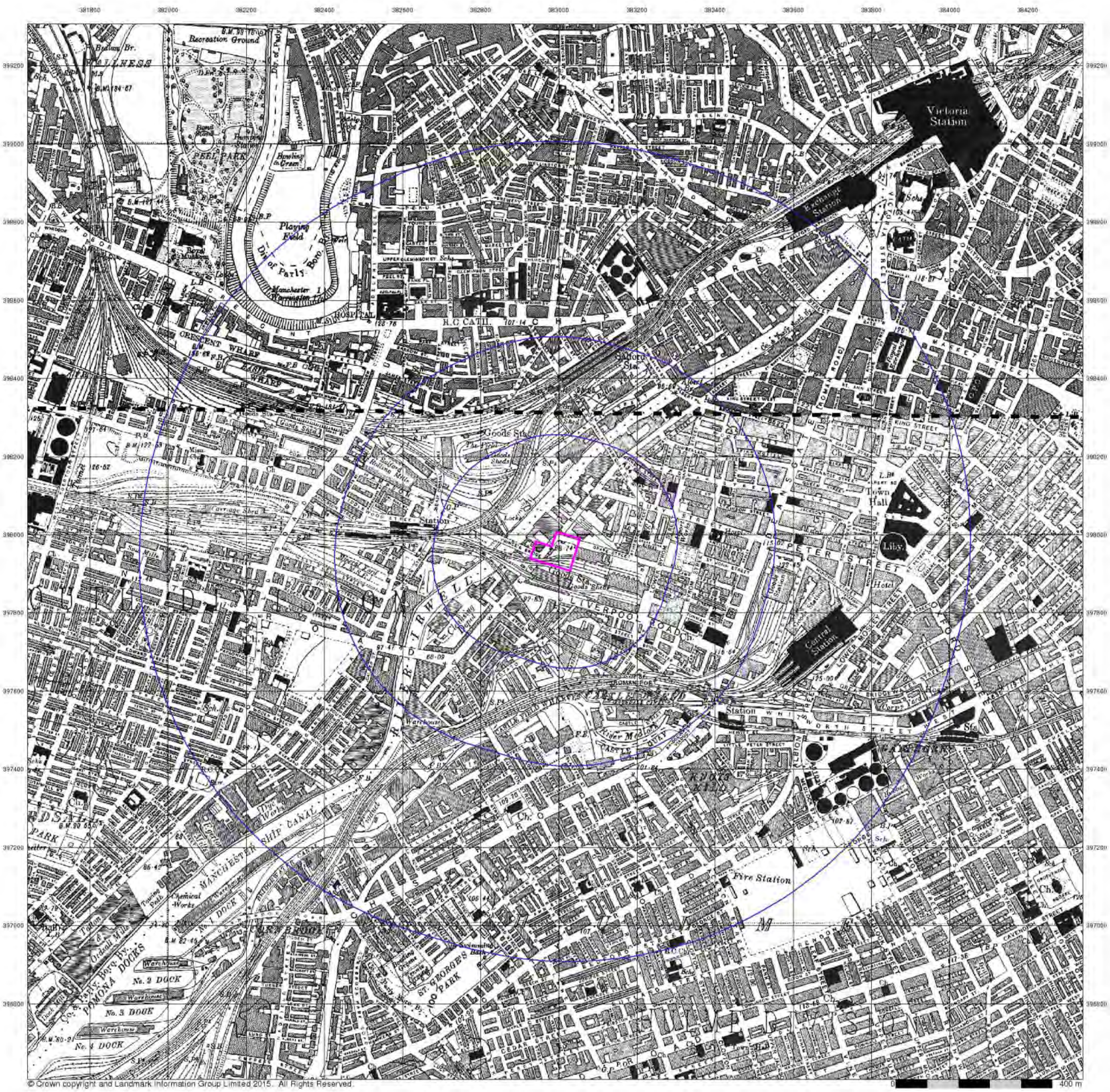
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark®
Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
Recreation Ground
Peel Park
Playing Field
Victoria Station
Exchange Station
Crescent
Wharf
Goods Sta.
Station
Liverpool Road
Peter Street
Town Hall
Liby.
Hotel
Central Station
Irwell
Fire Station
Manchester Ship Canal
No. 2 Dock
No. 3 Dock
No. 4 Dock
Pomona Docks
St. George's Park
0
400 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

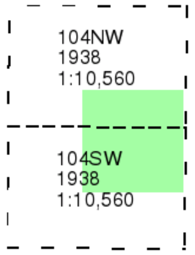
Lancashire And Furness

Published 1938

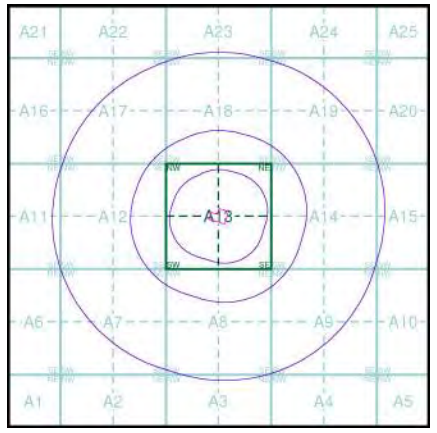
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)


104NW
1938
1:10,560
104SW
1938
1:10,560

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

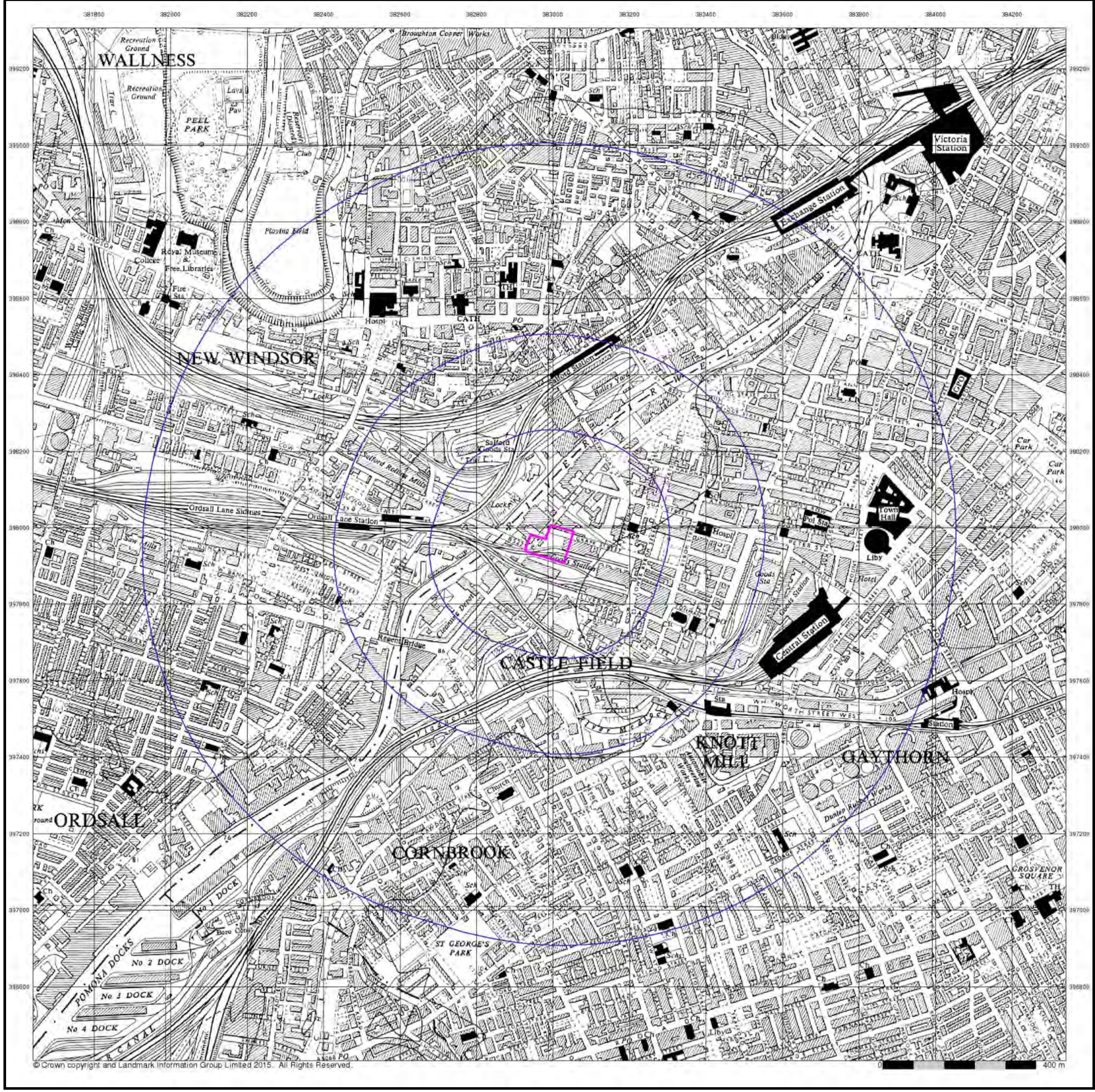
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark®
Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
WALLNESS
Recreation Ground
PEEL PARK
Playing Field
Royal Museum & Free Libraries
College
NEW WINDSOR
Salford Goods Sta
Salford Rolling Mills
Ordsall Lane Sidings
Ordsall Lane Station
Salford Station
Exchange Station
Victoria Station
Town Hall
Liby
Hospl
Goods Sta
Central Station
CASTLE FIELD
Regent Bridge
KNOTT MILL
GAYTHORN
ORDSALL
CORNBROOK
ST GEORGE'S PARK
No 1 DOCK
No 2 DOCK
No 3 DOCK
No 4 DOCK
POMONA DOCKS
GROSVENOR SQUARE
Broughton Copper Works
Car Park
0
400 m
© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

Ordnance Survey Plan

Published 1956

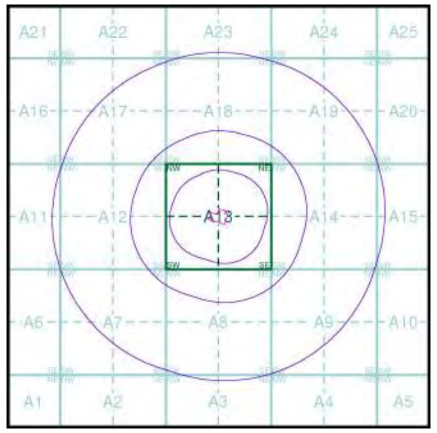
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SJ89NW
1956
1:10,560

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

N

Order Details

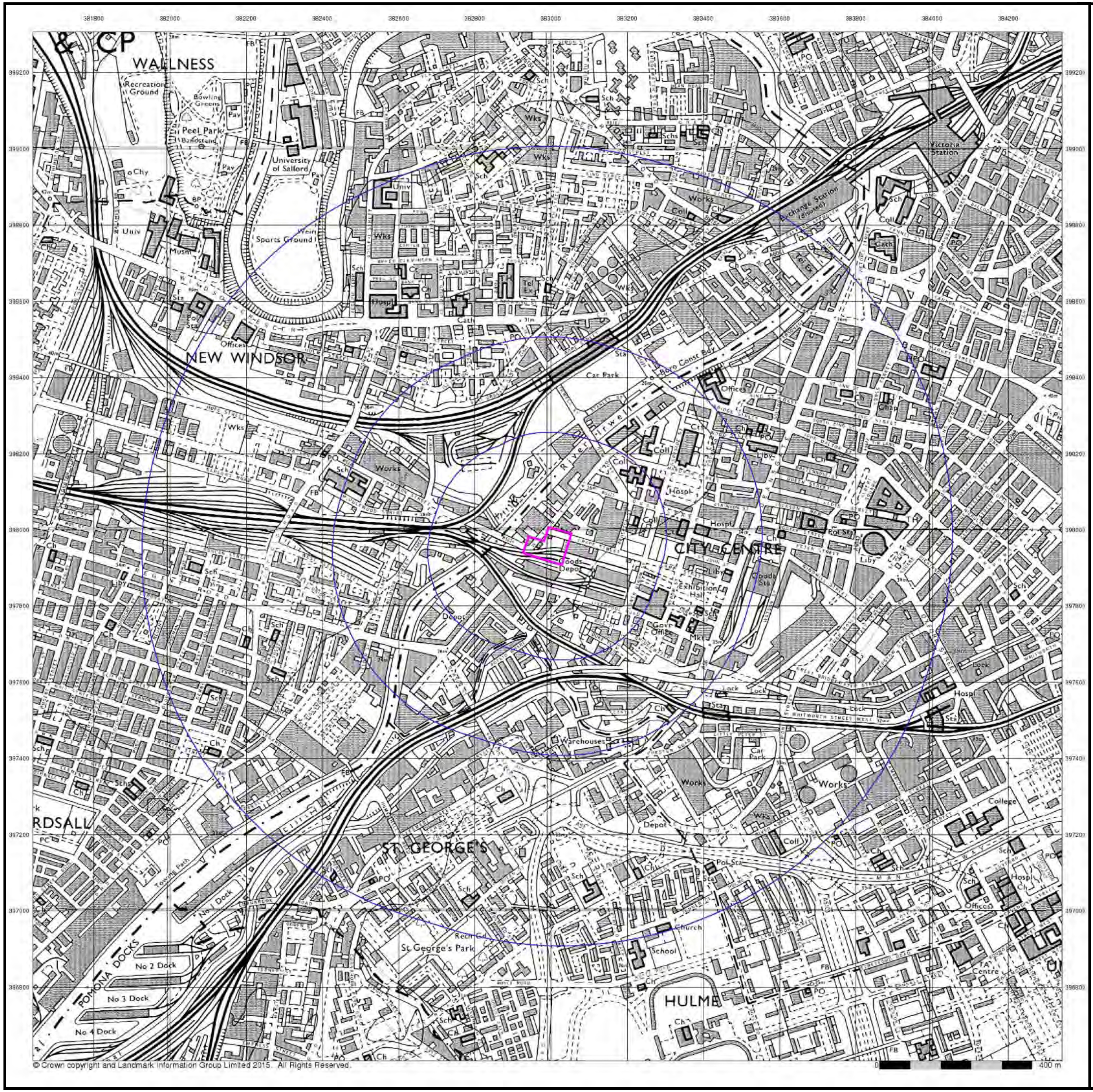
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
& CP
WALLNESS
Recreation Ground
Bowling Green
Peel Park
Bandstand
University of Salford
Sports Ground
Weir
Univ
Musm
Hospl
NEW WINDSOR
Offices
Victoria Station
Exchange Station (disused)
Car Park
River Irwell
CITY CENTRE
Goods Depot
Exhibition Hall
Goods Sta
Govt Offices
Mkt
Works
Wks
Depot
Warehouses
Lock
WHITWORTH STREET WEST
Works
College
ST. GEORGE'S
St George's Park
School
Church
Towing Path
POMONA DOCKS
No 2 Dock
No 3 Dock
No 4 Dock
RDSALL
HULME
0
400 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

Ordnance Survey Plan

Published 1972

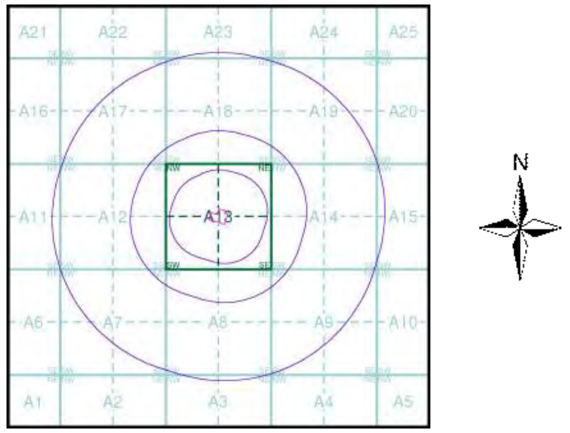
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SJ89NW
1972
1:10,000

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

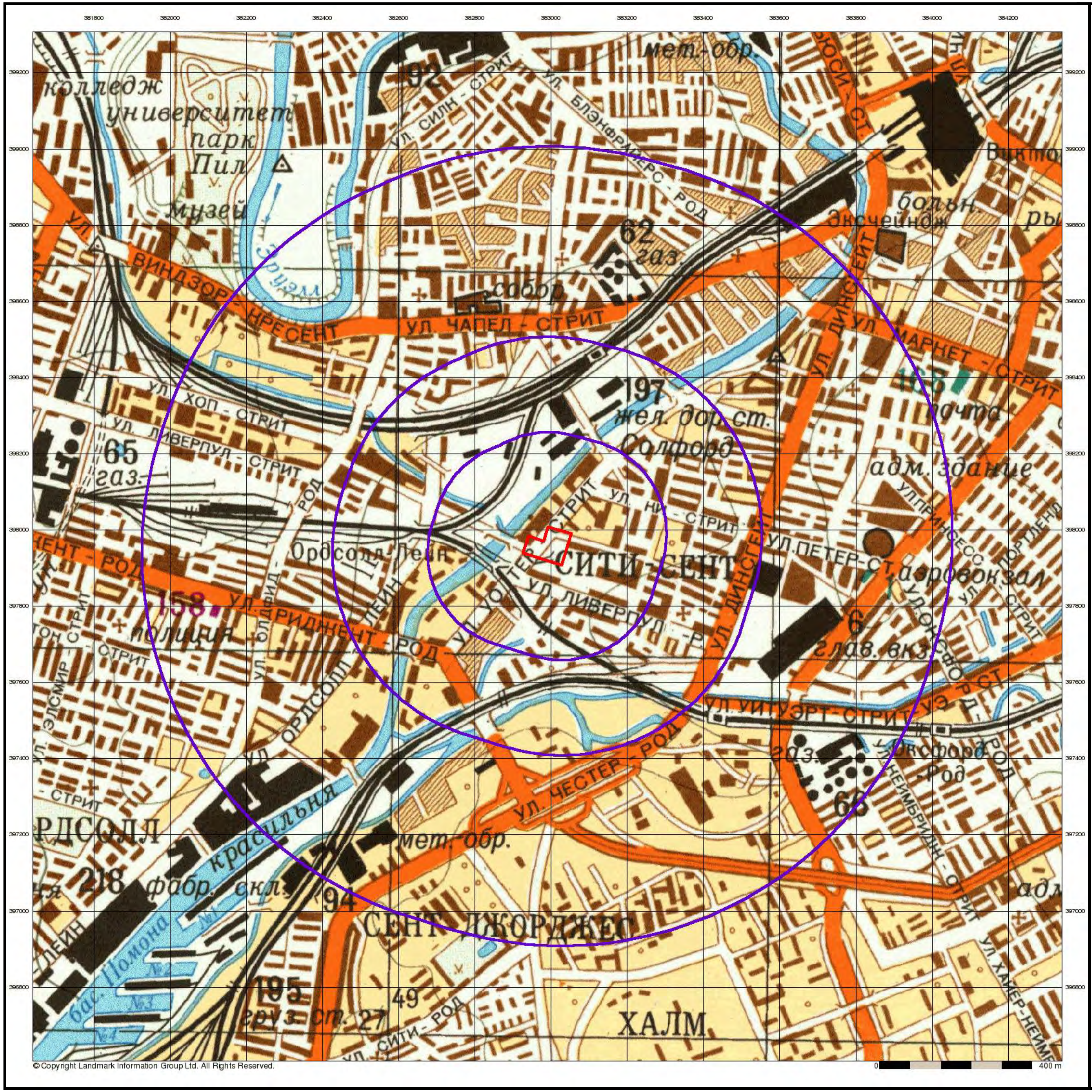
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk



381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
колледж
университет
парк
Пил
музей
мет.-обр.
92
УЛ. СИЛК - СТРИТ
УЛ. БЛЭКФРИЕРС - РОД
62
газ.
собор
УЛ. ВИНДЗОР - КРЕСЕНТ
УЛ. ЧАПЕЛ - СТРИТ
197
жел. дор. ст.
Солфорд
УЛ. ХОП - СТРИТ
УЛ. ЛИВЕРПУЛ - СТРИТ
65
газ.
Ордсолл-Лейн
СИТИ-СЕНТ
УЛ. ЛИВЕРПУЛ - Р
158
полиция
УЛ. БРИДЖВОТЕР - РОД
УЛ. ДИНСГЕЙТ
УЛ. ПЕТЕР - СТ.
больн.
почта
166
адм. здание
УЛ. МАРКЕТ - СТРИТ
аэровокзал
6
глав. вкз.
УЛ. УИТУОРТ - СТРИТ
УЛ. ЧЕСТЕР - РОД
газ.
66
Оксфорд-Род
мет.-обр.
красильня
218
фабр.
скл.
94
СЕНТ-ДЖОРДЖЕС
ХАЛМ
195
груз. ст.
27
49
УЛ. СИТИ - РОД
0
400 m

© Copyright Landmark Information Group Ltd. All Rights Reserved.

Envirocheck®

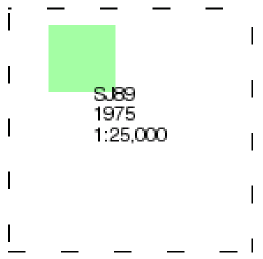
Manchester

Published 1975

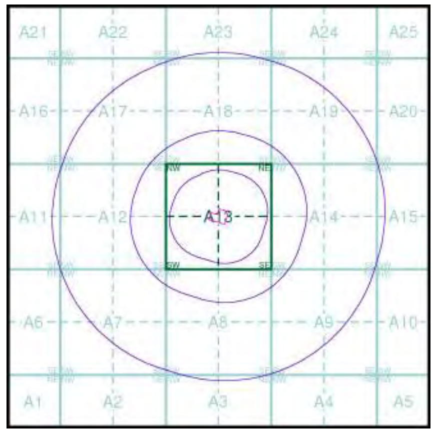
Source map scale - 1:25,000

These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use.
They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

Map Name(s) and Date(s)


SJ89
1975
1:25,000

Russian Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

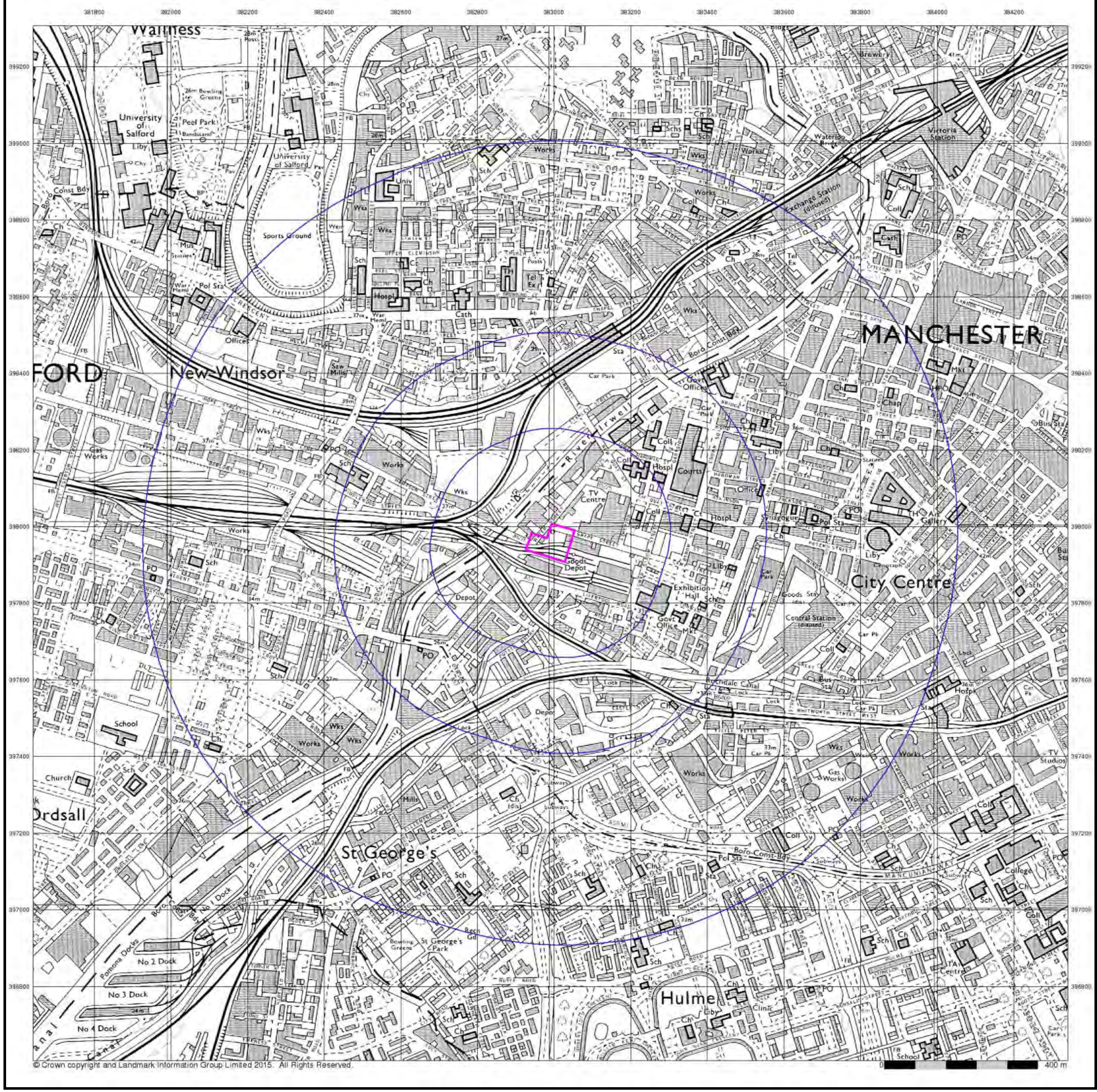
N

Order Details

Order Number: 79633581_1_1
Customer Ref: 034933
National Grid Reference: 382990, 397960
Slice: A
Site Area (Ha): 0.73
Search Buffer (m): 1000

Site Details

121, Water Street, Manchester, M3 4JU


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
University of Salford
Peel Park
Sports Ground
New Windsor
FORD
MANCHESTER
Victoria Station
Exchange Station (disused)
Waterloo Bridge
River Irwell
Goods Depot
TV Centre
Courts
Exhibition Hall
Central Station (disused)
City Centre
Gas Works
Rochdale Canal
St George's
Ordsall
Hulme
No 1 Dock
No 2 Dock
No 3 Dock
No 4 Dock
Pomona Docks
School
Church
TV Studios
0
400 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

Ordnance Survey Plan

Published 1980

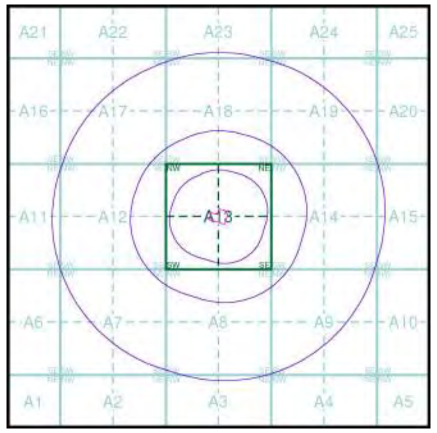
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SJ89NW
1980
1:10,000

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

Order Details

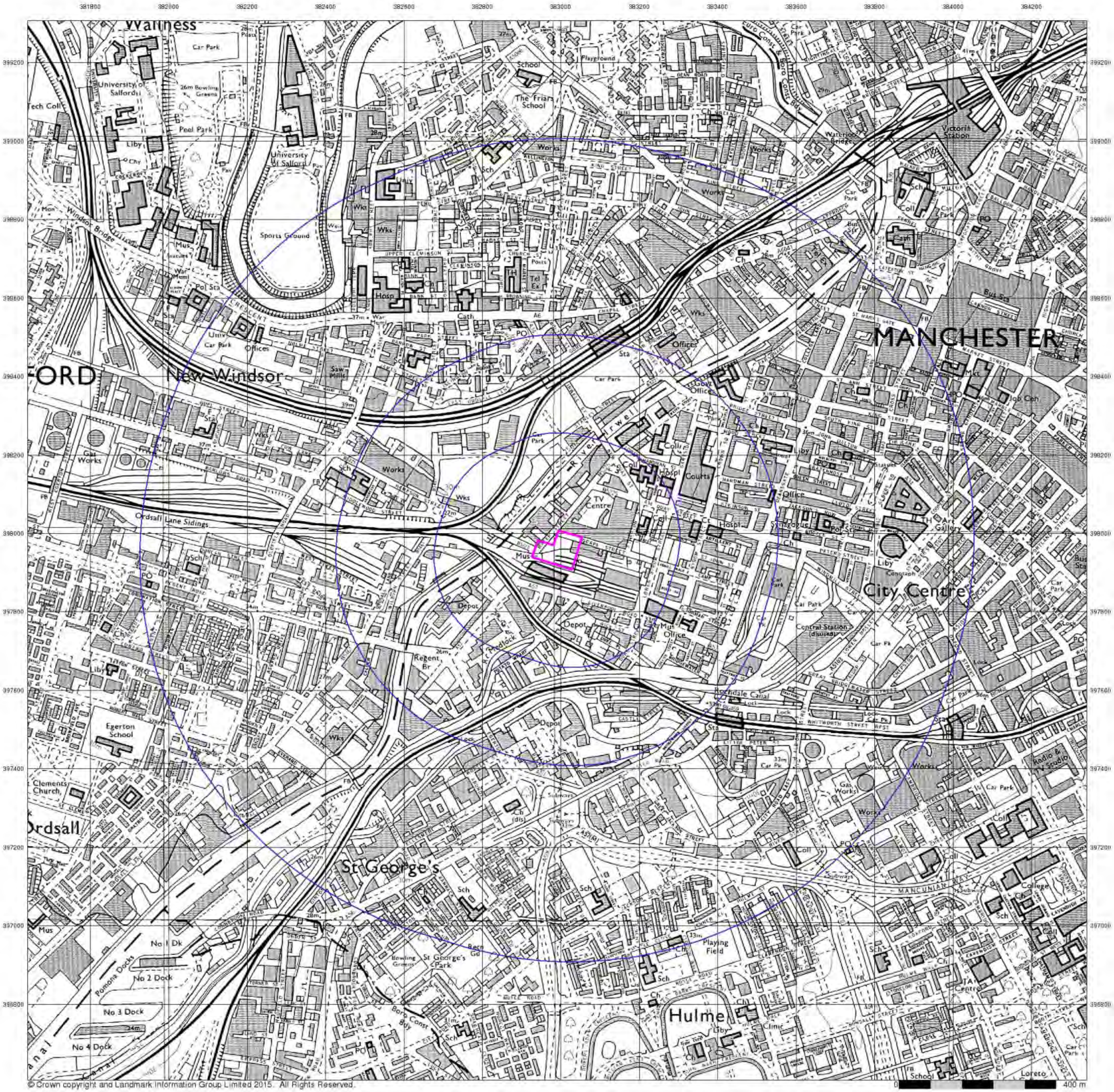
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
MANCHESTER
New Windsor
FORD
City Centre
Ordsall
St George's
Hulme
University of Salford
Peel Park
Sports Ground
Victoria Station
Central Station (disused)
Ordsall Lane Sidings
Rochdale Canal
Mancunian Way
Egerton School
Clements Church
No 1 Dk
No 2 Dock
No 3 Dock
No 4 Dock
Pomona Docks
Regent Br
Gas Works
Courts
TV Centre
Radio & TV Studio
Playing Field
St George's Park
Bowling Green
0
400 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

Ordnance Survey Plan

Published 1985

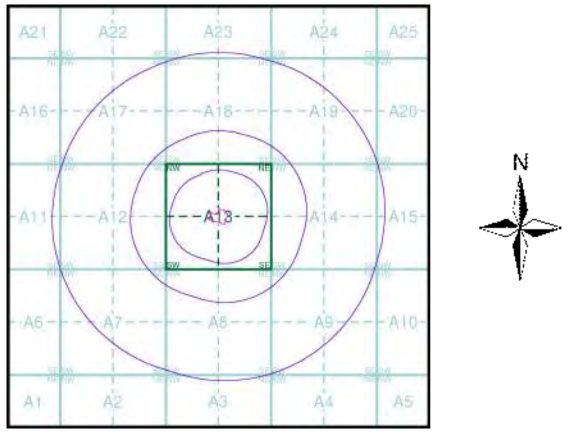
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SJ89NW
1985
1:10,000

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

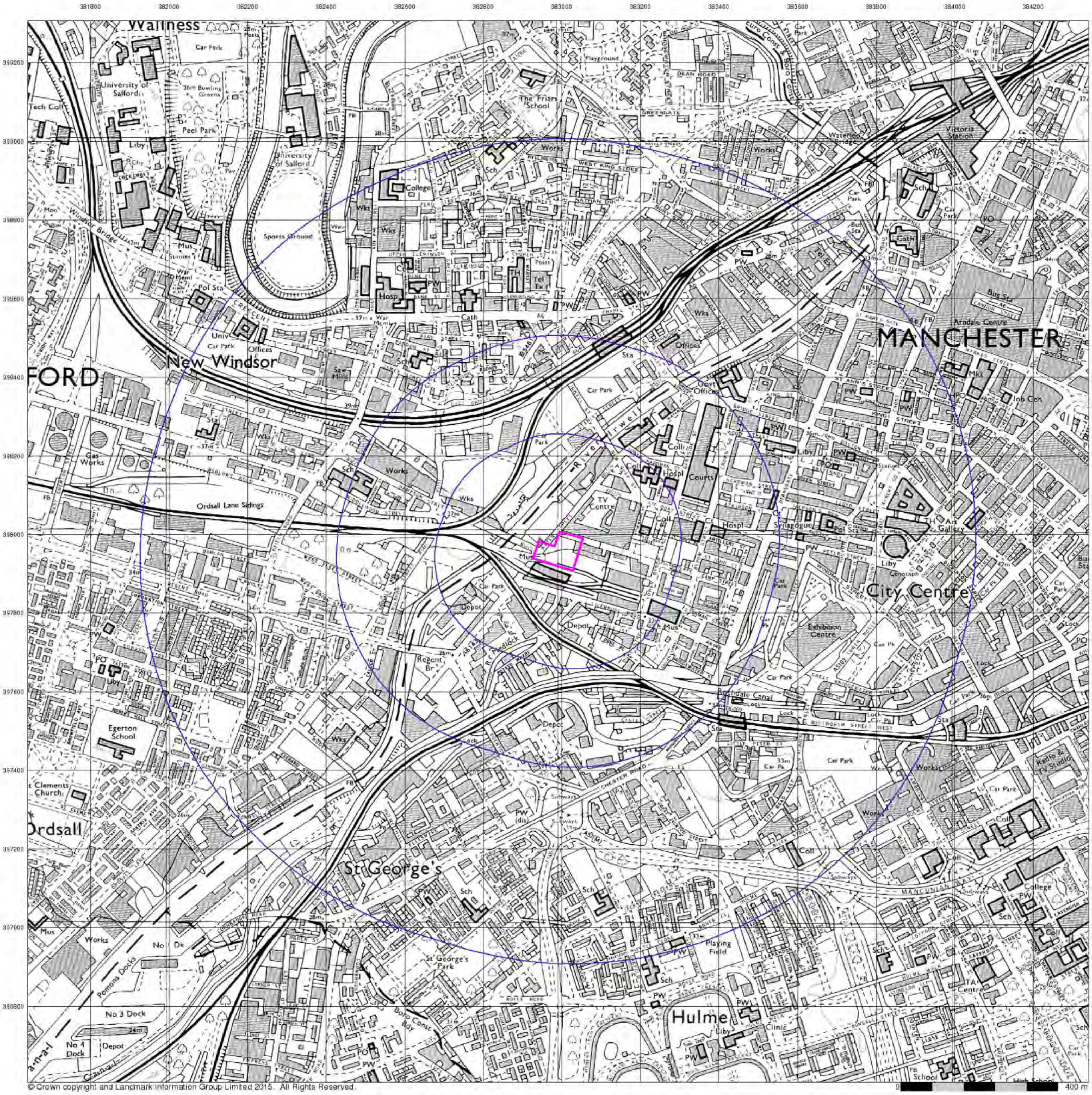
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
MANCHESTER
City Centre
New Windsor
FORD
Ordsall
St George's
Hulme
University of Salford
Peel Park
Victoria Station
Arndale Centre
Exhibition Centre
Egerton School
Ordsall Lane Sidings
Rochdale Canal
No 3 Dock
0
400 m

© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

Ordnance Survey Plan

Published 1989

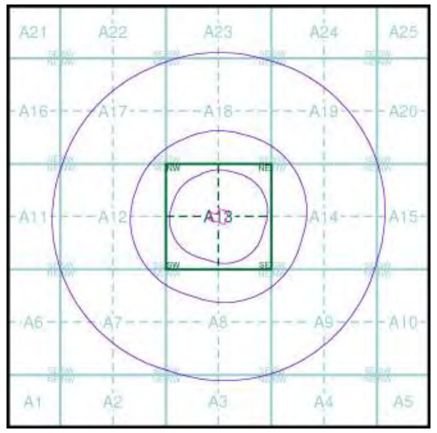
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SJ89NW
1989
1:10,000

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

N

Order Details

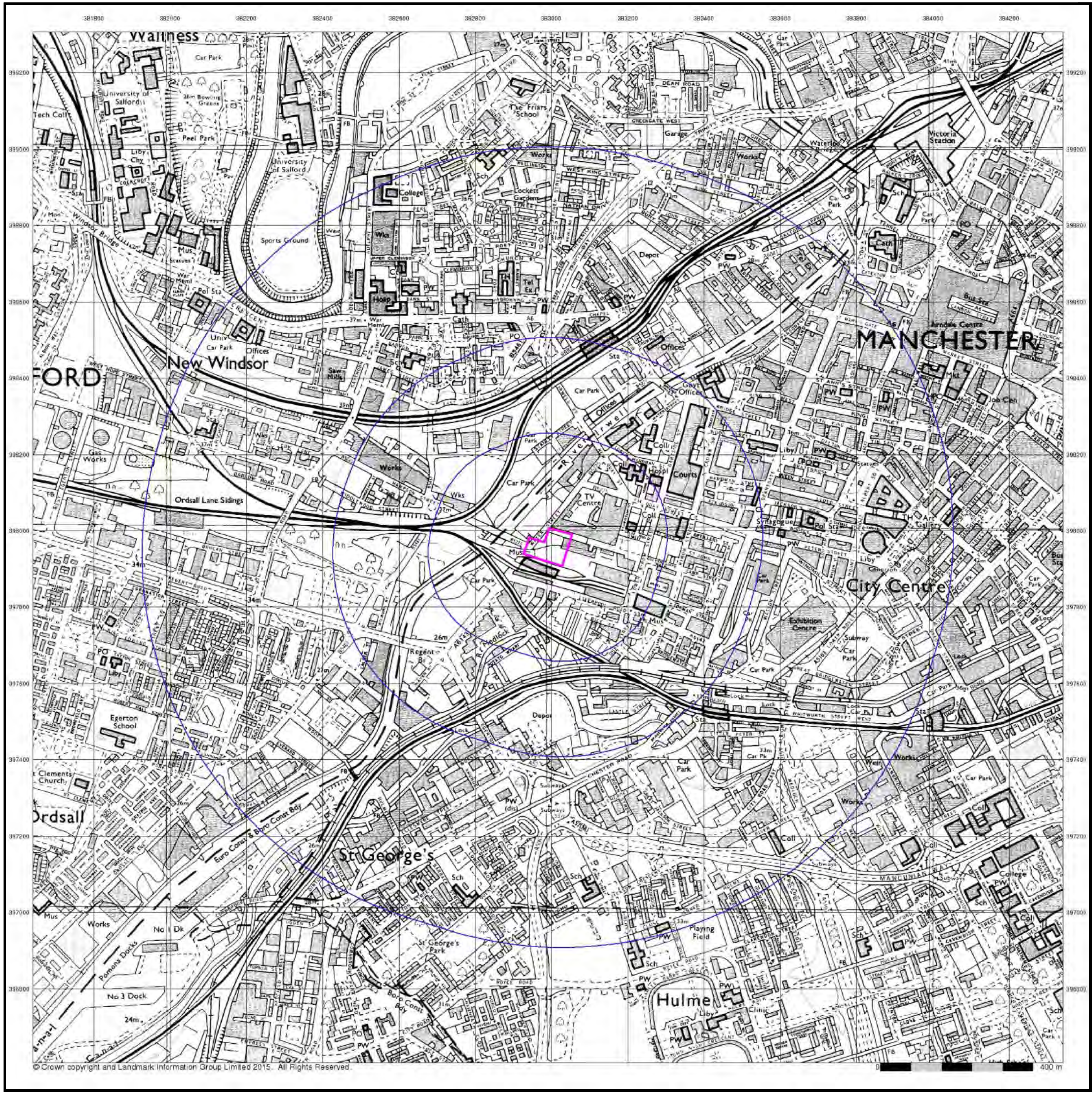
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
University of Salford
Peel Park
Tech Coll
Sports Ground
The Friars School
College
Hosp
Victoria Station
New Windsor
FORD
MANCHESTER
Arndale Centre
Ordsall Lane Sidings
Gas Works
Courts
TV Centre
Mus
Art Gallery
City Centre
Exhibition Centre
Regent Rd
R Medlock
Depot
Egerton School
St Clements Church
Ordsall
Euro Const & Boro Const Bdy
St George's
St George's Park
Playing Field
Pomona Docks
No 3 Dock
Hulme
Mancunian Way
Car Park
0
400 m
© Crown copyright and Landmark Information Group Limited 2015. All Rights Reserved.

Envirocheck®

Ordnance Survey Plan

Published 1994

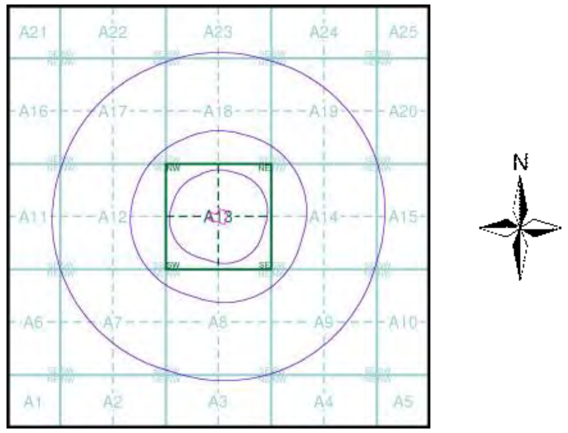
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

SJ89NW
1994
1:10,000

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

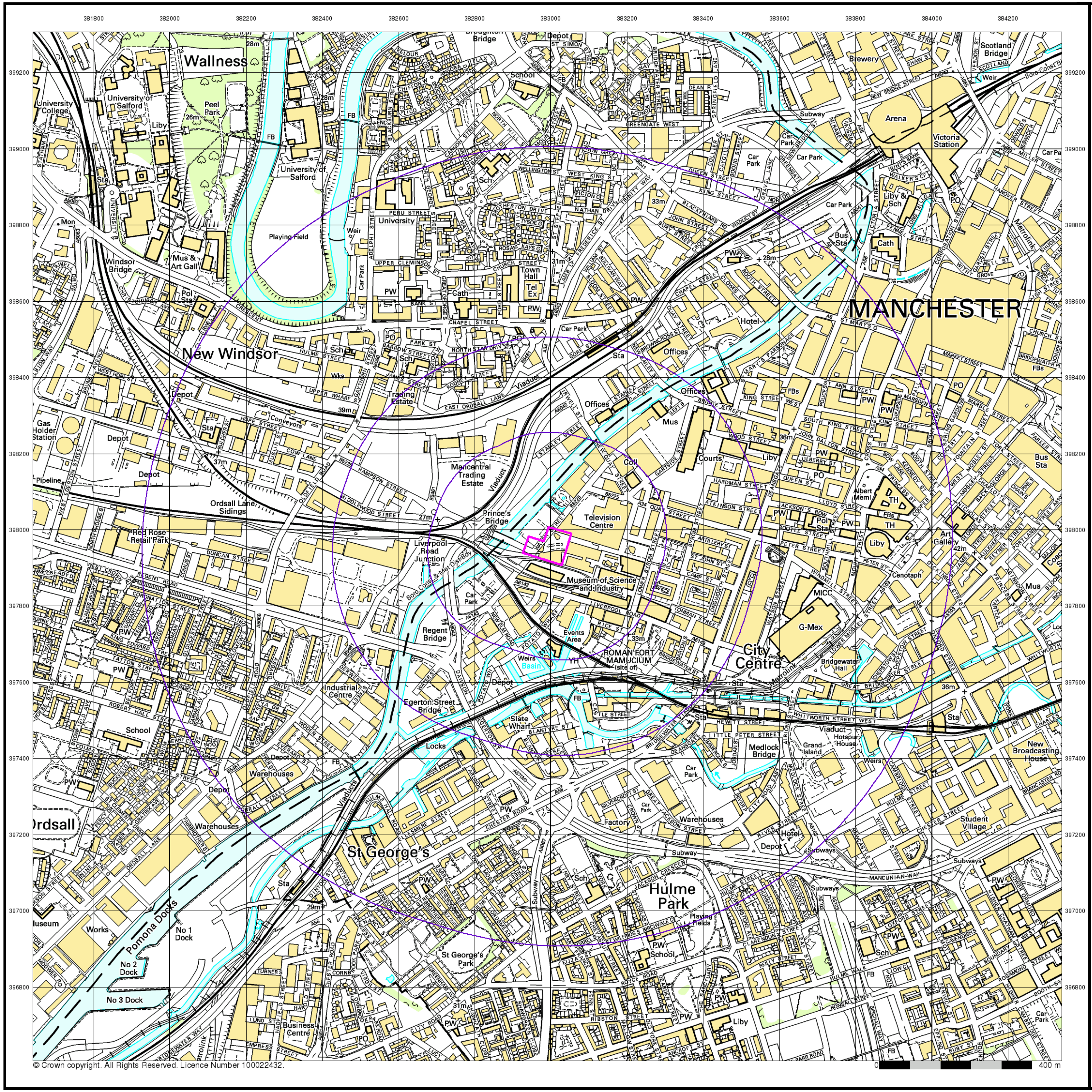
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel:	0844 844 9952
Fax:	0844 844 9951
Web:	www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
Wallness
Peel Park
University of Salford
University College
Playing Field
Windsor Bridge
Mus & Art Gall
New Windsor
Trading Estate
Mancentral Trading Estate
Prince's Bridge
Liverpool Road Junction
Television Centre
Museum of Science and Industry
Ordsall Lane Sidings
Red Rose Retail Park
Regent Bridge
Events Area
ROMAN FORT MAMUCIUM (site of)
Weirs Basin
Egerton Street Bridge
Industrial Centre
Slate Wharf
Locks
Warehouses
MANCHESTER
Arena
Victoria Station
Scotland Bridge
Brewery
Town Hall
Courts
Albert Meml
Art Gallery
MICC
G-Mex
City Centre
Bridgewater Hall
Cenotaph
Viaduct Hotspur House
Medlock Bridge
Grand Island
New Broadcasting House
Student Village
Hulme Park
St George's
St George's Park
Business Centre
Pomona Docks
No 1 Dock
No 2 Dock
No 3 Dock
Ordsall
Mancunian Way
Gas Holder Station
Pipeline
0
400 m

© Crown copyright. All Rights Reserved. Licence Number 100022432.

Envirocheck®

10k Raster Mapping

Published 2006

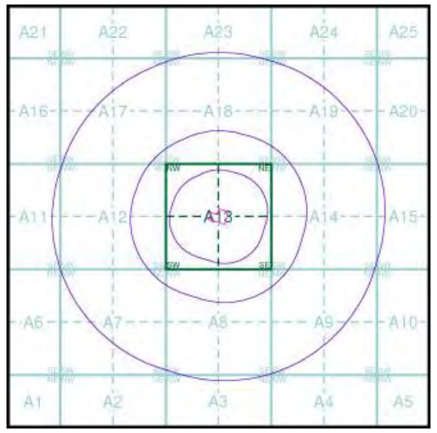
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

SJ89NW
2006
1:10,000

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

N

Order Details

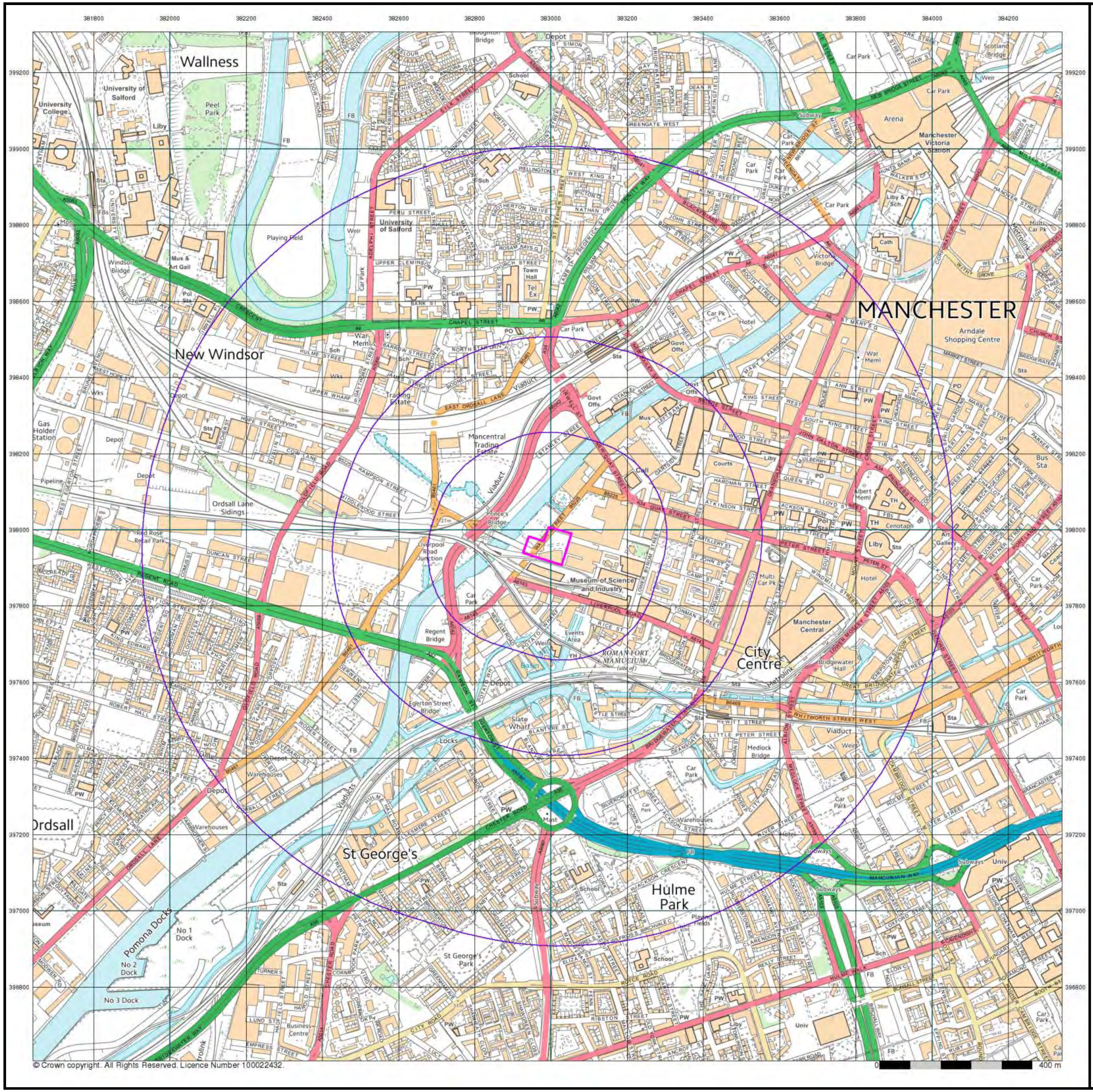
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


381800
382000
382200
382400
382600
382800
383000
383200
383400
383600
383800
384000
384200
399200
399000
398800
398600
398400
398200
398000
397800
397600
397400
397200
397000
396800
Wallness
University of Salford
University College
Peel Park
New Windsor
MANCHESTER
Arndale Shopping Centre
Arena
Manchester Victoria Station
Mancentral Trading Estate
Ordsall Lane Sidings
Red Rose Retail Park
Liverpool Road Junction
Museum of Science and Industry
ROMAN FORT MAMUCIUM (site of)
City Centre
Manchester Central
Regent Bridge
Slate Wharf
St George's
Hulme Park
Ordsall
Pomona Docks
No 1 Dock
No 2 Dock
No 3 Dock
MANCUNIAN WAY
CHAPEL STREET
REGENT ROAD
DEANSGATE
PETER STREET
WHITWORTH STREET WEST
LIVERPOOL ROAD
400 m
0
© Crown copyright. All Rights Reserved. Licence Number 100022432.

Envirocheck®

VectorMap Local

Published 2015

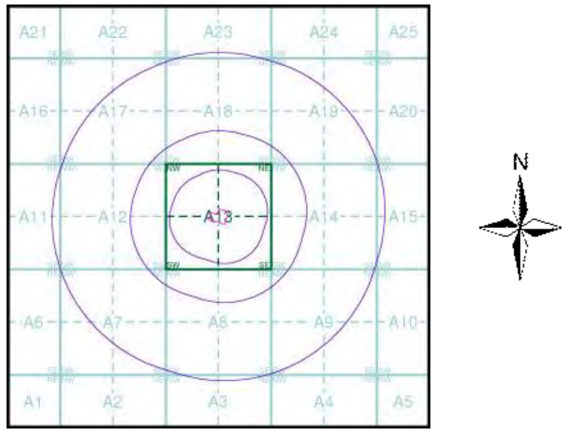
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities),1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

SJ89NW
2015
Variable

Historical Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

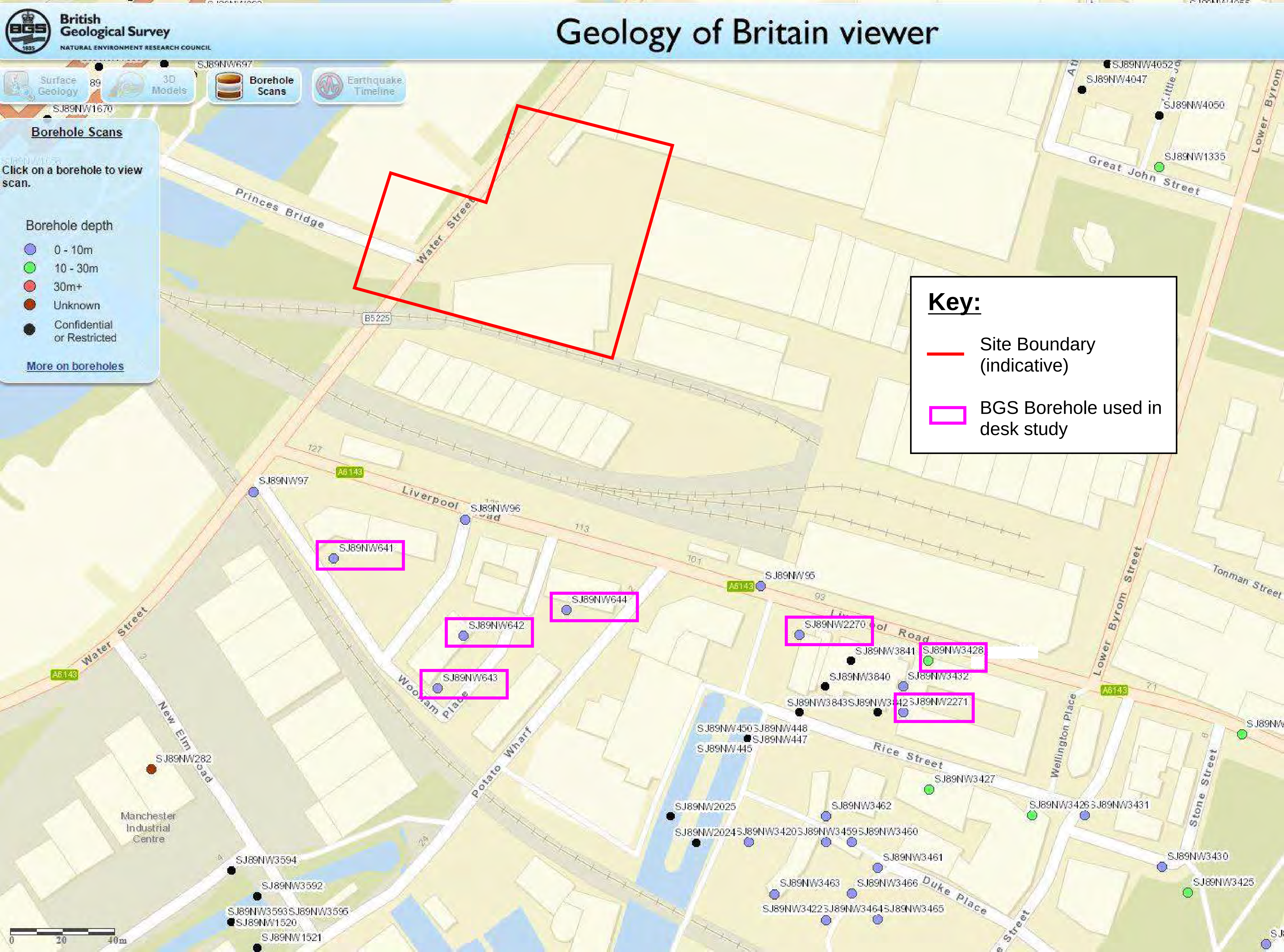
121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Appendix E – Historical Borehole Logs

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.



British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Geology of Britain viewer

Borehole Scans

Click on a borehole to view scan.

Borehole depth

- 🟣 0 - 10m
- 🟢 10 - 30m
- 🔴 30m+
- 🟤 Unknown
- ● Confidential or Restricted

More on boreholes

Key:

—	Site Boundary (indicative)
▭	BGS Borehole used in desk study

Surface Geology
3D Models
Borehole Scans
Earthquake Timeline
Princes Bridge
Water Street
B5225
Liverpool Road
A6143
Great John Street
Little John Street
Lower Byrom Street
Tonman Street
Woollam Place
Potato Wharf
New Elm Road
Rice Street
Wellington Place
Stone Street
Duke Place
Manchester Industrial Centre
SJ89NW697
SJ89NW1670
SJ89NW4052
SJ89NW4047
SJ89NW4050
SJ89NW1335
SJ89NW97
SJ89NW96
SJ89NW641
SJ89NW644
SJ89NW642
SJ89NW643
SJ89NW95
SJ89NW2270
SJ89NW3841
SJ89NW3428
SJ89NW3840
SJ89NW3432
SJ89NW3843
SJ89NW3842
SJ89NW2271
SJ89NW450
SJ89NW448
SJ89NW447
SJ89NW445
SJ89NW282
SJ89NW3427
SJ89NW2025
SJ89NW3462
SJ89NW3426
SJ89NW3431
SJ89NW2024
SJ89NW3420
SJ89NW3459
SJ89NW3460
SJ89NW3461
SJ89NW3430
SJ89NW3463
SJ89NW3466
SJ89NW3425
SJ89NW3422
SJ89NW3464
SJ89NW3465
SJ89NW3594
SJ89NW3592
SJ89NW3593
SJ89NW3595
SJ89NW1520
SJ89NW1521
0
20
40m

SJ 89 NW - 641   8292, 9783

Vibroflotation Limited

Site Manchester, Woolham Place Ref No V2845			Borehole No. Shell and Auger 1 Sheet 1
Date 7 August 1992	O. D. Level		

Day	Water Level	Casing Depth	Depth (m)	Description of Strata	Legend	Sample Type	Depth (m)	'N'
7.8.92				Gravel and shale fill	▩			
			1.10	Very soft brown clay containing cinders and ash	▩			
			2.10	..... becoming more yellow with depth	▩			
				Hard brown sandstone	⁘			
			3.10	End of borehole				

Sample Type U – Undisturbed Sample J – Jar Sample B – Bulk Sample W – Water Sample N – Standard Penetration Test

Casing Details	Date	Standing Water Level	Observed Water Seepage	Estimated Seepage	Depth of Casing to Seal	Water added to assist boring
150 mm. dia. to 2.10 m. ...... mm. dia. to ...... m.	7.8.92	Nil	Nil			

Remarks

SJ 89 NW - 642   8297, 9780

Vibroflotation Limited

Site Manchester, Woolham Place Ref No V2845		Borehole No. Shell and Auger 4 Sheet 1
Date 6 August 1992	O. D. Level	

Day	Water Level	Casing Depth	Depth (m)	Description of Strata	Legend	Sample Type	Depth (m)	'N'
6.8.92			0.30	Concrete slab (reinforced)	▨			
				Loose to medium dense mixture of broken concrete, bricks, ash and cinders	▨			
			2.70	Brown sandstone	⁘			
			3.70	End of borehole				

Sample Type U – Undisturbed Sample J – Jar Sample B – Bulk Sample W – Water Sample N – Standard Penetration Test

Casing Details	Date	Standing Water Level	Observed Water Seepage	Estimated Seepage	Depth of Casing to Seal	Water added to assist boring
150 mm. dia. to 3.50 m. ...... mm. dia. to ...... m.	6.8.92	Nil	Nil			

Remarks

1) Chiselling through concrete for 3 hours

2) Borehole backfilled with gravel and cement during installation of methane monitoring standpipe

8296, 9778.   SJ 89 NW - 645

Vibroflotation Limited	Site Manchester, Woolham Place Ref No V2845	Date 4 August 1992	O. D. Level
			Borehole No. Shell and Auger 5 Sheet 1

Day	Water Level	Casing Depth	Depth (m)	Description of Strata	Legend	Sample Type	Depth (m)	'N'
4.8.92			0.30	Concrete slab (reinforced)	▨			
				Compact mixture of broken concrete, sandstone cobbles, bricks, ash and cinders	▨	C	1.00	24
			1.30	Soft yellow silty clay containing abundant fragments of broken concrete, bricks, sand and gravel	▨	C	2.50	5
			3.80	Soft black very organic silty clay with some oil/tar contamination		B1	3.90	
			4.50	Hard broken sandstone		C	4.70	99
			4.70	End of borehole				

Sample Type U – Undisturbed Sample J – Jar Sample B – Bulk Sample W – Water Sample N – Standard Penetration Test

Casing Details	Date	Standing Water Level	Observed Water Seepage	Estimated Seepage	Depth of Casing to Seal	Water added to assist boring
150 mm. dia. to 4.5 m. ...... mm. dia. to ...... m.	4.8.92	Nil	Nil			

Remarks

i) Chiselling through concrete for 3 hours

C = Cone penetration test

8301,9781 SJ89NW-644

Vibroflotation Limited

Site Manchester, Woolham Place Ref No V2845		Borehole No. Shell and Auger 6 Sheet 1
Date 31 July 1992	O.D. Level	

Day	Water Level	Casing Depth	Depth (m)	Description of Strata	Legend	Sample Type	Depth (m)	'N'
31.7.92				Compact mixture of bricks, boulder and cobble size concrete slabs, tarmac, ash and sand	▨	B1	0.50	
						C	1.00	Refusal
			2.00	Soft brown silty clay with bands of soft black silty organic clay containing traces of ash, brick and cinders	▨	B2	2.50	
			3.00	Soft brown silty clay containing abundant fragments of weathered sandstone and gravel	▤	C	4.00	2
			4.50	Hard brown sandstone	⁙			
			4.90 →	End of borehole				

Sample Type U – Undisturbed Sample J – Jar Sample B – Bulk Sample W – Water Sample N – Standard Penetration Test

Casing Details	Date	Standing Water Level	Observed Water Seepage	Estimated Seepage	Depth of Casing to Seal	Water added to assist boring
150 mm. dia. to 3.50 m. ......mm. dia. to ...... m.	31.7.92	Nil	Nil			

Remarks

1) Chiselling through obstructions in fill for 1 hour

C = Cone penetration test

Norwest Holst Soil Engineering Ltd.

Borehole No. **1**

BOREHOLE LOG

Contract No. F9366
Location Liverpool Road, Manchester
Client Shepherd Gilmour
Method of Boring Cable Percussion
Diameter of Borehole 150mm

SJ89NW-3780
8310 9780

Sheet 1 of 1
Chainage
Ground Level m.A.O.D.
Date 19/11/91 - 20/11/91

Description of Strata	Legend	Depth Below G.L. (m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
TOPSOIL AND TURF *	▨	0.18					
MADE GROUND: Hard reinforced concrete house bricks and occasional ash.	▨	1.90			1.00-1.30 c	"38" for 150mm	19/11
MADE GROUND: Firm brown red black sandy clay with some fine to coarse subrounded gravel and occasional brick and coal fragments.	▨	2.80			2.00-2.50 (16)		
MADE GROUND: Medium dense brown black clayey sand and fine to coarse gravel of ash and coal.	▨	4.00			3.00-3.45 c	"12"	
MADE GROUND: Medium dense dark brown black slightly clayey sand and fine to coarse gravel of brick, coal and subrounded sandstone.	▨	6.00			4.00-4.45 c 5.00-5.45 c	"18" "20"	
MADE GROUND: Very soft to soft brown slightly sandy silty clay with occasional fine to medium gravels of sandstone and brick.	▨	6.50			6.00-6.50 (15)		
Soft to firm brown black organic silty CLAY with occasional wood fragments and peaty material.	≡	6.80					
Dense to very dense brown slightly clayey fine to coarse sand, fine to coarse gravel and occasional sandstone cobbles.	∴	8.40			7.00-7.20 c	"45" for 50mm	
Red fine to coarse grained slightly weathered SANDSTONE, moderately weak.	⁙	9.00			8.50 s	* * "63" for 75mm	20/11
Borehole Complete at 9.00m.							

Type of Sample

Is	S.P.T.	▮	Undisturbed
Ic	C.P.T	x	Vane
O	Jar	△	Water
●	Bulk	▮	Piezometer

Remarks (Observations of Ground Water etc.) ( ) U100 Blows
* Drillers description. ** Seating blows only
Inspection pit dug to 1.00m.
Hard ground: 1.30m to 1.60m 1 hour
7.10m to 7.70m 1½ hours
8.40m to 9.00m 1½ hours
Water added to assist drilling, standing water level at 5.30m.
Borehole cased to 8.50m.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

Norwest Holst Soil Engineering Ltd.

BOREHOLE LOG

Borehole No. 2

Contract No. F9366
Location Liverpool Road, Manchester
Client Shepherd Gilmour
Method of Boring Cable Percussion
Diameter of Borehole 150mm

SJ89NW2271
8314 9777

Sheet 1 of 1
Chainage
Ground Level m.A.O.D.
Date 21/11/91

Description of Strata	Legend	Depth Below G.L.(m)	O.D. Level (m)	Casing Depth at Sampling	Sampling and Coring	"N"/ R.Q.D.%	Daily Progress
TOPSOIL: Soft dark brown slightly silty clay with occasional fine sub-rounded gravel and some rootlets.		0.30			0.30		
MADE GROUND: Hard reinforced concrete house bricks and occasional ash.		1.80			1.00-1.45 D	"51"	
MADE GROUND: Soft red brown black sandy silty clay with some fine to coarse subrounded sandstone gravel with occasional coal fragments and cobbles.		2.50			2.00-2.45 C	"14"	
Stiff brown silty CLAY with some sub-rounded fine to coarse gravel and occasional black fine gravel coal fragments.		2.90			2.60 N.R		
Dense red slightly silty fine to medium SAND. (Completely weathered sandstone)		4.00			3.00-3.45 S	"48"	
Red fine to coarse grained, highly weathered SANDSTONE, weak.					4.00-4.30 S	"51" for 150mm	
Borehole Complete at 5.50m.		5.50			5.00-5.30 S	"77" for 150mm	21/11

Type of Sample

Is S.P.T ▮ Undisturbed
Ic C.P.T X Vane
o Jar △ Water
● Bulk ▮ Piezometer

Remarks (Observations of Ground Water etc.) N.R - No Recovery

Hard ground 1.40m - 1.80 ½ hr
4.00m - 5.50m 2 hrs
Inspection pit dug to 1.00m.
Water added to assist drilling; standing water level 4.80m
Borehole cased to 4.00m.

Water levels are subject to seasonal or tidal variations and should not be taken as constant

MANCHESTER CITY COUNCIL

CITY ENGINEER AND SURVEYORS DEPARTMENT

SJ89NW3428
8315 9779

SITE INVESTIGATION FOR	Main Drainage	DATE COMMENCED	7.8.84
LOCATION	Bridgewater Street/Rice Street	BORING METHOD	S.S. Multi Rig
BOREHOLE No.	6 (Sheet 2 of 2)	BORING DIAMETER	150/60mm
GRID REFERENCE		SCALE:	1.50

DATE	CASING DEPTH (m)	WATER LEVEL MORNING & EVENING	DEPTH OF STRATA BELOW GL	Reduced Level	DESCRIPTION	No. and Type of Sample	SAMPLE DEPTH PENETRATION From	SAMPLE DEPTH PENETRATION To	No. of Blows	Legend
					Red/brown fine/medium and medium grained very thinly to thinly bedded moderately weathered weak to moderately weak SANDSTONE	Core run	T	S	R	F
						7.0 to 8.5	100	80	33	1
					- Bands of laminated moderately weathered silty mudstone from 7.0 to 7.3m	8.5 to 10.0	100	53	19	17
					- completely weathered very weak zones from 8.50 - 8.80m	10.0 to 11.5	100	90	41	11
8.8.84			12·7			11.5 to 12.7	100	45	32	7

WATER OBSERVATIONS DURING BORING

DEPTH OF WATER ENTRY (m)	ESTIMATED SEEPAGE	STANDING LEVEL (m)	DEPTH OF CASING WHEN SEALED (m)

WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION

DATE	WATER LEVEL	DEPTH OF CASING

REMARKS:-

SAMPLE TEST KEY

D – DISTURBED SAMPLE
P – SPT SAMPLE
B – BULK SAMPLE
W – WATER SAMPLE
U – UNDISTURBED SAMPLE

NOTE: WHERE FULL 0.3 PENETRATION HAS NOT BEEN ACHIEVED, THE NUMBER OF BLOWS FOR THE QUOTED PENETRATION IS GIVEN (NOT N – VALUE)

ALL DEPTHS AND REDUCED LEVELS IN (m) UNLESS OTHERWISE STATED

REMARKS

MANCHESTER CITY COUNCIL

CITY ENGINEER AND SURVEYORS DEPARTMENT

SJ8947-3428
8315 9779

SITE INVESTIGATION FOR	Main Drainage	DATE COMMENCED	7.8.84.
LOCATION	Bridgewater Street/ Rice Street	BORING METHOD	S.S. Multi-Rig
BOREHOLE No.	6 (Sheet 1 of 2)	BORING DIAMETER	150/60mm
GRID REFERENCE		SCALE:	1 : 50

DATE	CASING DEPTH (m)	WATER LEVEL MORNING & EVENING	DEPTH OF STRATA BELOW GL	Reduced Level	DESCRIPTION	No. and Type of Sample	SAMPLE DEPTH PENETRATION		No. of Blows	Legend
							From	To		
7.8.84.			0. 32		Bituminous Surfacing					
			1.20		Ashes, clay, bricks, gravel - Made Ground	B1	0.50			
7.8.84. 8.8.84.	–	Dry	1.85		Stiff brown silty and sandy slightly laminated CLAY with grey fissures and stone inclusions	D1 U1	1.30 1.5	 1.95		
			2.50		Medium dense brown gravelly fine/medium SAND with clay lenses.	P1 B2	2.15 2.0	2.14	13	
			2.60		Cobble					
			3.0		Stiff to very stiff brown sandy CLAY with stone inclusions & sand lenses	P2	2.65	2.95	43	
			3.45		Very dense red/brown fine/medium grained SAND	P3	3.15	3.45	54	
						CORE RUN	T	S	R	F
					Red/brown fine/medium and medium grained very thinly to bedded moderately weathered weak to moderately weak SANDSTONE	3.30 to 4.40	27	7	0	4
						4.40 to 5.47	62	27	0	16
						5.47 to 7.0	98	72	28	20

WATER OBSERVATIONS DURING BORING

DEPTH OF WATER ENTRY (m)	ESTIMATED SEEPAGE	STANDING LEVEL (m)	DEPTH OF CASING WHEN SEALED (m)

WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION

DATE	WATER LEVEL	DEPTH OF CASING

REMARKS:-
T = Total Core Recovery (%) S = Solid Core Recovery (%)
R = Rock Quality Designation(%) F = Fracture Index

SAMPLE TEST KEY
D – DISTURBED SAMPLE
P – SPT SAMPLE
B – BULK SAMPLE
W – WATER SAMPLE
U – UNDISTURBED SAMPLE

NOTE: WHERE FULL 0.3 PENETRATION HAS NOT BEEN ACHIEVED, THE NUMBER OF BLOWS FOR THE QUOTED PENETRATION IS GIVEN (NOT N – VALUE)

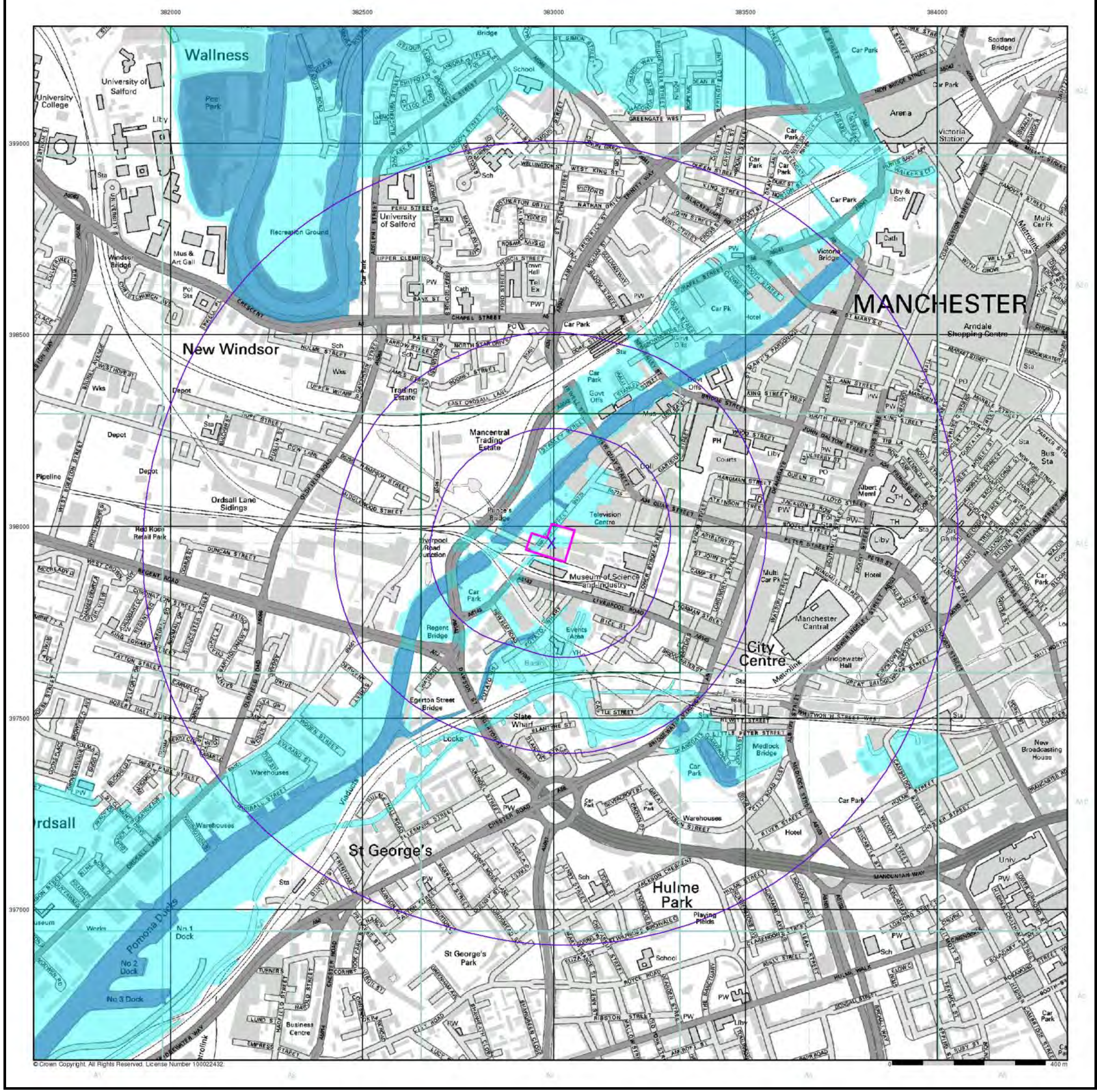
ALL DEPTHS AND REDUCED LEVELS IN (m) UNLESS OTHERWISE STATED

REMARKS

Trial hole excavated to 1.50 metres, 100m electricity duct located at 0.75 b.g.l. 450mm from kerbline
Borehole backfilled with concrete on completion.

Appendix F – Indicative Fluvial Floodplain Map

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.


382000
382500
383000
383500
384000
399000
398500
398000
397500
397000
Wallness
University of Salford
University College
Peel Park
Recreation Ground
New Windsor
Ordsall Lane Sidings
Mancentral Trading Estate
Television Centre
Museum of Science and Industry
MANCHESTER
Arndale Shopping Centre
Arena
Victoria Station
City Centre
Manchester Central
Bridgewater Hall
St George's
Hulme Park
St George's Park
rdsall
Pomona Docks
No 1 Dock
No 2 Dock
No 3 Dock
New Broadcasting House
Regent Bridge
Egerton Street Bridge
Slate Wharf
Medlock Bridge
Victoria Bridge
Scotland Bridge
0
400 m
© Crown Copyright. All Rights Reserved. Licence Number 100022432.

Envirocheck®

General

⬠ Specified Site

⬠ Specified Buffer(s)

X Bearing Reference Point

Agency and Hydrological (Flood)

🟦 Extreme Flooding from Rivers or Sea without Defences (Zone 2)

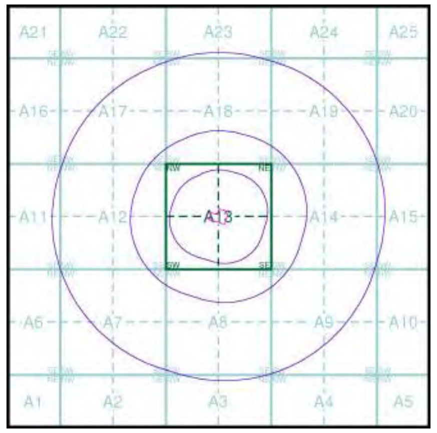
🟦 Flooding from Rivers or Sea without Defences (Zone 3)

▨ Area Benefiting from Flood Defence

▩ Flood Water Storage Areas

-·- Flood Defence

Flood Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

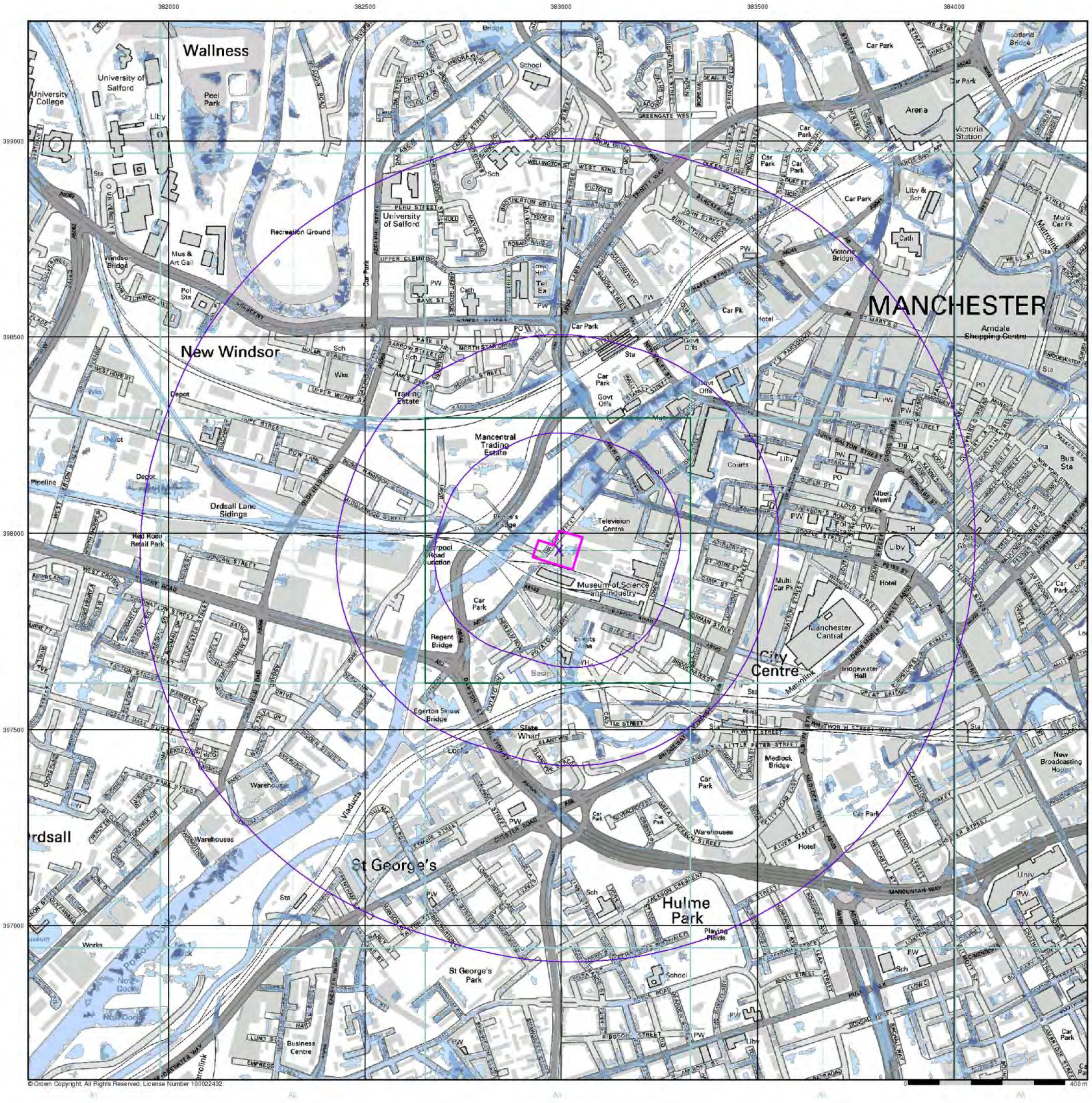
Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk


382000
382500
383000
383500
384000
399000
398500
398000
397500
397000
Wallness
University of Salford
Peel Park
New Windsor
Recreation Ground
University of Salford
Mancentral Trading Estate
Ordsall Lane Sidings
Television Centre
Museum of Science and Industry
MANCHESTER
Arndale Shopping Centre
City Centre
Manchester Central
Arena
Victoria Station
Hulme Park
St George's
St George's Park
rdsall
Regent Bridge
Slate Wharf
© Crown Copyright. All Rights Reserved. Licence Number 100022432.
0
400 m

Envirocheck®

General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Risk of Flooding from Surface Water

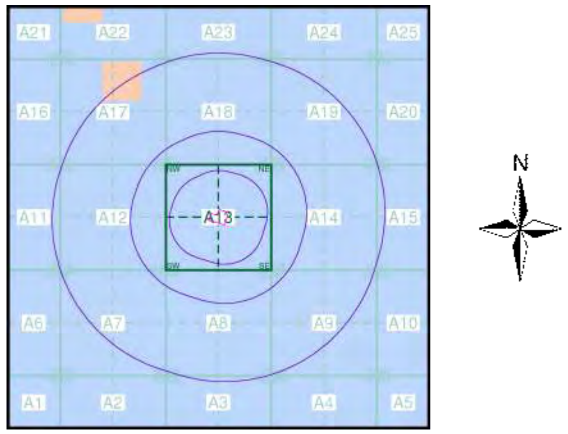
- ▨ High - 30 Year Return
- ▨ Medium - 100 Year Return
- ▨ Low - 1000 Year Return

Suitability

See the suitability map below

- 🟩 National to county
- 🟧 County to town
- 🟦 Town to street
- 🟪 Street to parcels of land
- 🟨 Property

EA/NRW Suitability Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5
N

Order Details

Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

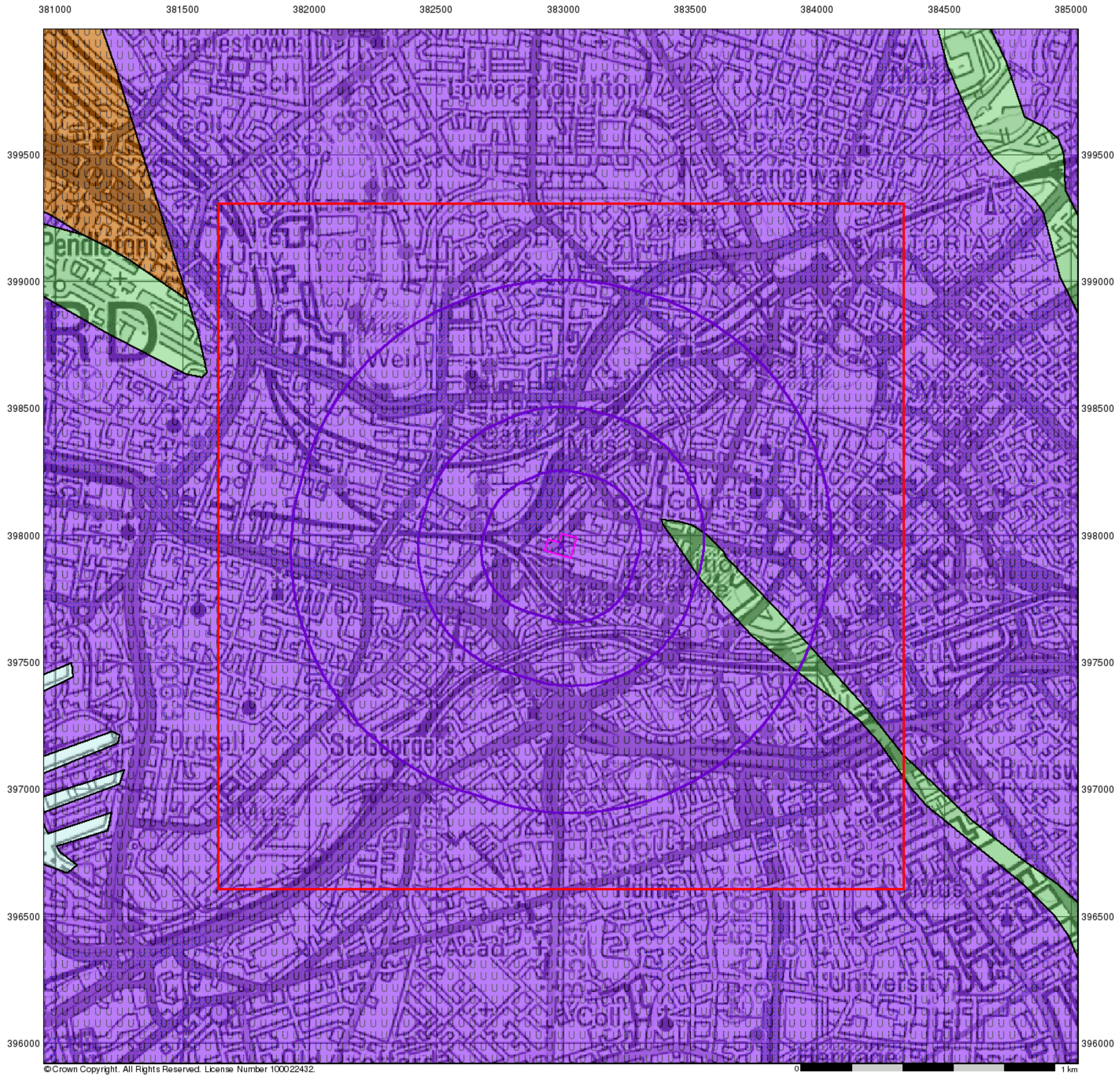
121, Water Street, Manchester, M3 4JU

Landmark® Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Appendix G – Groundwater Vulnerability Map

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.


381000
381500
382000
382500
383000
383500
384000
384500
385000
399500
399000
398500
398000
397500
397000
396500
396000
Charlestown
Lower Broughton
Strangeways
Pendleton
Ordsall
St George's
Brunsw
University
0
1 km

©Crown Copyright. All Rights Reserved. License Number 100022432.

Envirocheck®

Groundwater Vulnerability

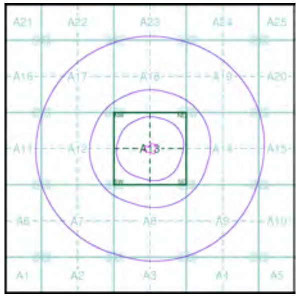
General

- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point
- ☐ Slice
- Map ID

Agency and Hydrological

Geological Classes		Soil Classes
Major Aquifer (Highly Permeable)	🟪	High (H) 1, 2, 3, U
	■	Intermediate (I) 1, 2
	■	Low
Minor Aquifer (Variably Permeable)	🟧	High (H) 1, 2, 3, U
	■	Intermediate (I) 1, 2
	■	Low
Non Aquifer (Negligibly Permeable)	🟩	
Water or Sea	■	
Drift Deposit	⁘	

Site Sensitivity Context Map - Slice A


A21
A22
A23
A24
A25
A16
A17
A18
A19
A20
A11
A12
A13
A14
A15
A6
A7
A8
A9
A10
A1
A2
A3
A4
A5

N

Order Details

Order Number:	79633581_1_1
Customer Ref:	034933
National Grid Reference:	382990, 397960
Slice:	A
Site Area (Ha):	0.73
Search Buffer (m):	1000

Site Details

121, Water Street, Manchester, M3 4JU

Landmark®

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

A Landmark Information Group Service v15.0 10-Feb-2016

Appendix H – Coal Authority Report

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.

Issued by:
The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com   Phone: 0345 762 6848

LANDMARK INFORMATION GROUP LIMITED
SOWTON INDUSTRIAL ESTATE
ABBEY COURT
UNIT 5/7 EAGLE WAY
EXETER
DEVON
EX2 7HY

Our reference:	**51001098500001**
Your reference:	**79633581_2|**
Date of your enquiry:	**10 February 2016**
Date we received your enquiry:	**10 February 2016**
Date of issue:	**10 February 2016**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

121, WATER STREET, MANCHESTER, GREATER MANCHESTER

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

All rights reserved. You must not reproduce, store or transmit any part of this document unless you have our written permission. --
© The Coal Authority --

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

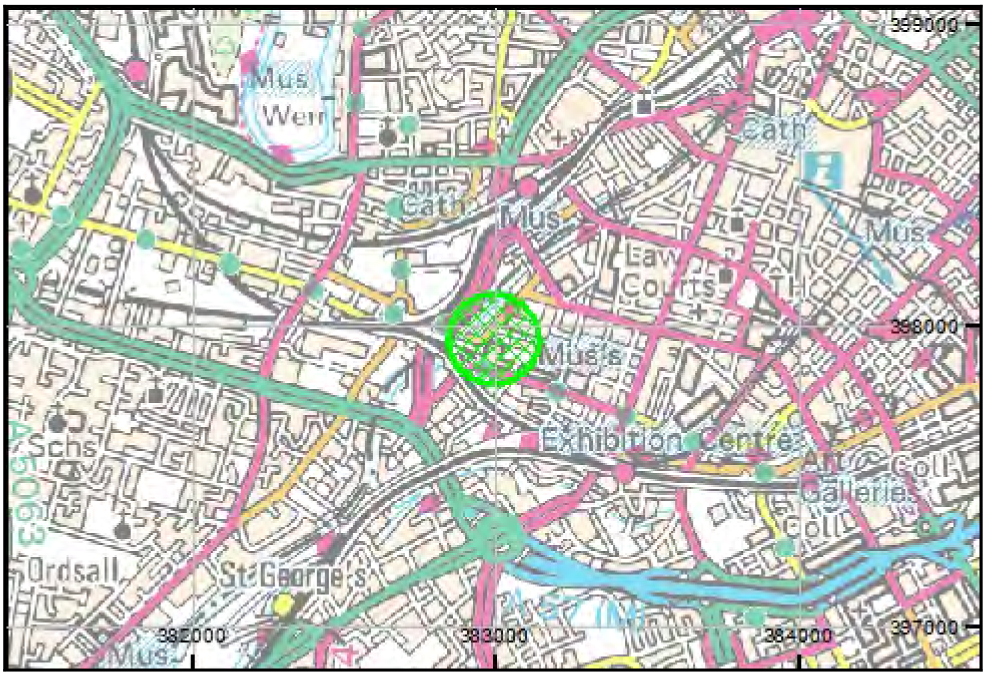
Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

The Coal Authority owns the copyright in this report. The information we have used to write this report is protected by our database rights. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

Location map

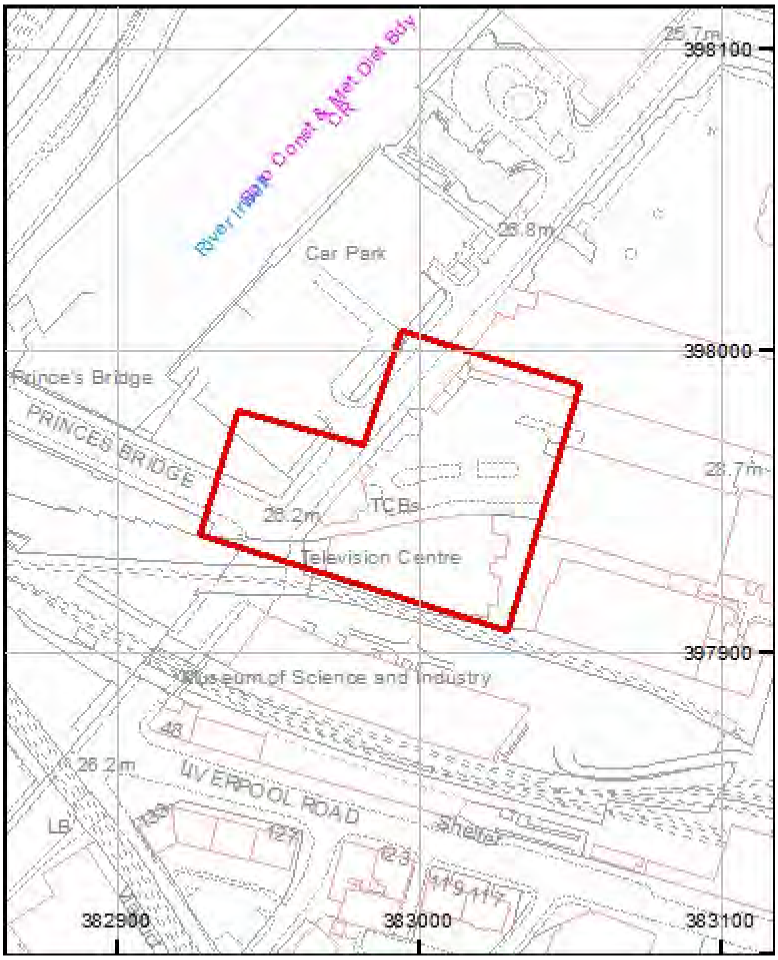
◍

Approximate position
of property


Mus
Weir
Cath
Mus
Law Courts
Cath
Mus
Mus'ls
Exhibition Centre
Art Coll Galleries
Coll
Schs
A5063
Ordsall
St George's
A57(M)
Mus
399000
398000
397000
382000
383000
384000

Enquiry boundary

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2016. All rights reserved. Ordnance Survey Licence number: 100020315


25.7m
398100
River Irwell
Co Const & Met Dist Bdy
Car Park
26.8m
398000
Prince's Bridge
PRINCES BRIDGE
28.7m
TCBs
28.2m
Television Centre
397900
Museum of Science and Industry
48
26.2m
LIVERPOOL ROAD
LB
132
127
123
Shelter
119-117
382900
383000
383100

Key

Approximate position of enquiry boundary shown ▭

Mapping sourced from Ordnance Survey

© The Coal Authority

Appendix I – Zetica Unexploded Bomb Map

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.

REGIONAL UNEXPLODED BOMB RISK

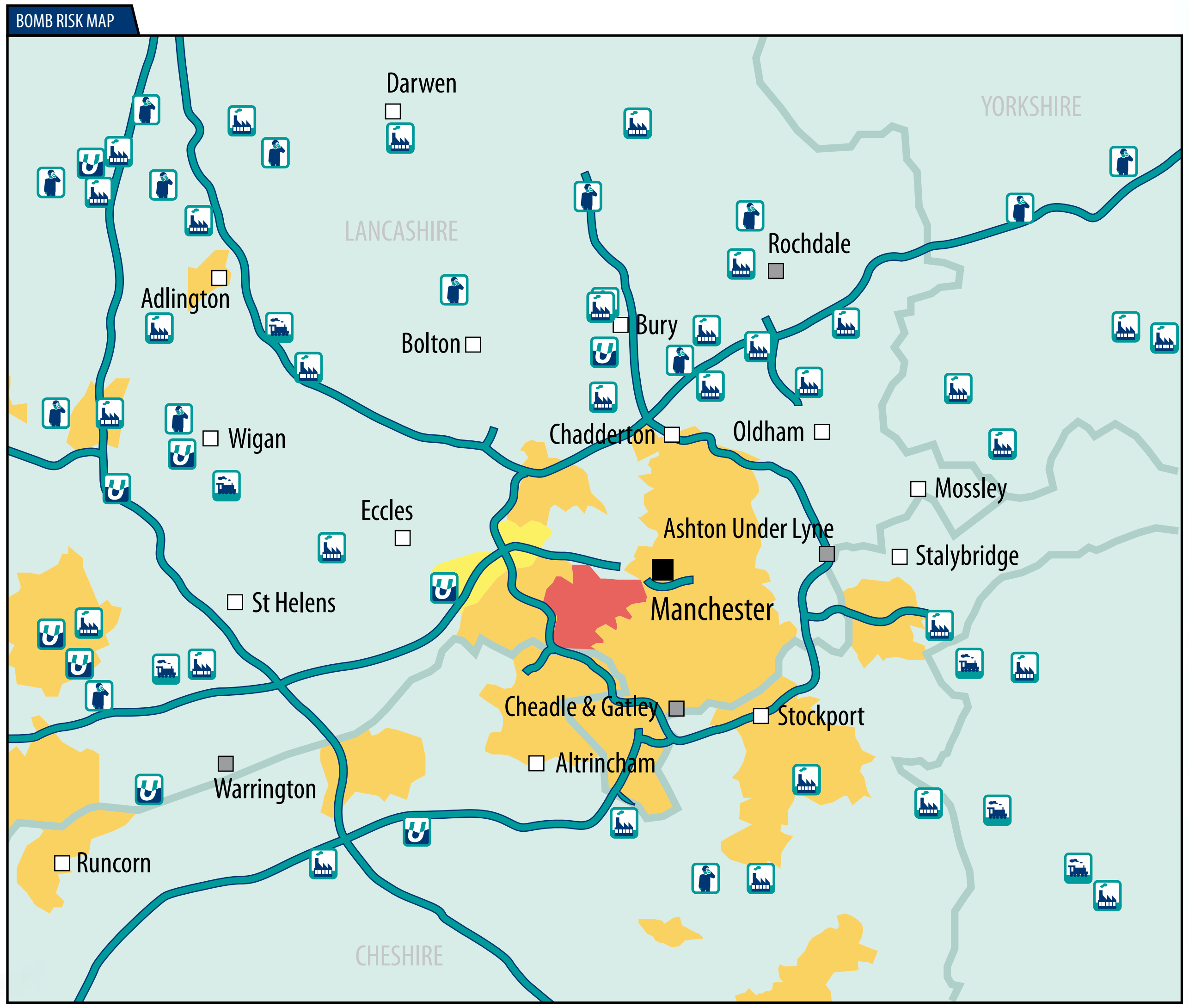
MANCHESTER

DENSITY OF BOMBS PER BOROUGH

Borough	High explosive	Anti-personnel	Incendiary
Bolton	45	0	0
Eccles	114	1	0
Manchester	712	18	7
Middleton	37	0	0
Oldham	25	1	0
Salford	406	29	16
Stretford	456	64	0
Swinton & Pendlebury	92	2	0
Urmston	122	5	0
Worsley	32	2	0

On average, 10% of high explosive and 50% of incendiary bombs failed to explode.

BOMB RISK MAP



Darwen
YORKSHIRE
LANCASHIRE
Rochdale
Adlington
Bury
Bolton
Chadderton
Oldham
Wigan
Mossley
Eccles
Ashton Under Lyne
Stalybridge
St Helens
Manchester
Cheadle & Gatley
Stockport
Altrincham
Warrington
Runcorn
CHESHIRE

OTHER WWII TARGETS

- military
- transport
- utilities
- industry
- docks
- ? other

BOMB TONNAGE

- ■ >1000
- ▨ >500
- ■ >100
- ▨ >0
- ☐ unverified

BOMB RISK

- 🟥 high
- 🟧 moderate
- 🟨 low

The information in this regional UXB risk map is derived from a number of sources and should be read in conjunction with the "Users' Guide" (printed overleaf). Zetica cannot guarantee the accuracy or completeness of the information or data.

This map covers regions of coast with beaches, estuaries and alike. Further consideration of the bomb risk is required in these areas. The often inaccessible nature and changing ground conditions (e.g. movement of silt that may contain ordnance) means that historical bombing records for these areas are often poor or inaccurate and further assessment of the bomb risk may be required as part of a site specific study.

A FOUR-STEP PROCESS

1. Risk assessment and method statement from a qualified explosive ordnance clearance (EOC) operative.
2. Surface geophysical survey to allow shallow groundwork.
3. MAGCONE detects UXBs and obstructions on piling layout to the no-risk depth.
4. Detected UXBs can be dealt with by our EOC engineers and a Clearance Certificate issued for the site.

zetica

For more details on this and related services, telephone: +44 (0) 1993 886682 or visit our website: www.zetica.com

BOMB MAP USERS’ GUIDE

Sources of information and explanation of bomb risk

Why?

Unexploded bombs (UXB) still present a risk to construction projects long after the end of the Second World War (WWII). UXBs often entered the ground unnoticed at high velocity and penetrated to a depth of several metres. Here they remain – vulnerable to disturbances from construction work. Beyond the depth of shallow excavation work, the greatest risk is to piling, drilling and probing crews. A piling rig could repeatedly hit a UXBs with considerable force before the crew realises an obstruction has been impacted. It could then be up to 72 hours before the detonator activates.

Who?

The responsibility for avoiding UXB risk usually lies with construction companies or house builders particularly those who are redeveloping urban sites. In addition, project engineering or environmental consultants are expected to advise their clients of a site’s history. Other interested parties include those organisations whose employees are physically at most risk from intrusive works, normally piling companies, drillers or probing operators.

How?

UXB risk should be assessed for every site, but especially those in known heavily bombed areas or those situated near war-time strategic installations that were priority targets for enemy aircraft, for example, airfields. Zetica’s regional bomb risk map is therefore a first point of reference from which the relative, potential abundance of UXBs can be judged. Consultants then advise their clients that an ordnance-risk desk study is required, which they may obtain from external sources. Construction companies or house builders who assess their own risk could choose to come direct to Zetica.

When?

Do not wait for the piling or drilling company to be on site before thinking about UXB risk – it will inevitably cause delays and higher costs. Request the regional bomb risk map from Zetica as soon as a site is being considered, and then use it to help you or your clients to decide if an ordnance-risk desk study is required.

Where?

Maps can be obtained for any county in England, Scotland, Wales or Northern Ireland – or for any London borough. They can help determine the areas that were most heavily bombed – but no part of the country should be considered 100% safe from UXB risk. Even remote rural areas can have a high risk if, for example, they were locations for decoy airfields or beacons that were lit to fool enemy pilots into thinking they had located a burning city that had been successfully hit by others in the raid.

How to use this regional map

This map is designed to give you an indication of the potential risk from UXBs in your area. If you are conducting work that involves excavation, piling or other disturbance of the ground, then you should use the map to identify the category of risk for your site.

The risk boundaries are a guide, compiled from data based on the political areas for which records are held; being just outside a high-risk area does not mean there is no UXB risk. You should use the map to assist in your decision of whether to investigate the UXB risk further.

Information on the regional risk remaining from UXBs in the UK

Zetica has built the largest UXB database of its kind in the UK. It includes a unique digital library of bomb census data, and maps showing key strategic points and bombing densities from the First and Second World Wars. The main sources of information include records from central government (Public Records Office), the Ministry of Defence, and the German Luftwaffe.

Using information from this database, Zetica has published maps of UXB risk on a regional, county and borough scale. The maps indicate relative degrees of UXB risk based on available records for bombing densities and known targeted areas for regions within the UK. The risk is broken down into individual boroughs, towns or cities. The data are based on the historical boroughs and are then overlaid onto the modern map. It is important to note that more-detailed research may be required for individual sites, particularly where proximity to a potential WWII target means the local risk may be higher.

High risk

Areas designated as high risk are those that show a high density of bombing hits (50+ bombs per 1000 acres) and abundant potential WWII targets. In high-risk regions, further action to mitigate UXB risk is considered essential.

Moderate risk

Moderate-risk regions are those that show a bomb density of between 11 and 50 bombs per 1000 acres and that may contain potential WWII targets. Action to mitigate the risk is considered essential, albeit more likely that a reduced scope of work is required compared with that needed for high-risk regions.

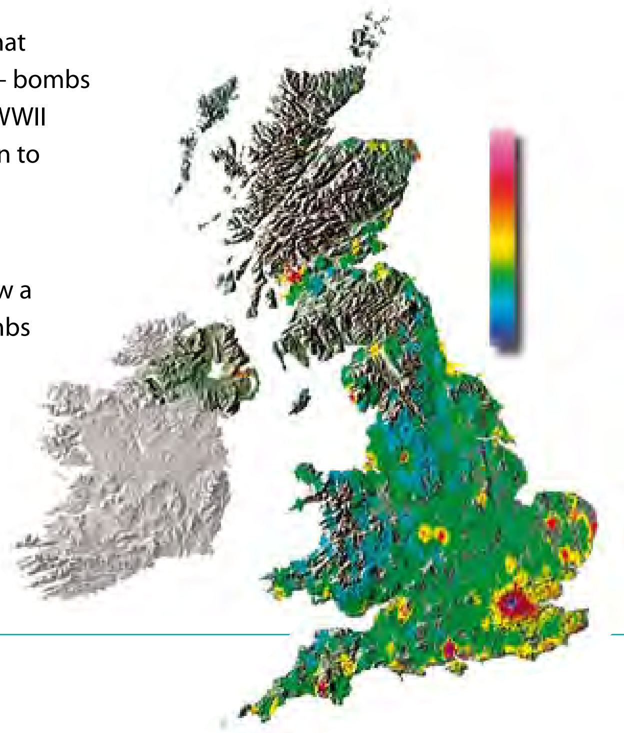
Low risk

Low-risk regions are those with a bombing density of up to 10 bombs per 1000 acres. These areas are considered to have a significant but low UXB risk. In general, further action to mitigate the risk is considered prudent, although not essential. Care is required when assessing the risk for specific sites where the risk may be higher because of local wartime activity.

Other WWII targets

Other regions with the risk of UXBs are key strategic points as defined by the government during WWII as representing potential enemy targets. Where these exist outside areas mapped as high, moderate or low risk, a site-specific assessment of the UXB risk may be required.

Relative UXB risk across UK



What to do if…

…you have a site that has a potential UXB risk

In the absence of current legislation requiring you to address the risk from UXBs, your responsibilities under health and safety legislation and regulations such as construction design and management require that you address all identified risks. The first stage is to request further advice from a professional adviser such as Zetica, or to gain more site-specific information by commissioning an ordnance-risk desk study. Then a strategy to deal with the risk can be established that is tailored to your proposed work.

…you find a suspect item or require advice

If during site works you find a suspect (ordnance-related) item, it is very important that you do not touch or move it (even if it has already been moved by an excavator). If it is clearly ordnance related, then dial 999 and ask for the police. Ensure that the area around the item is kept as clear as possible without placing yourself at risk. If you are unsure and do not wish to cause undue alarm, or you just require some advice, then you can call Zetica. We have experienced qualified UXB specialists on hand who can offer support and advice during any site works.

More-detailed procedures should be established in advance if you are in an area where the risk of finding a UXB is shown to be significant (moderate to high).

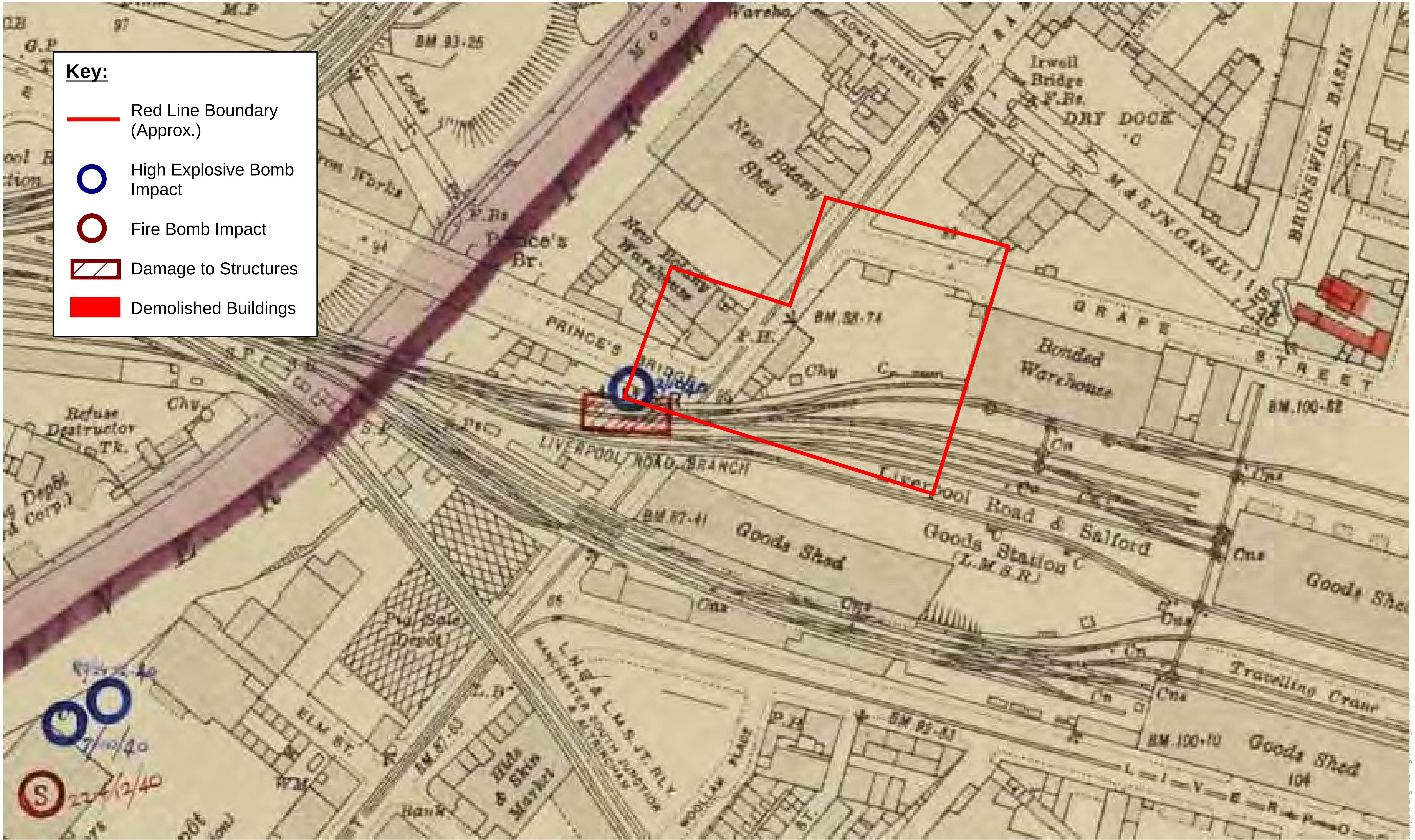
Site-specific desktop studies

Zetica is able to provide high-quality, site-specific UXB risk information for any residential, industrial or commercial property in the UK. These desktop studies provide details of the bombing density within an area and for the site itself, in order to indicate the risks of UXBs still being present. A risk assessment is provided to facilitate informed decision making on whether any further risk mitigation measures are required.

For more details on this and related services, telephone: +44 (0) 1993 886682 or visit our website: www.zetica.com

Appendix J – Manchester Bomb Damage Map

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.


Key:
Red Line Boundary (Approx.)
High Explosive Bomb Impact
Fire Bomb Impact
Damage to Structures
Demolished Buildings
New Botany Shed
New Botany Warehouse
Irwell Bridge F.Bt.
DRY DOCK
M. & S. JN. CANAL
BRUNSWICK BASIN
Prince's Br.
PRINCE'S BRIDGE
GRAPE STREET
Bonded Warehouse
BM 98.74
BM 100.82
BM 93.25
BM 97.41
BM 100.10
BM 95.83
BM 97.63
LIVERPOOL ROAD BRANCH
Liverpool Road & Salford Goods Station (L.M.S.R.)
Goods Shed
Travelling Crane
Refuse Destructor Tk.
Iron Works
Locks
ELM ST.
Fish Sale Depot
Hide & Skin Market
L.N.E. & L.M.S. JT. RLY. MANCHESTER SOUTH JUNCTION & ALTRINCHAM
WOOLLAM PLACE
L I V E R P O O
7/10/40
S 22/12/40

JOB TITLE: The Factory, Manchester

JOB NUMBER: 034933

DATE: 29/02/2016

SKETCH TITLE: Manchester Bomb Damage Map

SKETCH NUMBER: Appendix K

INITIALS: GM

BUROHAPPOLD ENGINEERING

Copyright © 1976-2014 BuroHappold Engineering

Appendix K – PLANIT Explosive Ordnance Threat Assessment

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved.

EXPLOSIVE ORDNANCE (EO) THREAT ASSESSMENT (EOTA)

MANCHESTER CITY CENTRE FACTORY

[redacted]

the preparation of detailed Risk Assessments in the management of UXO risks in the construction industry, for which PLANIT was an instrumental driver for improved UXO risk management and transparency.

CLIENT CONTACT DETAILS

Client Company:	**BuroHappold Engineering** Building Civils Cornwall Buildings 49 Newhall Street Birmingham B3 3QR
Tel:	0113 204 2200 ext. 6178 Mobile: 07740 110866
POC:	Chris O'Hara, Associate
Email:	Chris.O'Hara@burohappold.com

OUR CONTACT DETAILS

Company:	**PLANIT UXB Limited**
Address:	PO BOX 285 Nunburnholme York YO42 9AU
Tel:	08000 588 747
Email:	help@planit-international.com

LEGAL NOTICE

This document is of UK origin and is © PLANIT UXB Limited. It contains proprietary information which is disclosed for the purposes of assessment and evaluation only. The contents of this document shall not in whole or in part, (i) be used for any other purpose, (ii) be disclosed to any member of the recipient's organization not having a need to know such information nor to any third party individual, organisation or government, (iii) be stored in any retrieval system nor be reproduced or transmitted in any form by photocopying or any optical, electronic, mechanical or other means, without the prior written permission of PLANIT UXB Limited, PO BOX 285, Nunburnholme, York, YO42 9AU.

Notwithstanding the above, permission is granted for the Client as defined above to issue this report to contractors and other parties engaged in construction work on the work site to which this report refers, but not to other entities for any reason whatsoever.

DOCUMENT CONTROL

Copy No.	Recipient
1	PLANIT FILE
2	CLIENT E-COPY
3	CLIENT HARDCOPY (NOT ISSUED)

Document Reference:	
Date of Issue:	**17 February 2016**
Copy No:	**2 of 2**

Document Review	Name	Signature
Author Review:	Daniel WHELAN	
Peer Review:	Andrew HAMILTON	

EXECUTIVE SUMMARY

SITE DESCRIPTION	The site is located approximately 0.5km west of Manchester city centre and the Exhibition Centre, 0.6km south of Salford Central Station. The site straddles Prince's Bridge and Water Street (B6225) and is bounded to the east by the Museum of Science and Technology. National Grid Reference for the approximate centre of the site is SJ 829 979 and the nearest postcode is M3 4JQ. The site is dominated by a large, triangular structure at its centre but is mostly covered by hard standing for vehicle manoeuvre and parking.
POTENTIAL THREAT SOURCE	WW2 German air-dropped bombs – High Explosive (HE). British Anti-Aircraft Artillery (AAA) projectiles.
THREAT PATHWAY	For the purposes of this assessment, it has been assumed that development works would include piled foundations and excavations beyond WW2 ground levels. It is anticipated that personnel or key equipment may complete the risk pathway during excavation and/or piling operations that may bring them into physical contact with potential threat items.
KEY FINDINGS	There is evidence that the site of concern was directly affected by aerial bombing during WW2. The possibility that the site was affected by Anti-Aircraft Artillery projectiles returning to earth unexploded cannot be reasonably ignored. There is no evidence to suggest that other ordnance contamination events occurred at the site of concern. There are no Abandoned Bombs or UXBs recorded that would affect the site of concern directly. The EO Threat varies across the site of concern.
THREAT LEVEL	Outside of the UXB Threat Zone, the Ordnance Threat Levels are considered to be **NEGLIGIBLE**. Within the UXB Threat Zone, the following Ordnance Threat Levels apply: • 50, 250, 500 and 1,000kg bombs - **MEDIUM** • British AAA projectiles - **MEDIUM**
THREAT MITIGATION	In light of the findings of this assessment, within the UXB Threat Zone, a **UXO THREAT MITIGATION STRATEGY IS REQUIRED** to be in place prior to intrusive engineering works at this site of concern.
THREAT REVIEW	*A review of these recommendations must be undertaken in light of any additional, relevant information being provided. Such a review may, if the EO Threat Level is deemed to have altered, make alternative recommendations from those made above in order to implement work safely.*
AIM & METHODOLOGY	The aim of this assessment is to identify any threats that may be posed by EO during the proposed engineering works at the site of concern and, where a threat is identified, to recommend a risk mitigation strategy that will reduce this threat to acceptable levels.

This assessment follows the CIRIA 681 Guidelines, which were compiled using, as a main driver of change, PLANIT's innovative approach to EO risk assessment.

The following key considerations are addressed in this assessment:

- The risk that the site of concern was contaminated by EO.
- The risk that EO remains on site.
- The risk that EO may be encountered during the proposed engineering works.
- The risk that EO may be initiated by proposed engineering works.
- The consequences of encountering or initiating EO.

If the likelihood of encountering EO is significant, information about the types and natures of that EO and the expected levels of contamination is considered within the source-pathway-receptor context of contamination. Should a confirmed pathway exist, the information is entered into our proprietary Threat Assessment Matrices in order to arrive at a valid and transparent Threat Level.

The Threat Level allows relevant conclusions to be made about the EO Risk at the site of concern, which in turn allows an appropriate Risk Mitigation Strategy to be developed.
The Threat Mitigation Strategy is intended to give the Client a best-fit, safe solution that will allow the level of risk from EO to be reduced to an acceptable level; providing maximum project planning flexibility.

PLANITs approach to EO threat assessment has been fundamental in driving change throughout the UK Commercial EOD Industry and was instrumental in the drafting of CIRIA 681. PLANITs approach provides transparency to our EO risk assessment process allowing the Client to make valid decisions on what is a specialist activity; empowering them to maintain control over this vital aspect of their project - Where necessary, appropriate EO risk mitigation measures will be recommended.

This assessment considers general and site specific factors, including:

- Historical use of the site in relation to ordnance manufacturing, storage and disposal.
- Historical use of the site in relation to Military training and related facilities.
- Evidence of offensive aerial and naval bombardment during WW1 and WW2.
- Evidence of Unexploded Bombs (UXBs).
- Previous EO incidents and/or EO survey/clearance activities.
- Extent of post-war redevelopment.
- Proposed engineering works.

RELIABILITY OF HISTORICAL RECORDS

This assessment is drawn from detailed research into the available historical evidence. Every effort is made to gather all of the relevant material; however, PLANIT cannot be held responsible for any changes to the assessed level of risk or proposed risk mitigation strategies due to subsequent information that may come to light at a later date.

The accuracy and detail of wartime historical records is difficult to verify, not least of which is due to the conditions under which much of this information was gathered and recorded. Additionally, recording of information was less formalised in the early days of the German air campaign against the UK mainland (Pre-Bomb Census Record) and much information recorded early on was lost during subsequent air raids. Records for rural, sparsely populated areas are not always reliable, being based on second-hand information in many cases; records of attacks on military installations was often recorded independently from general records and many such archives have been lost or remain undisclosed to the public.

Consequently, the exact location, quantity and nature of the EO threat cannot be definitive but rather remains subjective and is based on the careful analysis by experts of the available information. PLANIT cannot accept liability for any gaps in the historical record.

CONTENTS

		Page Number
CONTACT DETAILS	....	1
DOCUMENT CONTROL	....	2
EXECUTIVE SUMMARY	....	3
CONTENTS	....	6
SITE LOCATION & DESCRIPTION	....	7
REVIEW OF DATASETS	....	8
THREAT ANALYSIS	....	11
THREAT ASSESSMENT	....	15
THREAT MITIGATION	....	19
ANNEXES	....	21

SITE LOCATION & DESCRIPTION

SITE OF CONCERN

The site is located approximately 0.5km west of Manchester city centre and the Exhibition Centre, 0.6km south of Salford Central Station. The site straddles Prince's Bridge and Water Street (B6225) and is bounded to the east by the Museum of Science and Technology.

National Grid Reference for the approximate centre of the site is SJ 829 979 and the nearest postcode is M3 4JQ.

The site is dominated by a large, triangular structure at its centre but is mostly covered by hard standing for vehicle manoeuvre and parking.

Maps showing the site location and layout are at Annex A.

SCOPE OF PROPOSED WORKS

The details of the proposed development are unknown at the time of writing this assessment.

For the purposes of this assessment, it has been assumed that development works could include intrusive engineering beyond WW2 ground levels. It is anticipated that personnel or key equipment may complete the risk pathway during excavation and/or piling operations that may bring them into physical contact with potential threat items.

GEOLOGICAL ENVIRONMENT

Information on the site specific geological environment is not available at the time of writing of this assessment. However, it is anticipated that the superficial deposits will consist of alluvium with clay, silt, sands and gravels.

REVIEW OF RELEVANT DATASETS

SOURCES OF INFORMATION

PLANIT ensures that Explosive Ordnance Risk Assessments (EORAs) are as comprehensive as possible and detailed research is undertaken to collate all of the available EO-related information that relates to the site of concern. Information sources may include, but are not restricted to:

- National Historic Archives.
- Local Authority & Council Archives.
- English Heritage National Monuments Record.
- Ministry of Defence Archives.
- PLANITs extensive archives drawn from many years of detailed research and operational experience of UXO Risk Management activities in the UK and abroad.
- Joint Service EOD Centre (JSEOD).
- Historic Mapping and Aerial Photography.
- Specific UXO-related documents such as military bombing and casualty records.
- Local libraries and history groups.
- Open sources such as published books and internet searches.
- Anecdotal evidence from eye witnesses.

NB: The MoD information office that deals with requests for information relevant to EO clearance operations completed by the MoD is currently facing significant delays. Although a request has been submitted, any information that may be relevant has not yet been forwarded for timely inclusion in this assessment. However, if any relevant information comes to light from this source that affects the threat assessment, this will be notified to the client as a matter of urgency.

SITE HISTORY

The site has been an area of industrialised docklands since at least 1848. At this time, Princes Bridge had not been built and the site was dominated by a number of large, warehouses.

By 1896, Princes Bridge is built and the tracks servicing the 'Goods Station' are installed. The site remains fairly static until at least 1972 by which date the servicing dock has been infilled in the northern part of the site.

By 1980, the 'TV Centre' appears in the map record built over the former servicing dock and by 1988 a number of large warehouses along the river bank to the west have been removed.

Between 1985 and 1999, the triangular shed appears in the centre of the site and no significant redevelopment has occurred since this time to the present day.

ORDNANCE MANUFACTURE & STORAGE

During WW1 and WW2, Lincolnshire housed a number of facilities involved in the manufacture, storage, filling and testing ordnance. The nearest explosive manufacturing sites (known as His Majesty's Explosive Filling Factories (HMEFs)) were:

- Trafford Park (HMEF).
- Hyde Road, Gorton, Manchester (National Shell Factory – manufacturing 4.5" shell (projectile) casings).

The nearest Royal Ordnance Facilities (ROFs) established in the run up to WW2 were:

- ROF Chorley.
- ROF Radway Green.

None of these sites would have posed a potential threat to the site of concern.

MILITARY HISTORY

There is no evidence to indicate that the site was ever used for military purposes.

CIVIL DEFENCE

Manchester possessed a peak of 56 Heavy Anti-Aircraft Batteries during WW2, including 4.5, 3.7 and 3 inch Anti-Aircraft (AA) guns, sited in some 70 separate locations. None of these were sited on or near to the site of concern to have created a direct source of potential ordnance contamination.

Due to the relatively high failure rate of Anti-Aircraft Ammunition (AAA) during this time, there remains the possibility that such ordnance fell back to earth creating additional UXO hazards. This type of ordnance had the potential to penetrate the ground to significant depths and cannot be entirely discounted as a potential threat source although its potential presence is impossible to determine with any quantifiable degree of certainty.

As would be expected, Manchester had several Civil Defence ('Starfish') sites designed to protect London from aerial attack. Manchester's Starfish Sites were located at:

- Chat Moss.
- Tatton Park.
- Park Moor (now in Lyme Park Country Park).
- Churnal Moor.
- Mossley.
- Carrington Moss.
- Ludworth Moor.
- Reddish.
- Elkstone (north Staffordshire).

None of these sites would indicate the possibility that erroneous Luftwaffe bombing would have produced a consequent UXO risk on the site of concern.

WW1

Greater Manchester suffered two aerial bombardments during WW1; on 26 Sep 1916 Zeppelin L21 dropped 20 HE bombs on Bolton, mistaking the town for Derby. Significant damage was caused and 13 people were killed. On 12 Apr 1918 Zeppelin L61 bombed Wigan at 2300hrs in a raid that lasted some 12 minutes. Three people were killed and a further nine were injured during the raid.

Neither of these raids would have affected the Site of concern and therefore the risk from WW1 unexploded ordnance is considered to be negligible.

WW2

During WWII the site sat close to a number of industrial and strategic installations key to the war effort that were located in the area – including Mills, Quarries and Railway infrastructure. Luftwaffe target maps do not list specific locations on or close to the site although the concept of specific targets, when bombing in and around Manchester, was only relevant prior to the accidental Luftwaffe raid on London on 24th Aug 1940. This attack broke the unofficial agreement not to bomb opposing capitals and led to the gradual breakdown of the Amsterdam draft international rules prohibiting the attacking of civilian infrastructure outside of combat zones (purely industrial areas); Great Britain, including Manchester, was now opened to air attacks. As well as the air raids targeting Manchester itself, unused bombs were routinely jettisoned whilst returning to base following an unsuccessful raid. In addition, the high-altitude area bombing during this period was notoriously inaccurate with areas surrounding specific targets suffering during attacks on the targets themselves.

The site in question sits to the western edge of the main areas within Manchester that were targeted, mostly during the 'Manchester Blitz' of Dec 22-24 1940 - Salford Docks, Manchester's industrial centre and Trafford Park (with the areas surrounding them also being affected by the same air raids). Many Manchester companies were involved in war production work including the Fairey Aviation plant at Ringway, the Ferranti factory at Hollingwood, Metropolitan Vickers works at Trafford Park and the A.V. Roe (Avro) plant at Chadderton. In addition, Ford operated a factory in Eccles building Rolls Royce Merlin engines for the Lancaster bomber and the Mosquito fighter bomber.

The Luftwaffe mounted consecutive heavy attacks on the Manchester area on the nights of 22/23rd and 23/24th Dec 1940. Large areas of Manchester, Salford and Stretford were devastated, killing some 684 people and injuring a further 2,364. The first raid of this 'Manchester Blitz' saw 272 tons of

HE bombs and 1, 023 canisters of Incendiary Bombs (IBs) dropped. During the second raid, 171 aircraft dropped a further 195 tons of HE bombs and 893 canisters of IBs

The site is located in Region 10 (Manchester) for Civil Defence purposes. Manchester received some 3, 465 Tonnes of HE bombs throughout the war although Cheshire and Chester were much less affected:

Ordnance Type	**Number of Bombs**		
	Region 10	Cheshire	Chester Rural District
50Kg HE	1403 (79)* + 576 (1)**	594 (25)	1
250Kg HE	727 (49) + 368	301 (19)	13
500Kg HE	114 (7) + 57 (3)	58 (6)	10 (1)
1000Kg HE	2 (2) + 6	1 (1)	
Parachute Mine	514 (77) + 592	139 (16)	
V1 'Doodlebug'	14	6	1
V2 Long Range Rocket	0		
Small Incendiary Bombs	25 454	3 639	
50Kg Phosphorus Bomb	Unknown		
Fire Pots	Unknown		
Oil Bomb	212 (4) + 202	48 (1)	
Containers	Unknown		
Unclassified Ordnance	8 114 (1 341) + 10 658	2 806 (524)	

The bombs recorded as falling on the County Borough of Manchester are summarised below:

Area Acreage	**27, 255**
High explosive Bombs (All Types)	712
Parachute Mines	18
Oil Bombs	7
Phosphorus Bombs	-
V1 'Doodlbug'	1
Total	**738**
Items per 1000 acres	**27.1**

UNEXPLODED BOMBS (UXBs)

Between 1940 and 1945, Bomb Disposal (BD) Teams cleared over 50,000 items of German air-dropped ordnance of 50Kg or larger, 7 000 anti-aircraft (AA) projectiles and more than 30 000 beach mines – This work claimed the lives of 394 Officer's and men. The War Office at the time stated that over 200 000 HE bombs exploded in Britain during WW2 with some 25 195 remaining a threat as UXBs i.e. 11%. Some 93% of all UXBs were 50Kg HE and 250Kg HE aerial bombs.

The types of ordnance discovered as UXBs give an indicator of the type of ordnance that may be encountered on or near the site of concern. In this instance there are no records of UXBs that may present a threat to the site.

ABANDONED BOMBS

A post-air raid search of damaged buildings and facilities would have included a specific search for bomb entry holes. If such evidence was discovered, then BD Teams would have been tasked (in order of strict priority from Category A, the highest priority, to category D, the lowest) to assess the potential UXB and to recommend a course of action. For UXBs that were deemed to be a high enough priority were tackled by the BD Teams who made strenuous efforts to recover and dispose of these items. However, it was not always possible to recover such bombs either through physical constraints, a lack of resources or a change in priority. Such UXBs were noted as 'Abandoned'.

Due to the low priority of abandoned bombs, records that detail them are sketchy and sometimes contradictory. Others were subsequently recovered after the War when time and resources permitted and others remain 'abandoned'. It is worth remembering that 'abandoned' bombs may also include suspected UXBs that were reported but not confirmed, but simply efforts to locate the 'bomb' were exhausted.

The Abandoned Bombs recorded in the vicinity of the site are:

Reference/ Location	Item
CD 49.3822 – Fields 600yds SE of Grove Farm, Chorlton by Beckford.	1 x AA Shell
CD 53.3825 – Fiels near rear of Gun Site Acres Lane, Upton Heath.	1 x AA Shell
CD 56.3826 – Staok Grange Farm, Little Stanney.	1 x AA Shell
CD 84.3843 – Wood Farm, Grove Road, Mollington, 500yds W of Lee Holme.	1 x AA Shell
CD 82.3842 – 50yds W of Dunkirk Lane, Capenhurst Hall Park Farm, Capenhurst.	1 x AA Shell
CD 81.3841 – 100yds S of Pitts farm, Woodbank, Shotwick.	1 x AA Shell
CD 59.3827 – Shotwick Park, S of No. 9/10 Holding Arterial Road.	1 x AA Shell

None of these are considered to present a potential UXO-related threat.

BOMB CENSUS MAPS

Manchester's Bomb Census Records are comprehensive and indicate that at least one large, air-dropped bomb fell within the south western part of the site itself.

The relevant Bomb Census Map extract is at Annex B.

HISTORICAL STREEP MAPS

Historical street plans of the period are a useful indicator of whether an area may have suffered bomb damage. The street layout prior to WW2 can be considered to be the start state and major changes to street layouts or building boundaries may indicate that the change was due to bomb damage.

In this instance, there are no significant changes to the street layout that indicate bomb damage on the site of concern itself, although there is clear bomb damage in the wider area surrounding the site.

The relevant Historical Street Plans are at Annex C.

HISTORICAL AERIAL PHOTGRAPHY

The same rational applies with historic aerial photography as it does when examining historical street plans – changes between pre-war and post-war images may indicate the possibility of damage caused by bombs falling on the site. Sometimes, detail is such that it allows bomb damage to be seen directly on sites of concern. In this instance, historical aerial photography from the period is not available and therefore no comparisons can be made.

THREAT ANALYSIS

IS THERE EVIDENCE THAT THE SITE WAS AFFECTED BY ANY EXPLOSIVE ORDNANCE

Yes.

The historical record is acknowledged as being incomplete from a National perspective but there is clear evidence within the relevant extract from the Manchester Bomb Census Maps that the site of concern was directly affected by bombing during WW2; which likely included large air-dropped bombs or British anti-aircraft artillery falling back to earth as UXBs.

CONTAMINATION EVENTS?	Although there is no change to the historical street maps of the period, this is likely more a function of the fact that the bomb is recorded as falling onto the trackway and may not have impacted nearby buildings significantly. The bomb damage would have been significant and the possibility that another bomb fell on the same area and remained underground, undiscovered as a UXB must be considered plausible. It was also a common error to mistake the havoc wreaked by a large bomb falling through built structures unexploded, which is considerable, with a smaller bomb detonating as intended. However, in this instance the damage to trackway would have been evidently caused by a detonation as it would have been burst apart as opposed to pushed into the ground as would be the case if it were a large UXB.
IF ENCOUNTERED, WHAT ORDNANCE TYPES ARE ANTICIPATED?	There is explicit evidence that the site received at least one direct hit from a large, air-dropped bomb during WW2. Given the location of the site and its proximity to Salford Docks, we must assume that larger bombs may have been used as was the procedure at the time when attacking such infrastructure. There is no explicit evidence that the site directly received Anti-Personnel or incendiary bomb strikes. Whether or not the area received AAA returning to earth unexploded is impossible to answer but it would be prudent to accept the worst case scenario in this case and accept that they probably did. The site is not known to have been used for ordnance manufacture or storage and neither was it a former Military installation. So we can discount the possibility that the site was contaminated by ad hoc military activity. The type and degree of post-War redevelopment is significant in that it would reduce the encounter potential for smaller items of ordnance such as anti-personnel bombs or AAA projectiles to such a degree in some areas of the site that this potential threat source may effectively be discounted. This is not the case for areas of the site that have not been significantly redeveloped since the end of the War. With this in mind, the following potential threat items may remain under the site in areas that have not been subject to significant redevelopment: • Large, air-dropped, German HE Bombs including 50, 250, 500 and 1,000kg bombs (of WW2 vintage). • British AAA projectiles.
WHAT IS THE EXPLOSIVE ORDNANCE / UXB ENCOUNTER DEPTH?	**Ministry of Homeland Defence Security Bomb Penetration Studies**. A major study was completed by the Ministry of Homeland Security during WW2, during which the penetration depths of 1328 air-dropped bombs (as reported by the BD Sections of the day and mostly in the Birmingham area). It was concluded, not surprisingly, that the penetration depths of different sized bombs varied according to the geology into which they fell. The average penetration depth of 430 x 50Kg HE bombs in London Clay was found to be 4.6m and that for a 250Kg bomb 6.1m. Also, they concluded that a 500Kg bomb, the largest common bomb dropped during the War, had a likely penetration depth of 6m in sand and 8.7m in clay – the maximum observed for a 500Kg was 10.2m and for a 1000Kg bomb was 12.7m. It should be remembered that these depths were achieved unencumbered by obstacles to penetration such as buildings, concrete and brickwork. **The 'J' Curve**. The 'J-curve' describes the path of a bomb (dropped from a normal altitude of about 5 000m) into homogenous ground will continue its line of flight (unless deflected by a substantial obstacle) but then turn upwards towards the surface before it stops. The horizontal distance (the 'offset') between the point of entry and final resting position was typically 1/3 of the ultimate penetration depth for a particular type of bomb. Therefore, if a bomb fell close to the exterior of a building or site and did not explode, the path that the bomb subsequently travelled beneath the ground, the "J-Curve", may have delivered it beneath the building or site footprint. The J-curve is often misunderstood, and used to describe the path taken by a bomb dropped from low flying aircraft to which it should not be applied.

The final penetration depth of an air-dropped depends upon a number of factors; the velocity of the bomb (as a function of the mass, speed) – PLANIT uses a standard velocity of 267m/s for assessment purposes – the angle of penetration of the bomb and the physical features through which the bomb travelled prior to impact with the ground and the geology of the ground into which it entered - Generally, the softer the ground, the deeper the expected penetration depth of the bomb. Peat, alluvium and soft clays are easier to penetrate than gravels and sand and water content plays a part. In addition, it must be remembered that 'barrier geology' such as very dense gravels or bedrock i.e. geology dense enough to stop the progress of a bomb underground, is an important factor in determining the median bomb penetration depth.

Given the ground cover at the time that the bombs fell, the anticipated geology and accepting the norm for the impact angle and velocity of a large UXB, it is reasonable to assume the norm when considering the potential Bomb Penetration Depth (BDP). Therefore, it is estimated that the average penetration depths of Explosive Ordnance (EO) at this site would be:

- **British AAA projectiles – 2m**
- **50kg HE – 4m**
- **250kg HE – 6m and**
- **500kg HE – 8m**
- **1000kg HE – 10m**

HOW COULD AN UNCONTROLLED DETONATION BE BROUGHT ABOUT?

Unexploded Bombs rarely spontaneously explode (although some incidents claim to contradict this statement). High Explosive (HE) requires a great deal of energy to create the necessary conditions for detonation to occur. In the case of WWII German bombs being disturbed during intrusive ground works, there are a number of scenarios to be considered:

- **Direct impact onto the main body of the bomb**. Although this is a possibility, there is little chance of generating enough energy to detonate the explosive fill unless the fuze itself is directly struck.

- **Re-starting the mechanical clock-timer in a bomb fuze**. This is a possibility. It is probable that environmental conditions have corroded the fuse sufficiently to prevent clockwork mechanisms from functioning. However, under some conditions, fuze elements will be in a good condition and additional movement of a bomb fuse may be sufficient to restart a previously 'jammed' mechanical clockwork mechanism.

- **Induction of a static charge, creating a sufficient current to initiate an electric fuze**. This is an unlikely event. Environmental conditions are likely to have corroded the fuze, degrading its components sufficiently to prevent them from functioning. Any elements of the fuze capable of holding a charge would have dissipated in the time since the bomb failed to function.

- **Friction impact initiating fuze elements causing bombs to detonate**. Although remote, this is the most likely scenario that may result in a bomb detonating. Weathering within the fuze pocket can cause the explosives within the fuze to breakdown, crystallize and exude from the fuze itself. Violent physical disturbance of this exuded material carries the remote possibility of initiating the fuze mechanism which in turn will initiate the bomb.

WHAT WOULD THE EFFECTS OF SUCH A DETONATION BE TO THE SITE?

The effects of WWII German bombs detonating have been the subject of a number of well recorded studies. The general effect of an explosive detonation will depend upon:

- The size of the bomb and its Net Explosive Quantity (NEQ) (i.e. how much explosive material it contains).
- The type of fill in the bomb (i.e. high explosive, incendiary, photoflash).
- The physical location of the bomb. Whether it is:
    - On the surface.
    - Partially buried.

  - Buried (A bomb can be considered to be 'buried' when it is more than 2½ times its own length below ground level and covered).

- The locations of the bomb in relation to other structures.
- The strength and design of structures near to the seat of an explosion.
- The nature of the ground (i.e. sand, gravel, clay, marsh etc).
- The location of the bomb in relation to human and animal populations.

There would be the potential for ground shock to damage important underground structures including sewers, communication cables, and foundations.

The potential Damage Radii to various underground structures has been assessed by extrapolating from the Joint Service Publication 364 which is the MOD Manual for assessing bomb damage. Potential damage radii for underground structures are assessed as:

Structure	Dist (m)
Brick Walls	30
Foundations	60
Cast Iron/ Concrete Pipes	15
Earthenware/ brisk Sewers	25
Electric Cables/ Steel Pipes	12

WOULD THE SITE CONDITIONS AFFECT THE BOMB FAILURE RATE?

There is no evidence to suggest that bomb failure rate at the site of concern would have been any different from that routinely experienced, i.e. 10-15% of all bombs dropped.

WOULD UXBs HAVE BEEN DISCOVERED DURING WW2?

Density of Bombing. Despite Manchester receiving a high density of bombing in WW2, the site sits on the periphery of the focus of those attacks. However, we know that the site itself received at least one direct bomb strike which caused significant damage. This factor would have made data gathering at the time more complicated and the likelihood of overlooking UXBs higher.

Frequency of Access. Since the site was occupied and used at the time of the air raids, the site of concern would have been subject to post-air raid survey and clearance. The fact that the site itself was affected by bombing, and given its key industrial role, any post-raid survey activities would have been thorough. This would have made the likelihood of identifying smaller items of EO (such as Incendiaries and AP bomblets) quite high whilst larger UXBs would have been more readily identified. However, entry holes and UXBs could easily have been overlooked due to their diminutive size, or gone unnoticed if they fell into water.

Ground Cover. Although the site was industrial in nature (and as such it's physical characteristics would act to retard the progress of UXBs underground by reducing their overall velocity prior to impact) the recorded bomb fell through trackway which is not as resilient as concrete or brick and therefore the maximum potential bomb penetration depths must be considered as the 'worst case'. This is also true of bombs falling into water.

Peripheral Bomb Damage. We know that the site of concern was subject to bomb damage during the War. This increases the possibility of post-air raid operations failing to identify entry holes of potential UXBs.

DOES THE SITE'S DEVELOPMENT HISTORY AFFECT THE POTENTIAL

Yes.

The fact that there has been a degree of post-War development at the site is worthy of note in that any potential contamination from shallow EO (i.e. AP bombs and IBs) would likely have been discovered during these works and dealt with at the time.

FOR UXO ENCOUNTER?	The small part of the site within which the bomb is recorded as falling has not been redeveloped since the end of the War in any meaningful way. Therefore, the potential for UXO encounter in this area remains as it did immediately post-War. It is worth remembering that development either immediately post-War or in the 1960/ 70s would not have taken any account of the potential for UXBs at the site of concern nor would any effective technology be available to detect such potential threat items. Modern structures tend to have foundation designs that go deeper than historic buildings and risk encountering UXBs at depths beyond existing historic foundation levels or within historic foundation structures that were not detected by excavation or historical bomb survey.
DOES THE UXO THREAT VARY ACROSS THE SITE?	**Yes.** Volumes of ground across the site that have already been subjected to extensive redevelopment involving the displacement of earth, may be considered free from the threat of UXO/EO *within the volumes of ground excavated/disturbed*. The same cannot be said of areas of the site that have not been subjected to the same degree of physical disturbance. Areas of the site that have been subjected to historical piling *cannot be automatically considered to be free from the threat of UXO/ EO within the volumes occupied by the piling layout although the threat is significantly reduced* – there is a possibility that historical piles have either missed UXBs at depth or pushed these items aside without incident when they were emplaced. Further, the volume of ground below such piled areas cannot be considered to be free from the threat of UXO/ EO. Volumes of post-War made ground may be considered free from the threat of UXO/EO also, unless a cross-contamination event has occurred. In this instance, only a small part of the site was affected by aerial bombing in WW2. We can say this with confidence as the built nature of the wider site during this time means that additional bomb damage would have been recorded as indeed it was further east of the site itself. Additionally, this area of the site has not been significantly redeveloped, involving the displacement of earth to significant depths since the end of the War and therefore the potential for UXO encounter remains the same today as it was back then. With this in mind, it is only this small area of the site that needs to be considered further when assessing the potential for UXO encounter. This area has been designated a 'UXB Threat Zone' and is highlighted at Annex D.

THREAT ASSESSMENT

POTENTIAL EXPLOSIVE ORDNANCE THREAT ITEMS	Outside of the UXB Threat Zone, there is no potential for UXO encounter. Within the UXB Threat Zone, the following items are considered to remain under the site as potential threat items: • Large, air-dropped, German HE Bombs including 50, 250, 500 and 1,000kg bombs (of WW2 vintage). • British AAA projectiles.
CURRENT EXPLOSIVE ORDNANCE THREAT LEVELS	The Ordnance Threat Levels for the site of concern from the Threat Assessment Matrices are assessed as: **Outside of the UXB Threat Zone**, the EO Threat Levels are considered to be **NEGLIGIBLE**. **Within the UXB Threat Zone**, the following EO Threat Levels apply:

- 50, 250, 500 and 1,000kg bombs - **MEDIUM**
- British AAA projectiles - **MEDIUM**

ENGINEERING WORKS

Intrusive Site Investigation, piled foundations, bulk excavations etc.

RISK PATHWAY

For the purposes of this assessment, it has been assumed that development works could include excavations and/or intrusive engineering beyond WW2 ground levels. It is anticipated that personnel or key equipment may complete the risk pathway during excavation and/or piling operations that may bring them into physical contact with potential threat items.

WHAT ARE THE CONSEQUENCES OF AN INCONTROLLED DETONATION?

The consequences of the uncontrolled detonation of any of the items of ordnance listed above are:

Asset	Consequence
People	Lost Time Injury >7 Days
Plant	Unit Level Damage
Property	Major Wider Damage
Environmental	Major Effect

THREAT MATRICES

ORDNANCE CATEGORY

The 'Ordnance Category' is assessed for the different types of ordnance in terms of the 'Damage Radii' that may result were the ordnance subject to an uncontrolled explosion and is a function of the calibre of the ordnance and whether it is encountered on the 'surface' or 'buried'.

Ordnance Category	Ordnance Category Description	Danger Radii (m)	Potential Threat Item
0	No Explosive Ordnance (EO) suspected to be present	NA	NA
1	Landmines, Anti-Personnel, HE; HE in Bulk <5Kg; Pyrotechnics	< 75	NA
2	Projectiles, HE <75mm calibre; Projectiles, Mortar, HE 50mm to < 75mm calibre; Grenades, Hand, HE; Grenades, Rifle, HE.	< 100	NA
3	Projectiles, HE < 125mm calibre; Rockets, HE, Anti-Tank (HEAT); Bombs PIAT, HE; Arial Bombs, HE, 50-250Kg (Surface & Buried); Aerial Bombs, Blast, HE & Sea Mines 20-250Kg; Aerial Bomb, HE, 250-500Kg (Buried)	< 250	**British AAA 50kg HE Bombs**
4	Bombs, Mortar, HE <105mm calibre; Bombs, Mortar, Spigot, HE; Landmines, Anti-Tank, HE; Aerial Bombs, HE, 250-500Kg (Surface)	< 300	**250-500kg HE Bombs**
5	Projectile, HE > 125mm calibre; Aerial Bombs, HE, 1500-2500Kg (Surface); Aerial Bomb, Blast, HE & Sea Mines 500-1500Kg (Surface)	< 500	**1000kg HE Bombs**

6	Aerial Bombs, HE, 2000-10000Kg (Buried); Aerial Bombs, Blast, HE & Sea Mines 1500-4000Kg (Surface)	< 800	NA

ORDNANCE THREAT

This table assigns the 'Ordnance Threat', which is a function of the Ordnance Category and the anticipated encounter depth. i.e. the smaller and deeper the ordnance the less threat is present to people and property at the surface.

	ORDNANCE CATEGORY						**Depth of Encounter (m)**
0	1	2	3	4	5	6	
	ORDNANCE THREAT						
	🟩	🟩	🟦	🟨	🟧 **1000 kg Bomb**	🟥	**>10**
	🟦	🟦	🟨	🟧 **250-500kg Bomb**	🟧	🟥	**5<10**
	🟨	🟨	🟧 **50kg Bomb**	🟧	🟥	🟥	**2.5<5**
	🟧	🟧	🟧 **British AAA**	🟥	🟥	🟥	**0.5<2.5**
	🟧	🟧	🟥	🟥	🟥	🟥	**0<0.5**
	🟥	🟥	🟥	🟥	🟥	🟥	**Surface**

ORDNANCE THREAT LEVEL

The 'Ordnance Threat Level' is arrived at by comparing the 'Ordnance Risk' with the 'Likelihood of Encounter' of a particular type of ordnance as a function of the level of expected ordnance contamination of a given type at a site of concern.

Ordnance Threat	**ASSETS AFFECTED**				**LIKELIHOOD OF ENCOUNTER**				
	People	Plant	Property	Environment	Very Unlikely	Unlikely	Likely	Very Likely	Extremely Likely
🟩	First aid injury	Slight damage	Slight damage	Slight Effect	🟩	🟩	🟦	🟨	🟧
🟦	Medical injury	Item repair	Minor damage	Minor Effect	🟩	🟦	🟦	🟨	🟧
🟨	Lost time <7 days	Item write off	Major damage	Local Effect	🟦	🟦	🟨	🟧	🟧
British AAA, 50-1000kg Bomb	Lost time injury >7 days	Unit level damage	Major wider damage	Major Effect	British AAA, 50-1000kg Bomb	🟨	🟧	🟧	🟧
🟧	Fatality	Multiple damage	Catastrophe	Massive Effect	🟨	🟧	🟧	🟧	🟧
					ORDNANCE THREAT LEVEL				

No special measures required	**NEGLIGIBLE**	
Monitor & manage potential risks	**LOW**	🟩
Review & emplace strict control measures if necessary	**MEDIUM**	🟦 **X**
Control measures required to mitigate risks to acceptable levels	**HIGH**	🟨
Intolerable Risk Level. Immediate control measures prior to any further works	**EXTREME**	🟧

THREAT MITIGATION

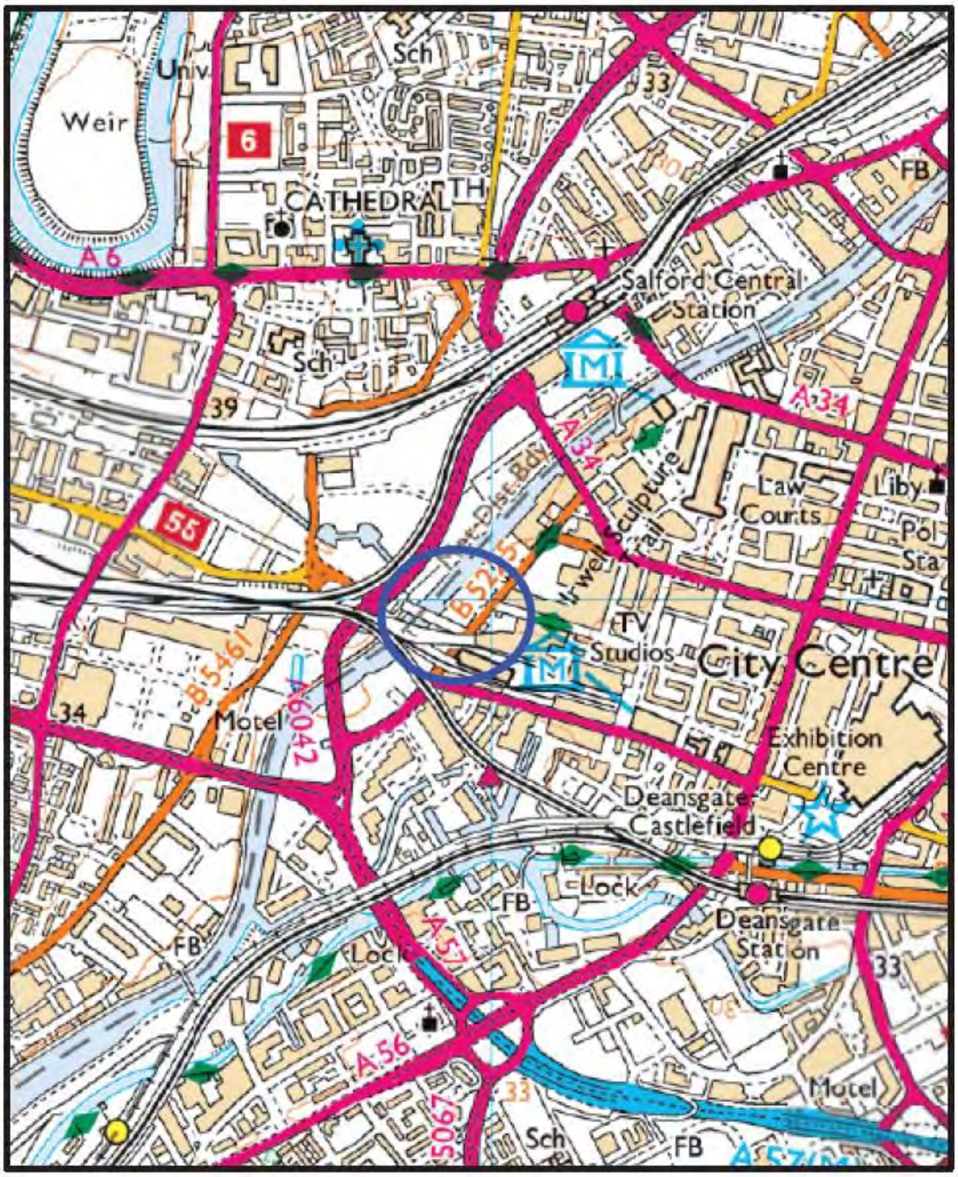
ACTIVITY	THREAT MITIGATION MEASURES	FINAL THREAT LEVEL
All Activities	If planned engineering works are going to enter into potentially at risk ground volumes within the UXB Threat Zone, then a threat management strategy **IS REQUIRED** to be in place prior to intrusive engineering works at the site of concern. **Explosive Ordnance Safety Awareness Briefings.** An explosive ordnance Safety Briefing should be included as part of routine site health and safety training and form a key element of the Site Health & Safety Plan. This should be conducted by a trained specialist and would assist conformance with the CDM Regulations 2007. The briefing will instruct all personnel on the identification of EO hazards, actions to take in the event of an EO incident in order to protect personnel, key equipment, property and the general public. **Explosive Ordnance Site Safety Instructions.** Explosive Ordnance Site Safety Instructions should be drafted for inclusion in the site specific health and safety manual and would include information on dealing with an EO incident safely and appropriately. These instructions would form part of the permanent site documentation and will be an aide memoire for identifying potential EO hazards, making a preliminary threat assessment as well as specific guidelines on what to do in the event of a confirmed incident.	**AS LOW AS REASONABLY PRACTICABLE (ALARP)**
SITE INVESTIGATION WORKS	Site investigation works should be supported by UXO survey as appropriate. Consideration should be given to whether the works are considered to be shallow or deep from the perspective of UXO Survey. 'Shallow' Survey is survey of the ground from 0.0m bgl to 6.5m bgl and 'Deep' UXO Survey is that beyond 6.5mbgl. • **Boreholes.** PLANIT can conduct a non-intrusive survey of a 5m x 5m box which will accurately allow your borehole to proceed into a volume of ground under which there are no ferrous obstructions. A number of locations may be provided within a survey box, allowing maximum flexibility for positioning and preventing any boreholes being terminated as a result of encountering a potential threat item at depth. • **Trial Pits.** Using shallow non-intrusive survey, the area for your trial pit can quickly be surveyed and confirmed as free from ferrous anomalies/UXO. Data is interpreted on-site and therefore locations can be changed very efficiently in the event of a potential obstacle. • **Window Sampling.** Using shallow non-intrusive survey, the area for your window sample can quickly be surveyed and confirmed as free from ferrous anomalies/UXO. Data is interpreted on-site and therefore locations can be changed very efficiently in the event of a potential obstacle.	**AS LOW AS REASONABLY PRACTICABLE (ALARP)**

SHALLOW INTRUSIVE ENGINEERING WORKS	Where 'shallow' engineering may complete the risk-receptor pathway, there are two options available to effectively deal with the EO Threat when conducting shallow intrusive ground works. **On-Site UXO Support.** On-site UXO Support for shallow ground works would involve the presence of an appropriately trained and experienced UXO Technician during this phase of construction. The role of the UXO Technician is to: • Conduct EO Safety Awareness Briefings as required. • Monitor all intrusive ground works using visual and instrument aided means to locate any EO that may be uncovered during site works. • Provide an immediate and expert assessment of any EO that may be discovered. • Assist in implementing an appropriate and safe response to an EO incident. • Design and emplace protective works as an immediate response in order to protect personnel, key equipment, property and the general public as may be required. • Advise on best safe working practice in light of the perceived EO Threat. • Act as the liaison with the Authorities on behalf of the Client in the event of an EO incident. **Shallow Non-Intrusive UXO Survey**. PLANIT can deploy industry leading technology that will survey your site of concern non-intrusively (as long as ground conditions permit) in order to identify potential EO Threat Items. Any anomalies identified following the non-intrusive survey that may be EO should then be subject to Controlled Excavation in order to confirm them as EO and remove the threat or discount them. Once the non-intrusive survey and controlled excavation are complete, there is no further requirement for UXO Support at the site of concern since all EO Threats would have been identified and dealt with.	**AS LOW AS REASONABLY PRACTICABLE (ALARP)**
DEEP INTRUSIVE ENGINEERING	There are a number of options available to effectively deal with potential EO Threats when conducting deep intrusive ground works. Which approach is applicable will depend upon the ground conditions of the site of concern: **Deep Non-Intrusive UXO Survey.** PLANIT can deploy industry leading technology that will survey your site of concern non-intrusively (as long as ground conditions permit) in order to identify potential EO Threat Items at depth – UXO Survey should proceed to the expected UXB penetration depth or maximum depth of intrusive ground works, whichever is shallower. As a benchmark, PLANITs Deep Non-Intrusive Survey is capable of identifying a 500Kg HE bomb to some 8.0m bgl in average ground and larger bombs deeper. This approach is ideal for covering large areas quickly and can be employed to survey piling runs and borehole locations. Any anomalies identified following the non-intrusive survey that may be EO should then be subject to Controlled Excavation in order to confirm them as EO and remove the threat or discount them. Once the non-intrusive survey and controlled excavation are complete, there is no further requirement for UXO Support at the site of concern since all EO Threats would have been identified and dealt with. **Magcone UXB Survey.** PLANIT can deploy world class Magcone Survey Systems to survey either pile locations or small areas ahead of intrusive	**AS LOW AS REASONABLY PRACTICABLE (ALARP)**

	engineering including piling and drilling. The Magcone system is very versatile and can survey to great depths if required. **Down-Hole Magnetometer UXO Survey**. PLANIT can deploy down-borehole UXO Survey equipment that will clear ahead of a piling or borehole rig as it descends underground. The main drawbacks of this approach are that it is time consuming, 'blind' (insofar as the borehole may proceed for some depth before a potential threat item is identified, at which stage the borehole will have to be terminated and relocated, wasting time and money), equipment heavy and expensive. Any anomalies identified during this survey that may be EO should either be subject to Controlled Excavation in order to confirm them as EO and remove the threat or discount them or relocate the borehole or adjust the piling plan. UXO Survey should proceed to the expected UXB penetration depth or maximum depth of intrusive ground works, whichever is shallower.	

ANNEXES

A. Site Location & Layout.
B. Bomb Census Map.
C. Historical Street Maps.
D. UXB Threat Zone.

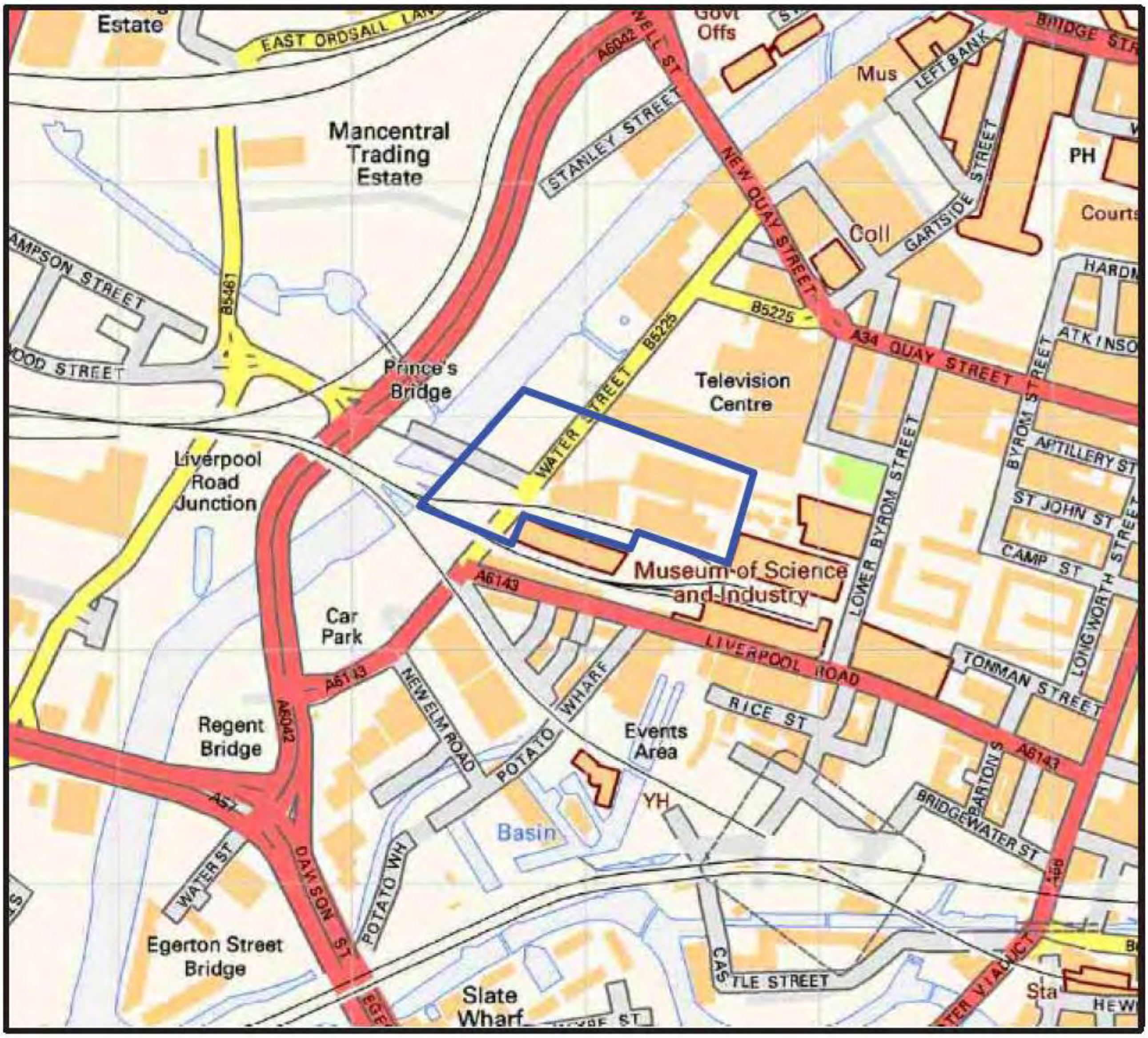

Weir
Univ
6
Sch
CATHEDRAL
TH
A 6
33
FB
Salford Central
Station
Sch
39
A 34
A 34
Law
Courts
Liby
Pol
Sta
55
Irwell Sculpture Trail
B 5225
TV
Studios
City Centre
B 5461
A 6042
Motel
34
Exhibition
Centre
Deansgate-
Castlefield
Lock
FB
Deansgate
Station
33
Lock
A 57
A 56
FB
Motel
33
5067
Sch
FB
A 57(M)

Annex A: Site Location
Client: Buro Happold
Project Ref: Manchester City Centre Factory
Doc Ref: 0123 EOTA MCCF 16/02/16

Key:

Site Location ○

PLANIT
RESTORING BALANCE

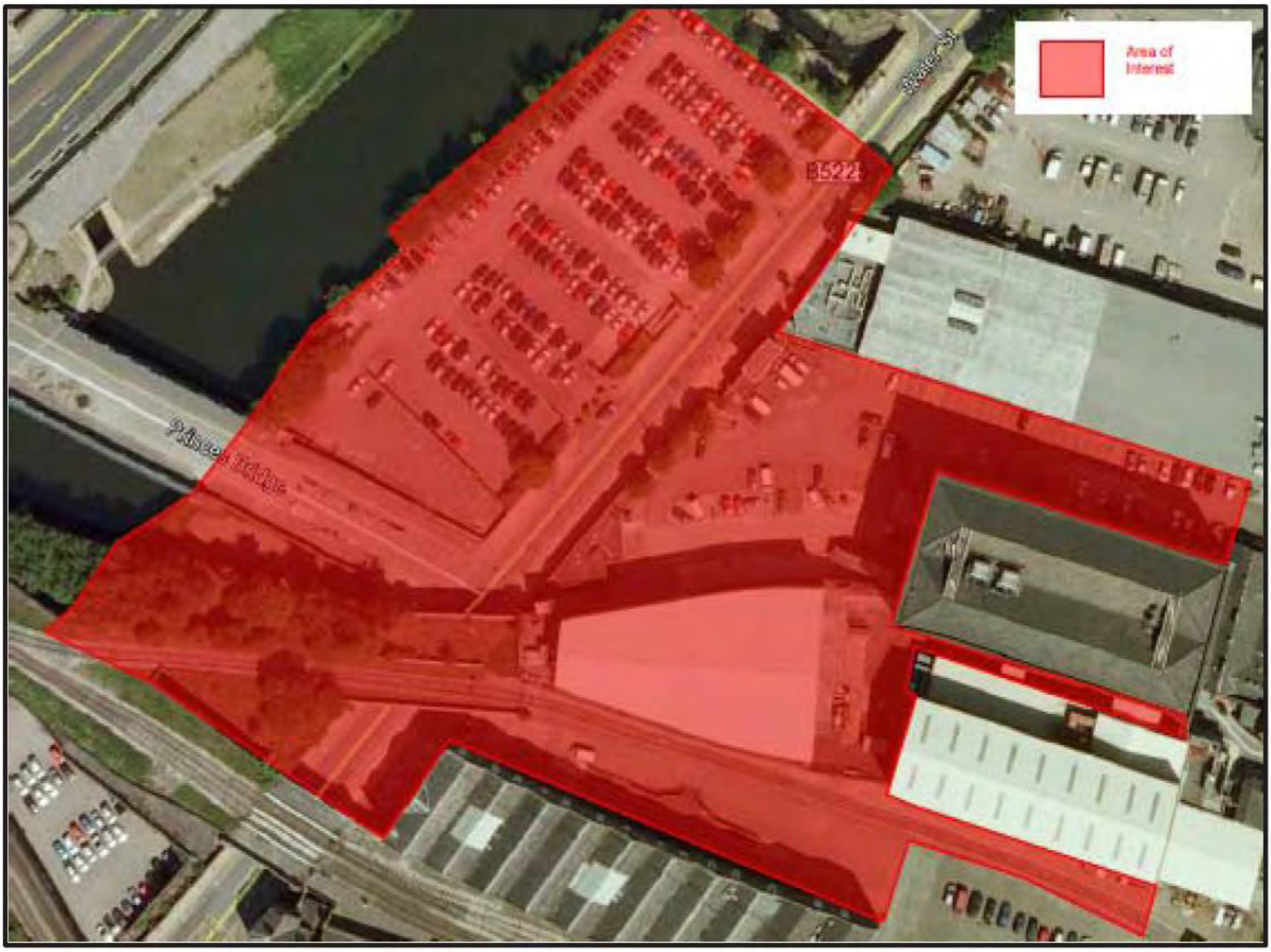

N
Estate
EAST ORDSALL LANE
Govt Offs
Mus
LEFT BANK
BRIDGE STR
Mancentral Trading Estate
STANLEY STREET
A6042
NEW QUAY STREET
GARTSIDE STREET
PH
Courts
Coll
SAMPSON STREET
B5461
B5225
HARDM
ATKINSO
A34 QUAY STREET
OOD STREET
Prince's Bridge
WATER STREET
Television Centre
BYROM STREET
ARTILLERY ST
LOWER BYROM STREET
Liverpool Road Junction
ST JOHN ST
CAMP ST
LONGWORTH STREET
Museum of Science and Industry
A6143
Car Park
LIVERPOOL ROAD
TONMAN STREET
NEW ELM ROAD
WHARF
RICE ST
A6143
Regent Bridge
A6042
Events Area
POTATO
BARTON S
BRIDGEWATER ST
YH
A57
Basin
WATER ST
DAWSON ST
POTATO WH
A56
Egerton Street Bridge
CASTLE STREET
VIADUCT
Slate Wharf
Sta
HEWI

Annex A: Site Location
Client: Buro Happold
Project Ref: Manchester City Centre Factory
Doc Ref: 0123 EOTA MCCF 16/02/16

Key:

Site Location ○

PLANIT
RESTORING BALANCE


Area of Interest
B5224
Princes Bridge

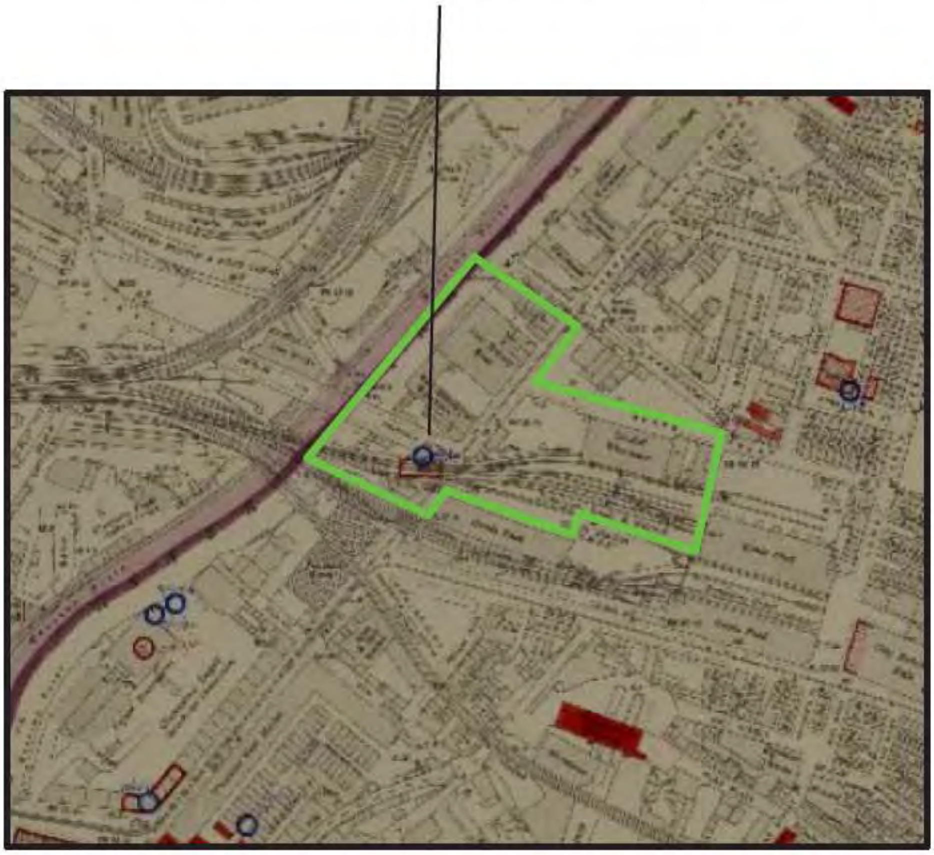
Annex A: Site Location
Client: Buro Happold
Project Ref: Manchester City Centre Factory
Doc Ref: 0123 EOTA MCCF 16/02/16

Key:

Site Location ●

PLANIT
RESTORING BALANCE

High Explosive Bomb Strike (Blue) & Bomb Damage (Red)

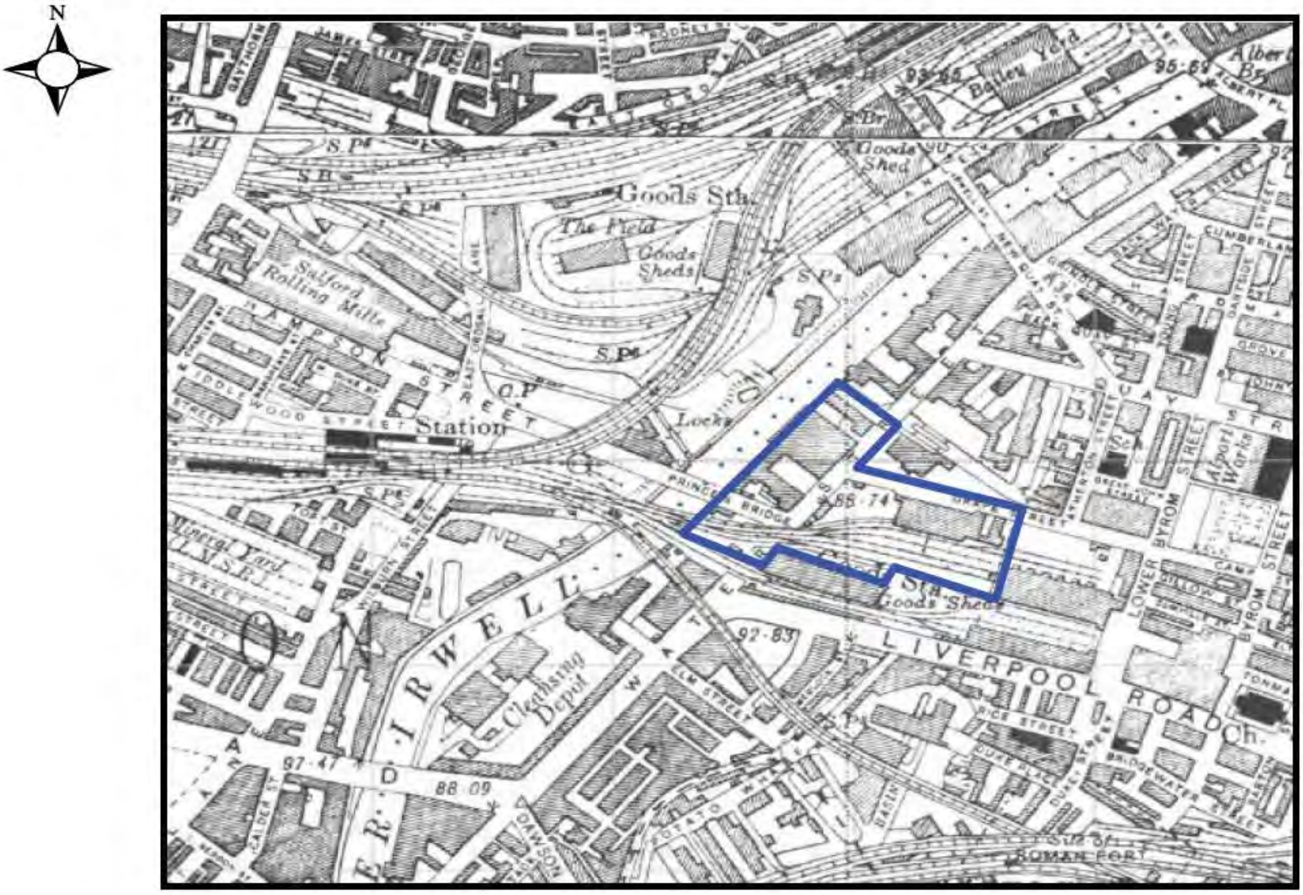


Annex B: Bomb Census
Client: Buro Happold
Project Ref: Manchester City Centre Factory
Doc Ref: 0123 EOTA MCCF 16/02/16

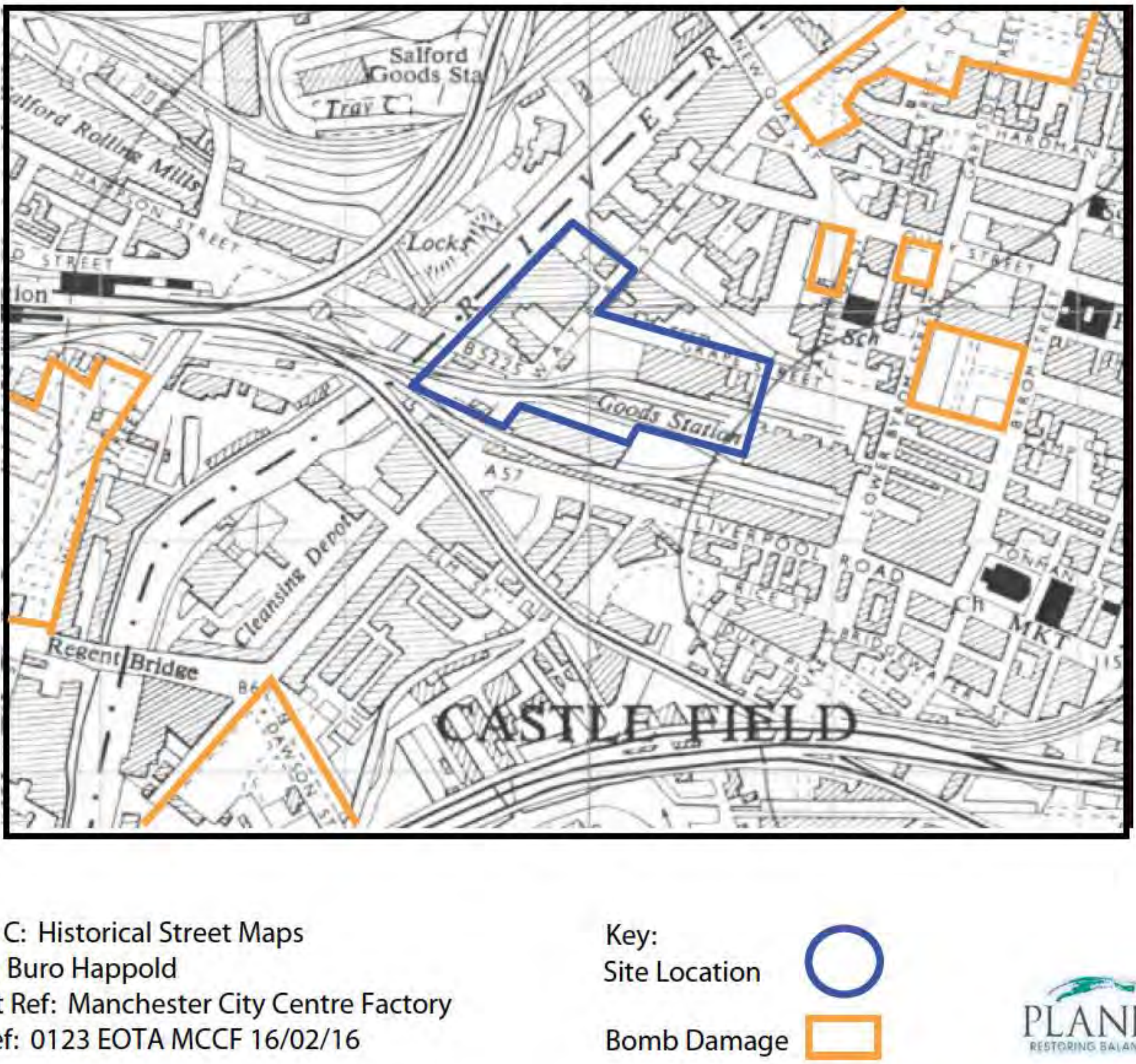
Key:

Site Location ○

PLANIT
RESTORING BALANCE


N
Goods Sta.
The Field
Goods Sheds
Salford Rolling Mills
Station
Locks
Princess Bridge
Goods Shed
IRWELL
Cleansing Depot
Liverpool Road
Elm Street
Albert Br.
Bailey Yard
Byrom Street
Lower Byrom Street
Roman Fort
88·09
97·47
92·83
88·74
95·69

1938

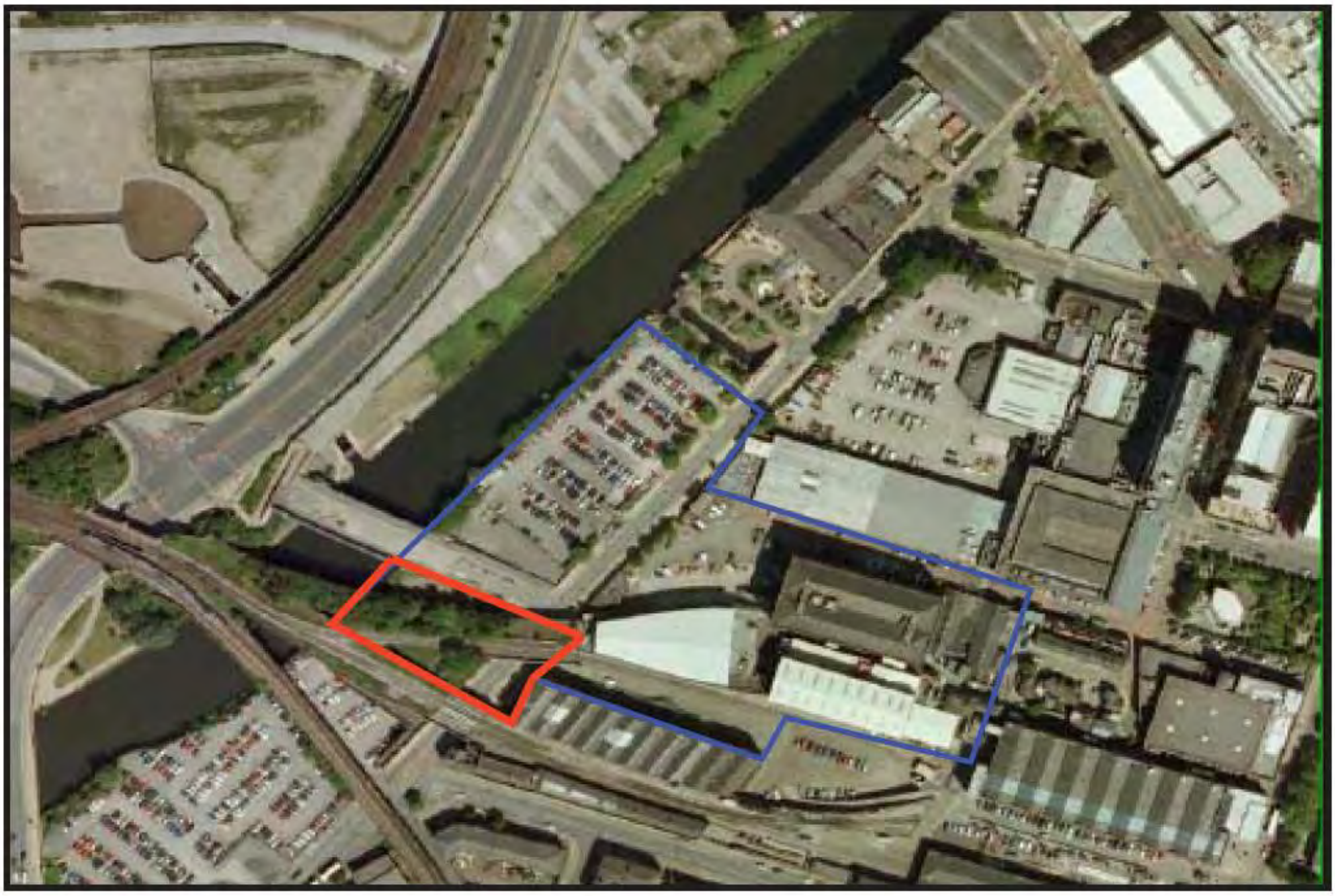

Salford Goods Sta
Trav C
Salford Rolling Mills
Locks
Goods Station
Sch
Cleansing Depot
Liverpool Road
Regent Bridge
Dawson St
Castle Field
A57
Ch
MKT
Hardman
85·25

1956

Annex C: Historical Street Maps
Client: Buro Happold
Project Ref: Manchester City Centre Factory
Doc Ref: 0123 EOTA MCCF 16/02/16

Key:
Site Location ○
Bomb Damage □

PLANIT
RESTORING BALANCE



Key:

Site Location 🟦

UXB Threat Zone 🟥

Annex D: UXB Threat Zone
Client: Buro Happold
Project Ref: Manchester City Centre Factory
Doc Ref: 0123 EOTA MCCF 16/02/16

PLANIT
RESTORING BALANCE

Appendix L – Hazard Checklist

Ground Engineering Hazard Check List

Job Nr: 034933 **Project: The Factory, Manchester**

Rev: 00 **Date: July 2016**

BUROHAPPOLD ENGINEERING

Ref No.	Hazard	Risk (Y/N?)					What action have you taken	Further action(s) required	Action Req'd By		
		C	P	H&S	E	S			Client	Des'nr	Cont'r
1.00	**Site Appraisal**										
1.01	Are access restrictions (e.g. site access, turning circles in the vicinity of the site, or congested sites) likely to cause restrictions in the ability to access the site for ground investigation purposes? *(Refer to BH CDM Policy hazard note 6.4)*	N	Y	N	N	Y	Access likely to be restricted in western portion of site (Network Rail/Skanska) and within MoSI land.	Contractor/Buro Happold to liaise with landowner(s) prior to start of/during works.	Y	Y	Y
1.02	Is there restricted space at the perimeter of the site boundary for required investigation?	N	N	N	N	Y	Access restrictions TBC.	Contractor to liaise with landowner(s) prior to start of/during works. Site meeting proposed prior to GI works commencing to agree exploratory hole positions.	-	Y	Y
1.03	Could the location of investigations result in undermining or cause vibration to existing structures resulting in structural collapse or damage?	N	N	Y	Y	Y	No exploratory holes (except hand excavated pits with lightweight machine assist) to be undertaken within a reasonable distance of existing structures.	Contractor method statements to take account of associate risk.	-	-	Y
1.04	Will any ground investigation works impede the means of escape from occupied or nearby premises or restrict access for emergency vehicles during construction?	N	N	N	N	N	Exploratory holes located where they will not block site entrances, access roads or fire escape routes from buildings.	-	-	-	-
1.05	Are there any overhead power lines crossing the site?	N	N	N	N	N	None anticipated	-	-	-	-
1.06	Will working over or adjacent to water be required at the site?	N	N	N	N	N	River Irwell to the west of the Site. Any exploratory holes in this area of the site have been located away from the river.	Contractor method statements to take account of associate risk.	-	-	Y
1.07	Will rope access or work on or adjacent to steep slopes be required at the site?	N	N	N	N	N	None anticipated	-	-	-	-
1.08	Will working in confined spaces be required?	N	N	N	N	N	None anticipated	-	-	-	-
1.09	Is the site in an area where damage to plant and/or equipment stored on site needs to be considered?	Y	N	N	N	Y	All working areas must be fenced off and locked if equipment is to be left on site overnight.	Secure container to be used if required by contactor.	-	-	Y

Risk Categories: C = Cost; P = Programme; H&S = Health & Safety; E = Environmental and S = Serviceability

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved

Ground Engineering Hazard Check List

Job Nr: 034933 **Project: The Factory, Manchester**

Rev: 00 **Date: July 2016**

BUROHAPPOLD ENGINEERING

Ref No.	Hazard	Risk (Y/N?)					What action have you taken	Further action(s) required	Action Req'd By		
		C	P	H&S	E	S			Client	Des'nr	Cont'r
1.10	Are munitions or unexploded ordnance present or likely to be present on site?	N	Y	Y	N	Y	The Zetica UXO Map states moderate risk. The PLANIT Explosive Ordnance Threat Assessment (EOTA) concludes that UXO management is required in the southwest portion of the site.	During the GI, on site presence from suitable UXO company is required to clear all exploratory hole positions to bedrock (southwest portion of site only).	-	Y	Y
1.11	Is there the presence or likely presence of tunnels or mineshafts?	N	N	N	N	N	None envisaged.	-	-	-	-
1.12	Is the site in an area that has or is likely to have experienced mining activities?	N	N	N	N	N	None envisaged.	-	-	-	-
1.13	Is the site in an area that is likely to contain natural cavities, voids or solution features?	N	N	N	N	N	None envisaged	-	-	-	-
1.14	Is there a possibility that existing structures, below or above ground, could contain or incorporate asbestos or other suspect harmful chemicals? *(Refer to BH CDM Policy hazard note 6.3)*	N	N	Y	Y	N	Buildings demolished on site between the 1950s and the 1990s may have contained asbestos.	Asbestos testing during ground investigation.	-	-	Y
1.15	Does the site history indicate that the site is likely to be contaminated either above or below ground?	Y	N	Y	Y	N	The site is in an industrial area of Manchester City Centre which has previously been used for a variety of industrial uses. Chemical testing during site specific ground investigation will be required.	Chemical testing during site specific ground investigation will be required.	-	-	Y
1.16	Is there the presence or likely presence of below ground fuel tanks that may or may not have fuel in them?	N	N	Y	Y	Y	Potential presence due to the industrial nature of the area.	Chemical testing during site specific ground investigation will be required.	-	-	Y
1.17	Are there likely to be any harmful or explosive gases below ground?	N	N	Y	Y	N	Ground gas monitoring to take place as part of site specific ground investigation.	-	-	-	Y
1.18	Are there gas storage tanks on or near the site?	N	N	Y	Y	Y	Potential presence due to the industrial nature of the area.	Chemical testing during site specific ground investigation will be required.	-	-	Y
1.19	Are there any live services within the existing structures and or on the site? Have these been adequately identified especially next to live services? *(Refer to BH CDM Policy hazard note 6.5)*	N	Y	Y	N	Y	Available service plans to be provided to contractor.	Contractor to review service information provided and provide for CAT scans, manhole lifting and complete hand dug inspection pits.	-	-	Y
1.20	Are there any legal or other constraints to obtaining access to work on boundary walls from the neighbours' side?	N	Y	N	N	Y	Network Rail / Skanska compound (area to the west of Water Street) currently inaccessible.	Design team to liaise with Network Rail / Skanska for existing GI data in that area; future GI mobilisation may be required once access is available.	-	Y	Y

Risk Categories: C = Cost; P = Programme; H&S = Health & Safety; E = Environmental and S = Serviceability

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved

Ground Engineering Hazard Check List

Job Nr: 034933 **Project: The Factory, Manchester**

Rev: 00 **Date: July 2016**

BUROHAPPOLD ENGINEERING

Ref No.	Hazard	Risk (Y/N?)					What action have you taken	Further action(s) required	Action Req'd By		
		C	P	H&S	E	S			Client	Des'nr	Cont'r
1.21	Are there any permits or consents required for ground investigation work, e.g. hot springs	N	N	N	N	N	None required.	-	-	-	-
1.22	Will work on the site require access to or be adjacent to land owned by Network Rail?	N	N	N	N	N	None required.	-	-	-	-
1.23	Is there the presence or likely presence of below ground structures on site i.e. basements?	N	Y	Y	N	N	Infilled basements and concrete/brick obstructions likely due to the development history of the site.	Provision of breaker required for inspection pits.	-	Y	Y
1.24	Is there the presence or likely presence of deep chambers?	N	N	N	N	N	None required.	-	-	-	-
1.25	Is there the presence or likely presence of tunnels below or near the site?	N	N	N	N	N	None required.	-	-	-	-
1.26	Will ground investigation result in excessive noise, dust, vibration which could affect adjacent properties such as schools and hospitals etc.?	N	N	N	N	N	None required.	-	-	-	-
1.27	Are there any site issues with regard to water e.g. flooding, tidal and ground water?	N	N	N	N	N	None required.	-	-	-	-
1.28	Are there likely to be any archaeological features on site?	Y	Y	N	N	Y	Archaeological remains likely due to the development history of the site. A scheme specific archaeological investigation may be required.	-	-	-	-
1.29	Are there likely to be any ecological features on site?	N	N	N	N	N	Ecology survey required.	-	-	-	-

Risk Categories: C = Cost; P = Programme; H&S = Health & Safety; E = Environmental and S = Serviceability

Copyright © 1976 - 2016 BuroHappold Engineering. All Rights Reserved

George Mitchell

Buro Happold Limited

2 Brewery Place

Brewery Wharf

Leeds

LS10 1NE

UK

T: +44 (0)113 204 2200

F: +44 (0)870 787 4144

Email: George.Mitchell@BuroHappold.com

THE FACTORY

FACTUAL REPORT ON GROUND INVESTIGATION

Report No A6053-16

October 2016

Carried out for:
Manchester City Council
Town Hall
Albert Square
Manchester
M60 2LA

Engineer:
Buro Happold Limited
2 Brewery Place
Brewery Wharf
Leeds
LS10 1NE

.esg.co.uk

ESG
Askern Road, Carcroft
Doncaster DN6 8DG
Tel: +44 (0) 1302 723456
email: geo.doncaster@esg.co.uk

Report No A6053-16

October 2016

Issue No Date	Status	Prepared by	Checked by	Approved by
1 Sept 2016	Draft report	NAME and QUALIFICATIONS P Hepton BSc PhD	NAME and QUALIFICATIONS T Clifford BEng	NAME and QUALIFICATIONS T Clifford BEng
		SIGNATURE	SIGNATURE	SIGNATURE
1 Oct 2016	Final report	NAME and QUALIFICATIONS P Hepton BSc PhD	NAME and QUALIFICATIONS P Hepton BSc PhD	NAME and QUALIFICATIONS T Clifford BEng
		SIGNATURE	SIGNATURE	SIGNATURE
		NAME and QUALIFICATIONS	NAME and QUALIFICATIONS	NAME and QUALIFICATIONS
		SIGNATURE	SIGNATURE	SIGNATURE

This Report has been prepared by ESG Limited (“ESGL”) with all reasonable skill and care, within the terms and conditions of the contract between ESGL and the Client (“Contract”) and within the limitations of the resources devoted to it by agreement with the Client. Any reliance upon the Report is subject to the Contract terms and conditions.

This Report is confidential between the Client and ESGL. ESGL accepts no responsibility whatsoever to third parties to whom this document, or any part thereof, is made known. Any such party relies upon the Report at their own risk. The Contracts (Rights of Third Parties) Act 1999 does not apply to this Report nor the Contract and the provisions of the said Act are hereby excluded.

This Report shall not be used for engineering or contractual purposes unless signed above by the author, checker and the approver for and on behalf of ESGL and unless the Report status is ‘Final’.

Unless specifically assigned or transferred within the terms and conditions of the Contract, ESGL asserts and retains all Copyright and other Intellectual Property Rights in and over the Report and its contents. The Report may not be copied or reproduced, in whole or in part, without the written authorisation from ESGL. ESGL shall not be liable for any use of the Report for any purpose other than that for which it was originally prepared.

Whilst every effort has been made to ensure the accuracy of the data supplied and any analysis interpretation derived from it, the possibility exists of variations in the ground and groundwater conditions around and between the exploratory positions. No liability can be accepted for any such variations in these conditions. Furthermore, any recommendations are specific to the development as detailed in this Report and no liability will be accepted should they be used for the design of alternative schemes without prior consultant with ESGL

CONTENTS

Page

1 INTRODUCTION....................1

2 SITE SETTING....................1

2.1 Location and Description....................1
2.2 Published Geology....................2

3 FIELDWORK....................2

3.1 General....................2
3.2 Exploratory Holes....................2
3.3 Groundwater and Gas Monitoring....................3
3.4 Structural and Geophysical Surveying....................3

4 LABORATORY TESTING....................4

4.1 Geotechnical Testing....................4
4.2 Geoenvironmental Testing....................4

REFERENCES....................5

APPENDIX A FIGURES AND DRAWINGS

APPENDIX B EXPLORATORY HOLE RECORDS

APPENDIX C INSTRUMENTATION AND MONITORING

APPENDIX D GEOTECHNICAL LABORATORY TEST RESULTS

APPENDIX E GEOENVIRONMENTAL LABORATORY TEST RESULTS

APPENDIX F PHOTOGRAPHS

APPENDIX G STRUCTURAL SURVEY

APPENDIX H GPR SURVEY

1 INTRODUCTION

In April 2016 ESG was commissioned by Buro Happold Limited, on behalf of Manchester City Council, to carry out a ground investigation in the centre of Manchester, at a site referred to as The Factory. The investigation was required to obtain geotechnical, structural and geoenvironmental information for proposed development of the site.

The scope of the investigation was specified by Buro Happold Limited and comprised cable percussion and rotary drilled boreholes, dynamic sampling, machine and hand excavated trial pits, in situ testing, laboratory testing and monitoring. The investigation was performed in accordance with the contract specification, and the general requirements of BS 5930 (2015), BS EN 1997-2 (2007), BS EN ISO 22475-1 (2006) and other relevant related standards identified below. The fieldwork took place between 23 June and 12 July 2016.

This report presents the factual records of the fieldwork and laboratory testing. The information is also presented as digital data as defined in AGS (2010).

2 SITE SETTING

2.1 Location and Description

The site is located in Manchester City Centre, approximately 550 m northwest of Deansgate Railway Station, see Site Location Plan in Appendix A, and centred at National Grid reference SJ 830 979. It covers an area of approximately 0.7 hectares, comprising areas of hardstanding either side of Water Street and railway arches underlying the Starlight Theatre shed building.

The site is bounded to the north by the old Granada Television Centre, to the south/southeast by the Museum of Science and Industry (MoSI) (with railway lines and Liverpool Road beyond), to the west/northwest by Princes Bridge and a car park/Skanska site (with the River Irwell beyond) and to the east by the Bonded Warehouse (5 storey building) (with Granada Television Centre land beyond).

2.2 Published Geology

The published geological map for the area, BGS Sheet 85 (2011), and the BGS Geology of Britain Viewer (2016) show the site located on superficial deposits comprising Alluvium and Glacial Till, overlying bedrock of the Chester Pebble Beds Formation, part of the Sherwood Sandstone Group. Made ground associated with previous development is understood to be present.

3 FIELDWORK

3.1 General

The fieldwork was carried out in general accordance with BS 5930 (2015), BS EN 1997-2 (2007) and BS EN ISO 22475-1 (2006).

The exploratory hole locations were selected by Buro Happold Limited and set out from local features. The co-ordinates and ground levels were surveyed by ESG to National Grid and Ordnance Datum. The exploratory hole locations are shown on the Site Plan in Appendix A.

The location of trial pit HTP03 was not accessible at the time of the surveying, therefore the approximate location has been presented on the Site Plan, along with a suitable note. No co-ordinates are presented on the trial pit log for HTP03.

3.2 Exploratory Holes

The exploratory holes are listed in the following table.

TABLE 1 : SUMMARY OF EXPLORATORY HOLES

TYPE	QUANTITY	MAXIMUM DEPTH (m)	REMARKS
Cable Percussion Boring extended by Rotary Core Drilling/Open Hole Drilling	3	25.60	BH01 to BH03
Dynamic (Windowless) Sampling	11	4.32	WS01 to WS09, WS01A, WS03A
Trial Pits – hand dug	8	2.90	HTP01 to HTP08
Trial Pits – machine dug	5	4.00	MTP03 to MTP06, MTP03A

The exploratory hole logs are presented in Appendix B. These provide information including the equipment and methods used, samples taken, tests carried out, water observations and descriptions of the strata encountered. Explanation of the terms and abbreviations used on the logs is given in the Key to Exploratory Hole Records in Appendix B, together with other explanatory information. The logging of soil and rock materials is in accordance with BS EN ISO 14688-1+A1 (2013) and BS EN ISO 14689-1 (2003) respectively, as amplified by BS 5930 (2015). Standard penetration tests (SPT) in the boreholes were carried out in accordance with BS EN ISO 22476-3+A1 (2011) and the SPT hammer energy ratio certificates are included in Appendix B. The SPT results are presented on the logs as uncorrected N values.

Photographs of the trial pits and rotary drilled core are presented in Appendix F. No photographic record is available for MTP03A; a note has been included on the relevant page in Appendix F.

On completion of the fieldwork geotechnical samples were transported to the Doncaster office of ESG for temporary retention, with those required for testing being transferred to the ESG laboratory there. Geoenvironmental samples were transported from site directly to the ESG laboratory at Bretby, Burton-on-Trent.

3.3 Groundwater and Gas Monitoring

Instrumentation installed in the exploratory holes for groundwater and gas monitoring are shown on the logs and summarised in Appendix C. Records of monitoring carried out by ESG following the fieldwork period are presented in Appendix C.

3.4 Structural and Geophysical Surveying

Material investigation of the existing masonry arches was carried out by ESG and is reported separately in Appendix G.

A geophysical survey using ground penetrating radar (GPR) was carried out by ESG for investigation of the brick arch thickness. This is reported separately in Appendix H.

4 LABORATORY TESTING

4.1 Geotechnical Testing

Geotechnical laboratory testing was scheduled by Buro Happold Limited and was carried out in accordance with BS 1377 (1990) and ISRM (2007) unless otherwise stated. The testing is summarised below and the results are presented in Appendix D.

TABLE 2 : SUMMARY OF GEOTECHNICAL LABORATORY TESTING

TYPE	REMARKS
Moisture Content Determination	6 No
Atterberg Limit Determination	5 No
Particle Size Distribution Analysis	5 No
Dry Density / Moisture Content Relationship	3 No (4.5 kg heavy compaction)
Point Load Index Testing	32 No
Uniaxial Compressive Strength of Rock	5 No
pH and Water Soluble Sulphate Content of Soils	15 No

4.2 Geoenvironmental Testing

Geoenvironmental laboratory testing was scheduled by Buro Happold Limited on selected soil samples recovered during the fieldwork, and water samples taken by ESG from the installations. The testing was carried out by the ESG laboratory at Burton-on-Trent. The results are presented in Appendix E.

REFERENCES

AGS : 2010 : Electronic transfer of geotechnical and geoenvironmental data (Edition 4 including Addendum 3. October 2011). Association of Geotechnical and Geoenvironmental Specialists.

BGS England and Wales Sheet 85 : 2011 : Manchester. 1:50000 geological map (Bedrock and Superficials). British Geological Survey.

BGS Geology of Britain Viewer : 2015. www.bgs.ac.uk. British Geological Survey.

BS 1377 : 1990 : Methods of test for soils for civil engineering purposes. British Standards Institution.

BS 5930 : 2015 : Code of practice for ground investigations. British Standards Institution.

BS EN 1997-2 : 2007 : Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. British Standards Institution.

BS EN ISO 14688-1:2002+A1 : 2013 : Geotechnical investigation and testing - Identification and classification of soil - Part 1 Identification and description. British Standards Institution.

BS EN ISO 14688-2:2004+A1 : 2013 : Geotechnical investigation and testing - Identification and classification of soil - Part 2 Principles for a classification. British Standards Institution.

BS EN ISO 14689-1 : 2003 : Geotechnical investigation and testing - Identification and classification of rock - Part 1 Identification and description. British Standards Institution.

BS EN ISO 22475-1 : 2006 : Geotechnical investigation and testing – Sampling methods and groundwater measurements - Part 1 Technical principles for execution. British Standards Institution.

BS EN ISO 22476-3:2005+A1 : 2011 : Geotechnical investigation and testing - Field testing - Part 3 Standard penetration test. British Standards Institution.

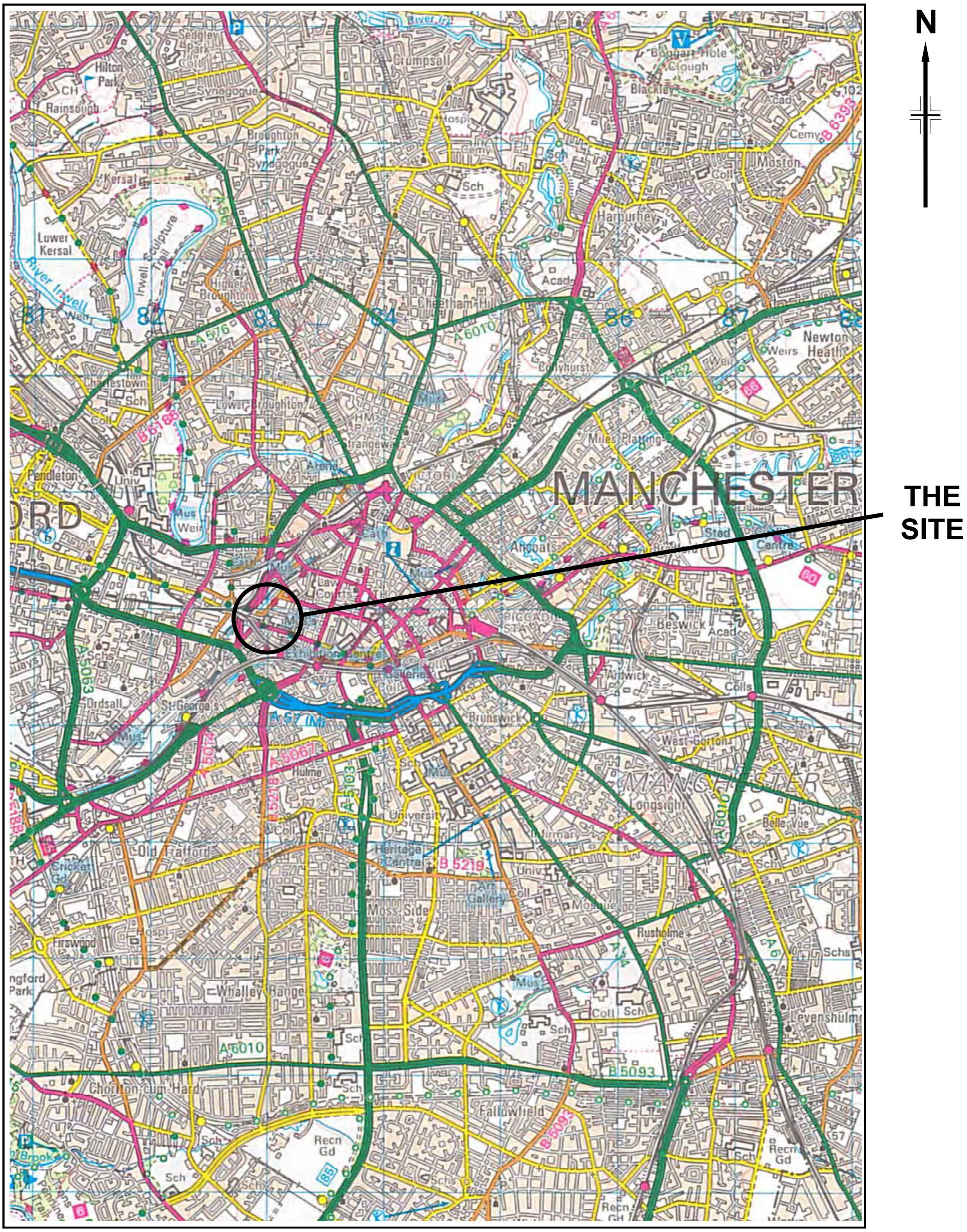
ISRM : 2007 : The Complete ISRM Suggested Methods for Rock Characterisation, Testing and Monitoring (1974-2006). Commission on Testing Methods, International Society for Rock Mechanics (Editors Ulusay R & Hudson JA).

APPENDIX A

FIGURES AND DRAWINGS

Site Location Plan	A1
Site Plan	A2

Site Location Plan


N
THE SITE
MANCHESTER
Cheetham Hill
Lower Broughton
Broughton
Crumpsall
Harpurhey
Collyhurst
Miles Platting
Newton Heath
Moston
Blackley
Kersal
Lower Kersal
Charlestown
Pendleton
Ordsall
St George's
Exhibition Centre
Piccadilly
Ancoats
Beswick
Bradford
West Gorton
Brunswick
Hulme
Old Trafford
Moss Side
Whalley Range
Rusholme
Longsight
Belle Vue
Levenshulme
Fallowfield
Firswood
Chorlton-cum-Hardy
A57 (M)
A6010
A5103
A5067
A576
A62
B5219
B5093

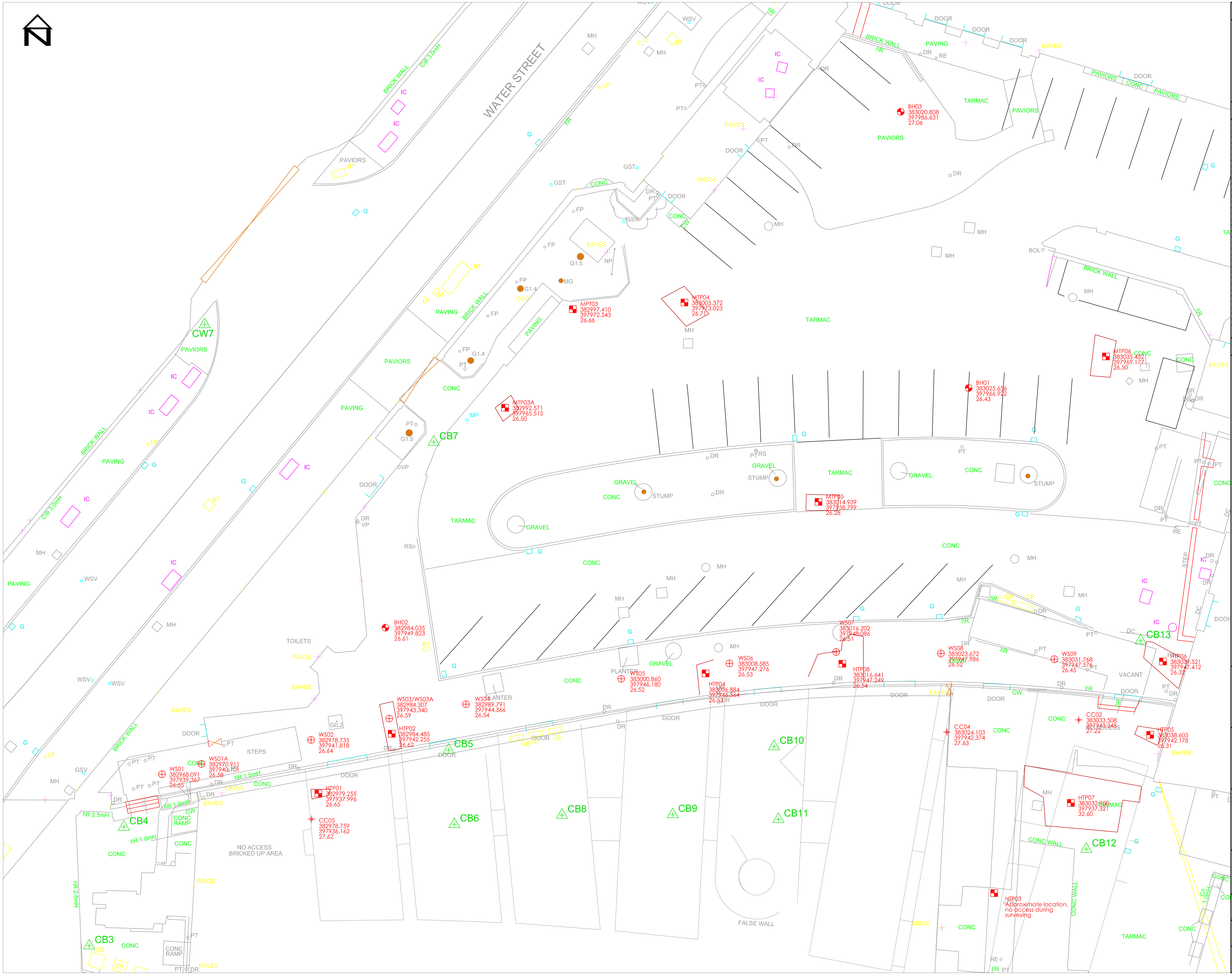
Reproduced from the 2013 Ordnance Survey 1:50 000 scale Landranger map No 109 by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright, Environmental Services Group Limited. All rights reserved. Licence Number 100006060

Notes:
Scale 1:50 000

Project THE FACTORY, MANCHESTER
Project No. A6053-16
Carried out for Buro Happold Limited

Figure
A1

Sheet 1 of 1


WATER STREET
BRICK WALL
PAVIORS
PAVING
TARMAC
CONC
GRAVEL
STUMP
TOILETS
STEPS
PLANTER
VACANT
FALSE WALL
NO ACCESS
BRICKED UP AREA
CONC RAMP
CONC WALL
CB3
CB4
CB5
CB6
CB7
CB8
CB9
CB10
CB11
CB12
CB13
CW7
BH01 383025.656 397966.922 26.43
BH02 382984.035 397949.823 26.61
BH03 383020.808 397986.631 27.06
MPT03 382997.410 397972.543 26.66
MTP03A 382992.571 397965.515 26.50
MTP04 383005.372 397973.023 26.71
MTP05 383014.939 397958.799 26.28
MTP06 383035.452 397969.177 26.50
HTP01 382979.255 397937.996 26.65
HTP02 382984.485 397942.255 26.62
HTP03 Approximate location, no access during surveying
HTP04 383006.884 397946.564 26.53
HTP05 383038.605 397942.178 26.31
HTP06 383039.521 397947.412 26.32
HTP07 383032.950 397937.321 32.60
HTP08 383016.641 397947.249 26.54
CC02 383033.508 397943.245 27.22
CC04 383024.103 397942.374 27.63
CC05 382978.759 397936.162 27.62
WS01 382968.091 397939.367 26.55
WS01A 382970.911 397940.101 26.58
WS02 382978.735 397941.818 26.64
WS03/WS03A 382984.307 397943.340 26.59
WS04 382989.791 397944.366 26.54
WS05 383000.860 397946.180 26.52
WS06 383008.585 397947.276 26.53
WS07 383016.202 397948.086 26.51
WS08 383023.672 397947.986 26.52
WS09 383031.768 397947.576 26.45

CONTROL & DATUM INFORMATION

Co-ordinates and levels are based upon OSGB 1936 National Grid (OSGB36) and Ordnance Survey Datum Newlyn (ODN).

They are derived using realtime on site GPS survey, that utilises the National Grid Transformation OSTN15GB and the National Geoid Model OSGM15GB.

The data obtained for use in this drawing involved the use of realtime GPS survey and total station survey.

COODINATES

Ground Investigation Co-ordinates (OSGM15GB-OSTN15GB)

Reference	East	North	Elevation	Description
BH01	383025.656	397966.922	26.43	Borehole
BH02	382984.035	397949.823	26.61	Borehole
BH03	383020.808	397986.631	27.06	Borehole
CC02	383033.508	397943.245	27.22	Wall Core
CC04	383024.103	397942.374	27.63	Wall Core
CC05	382978.759	397936.162	27.62	Wall Core
HTP01	382979.255	397937.996	26.65	Trial Pit
HTP02	382984.485	397942.255	26.62	Trial Pit
HTP03	Unable to suvery			
HTP04	383006.884	397946.564	26.53	Trial Pit
HTP05	383038.605	397942.178	26.31	Trial Pit
HTP06	383039.521	397947.412	26.32	Trial Pit
HTP07	383032.950	397937.321	32.60	Trial Pit
HTP08	383016.641	397947.249	26.54	Trial Pit
MPT03	382997.410	397972.543	26.66	Trial Pit
MTP03A	382992.571	397965.515	26.50	Trial Pit
MTP04	383005.372	397973.023	26.71	Trial Pit
MTP05	383014.939	397958.799	26.28	Trial Pit
MTP06	383035.452	397969.177	26.50	Trial Pit
WS01	382968.091	397939.367	26.55	Window Sample
WS01A	382970.911	397940.101	26.58	Window Sample
WS02	382978.735	397941.818	26.64	Window Sample
WS03/WS03A	382984.307	397943.340	26.59	Window Sample
WS04	382989.791	397944.366	26.54	Window Sample
WS05	383000.860	397946.180	26.52	Window Sample
WS06	383008.585	397947.276	26.53	Window Sample
WS07	383016.202	397948.086	26.51	Window Sample
WS08	383023.672	397947.986	26.52	Window Sample
WS09	383031.768	397947.576	26.45	Window Sample

LEGEND TO SYMBOLS

◐	Denotes Borehole Location
▚	Denotes Trial Pit Location
⌖	Denotes Wall Core Location
⊕	Denotes Window Sample Location

Scale: 1:125

0 12.5m 25 50 75 100

Title

SITE PLAN

Project

The Factory,
Manchester

Client

Buro Happold Limited

Date	Drawn By	Approv. By
29.09.16	HSL	TC

Sheet Size	Scale	Project No
A1	1:125	A6053-16

Drawing No	Rev
A2	0

APPENDIX B

EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records	Key
SPT Hammer Energy Ratio Reports	SPT Hammer Refs: ACE2 and 0047
Dynamic Probing Rig Energy Ratio Report	DP Rig Ref: Dart343
Exploratory Hole Summary	Table B1
Borehole Logs	BH01 to BH03
Dynamic (Windowless) Sampler Hole Logs	WS01 to WS09, WS01A and WS03A
Trial Pit Logs – Machine Excavated	MTP03 to MTP06, and MTP03A
Trial Pit Logs – Hand Excavated	HTP01 to HTP08

Key to Exploratory Hole Records

SAMPLES

Undisturbed

U	Driven tube sample	nominally 100 mm diameter and full recovery unless otherwise stated
UT	Driven thin wall tube sample	
TW	Pushed thin wall tube sample	
P	Pushed piston sample	
L	Liner sample (from Windowless or similar sampler), full recovery unless otherwise stated	
CBR	CBR mould sample	
BLK	Block sample	
CS	Core sample (from rotary core) taken for laboratory testing	
AMAL	Amalgamated sample	

Disturbed

D	Small sample
B	Bulk sample

Other

W	Water sample
G	Gas sample
	Environmental chemistry samples (in more than one container where appropriate)
ES	Soil sample
EW	Water sample

Comments Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that attempt was made to take a tube sample, however, there was no recovery.

Monitoring samples taken after completion of hole construction are not shown on the exploratory hole logs.

TESTS

SPT S or SPT C	Standard Penetration Test, open shoe (S) or solid cone (C)

The Standard Penetration Test is defined in BS EN ISO 22476-3:2005+A1:2011. The incremental blow counts are given in the Field Records column; each increment is 75 mm unless stated otherwise and any penetration under self weight in mm (SW) is noted. Where the full 300 mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach 50 the total blow count beyond the seating drive is given (without the N = prefix).

IV	*in situ* Vane shear strength, peak (p) and remoulded (r)
HV	Hand vane shear strength, peak (p) and remoulded (r)
PP	Pocket penetrometer test, converted to shear strength
KFH, KRH, KPI	Permeability tests (KFH = falling head, KRH = rising head; KPI = packer inflow); results provided in Field Records column (one value per stage for packer tests)

DRILLING RECORDS

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930:2015

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
If	Fracture spacing, mm. Minimum, typical and maximum spacings are presented. The term non-intact (NI) is used where the core is fragmented.

Flush returns, estimated percentage with colour where relevant, are given in the Records column

CRF	Core recovered (length in m) in the following run
AZCL	Assessed zone of core loss
NR	Not recovered

GROUNDWATER

▼	Groundwater strike
▽	Groundwater level after standing period

Notes:
See report text for full references of standards

Project	**THE FACTORY**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Key

Key to Exploratory Hole Records

INSTALLATION

Standpipe/ piezometer

Details of standpipe/piezometer installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill.

The type of instrument installed is indicated by a code in the Legend column at the depth of the response zone:

SP	Standpipe
SPIE	Standpipe piezometer
PPIE	Pneumatic piezometer
EPIE	Electronic piezometer

Inclinometer or Slip Indicator

The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend column.

The type of instrument installed is indicated by a code in the Legend column at the base of the tubing:

ICE	Biaxial inclinometer
ICM	Inclinometer tubing for use with probe
SLIP	Slip indicator

Settlement Points or Pressure Cells

The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the Legend column.

The type of instrument installed is indicated by a code in the Legend column:

ESET	Electronic settlement cell/gauge
ETM	Magnetic extensometer settlement point
EPCE	Electronic embedment pressure cell
PPCE	Electronic push in pressure cell

INSTALLATION LEGENDS

A legend describing the installation is shown in the rightmost column. Legends used to describe the backfill materials as indicated below.

Arisings	Concrete	Grout	Bentonite	Sand	Gravel	Macadam
▒	░	▧	▨	⁘	○	▲

NOTES

1 Soils and rocks are described in accordance with BS EN ISO 14688-1:2002+A1:2013 and 14689-1:2003 respectively as amplified by BS 5930:2015.

2 For fine soils, consistency determined during description is reported for those strata where undisturbed samples are available. Where the logger considers that the sample may not be representative of the condition in situ, for whatever reason, the reported consistency is given in brackets. The reliability of the sample is indicated by Probably or Possibly as appropriate. Hence (Probably firm) indicates the logger is reasonably confident of the assessment, but (Possibly firm) means less certainty. Where the samples available are too disturbed to allow a reasonable assessment of the in situ condition, no consistency is given.

3 Evidence of the occurrence of very coarse particles (cobbles and boulders) is presented on the logs, however, because of their size in relation to the exploratory hole these records may not be fully representative of their size and frequency in the ground mass.

4 The declination of bedding and joints is given with respect to the normal to the core axis. Thus in a vertical borehole this will be the dip.

5 The assessment of SCR, RQD and Fracture Spacing excludes artificial fractures

6 Water level observations of discernible entries during the advancing of the exploratory hole are given at the foot of the log and in the Legend column. The term "none observed" is used where no discrete entries are identified although this does not necessarily indicate that the hole has not been advanced below groundwater level. Under certain conditions groundwater cannot be observed, for instance, drilling with water flush or overwater, or boring at a rate much faster than water can make its way into the borehole In addition, where appropriate, water levels in the hole at the time of recovering individual samples or carrying out in situ tests and at shift changes are given in the Records column.

7 The borehole logs present the results of Standard Penetration Tests recorded in the field without correction or interpretation. However, in certain ground conditions (eg high hydraulic head or where very coarse particles are present) some judgement may be necessary in considering whether the results are representative of in situ mass conditions.

Notes:
See report text for full references of standards

Project	**THE FACTORY**	**Key**
Project No.	**A6053-16**	Sheet 2 of 2
Carried out for	**Buro Happold Limited**	

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref:	ACE2
Test Date:	17/09/2015
Report Date:	9/17/2015
File Name:	ACE2.spt
Test Operator:	SH

Instrumented Rod Data

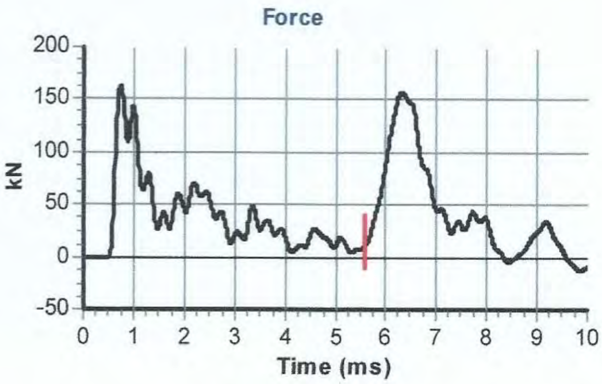
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.1
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	7079
Accelerometer No.2:	7080

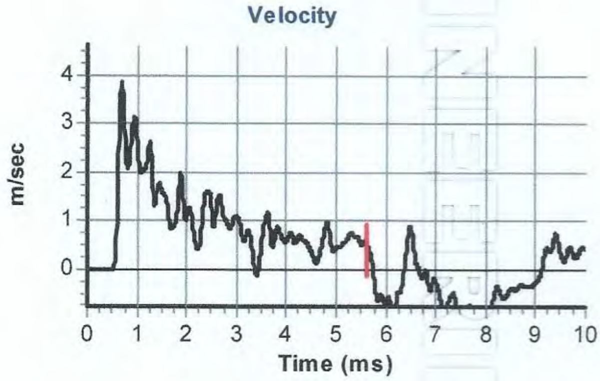
SPT Hammer Information

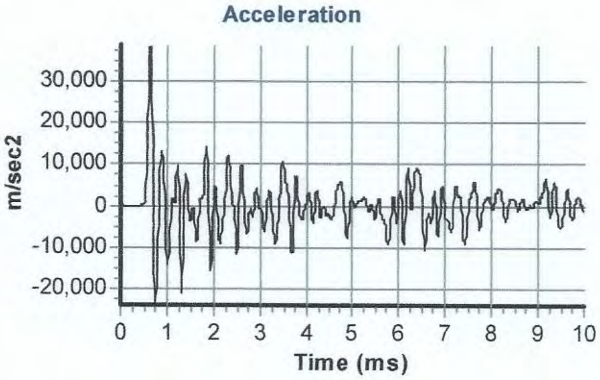
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	13.0

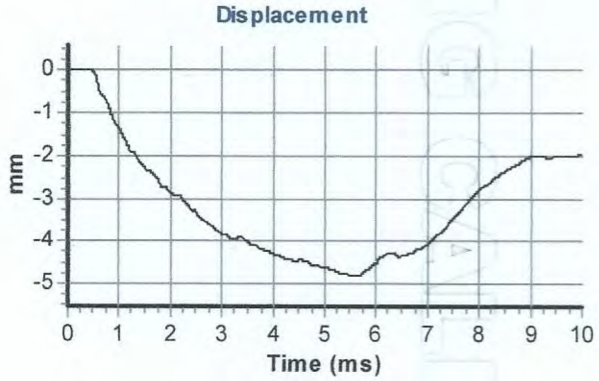
Comments / Location

CALIBRATION









Calculations

Area of Rod A (mm2):	918
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	333

Energy Ratio E_r (%): 70

Signed: S. HOWARTH
Title: FITTER

The recommended calibration interval is 12 months

ARCHWAY ENGINEERING CALIBRATION

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref:	0047
Test Date:	19/08/2015
Report Date:	8/19/2015
File Name:	0047.spt
Test Operator:	SH

Instrumented Rod Data

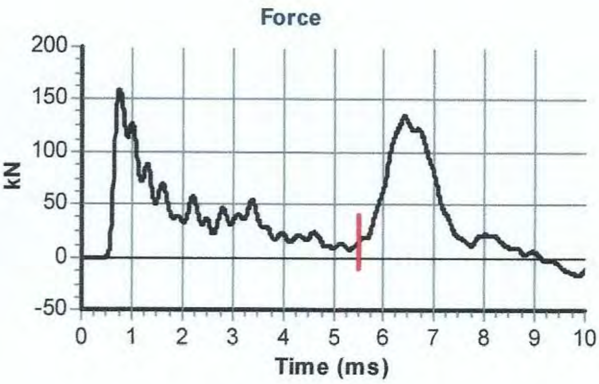
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.1
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	7079
Accelerometer No.2:	7080

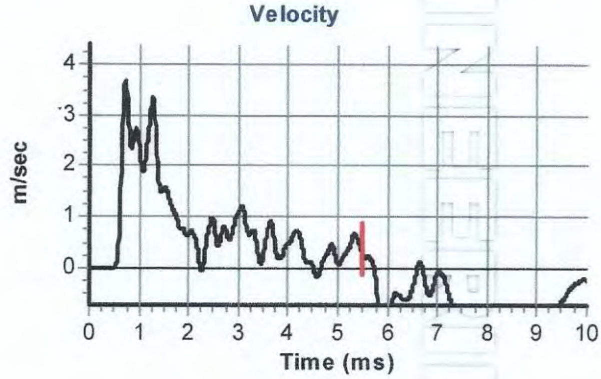
SPT Hammer Information

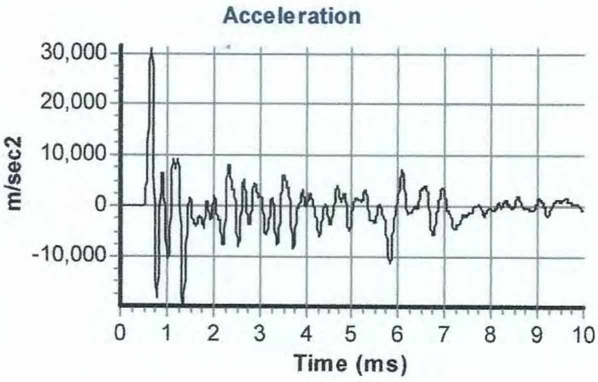
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	13.0

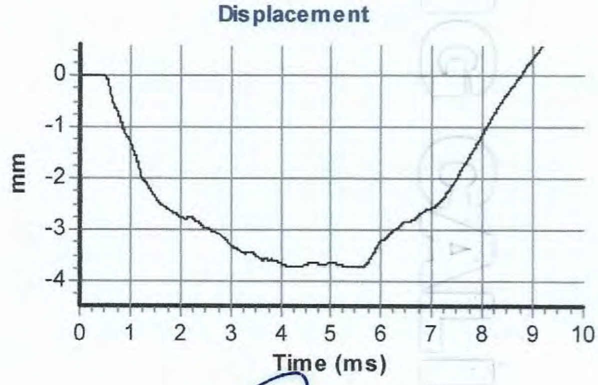
Comments / Location

CALIBRATION


Force


Velocity


Acceleration


Displacement

Calculations

Area of Rod A (mm2):	918
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	336

Energy Ratio E_r (%): 71

Signed: S. HOWARTH
Title: FITTER

The recommended calibration interval is 12 months

ARCHWAY ENGINEERING CALIBRATION

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING (UK) LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref: DART343
Test Date: 19/10/2015
Report Date: 12/10/2015
File Name: DART343 (2).spt
Test Operator: SH

Instrumented Rod Data

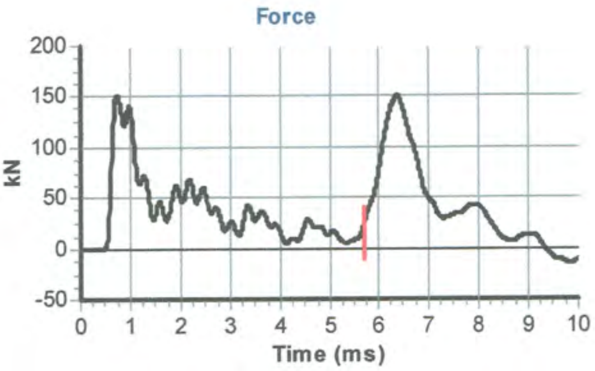
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.1
Assumed Modulus E_a (GPa):	200
Accelerometer No.1:	7079
Accelerometer No.2:	7080

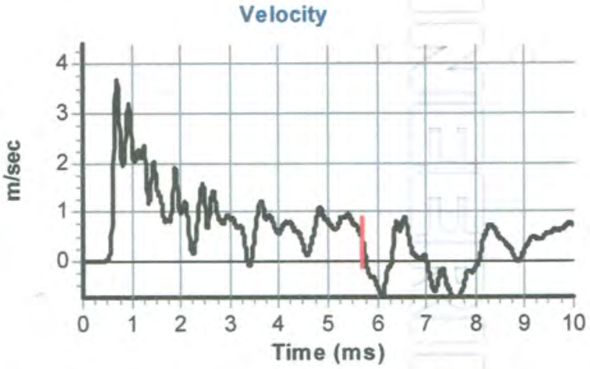
SPT Hammer Information

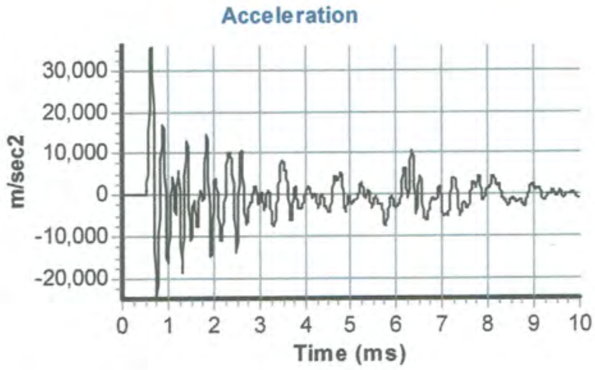
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	13.0

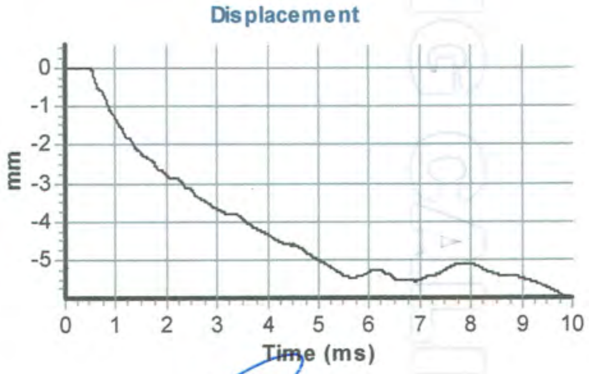
Comments / Location

CALIBRATION









Calculations

Area of Rod A (mm2):	918
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	322

Energy Ratio E_r (%): 68

Signed: S. HOWARTH
Title: FITTER

The recommended calibration interval is 12 months

ARCHWAY ENGINEERING CALIBRATION

Exploratory Hole Summary

Hole ID	Hole Type	Hole Depth, (m)	Eastings, (m)	Northings, (m)	Ground Level, (m AOD)	Installation	Hole Remarks
BH01	DS	4.20	383025.656	397966.922	26.43	19mm SPIE & 50mm SP	
	RC	25.60					
BH02	DS	4.20	382984.035	397949.823	26.61	19mm SPIE & 50mm SP	
	RC	25.20					
BH03	DS	4.20	383020.808	397986.631	27.06	19mm SPIE & 50mm SP	
	RC	24.90					
WS01	DS	1.62	382968.09	397939.37	26.55	-	
WS01A	DS	1.87	382970.91	397940.10	26.58	-	
WS02	DS	4.32	382978.74	397941.82	26.64	50mm SP	
WS03	DS	2.06	382984.31	397943.34	26.59	-	
WS03A	DS	2.58	382984.00	397943.00	26.60	-	Carried out adjacent to WS03, coordinates and GL are rounded
WS04	DS	4.17	382989.79	397944.37	26.54	-	
WS05	DS	4.17	383000.86	397946.18	26.52	-	
WS06	DS	3.50	383008.59	397947.28	26.53	50mm SP	
WS07	DS	2.88	383016.20	397948.09	26.51	-	
WS08	DS	3.79	383023.67	397947.99	26.52	50mm SP	
WS09	DS	3.85	383031.77	397947.58	26.45	-	
MTP03	MTP	2.50	382997.41	397972.54	26.66	-	
MTP03A	MTP	1.20	382992.57	397965.52	26.50	-	
MTP04	MTP	4.00	383005.37	397973.02	26.71	-	
MTP05	MTP	3.10	383014.94	397958.80	26.28	-	
MTP06	MTP	2.90	383035.45	397969.18	26.50	-	
HTP01	HTP	2.40	382979.26	397938.00	26.65	-	Excavated to expose foundations.
HTP02	HTP	1.20	382984.49	397942.26	26.62	-	Excavated to expose foundations. Terminated due to buried services in pit.
HTP03	HTP	2.20	-	-	-	-	Excavated to expose foundations. Approximate location shown on site plan, no access during survey works.
HTP04	HTP	2.90	383006.88	397946.56	26.53	-	Excavated to expose foundations.
HTP05	HTP	2.20	383038.61	397942.18	26.31	-	Excavated to expose foundations.
HTP06	HTP	2.30	383039.52	397947.41	26.32	-	Excavated to expose foundations.
HTP07	HTP	1.20	383032.95	397937.32	32.60	-	Excavated to expose crown of arch..
HTP08	HTP	2.20	383016.64	397947.25	26.54	-	Excavated to expose foundations.

Key:

Hole type:-		Installations:-	
DS	Dynamic Sampling	19mm SPIE	19mm diameter standpipe piezometer
RC	Rotary Coring	50mm SP	50mm diameter standpipe
MTP	Machine Dug Trial Pit		
HTP	Hand Dug Trial Pit		

Notes:

Project	THE FACTORY, MANCHESTER	**Table** B1
Project No.	A6053-16	
Carried out for	Buro Happold Limited	

Borehole Log

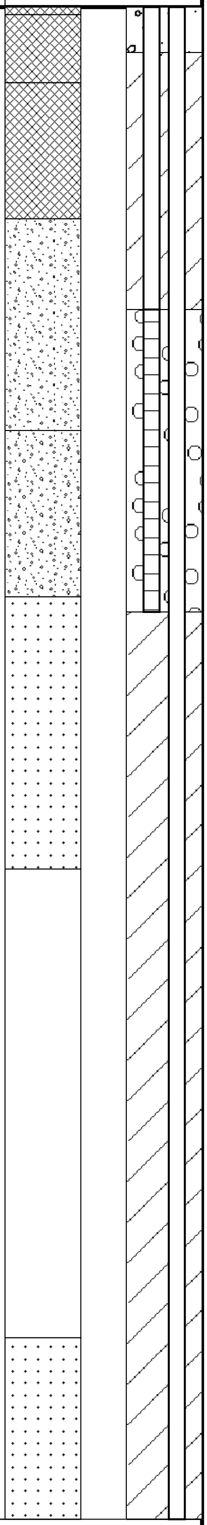
Drilled	PS	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	26.43 mOD
Logged	RS	26/06/2016	Beretta T46. Dynamic sampling and rotary core drilling (PWF size) using air mist flush. SPT Hammer ID: ACE2, Rod type: 2 3/8 REG.	0.00	25.60	121	4.20	**Coordinates (m)**	E 383025.66
Checked	TC	**End**						**National Grid**	N 397966.92
Approved	PH	04/07/2016							

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
			0.00-1.20 Hand excavated inspection pit.		
0.50	ES 1				
1.00	ES 2				
1.20 - 1.65 1.20 - 1.65	SPTS D 3		N=23 (1,2/4,7,8,4)	1.20	dry
				28/06/16 1.20	1800 dry
2.20 - 2.65 2.20 - 2.65	SPTS D 4		N=24 (8,9/9,5,5,5)		
				29/06/16 1.20	0800 dry
3.00	EW 1				
3.20 - 3.65 3.20 - 3.65	SPTS D 5		N=46 (8,11/8,10,13,15)	3.20	dry
4.20 - 4.42 4.20 - 4.65			50 (16,9 for 0mm/16,34 for 75mm) D 6	4.20	
4.20 - 5.20	30 0 0				
5.20 - 5.70 5.45 - 5.54	100 52 20		CS 11		
5.70 - 6.20	0 0 0				
			Flush: 4.20 - 8.20 Air/mist 100%		
6.20 - 7.20 6.70 - 6.98	0 0 0		SPTS 50 (10,15 for 60mm/21,29 for 75mm)	4.20	
		NI NI NI			
7.20 - 7.44 7.20 - 7.50			SPTS 50 (8,13 for 7mm/18,26,6 for 5mm) D 7	4.20	
7.20 - 8.20 7.70 - 7.90	0 0 0		D 8		
				29/06/16 4.20	1800 7.72
8.20 - 8.49 8.20 - 8.50 8.20 - 8.70	0 0 0		SPTS 50 (11,6 for 70mm/14,36 for 68mm) D 9	30/06/16 4.20	0800 dry
8.70 - 8.99 8.70 - 9.00			SPTS 50 (11,14/23,27 for 70mm) D 10	4.20	
8.70 - 9.70 9.28 - 9.40 9.40 - 9.50 9.50 - 9.60	90 0 0		CS 12 CS 13 CS 14		

Strata Description

Main	Detail	Depth	Level	(Thickness)
Black MACADAM. (MADE GROUND)		0.05	+26.38	(0.05)
Greyish brown sandy angular to subrounded fine to coarse GRAVEL of mudstone, limestone and coal. (MADE GROUND)		0.50	+25.93	(0.45)
Soft greyish brown mottled brownish yellow sandy gravelly CLAY with low cobble content. Gravel is angular to subrounded fine to coarse of coal, clinker, brick, limestone, mudstone, sandstone and glass. Cobbles are subrounded of limestone. Locally sandy clayey gravel. (MADE GROUND)		1.40	+25.03	(0.90)
Medium dense dark brown gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone, mudstone and shale.	1.60-1.63 sandy clayey gravel 1.70-1.85 sandy clayey gravel	2.80	+23.63	(1.40)
Dense dark brown SAND AND GRAVEL. Gravel is subangular to rounded fine to coarse of granite, quartzite, sandstone, mudstone, coal and siltstone.		3.90	+22.53	(1.10)
ZONE OF MINIMAL CORE RECOVERY. Core loss presumed to be throughout stratum. Recovered material comprises extremely weak, locally very weak, reddish brown fine and medium grained SANDSTONE, Recovered as gravelly sand. (SHERWOOD SANDSTONE)		5.70	+20.73	(1.80)
ZONE OF NO CORE RECOVERY.	7.20-7.60 AZCL	8.80	+17.63	(3.10)
Extremely weak reddish brown fine and medium grained SANDSTSONE. Recovered as gravelly sand.				(1.90)



Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 13:15:52

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

BH01

Borehole Log

Drilled	PS	**Start**	26/06/2016
Logged	RS		
Checked	TC	**End**	
Approved	PH		04/07/2016

Equipment, Methods and Remarks

Beretta T46.
Dynamic sampling and rotary core drilling (PWF size) using air mist flush.
SPT Hammer ID: ACE2, Rod type: 2 3/8 REG.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
0.00	25.60	121	4.20

Ground Level	26.43 mOD
Coordinates (m)	E 383025.66
National Grid	N 397966.92

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
9.70 - 11.20	80 15 15				
10.50 - 10.60			CS 15		
10.98 - 11.20			CS 16		
11.20 - 12.70	100 44 36				
12.11 - 12.30			CS 17		
12.33 - 12.50		40 140 200	CS 18		
12.70 - 14.20	87 73 61				
13.51 - 13.68			CS 19		
14.20 - 15.70	87 59 46				
15.28 - 15.42			CS 20		
		NI 125 220			
15.70 - 17.20	93 44 44				
16.91 - 17.02			Flush: 8.20 - 25.60 Air/mist 90% CS 21	30/06/16 4.20	1800 1.05
				01/07/16 4.20	0800 2.95
17.20 - 18.70	74 49 43				
18.34 - 18.46			CS 22		
		NI 142 240			
18.70 - 20.10	100 59 32				

Strata Description

Main	Detail	Depth, Level (Thickness)
Very weak to weak thinly to medium bedded reddish brown fine and medium grained SANDSTONE. Discontinuities are: 1. Closely to medium spaced, subhorizontal, planar, undulating, smooth and rough with sand smearing on surface and local clay smearing (up to 3mm), loss of strength adjacent to fractures (5-20mm). 2. Subvertical, planar, smooth with sand smearing and local clay smearing (up to 2mm), loss of strength adjacent to fractures (10-30mm).	12.70-12.90 AZCL 14.20-14.40 AZCL 17.20-17.59 AZCL	10.70 +15.73 (14.90)

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 13:15:52

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

BH01

Sheet 2 of 3

Borehole Log

Drilled	PS	**Start**	26/06/2016
Logged	RS		
Checked	TC	**End**	04/07/2016
Approved	PH		

Equipment, Methods and Remarks

Beretta T46.
Dynamic sampling and rotary core drilling (PWF size) using air mist flush.
SPT Hammer ID: ACE2, Rod type: 2 3/8 REG.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
0.00	25.60	121	4.20

Ground Level	26.43 mOD
Coordinates (m)	E 383025.66
National Grid	N 397966.92

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
20.10 - 21.60	100 71 47				
				01/07/16 4.20	1800 2.94
				04/07/16 4.20	0800 2.90
21.60 - 23.10	73 44 39	30 115 320			
23.10 - 24.60	100 67 51				
24.60 - 25.60	60 26 17	NI 95 190			
				04/07/16 4.20	1800 2.90

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
	21.60-22.01 AZCL			
	24.60-25.00 AZCL			
		25.60 +0.83		
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 13:15:52

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

BH01

Sheet 3 of 3

Borehole Log

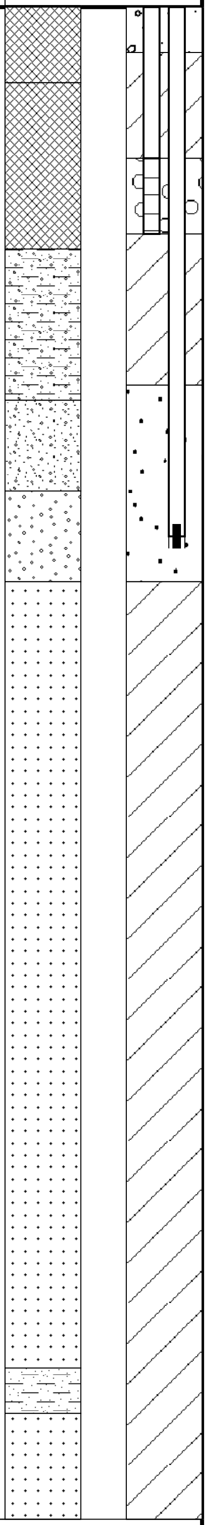
Drilled TW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	26.61 mOD
Logged RS	05/07/2016	Beretta T41. Dynamic sampling and rotary core drilling (PWF size) using water flush. SPT Hammer ID: 0047, Rod type: 2 3/8 REG.	1.20	25.20	121	4.90	**Coordinates (m)**	E 382984.04
Checked PH	**End**						**National Grid**	N 397949.82
Approved PH	07/07/2016							

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
			0.00-1.20 Hand excavated inspection pit.		
0.50 0.50 - 1.00	ES 1 B 2				
1.00 1.05 - 1.20 1.20 - 1.65 1.20 - 1.65	ES 3 B 4 SPTS D 6		N=5 (1,7/1,1,2,1)	1.20	1.00
1.50	ES 5				
2.00	HV		p 27kPa, r 13kPa		
2.20 - 2.65 2.20 - 2.65	SPTS D 7		N=27 (8,10/8,8,6,5)	2.20	1.00
3.20 - 3.65 3.20 - 3.65	SPTS D 8		N=39 (4,11/11,9,8,11)	3.20	1.00
				05/07/16 4.20	1800 1.00
4.20 - 4.65 4.20 - 4.65			N=24 (1,1/1,2,7,14) D 9	06/07/16 4.20	0800 1.70
4.20 - 4.90	43 0 0	NI NI NI			
			67 37 0		
4.90 - 5.20					
5.20 - 5.28			CS 10		
5.20 - 5.70	100 100 80				
6.44 - 6.63 5.70 - 7.20	100 86 66	30 125 200	CS 11		
7.47 - 7.55			CS 12		
7.74 - 8.01			CS 13		
7.20 - 8.70	100 93 68				
8.30 - 8.46			CS 14		
		NI 160 324			
8.70 - 10.20 9.50 - 9.70	100 55 39		CS 15		

Strata Description

Main	Detail	Depth	Level	(Thickness)
Light grey CONCRETE. 55-65% aggregate of subangular to rounded fine to coarse mudstone, quartzite, limestone and basalt gravels. 2-5% small and medium voids penetrating approximately 2-9mm. Rebar present at 0.09m. (MADE GROUND)	0.50 plastic sheet	0.50	+26.11	(0.50)
Dark brown slightly sandy clayey GRAVEL with low cobble content. Gravel is angular to subangular fine to coarse of brick, coal, sandstone, limestone, mudstone and quartzite. Cobbles are subangular of sandstone. (MADE GROUND)	1.30-1.60 slightly gravelly clay	1.60	+25.01	(1.10)
Soft to firm brownish yellow mottled grey slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine to medium of sandstone and mudstone.	2.20-2.40 gravel band 2.40-2.50 gravel band. Gravel is angular to subrounded fine to medium of mudstone and siltstone	2.60	+24.01	(1.00)
Brownish grey, becoming yellowish grey, gravelly medium to coarse SAND. Gravel is subangular to rounded fie to coarse of sandstone, quartzite and siltstone.. (GLACIOFLUVIAL)	3.00-3.05 greyish sandy clay band	3.20	+23.41	(0.60)
Light brown, light grey and light yellow GRAVEL. Gravel is subangular to rounded fine to coarse of quartz, sandstone, mudstone, quartzite, granite and calcite. (GLACIOFLUVIAL)	3.60-3.80 predominantly medium to coarse	3.80	+22.81	(0.60)
Very weak reddish brown to medium bedded medium grained micaceous SANDSTONE. Discontinuities are: 1. Bedded fractures are subhorizontal, very closely to medium spaced, tight, planar, smooth and rough with sand smeared up to 1-2mm. Loss of strength adjacent to fracture up to 5-12mm. 2. Joints are subvertical, widely spaced, tight, planar, smooth with sand smeared up to 3-6mm. Loss of strength adjacent to fracture up to 8-10mm.	8.55-8.60 NI as red gravel. Gravel is angular to subangular fine to coarse of sandstone 8.60 locally yellowish brown staining adjacent to bedding fracture penetrating 4mm	9.00	+17.61	(5.20)
Very soft orangish brown sandy CLAY.		9.30	+17.31	(0.30)
Very weak, varying to extremely weak, reddish brown thinly to medium bedded medium grained micaceous SANDSTONE. Discontinuities are: 1. Bedding fractures are subhorizontal, closely to	8.80-8.90 NI as red gravel. Gravel is angular to subangular fine to coarse of sandstone			



Hole continues on next sheet

Groundwater Entries				
No.	**Depth Strike**	**Remarks**	**Depth Sealed**	

Depth Related Remarks	
Depths (m)	**Remarks**

Chiselling Details		
Depths (m)	**Duration (mins)**	**Tools used**

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 13:15:53

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

BH02

Borehole Log

Drilled	TW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	26.61 mOD
Logged	RS	05/07/2016	Beretta T41. Dynamic sampling and rotary core drilling (PWF size) using water flush. SPT Hammer ID: 0047, Rod type: 2 3/8 REG.	1.20	25.20	121	4.90	**Coordinates (m)**	E 382984.04
Checked	PH	**End**						**National Grid**	N 397949.82
Approved	PH	07/07/2016							

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.53 - 10.68			CS 16		
10.20 - 11.70	100 71 65				
11.45 - 11.55			CS 17		
		NI 200 510	Flush: 4.20 - 19.20 Water 100%		
11.70 - 13.20 12.46 - 12.56	100 65 61		CS 18		
				06/07/16 4.90	1800 3.05
				07/07/16 4.90	0800 3.60
13.49 - 13.58			CS 19		
		NI 153 220			
13.20 - 14.70 14.03 - 14.14	93 71 46		CS 20		
14.70 - 16.20	100 93 65				
		60 190 480			
16.20 - 17.70	100 100 79				
18.08 - 18.17			CS 21		
17.70 - 19.20	100 85 68				
		NI 115 240			
19.20 - 19.45			CS 22		
	100 91 64				
19.20 - 20.70					

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfil
medium spaced, tight, planar and undulating, smooth and rough with sand smearing up to 3-6mm, local clay smearing up to 3mm and locally sand infilled up to 7-10mm. Occasional loss of strength adjacent to fractures up to 10-30mm. 2. Joints are subvertical, widely spaced, tight, planar, smooth with sand smearing up to 3-5mm, local clay smearing up to 2mm, local staining penetrating up to 5mm. Occasional loss of strength adjacent to fractures up to 5-10mm.	10.95-11.55 NI as red slightly silty fine and medium sand 12.05-12.15 infilled joint with slightly silty sand 12.70-12.90 NI cobbly gravel 13.20-13.30 AZCL 13.30-13.40 NI slightly silty sand 13.65-13.75 NI slightly silty sand 13.83-13.87 thinly laminated mudstone 14.25-14.35 NI slightly silty sand 14.40-14.70 locally yellowish brown staining penetrating up to 5mm adjacent to bedding fractures	(5.40) 14.70 +11.91		
Very weak to weak reddish brown thinly to medium bedded medium grained micaceous SANDSTONE. Discontinuities are: 1. Bedding fractures are subhorizontal, closely to medium spaced, tight, planar and undulating, smooth and rough with occasional sand smearing up to 2-5mm, local clay smearing up to 2-4mm and local clay infill 3-10mm. Occasional loss of strength up to 2-6mm. 2. Joints are subvertical, widely spaced, tight, planar, smooth with sand smearing up to 2-6mm. Occasional clay smearing up to 2-3mm. Local loss of strength up to 2-3mm.	20.00-20.10 NI	(10.50)		

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 13:15:53

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

BH02

Borehole Log

Drilled	TW	**Start**	
Logged	RS	05/07/2016	
Checked	PH	**End**	
Approved	PH	07/07/2016	

Equipment, Methods and Remarks

Beretta T41.
Dynamic sampling and rotary core drilling (PWF size) using water flush.
SPT Hammer ID: 0047, Rod type: 2 3/8 REG.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	25.20	121	4.90

Ground Level	26.61 mOD
Coordinates (m)	E 382984.04
National Grid	N 397949.82

Samples and Tests / Strata Description

Depth	TCR SCR RQD	If	Records/Samples	Date / Casing	Time / Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
							20.30-20.33 2No. very closely spaced subhorizontal bedded fractures 20.50-20.54 2No. very closely spaced, subhorizontal bedding fractures 20.70-20.75 AZCL 20.75-20.85 NI recovered as sandy clay			
20.70 - 22.20	97 89 77	NI 140 230								
			Flush: 19.20 - 25.20 Water 90%				22.00-22.60 thinly laminated with extremely closely spaced subhorizontal fractures 22.25-22.30 NI			
22.20 - 23.70	100 92 82						23.00-23.10 thinly laminated mudstone			
		NI 135 330								
23.70 - 25.20	100 87 42						24.90-25.00 NI			
				07/07/16 4.90	1800 3.50					
						END OF EXPLORATORY HOLE		25.20 +1.41		

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 13:15:53

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

BH02

Sheet 3 of 3

Borehole Log

Drilled	PS	**Start**	**Equipment, Methods and Remarks**		
Logged	TRB/JH	05/07/2016	Beretta T46. Dynamic sampling and rotary core drilling (PWF size) using water flush. SPT Hammer ID: ACE2, Rod type: 2 3/8 REG.		
Checked	PH	**End**			
Approved	PH	08/07/2016			

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	24.90	121	4.20

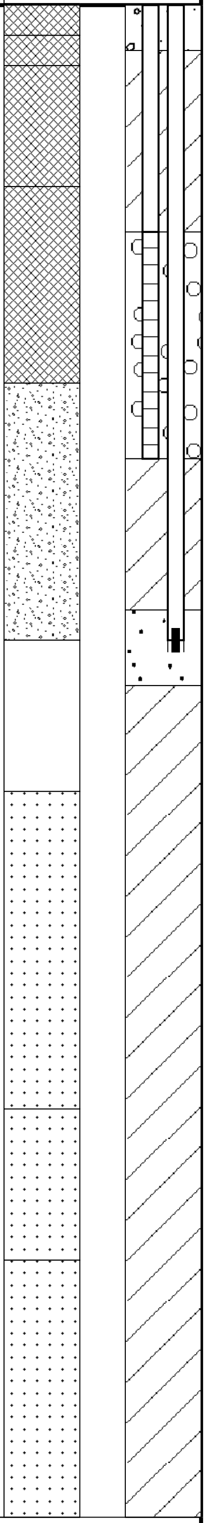
Ground Level	27.06 mOD
Coordinates (m)	E 383020.81
National Grid	N 397986.63

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
			0.00-1.20 Hand excavated inspection pit.		
0.30	ES 1				
0.50	ES 1A				
0.80	ES 2				
0.90	D 3				
1.00	ES 2A				
1.20 - 1.65	SPTS		N=7 (1,1/1,2,2,2)	1.20	2.96
1.20	D 3A				
2.20 - 2.65	SPTS		N=4 (1,1/1,1,1,1)	2.20	2.96
2.50	D 5A				
2.50	B 4A				
3.20 - 3.65	SPTS		N=37 (4,4/10,11,8,8)	3.20	2.96
3.50	B 6A				
4.20 - 4.65			N=39 (8,9/8,7,8,16)	4.20	2.96
4.20			B 8A		
4.20			D 7A		
4.20 - 5.20	0 0 0	NA NA NA			
5.20 - 5.50			SPTS 50 (10,14/11,39 for 75mm)	4.20	3.05
5.20 - 5.90	100 93 93				
				06/07/16 4.20	1800 2.96
6.00 - 6.20			CS 1	07/07/16 4.20	0800 3.05
5.90 - 7.40	93 86 80				
6.96 - 7.16			CS 2		
8.00 - 8.15			CS 3		
7.40 - 8.90	100 93 93				
9.00 - 9.13			CS 4		
8.90 - 10.40	100 97 80				

Strata Description

Main	Detail	Depth, Level (Thickness)		
Brick COBBLES, SAND and CONCRETE layers. (MADE GROUND)		0.20	+26.86	(0.20)
Black sandy organic CLAY with rare rootlets and wood fragments. (MADE GROUND)		0.40	+26.66	(0.20)
Soft light brown and yellowish brown sandy gravelly CLAY with medium cobble content. Gravel is angular to subangular fine to coarse of brick, coal, quartzite, limestone, mudstone, slate and timber. Cobbles are of brick. (MADE GROUND)		1.20	+25.86	(0.80)
Soft to firm dark brown slightly gravelly sandy SILT. Sand is fine to coarse. Gravel is fine to medium of brick, sandstone and ash. (MADE GROUND)		2.50	+24.56	(1.30)
Very dense orangish brown slightly gravelly fine SAND. Gravel is subrounded to well rounded fine of sandstone, limestone and chert.		4.20	+22.86	(1.70)
ZONE OF NO CORE RECOVERY.		5.20	+21.86	(1.00)
Very weak, varying to extremely weak, thickly bedded red medium grained SANDSTONE. Discontinuities are subhorizontal, widely spaced, rough, undulating, clean.		7.30	+19.76	(2.10)
Very weak thickly bedded speckled yellowish brown and red medium grained SANDSTONE. Discontinuities are subhorizontal, widely spaced, rough, planar.	7.60-7.61 2mm diameter quartz fragments embedded in sandstone	8.30	+18.76	(1.00)
Very weak to weak, locally extremely weak, medium to thickly bedded red medium grained SANDSTONE. Discontinuities are subhorizontal, medium to widely spaced, rough, planar, clean.	9.05-9.10 speckled yellowish brown and red sandstone 9.20-9.30 fractures are subvertical smooth planar			



Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 13:15:53

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

BH03

Borehole Log

Drilled	PS	**Start**	05/07/2016
Logged	TRB/JH		
Checked	PH	**End**	08/07/2016
Approved	PH		

Equipment, Methods and Remarks

Beretta T46.
Dynamic sampling and rotary core drilling (PWF size) using water flush.
SPT Hammer ID: ACE2, Rod type: 2 3/8 REG.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	24.90	121	4.20

Ground Level	27.06 mOD
Coordinates (m)	E 383020.81
National Grid	N 397986.63

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.25 - 10.40			CS 5		
10.70 - 10.90			CS 6		
11.00 - 11.20			CS 7		
10.40 - 11.90	100 87 60				
12.00 - 12.10			CS 8		
11.90 - 13.40	100 95 89				
13.00 - 13.23			CS 9		
13.40 - 14.90	93 93 87		CS 10		
14.15 - 14.25					
			Flush: 4.20 - 24.90 Water 100%		
15.00 - 15.20		20 400 830	CS 11		
14.90 - 16.40	97 97 82				
17.00 - 17.18			CS 12		
16.40 - 17.90	100 100 89				
17.90 - 19.40	90 88 85				
18.95 - 19.15			CS 13		
				07/07/16 4.20	1800 0.00
				08/07/16 4.20	0800 3.10

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
	10.15-10.20 brown sandstone band			
	12.40-12.60 fractures are subvertical rough planar			
	12.76-12.82 fractures are subvertical rough planar			
		(16.60)		
	17.00-17.02 medium weak red mudstone band			

Hole continues on next sheet

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 13:15:53

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

BH03

Sheet 2 of 3

Borehole Log

Drilled	PS	**Start**	05/07/2016
Logged	TRB/JH		
Checked	PH	**End**	
Approved	PH		08/07/2016

Equipment, Methods and Remarks

Beretta T46.
Dynamic sampling and rotary core drilling (PWF size) using water flush.
SPT Hammer ID: ACE2, Rod type: 2 3/8 REG.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	24.90	121	4.20

Ground Level	27.06 mOD
Coordinates (m)	E 383020.81
National Grid	N 397986.63

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
19.40 - 20.90	100 100 89				
20.90 - 22.40	93 93 90				
22.40 - 23.40	100 100 88				
23.40 - 24.90	100 100 95			08/07/16 4.20	1800

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
		24.90 +2.16		
END OF EXPLORATORY HOLE				

Groundwater Entries No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks Depths (m)	Remarks

Chiselling Details Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 13:15:53

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

BH03

Sheet 3 of 3

Borehole Log

Drilled	RD Drilling	**Start**	27/06/2016	
Logged	TRB		27/06/2016	
Checked	PH	**End**		
Approved	PH		27/06/2016	

Equipment, Methods and Remarks

Competitor Dart.
Dynamic sampling.
SPT Hammer ID: 0047, Rod type: Quick start 1 1/4.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
0.00	1.60	97	

Ground Level	26.55 mOD
Coordinates (m)	E 382968.09
National Grid	N 397939.37

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
		0.00-1.20 Hand excavated inspection pit.		
0.10	ES 1			
0.50 - 1.20 0.50	B 3 ES 2			
1.20 - 1.60 1.20 - 1.60 1.20 - 1.60	SPTS B 5 D 4	34 (3,6/9,9,16 for 75mm)		dry
1.60 - 1.63 1.60 - 1.63	SPTS D 6	50 (25 for 11mm/50 for 22mm)		dry

Strata Description

Main	Detail	Depth	Level	(Thickness)
CONCRETE. (MADE GROUND)		0.15	+26.40	(0.15)
Brown gravelly medium to coarse SAND. Gravel is angular to subangular fine to coarse of various lithologies. (MADE GROUND)		0.50	+26.05	(0.35)
Reddish brown angular fine to coarse GRAVEL of brick. (MADE GROUND)		1.63	+24.92	(1.13)
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks
0.00 - 1.62	No groundwater encountered.
1.62	Terminated at refusal.

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 14:49:55

AGS

Project	THE FACTORY, MANCHESTER
Project No.	A6053-16
Carried out for	Buro Happold Limited

Borehole

WS01

Sheet 1 of 1

Borehole Log

ESG

Drilled	RD Drilling	**Start**	27/06/2016	
Logged	TRB			
Checked	PH	**End**		
Approved	PH		27/06/2016	

Equipment, Methods and Remarks

Competitor Dart.
Dynamic sampling.
SPT Hammer ID: 0047, Rod type: Quick start 1 1/4.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	1.70	97	

Ground Level	26.58 mOD
Coordinates (m)	E 382970.91
National Grid	N 397940.10

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
		0.00-1.20 Hand excavated inspection pit.		
0.10	ES 1			
0.50 - 1.20 0.50	B 3 ES 2			
1.20 - 1.65 1.20 - 1.70 1.20 - 1.65	SPTS B 5 D 4	N=18 (3,3/3,4,5,6)		dry
1.70 - 1.87 1.70	SPTS D 6	50 (13,18/50 for 22mm)		dry

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfil
CONCRETE. (MADE GROUND)		0.15 (0.15) +26.43		
Brown gravelly medium to coarse SAND. Gravel is angular to subangular fine to coarse of various lithologies. (MADE GROUND)		0.50 (0.35) +26.08		
Reddish brown angular fine to coarse GRAVEL of brick. (MADE GROUND)		1.87 (1.37) +24.71		
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks
0.00 - 1.87	No groundwater encountered.
1.87	Terminated at refusal.

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 14:50:06

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

WS01A

Sheet 1 of 1

Borehole Log

Drilled	RD Drilling	**Start**	**Equipment, Methods and Remarks**	
Logged	TRB	24/06/2016	Competitor Dart. Dynamic sampling. SPT Hammer ID: 0047, Rod type: Quick start 1 1/4.	
Checked	PH	**End**		
Approved	PH	24/06/2016		

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	3.00	97	2.00
3.00	4.00	72	

Ground Level	26.64 mOD
Coordinates (m)	E 382978.74
National Grid	N 397941.82

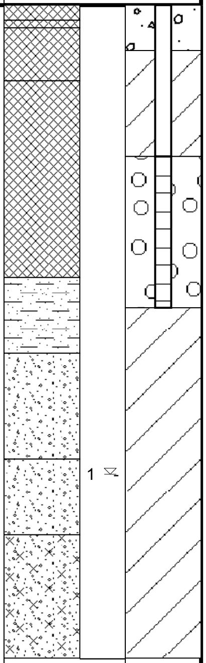
Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
		0.00-1.20 Hand excavated inspection pit.		
0.10	ES 1			
0.50 - 1.20	B 3			
0.50	ES 2			
1.20 - 1.65	SPTS	N=9 (2,3/2,2,3,2)		dry
1.20 - 1.80	B 5			
1.20 - 1.65	D 4			
1.80 - 2.30	B 7			
2.00 - 2.45	SPTS	N=16 (3,3/4,3,4,5)		dry
2.00 - 2.45	D 6			
2.30 - 3.00	B 8			
3.00 - 3.45	SPTS	N=28 (3,4/4,5,7,12)		3.10
3.00 - 3.45	D 9			
3.00 - 3.50	D 10			
3.50 - 4.00	B 11			
4.00 - 4.32	SPTS	51 (5,10/11,20,20 for 15mm)		3.10
4.00 - 4.32	D 12			

Strata Description

Main	Detail	Depth	Level	(Thickness)
CONCRETE. (MADE GROUND)		0.10	+26.54	(0.10)
Grey angular to subangular fine to coarse GRAVEL of concrete. (MADE GROUND)		0.15	+26.49	(0.05)
Light brown gravelly SAND. Gravel is subangular to subrounded fine to coarse of sandstone, limestone and mudstone (MADE GROUND)		0.50	+26.14	(0.35)
Loose black and grey gravelly clayey SAND. Gravel is angular fine to coarse of brick, concrete and coal. (MADE GROUND)		1.80	+24.84	(1.30)
Firm brown mottled grey sandy CLAY.		2.30	+24.34	(0.50)
Medium dense brown slightly gravelly SAND. Gravel is subrounded to rounded fine to medium of sandstone and mudstone.		3.00	+23.64	(0.70)
Medium dense brown gravelly SAND. Gravel is rounded fine to coarse of various lithologies.		3.50	+23.14	(0.50)
Reddish brown slightly gravelly silty fine and medium SAND. Gravel is rounded fine to medium of various lithologies.		4.32	+22.32	(0.82)
END OF EXPLORATORY HOLE				

Legend **Backfill**



Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	3.10		

Depth Related Remarks

Depths (m)	Remarks
4.32	Terminated at refusal.

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 14:50:08

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

WS02

Sheet 1 of 1

Borehole Log

Drilled	RD Drilling	**Start**	24/06/2016	
Logged	TRB		24/06/2016	
Checked	PH	**End**		
Approved	PH		24/06/2016	

Equipment, Methods and Remarks

Competitor Dart.
Dynamic sampling.
SPT Hammer ID: 0047, Rod type: Quick start 1 1/4.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	1.50	97	

Ground Level	26.59 mOD
Coordinates (m)	E 382984.31
National Grid	N 397943.34

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
0.10	ES 1	0.00-1.20 Hand excavated inspection pit.		
0.50 - 1.20 0.50	B 3 ES 2			
1.00 - 1.50	B 4			
1.20 - 1.65	SPTS	N=42 (4,3/9,9,11,13)		dry
1.80 - 2.06	SPTS	69 (11,19/19,50 for 34mm)		dry

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
CONCRETE. (MADE GROUND)		(0.30) 0.30 +26.29	▨	
Grey sandy GRAVEL. Gravel is angular fine to coarse of concrete. (MADE GROUND)		(0.90) 1.20 +25.39	▨	▨
Reddish brown slightly sandy GRAVEL. Gravel is angular fine to coarse of brick and concrete. (MADE GROUND)		(0.86) 2.06 +24.53	▨	▨
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks
0.00 - 2.06	No groundwater encountered.
2.06	Terminated at refusal.

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 14:50:10

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

WS03

Sheet 1 of 1

Borehole Log

Drilled	RD Drilling	**Start**	24/06/2016
Logged	TRB		
Checked	PH	**End**	
Approved	PH		24/06/2016

Equipment, Methods and Remarks

Competitor Dart.
Dynamic sampling.
SPT Hammer ID: 0047, Rod type: Quick start 1 1/4.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	2.00	97	
2.00	2.55	87	

Ground Level	26.60 mOD
Coordinates (m)	E 382984.00
National Grid	N 397943.00

Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
		0.00-1.20 Hand excavated inspection pit.		
0.10	ES 1			
0.50 - 1.20 0.50	B 3 ES 2			
1.20 - 1.65 1.20 - 2.00 1.20 - 1.65	SPTS B 5 D 4	N=11 (2,2/2,3,3,3)		dry
2.00 - 2.45 2.00 - 2.50 2.00 - 2.45	SPTS B 7 D 6	N=25 (3,4/4,5,8,8)		dry
2.55 - 2.58 2.55 - 2.58	SPTS D 8	50 (25 for 10mm/50 for 25mm)		dry

Strata Description

Main	Detail	Depth	Level	(Thickness)	Legend	Backfill
CONCRETE. (MADE GROUND)				(1.20)	▨	▨
Medium dense brown sandy angular fine to coarse GRAVEL of coal, brick and sandstone. (MADE GROUND)		1.20	+25.40	(0.80)	▨	▨
Medium dense black SAND. (MADE GROUND)		2.00	+24.60	(0.50)	▨	▨
Reddish brown angular fine to coarse GRAVEL of brick. (MADE GROUND)		2.50	+24.10	(0.08)	▨	
END OF EXPLORATORY HOLE		2.58	+24.02			

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks
0.00 - 2.58	No groundwater encountered.
2.58	Terminated at refusal.

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 14:50:11

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

WS03A

Borehole Log

Drilled	RD Drilling	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level** 26.54 mOD
Logged	TRB	24/06/2016	Competitor Dart. Dynamic sampling. SPT Hammer ID: 0047, Rod type: Quick start 1 1/4.	1.20 2.00 3.00	2.00 3.00 4.00	97 87 72	2.00	**Coordinates (m)** E 382989.79
Checked	PH	**End**						**National Grid** N 397944.37
Approved	PH	24/06/2016						

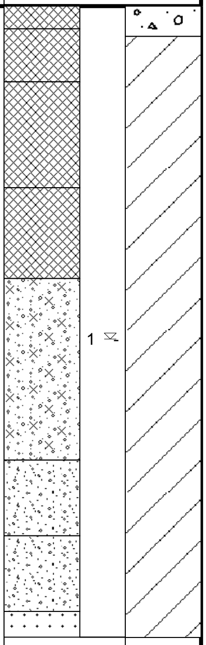
Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
0.15	ES 1	0.00-1.20 Hand excavated inspection pit.		
0.50 - 1.20 0.50	B 3 ES 2			
1.20 - 1.65 1.20 - 1.80 1.20 - 1.65	SPTS B 5 D 4	N=10 (2,2/2,2,3,3)		dry
1.80 - 3.00	B 6			
2.00 - 2.45 2.00 - 2.45	SPTS D 6A	N=14 (3,3/3,3,3,5)		2.20
3.00 - 3.45 3.00 - 3.45 3.00 - 3.50	SPTS D 7 D 8	N=32 (5,7/7,7,9,9)		2.20
3.50 - 4.00	D 9			
4.00 - 4.17 4.00 - 4.17	SPTS D 10	50 (11,14/50 for 22mm)		2.20

Strata Description

Main	Detail	Depth	(Thickness)	Level
CONCRETE. (MADE GROUND)		0.15	(0.15)	+26.39
Light brown sandy angular to subangular fine to coarse GRAVEL of limestone and concrete. (MADE GROUND)		0.50	(0.35)	+26.04
Black and grey sandy angular to subangular fine to coarse GRAVEL of limestone, sandstone and brick. (MADE GROUND)		1.20	(0.70)	+25.34
Firm black, grey and brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of brick, sandstone and coal. (MADE GROUND)		1.80	(0.60)	+24.74
Medium dense orangish brown and grey very sandy silty GRAVEL with occasional cobbles. Gravel is subangular to subrounded fine to coarse of sandstone and mudstone.		3.00	(1.20)	+23.54
Dense brown gravelly SAND. Gravel is subrounded to rounded fine to medium of sandstone, quartzite and mudstone.		3.50	(0.50)	+23.04
Reddish brown slightly gravelly SAND. Gravel is subrounded fine to medium of sandstone, coal and mudstone.		4.00	(0.50)	+22.54
Reddish brown SANDSTONE. Recovered as fine to coarse sand. (SHERWOOD SANDSTONE)		4.17	(0.17)	+22.37
END OF EXPLORATORY HOLE				

Legend **Backfill**



Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	2.20		

Depth Related Remarks

Depths (m)	Remarks
4.17	Terminated at refusal.

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 14:50:14

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

WS04

Sheet 1 of 1

Borehole Log

Drilled	RD Drilling	**Start**	**Equipment, Methods and Remarks**	
Logged	TRB	24/06/2016	Competitor Dart. Dynamic sampling. SPT Hammer ID: 0047, Rod type: Quick start 1 1/4.	
Checked	PH	**End**		
Approved	PH	24/06/2016		

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	2.00	97	1.00
2.00	3.00	87	
3.00	4.00	72	

Ground Level	26.52 mOD
Coordinates (m)	E 383000.86
National Grid	N 397946.18

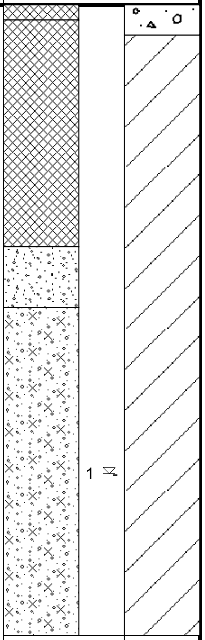
Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
0.15	ES 1	0.00-1.20 Hand excavated inspection pit.		
0.50	ES 2			
1.20 - 1.65	SPTS	N=12 (2,2/3,3,3,3)		dry
1.20 - 1.60	D 3			
1.60 - 2.00	D 4			
2.00 - 2.45	SPTS	N=19 (3,3/4,5,5,5)		dry
2.00 - 2.45	D 5			
2.00 - 2.60	D 6			
2.60 - 3.00	B 7			
3.00 - 3.45	SPTS	N=34 (7,7/8,9,8,9)		3.10
3.00 - 3.45	D 8			
3.00 - 3.50	D 9			
3.50 - 4.00	D 10			
4.00 - 4.17	SPTS	50 (9,11/50 for 20mm)		3.10
4.00 - 4.17	D 11			

Strata Description

Main	Detail	Depth	Level	(Thickness)
CONCRETE. (MADE GROUND)		0.10	+26.42	(0.10)
Medium dense black, grey and brown gravelly clayey SAND. Gravel is angular to subangular fine to coarse of sandstone, brick and coal. (MADE GROUND)		1.60	+24.92	(1.50)
Brown gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone, quartzite, coal and mudstone.		2.00	+24.52	(0.40)
Medium dense, becoming dense, brown and reddish brown very sandy slightly silty GRAVEL. Gravel is subangular to subrounded fine to coarse of sandstone and coal.	3.00 becoming dense	4.17	+22.35	(2.17)
END OF EXPLORATORY HOLE				

Legend Backfil



Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	3.10		

Depth Related Remarks

Depths (m)	Remarks
4.17	Terminated at refusal.

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 14:50:16

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

WS05

Sheet 1 of 1

Borehole Log

Drilled	RD Drilling	**Start**	23/06/2016
Logged	TRB		23/06/2016
Checked	PH	**End**	
Approved	PH		23/06/2016

Equipment, Methods and Remarks

Competitor Dart.
Dynamic sampling.
SPT Hammer ID: 0047, Rod type: Quick start 1 1/4.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	2.00	97	2.00
2.00	3.00	87	
3.00	3.50	72	

Ground Level	26.53 mOD
Coordinates (m)	E 383008.59
National Grid	N 397947.28

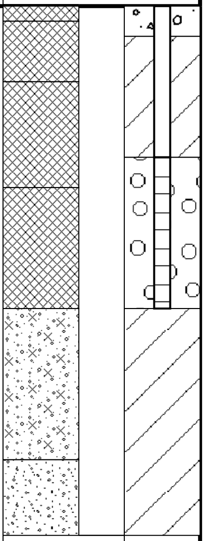
Samples and Tests

Depth	Type & No.	Records	Date / Casing	Time / Water
		0.00-1.20 Hand excavated inspection pit.		
0.10	ES 1			
0.50 - 1.20	B 3			
0.50	ES 2			
1.20 - 1.65	SPTS	N=11 (3,3/4,3,2,2)		dry
1.20 - 2.00	B 6			
1.20 - 1.65	D 4			
1.20	ES 5			
2.00 - 2.45	SPTS	N=30 (4,5/7,7,7,9)		dry
2.00 - 3.00	B 8			
2.00 - 2.45	D 7			
3.00 - 3.39	SPTS	90 (10,11/12,12,16,50 for 15mm)		dry
3.00 - 3.50	B 9			

Strata Description

Main	Detail	Depth	Level	(Thickness)
CONCRETE. (MADE GROUND)		0.10	+26.43	(0.10)
Light brown gravelly SAND. (MADE GROUND)		0.50	+26.03	(0.40)
Black and grey gravelly SAND. (MADE GROUND)		1.20	+25.33	(0.70)
Firm orangish brown mottled light brown sandy gravelly CLAY. Gravel is angular fine to coarse of sandstone, coal and brick. (MADE GROUND)		2.00	+24.53	(0.80)
Medium dense to dense black and brown very sandy slightly silty GRAVEL. Gravel is angular to subangular fine to coarse of coal and sandstone.		3.00	+23.53	(1.00)
Very dense orangish brown gravelly SAND. Gravel is subangular to subrounded fine to coarse of mudstone.		3.50	+23.03	(0.50)
END OF EXPLORATORY HOLE				

Legend Backfil



Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks
0.00 - 3.50	No groundwater encountered
3.50	Terminated at refusal.

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 14:50:18

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

WS06

Sheet 1 of 1

Borehole Log

Drilled	RD Drilling	**Start**	23/06/2016
Logged	TRB		23/06/2016
Checked	PH	**End**	
Approved	PH		23/06/2016

Equipment, Methods and Remarks

Competitor Dart.
Dynamic sampling.
SPT Hammer ID: 0047, Rod type: Quick start 1 1/4.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	2.00	97	2.00
2.00	2.70	87	

Ground Level	26.51 mOD
Coordinates (m)	E 383016.20
National Grid	N 397948.09

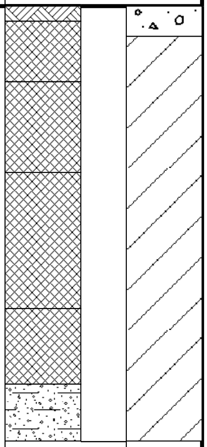
Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
		0.00-1.20 Hand excavated inspection pit.		
0.10	ES 1			
0.50 - 1.10	B 3			
0.50	ES 2			
1.10 - 2.00	D 5			
1.10	ES 4			dry
1.20 - 1.65	SPTS	N=7 (3,3/2,2,2,1)		
1.20 - 1.65	D 5A			
2.00 - 2.45	SPTS	N=20 (5,4/4,4,6,6)		dry
2.00 - 2.45	D 6			
2.10 - 2.60	D 8			
2.10	ES 7			
2.60	D 9			
2.70 - 2.88	SPTS	50 (12,16/50 for 26mm)		dry

Strata Description

Main	Detail	Depth	(Thickness)	Level
CONCRETE. (MADE GROUND)		0.10	(0.10)	+26.41
Light greyish brown gravelly SAND. Gravel is angular to subangular fine to coarse of sandstone and concrete. (MADE GROUND)		0.50	(0.40)	+26.01
Light brown and reddish brown GRAVEL with medium cobble content. Gravel is angular fine to coarse of sandstone and brick. Cobbles are angular of sandstone. (MADE GROUND)		1.10	(0.60)	+25.41
Loose light grey GRAVEL. Gravel is subangular medium to coarse of limestone with fragments of red brick. (MADE GROUND)		2.00	(0.90)	+24.51
Medium dense brown and reddish brown sandy GRAVEL. Gravel is angular to subangular fine to coarse of limestone and red brick. (MADE GROUND)		2.50	(0.50)	+24.01
Very dense brown gravelly clayey SAND. Gravel is subangular to subrounded fine to medium of sandstone.		2.88	(0.38)	+23.63
END OF EXPLORATORY HOLE				

Legend Backfill



Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks
0.00 - 2.88	No groundwater encountered.
2.88	Terminated at refusal.

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 14:50:20

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

WS07

Sheet 1 of 1

Borehole Log

ESG

Drilled	RD Drilling	**Start**	23/06/2016
Logged	TRB		23/06/2016
Checked	PH	**End**	
Approved	PH		23/06/2016

Equipment, Methods and Remarks

Competitor Dart.
Dynamic sampling.
SPT Hammer ID: 0047, Rod type: Quick start 1 1/4.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	2.00	97	2.00
2.00	3.00	87	
3.00	3.60	72	

Ground Level	26.52 mOD
Coordinates (m)	E 383023.67
National Grid	N 397947.99

Samples and Tests

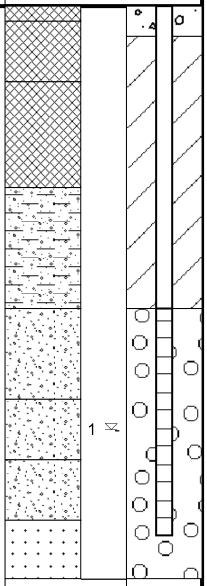
Depth	Type & No.	Records	Date / Casing	Time / Water
		0.00-1.20 Hand excavated inspection pit.		
0.10	ES 1			
0.50 - 1.00	B 3			
0.50	ES 2			
1.20 - 1.65	SPTS	N=5 (1,2/1,1,2,1)		dry
1.20 - 2.00	B 6			
1.20 - 1.65	D 4			
1.20	ES 5			
2.00 - 2.45	SPTS	N=9 (2,2/3,2,2,2)		dry
2.00 - 2.60	B 8			
2.00 - 2.45	D 7			
2.60 - 3.00	D 9			
3.00 - 3.45	SPTS	N=23 (3,4/5,5,6,7)		2.80
3.00 - 3.40	D 11			
3.00 - 3.45	D 10			
3.40	D 12			
3.60 - 3.79	SPTS	50 (10,15/50 for 36mm)		2.80

Strata Description

Main	Detail	Depth	Level	(Thickness)
CONCRETE. (MADE GROUND)		0.10	+26.42	(0.10)
Light brown sandy angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)		0.50	+26.02	(0.40)
Brown gravelly fine to coarse SAND with medium cobble content. Gravel is angular to subangular fine to coarse of sandstone. Cobbles are subangular of sandstone. (MADE GROUND)		1.20	+25.32	(0.70)
Soft orangish brown and brown mottled black sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of sandstone, coal and mudstone.		2.00	+24.52	(0.80)
Loose orangish brown and dark brown gravelly SAND. Gravel is subangular to rounded fine to coarse of sandstone and mudstone.		2.60	+23.92	(0.60)
Grey and brown gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone and mudstone.		3.00	+23.52	(0.40)
Medium dense brown gravelly SAND. Gravel is subrounded to rounded fine to coarse of sandstone and mudstone.		3.40	+23.12	(0.40)
Reddish brown SANDSTONE. Recovered as fine to coarse sand. (SHERWOOD SANDSTONE)		3.79	+22.73	(0.39)

END OF EXPLORATORY HOLE

Legend Backfill



Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	2.80		

Depth Related Remarks

Depths (m)	Remarks
3.79	Terminated at refusal.

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
12/10/2016 14:50:23

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Borehole

WS08

Sheet 1 of 1

Borehole Log

ESG

Drilled	RD Drilling	**Start**	23/06/2016	
Logged	TRB	23/06/2016		
Checked	PH	**End**		
Approved	PH	23/06/2016		

Equipment, Methods and Remarks

Competitor Dart.
Dynamic sampling.
SPT Hammer ID: 0047, Rod type: Quick start 1 1/4.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	2.00	97	1.00
2.00	3.00	87	
3.00	3.60	72	

Ground Level	26.45 mOD
Coordinates (m)	E 383031.77
National Grid	N 397947.58

Samples and Tests

Depth	Type & No.	Records	Date Casing	Time Water
		0.00-1.20 Hand excavated inspection pit.		
0.10	ES 1			
0.50 - 1.00	B 3			
0.50	ES 2			
1.00 - 1.50	D 5			
1.00	ES 4			
1.20 - 1.65	SPTS	N=8 (1,2/2,2,2,2)		dry
2.00 - 2.45	SPTS	N=28 (3,4/6,7,7,8)		dry
2.00 - 2.30	D 7			
2.00	ES 6			
2.30 - 3.00	B 8			
3.00 - 3.45	SPTS	N=34 (9,10/9,8,8,9)		2.90
3.00 - 3.30	D 9			
3.30	ES 10			
3.60 - 3.85	SPTS	66 (12,12/16,50 for 24mm)		2.90
3.60 - 3.85	D 11			

Strata Description

Main	Detail	Depth, Level (Thickness)		Legend	Backfill
CONCRETE SLAB. (MADE GROUND)		0.10 (0.10)	+26.35		
Light brown gravelly SAND. Gravel is subangular to subrounded fine to coarse of various lithologies. (MADE GROUND)		1.00 (0.90)	+25.45		
Firm black, grey and brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of brick and concrete. (MADE GROUND)		1.50 (0.50)	+24.95		
Firm light brown and grey slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of brick, concrete and sandstone (MADE GROUND)		2.00 (0.50)	+24.45		
Medium dense orangish brown and light brown gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of various lithologies. (MADE GROUND)		2.30 (0.30)	+24.15		
Medium dense reddish brown and brown very gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of various lithologies including sandstone, mudstone and quartzite.		3.00 (0.70)	+23.45	1 ▽	
Dense brown very sandy subrounded to rounded fine to coarse GRAVEL of mudstone and sandstone.		3.30 (0.30)	+23.15		
Very dense dark grey gravelly fine to coarse SAND. Strong diesel odour (hydrocarbon).		3.85 (0.55)	+22.60		

END OF EXPLORATORY HOLE

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)
1	2.90		

Depth Related Remarks

Depths (m)	Remarks
3.85	Terminated at refusal.

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk AGS
12/10/2016 14:50:25

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

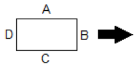
Borehole

WS09

Sheet 1 of 1

Trial Pit Log

Logged RS **Checked** PH **Approved** PH	**Start** 04/07/2016 **End** 04/07/2016	**Equipment, Methods and Remarks** JCB 3CX. Machine excavated.	**Dimension and Orientation** Width 1.00 m Length 3.00 m	**Ground Level** 26.66 mOD **Coordinates (m)** E 382997.41 **National Grid** N 397972.54



Samples and Tests

Depth	Type & No.	Records
0.50 - 0.70	B2	
0.50	ES1	
0.90	ES3	
1.00 - 1.30	B4	
1.40	HV	p 45kPa, r 2kPa
1.50	ES5	
1.60 - 2.00	B6	
1.90	HV	p 71kPa, r 23kPa
2.00 - 2.30	B7	
		04/07/16 dry

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Black MACADAM. (MADE GROUND)		(0.15) 0.15 +26.51	▨	░
Light grey slightly sandy angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)		(0.30) 0.45 +26.21	▨	░
Black slightly clayey SAND AND GRAVEL with medium cobble content. Gravel is angular to subangular fine to coarse of brick, sandstone, concrete, mudstone, coal, clinker, limestone and granite. Cobbles are subangular of sandstone and brick. (MADE GROUND)		(0.30) 0.75 +25.91	▨	░
Black sandy gravelly CLAY with low cobble content. Gravel is angular to subangular fine to coarse of slag, brick, coal, clinker, mudstone, limestone and sandstone. Cobbles are subangular of brick. (MADE GROUND)		(0.55) 1.30 +25.36	▨	░
Stiff friable orangish brown mottled grey slightly gravelly sandy CLAY. Gravel is subrounded to rounded fine to medium of mudstone and sandstone.		(0.70) 2.00 +24.66	▤	░
Light brown gravelly slightly clayey fine to coarse SAND with medium cobble content. Gravel is subrounded to rounded fine to coarse of mudstone, sandstone and quartzite. Cobbles are subrounded of sandstone and mudstone.		(0.50) 2.50 +24.16	▒	░
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depths (m)	Remarks
0.00 - 2.50	No groundwater encountered during excavation.

Stability	Stable
Shoring	None
Weather	Sunny

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:53:33

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

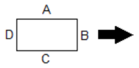
Trial Pit

MTP03

Sheet 1 of 1

Trial Pit Log

Logged RS **Checked** PH **Approved** PH	**Start** 06/07/2016 **End** 06/07/2016	**Equipment, Methods and Remarks** JCB 3CX. Machine excavated to 0.50m, hand excavated from 0.50 to 1.20m.	**Dimension and Orientation** Width 1.00 m Length 1.50 m	**Ground Level** **Coordinates (m)** **National Grid**	26.50 mOD E 382992.57 N 397965.52



Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			Black MACADAM. (MADE GROUND)		(0.20) 0.20 +26.30	▨	░
			COBBLES of sandstone (MADE GROUND)		(0.15) 0.35 +26.15	▨	░
			Black slightly sandy GRAVEL with low cobble content. Sand is of ash. Gravel is angular to subangular fine to coarse of brick, clinker, coal, sandstone and mudstone. Cobbles are subangular of brick. (MADE GROUND)		(0.15) 0.50 +26.00	▨	░
			Dark brown gravelly fine to coarse SAND with low cobble content. Gravel is angular to subangular fine to coarse of brick, coal, sandstone, limestone, slag and slate. Cobbles are subangular of brick. (MADE GROUND)		(0.50) 1.00 +25.50	▨	░
		06/07/16 dry	Soft to firm orangish brown mottled grey sandy CLAY.		(0.20) 1.20 +25.30	▤	░
			END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depths (m)	Remarks
0.00 - 1.20	No groundwater encountered during excavation.

Stability Stable

Shoring None

Weather Overcast

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:53:36

AGS

Project **THE FACTORY, MANCHESTER**

Project No. **A6053-16**

Carried out for **Buro Happold Limited**

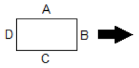
Trial Pit

MTP03A

Sheet 1 of 1

Trial Pit Log

Logged TRB **Checked** PH **Approved** PH	**Start** 29/06/2016 **End** 29/06/2016	**Equipment, Methods and Remarks**	**Dimension and Orientation** Width 0.50 m Length 3.00 m 90 (Deg)	**Ground Level** 26.71 mOD **Coordinates (m)** E 383005.37 **National Grid** N 397973.02



Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			MACADAM. (MADE GROUND)		(0.15) 0.15 +26.56	▨	▒
			Light brown sandy angular to subangular fine to coarse sandy GRAVEL of various lithologies including sandstone, concrete and brick. (MADE GROUND)		(0.15) 0.30 +26.41	▨	▒
			CONCRETE. (MADE GROUND)		(0.20) 0.50 +26.21	▨	▒
0.50 - 1.00 0.50 0.50	B3 D2 ES1		Dark grey sandy gravelly CLAY with medium cobble content. Gravel is angular to subangular fine to coarse of brick and sandstone. Cobbles are angular of brick. (MADE GROUND)		(0.90) 1.40 +25.31	▨	▒
1.40 - 2.20 1.40 1.40	B6 D5 ES4		Light grey mottled brown sandy CLAY.		(0.80) 2.20 +24.51	▤	▒
2.20 - 3.14 2.20	B8 D7		Brown and grey gravelly slightly clayey fine to coarse SAND. Gravel is subrounded to rounded fine to coarse of various lithologies including sandstone and mudstone.		(0.94) 3.14 +23.57	⁘	▒
3.14 - 4.00 3.14	B10 D9	29/06/16 dry	Light brownish grey very gravelly SAND with medium cobble content. Gravel is subrounded to rounded fine to coarse of various lithologies. Cobbles are rounded of sandstone and mudstone.		(0.86) 4.00 +22.71	⁘	▒
4.00 4.00	B12 D11		END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depths (m)	Remarks
0.00 - 4.00	No groundwater encountered during excavation.

Stability

Shoring

Weather

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:53:38

AGS

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

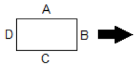
Trial Pit

MTP04

Sheet 1 of 1

Trial Pit Log

Logged RS **Checked** PH **Approved** PH	**Start** 06/07/2016 **End** 06/07/2016	**Equipment, Methods and Remarks** JCB 3CX. Machine excavated.	**Dimension and Orientation** Width 1.00 m Length 3.00 m	**Ground Level** 26.28 mOD **Coordinates (m)** E 383014.94 **National Grid** N 397958.80



Samples and Tests

Depth	Type & No.	Records
0.40	ES1	
0.60	ES2	
0.80 - 1.00	B4	
0.90	HV	p 38kPa, r 14kPa
1.00	ES3	
1.20	HV	p 44kPa, r 13kPa
1.20 - 1.70	B5	
2.00	HV	p 35kPa, r 11kPa
2.00 - 2.50	B7	
2.00	ES6	
2.50	ES8	
2.60	HV	p 29kPa, r 10kPa
2.60 - 3.00	B9	
		06/07/16

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Black MACADAM. (MADE GROUND)		(0.10) 0.10 +26.18		
Yellowish brown slightly sandy angular to subangular fine to coarse GRAVEL of limestone. (MADE GROUND)		(0.20) 0.30 +25.98		
Black slightly sandy slightly clayey GRAVEL with medium cobble content. Gravel is angular to subangular fine to coarse of clinker, coal, brick, mudstone and sandstone. Cobbles are subangular of sandstone and brick. Hydrocarbon odour and sheen. (MADE GROUND)		(0.25) 0.55 +25.73		1 ▽
Firm black slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of coal, clinker and mudstone. Hydrocarbon odour. (MADE GROUND)		(0.25) 0.80 +25.48		
Soft to firm dark grey mottled yellowish brown sandy gravelly CLAY with medium cobble content. Gravel is angular to subrounded fine to coarse of slate, clay pipe, brick, clinker, sandstone, mudstone, coal, concrete and shell fragments. Cobbles are subangular of brick. Occasional sand lenses. Hydrocarbon odour and sheen. (MADE GROUND)	0.80-1.00 black bands 1.20-1.40 black bands 1.90-2.00 black bands	(1.70) 2.50 +23.78		
Soft light grey mottled light brown sandy CLAY. Slight hydrocarbon odour.		(0.60) 3.10 +23.18		
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks
1	0.50	Seepage with hydrocarbon sheen.

Remarks

Depths (m)	Remarks

Stability Stable

Shoring None

Weather Overcast

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:53:39

AGS

Project **THE FACTORY, MANCHESTER**

Project No. **A6053-16**

Carried out for **Buro Happold Limited**

Trial Pit

MTP05

Sheet 1 of 1

Trial Pit Log

Logged RS **Checked** PH **Approved** PH	**Start** 06/07/2016 **End** 06/07/2016	**Equipment, Methods and Remarks** JCB 3CX. Machine excavated.	**Dimension and Orientation** Width 0.80 m Length 2.60 m A B C D	**Ground Level** 26.50 mOD **Coordinates (m)** E 383035.45 **National Grid** N 397969.18

Samples and Tests

Depth	Type & No.	Records
0.20 - 0.40	B1	
0.20	ES2	
0.65 - 0.80	B3	
0.90 - 1.10	B4	
1.20	ES5	
1.50 - 1.80	B6	
2.00 - 2.50	B7	
		06/07/16 dry

Strata Description

Main	Detail	Depth, Level (Thickness)
Black MACADAM. (MADE GROUND)		(0.15) 0.15 +26.35
Yellowish brown slightly sandy GRAVEL with high cobble content. Gravel is angular to subangular fine to coarse of limestone and sandstone, Cobbles are subangular of sandstone. (MADE GROUND)		(0.25) 0.40 +26.10
Grey CONCRETE, 60-20% aggregate of angular to subangular fine to coarse gravel of quartzite and limestone. (MADE GROUND)		(0.20) 0.60 +25.90
Dark brown slightly sandy clayey GRAVEL with low cobble content. Gravel is angular to subangular fine to coarse of limestone, clinker, mudstone, coal, brick, sandstone and concrete. Rare fragments of plastic. Cobbles are subangular of limestone. Pockets (200x50mm) of sandy clay. (MADE GROUND)		(0.20) 0.80 +25.70
Very soft, becoming firm, orangish brown mottled grey slightly gravelly sandy CLAY. Gravel is subangular to rounded fine to coarse of mudstone and sandstone.		(1.00) 1.80 +24.70
Yellowish brown very sandy silty GRAVEL with low cobble content. Gravel is subangular to rounded fine to coarse of sandstone, mudstone, quartzite and granite. Cobbles are subangular of mudstone and sandstone.		(1.10) 2.90 +23.60
END OF EXPLORATORY HOLE		

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depths (m)	Remarks
0.00 - 2.90	No groundwater encountered during excavation.
2.90	Trial pit terminated due to instability.

Stability Unstable from 1.80 - 2.90m

Shoring None

Weather Overcast

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:53:40

AGS

Project **THE FACTORY, MANCHESTER**

Project No. **A6053-16**

Carried out for **Buro Happold Limited**

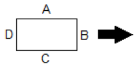
Trial Pit

MTP06

Sheet 1 of 1

Trial Pit Log

Logged TRB **Checked** PH **Approved** PH	**Start** 12/07/2016 **End** 12/07/2016	**Equipment, Methods and Remarks** Micro digger. Hand and machine excavated. Strata description for Face D. See sheet 2 for foundation details.	**Dimension and Orientation** Width 1.00 m Length 1.60 m	**Ground Level** 26.65 mOD **Coordinates (m)** E 382979.26 **National Grid** N 397938.00



Samples and Tests / Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			CONCRETE. (MADE GROUND)		(0.20) 0.20 +26.45	▨	▒
0.30	ES1		Black and grey gravelly clayey SAND with high cobble content. Gravel is angular to subangular fine to coarse of various lithologies. Cobbles are angular of brick. Bituminous odour. (MADE GROUND)	0.75 230mm diameter drain pipe running along the wall	(0.73) 0.93 +25.72	▨	▒
0.93	ES2		Firm light brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of sandstone and brick. (MADE GROUND)	1.30 possible gas main	(1.22) 2.15 +24.50	▨	▒
2.30	ES3	12/07/16 dry	Firm grey and brown sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of brick and clinker. (MADE GROUND)		(0.25) 2.40 +24.25	▨	▒
			END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depths (m)	Remarks
0.00 - 2.40	No groundwater encountered during excavation.
2.40	Trial pit terminated at base of foundation.

Stability Partly stable

Shoring Trench sheets

Weather Dry

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:47:27

AGS

Project **THE FACTORY, MANCHESTER**

Project No. **A6053-16**

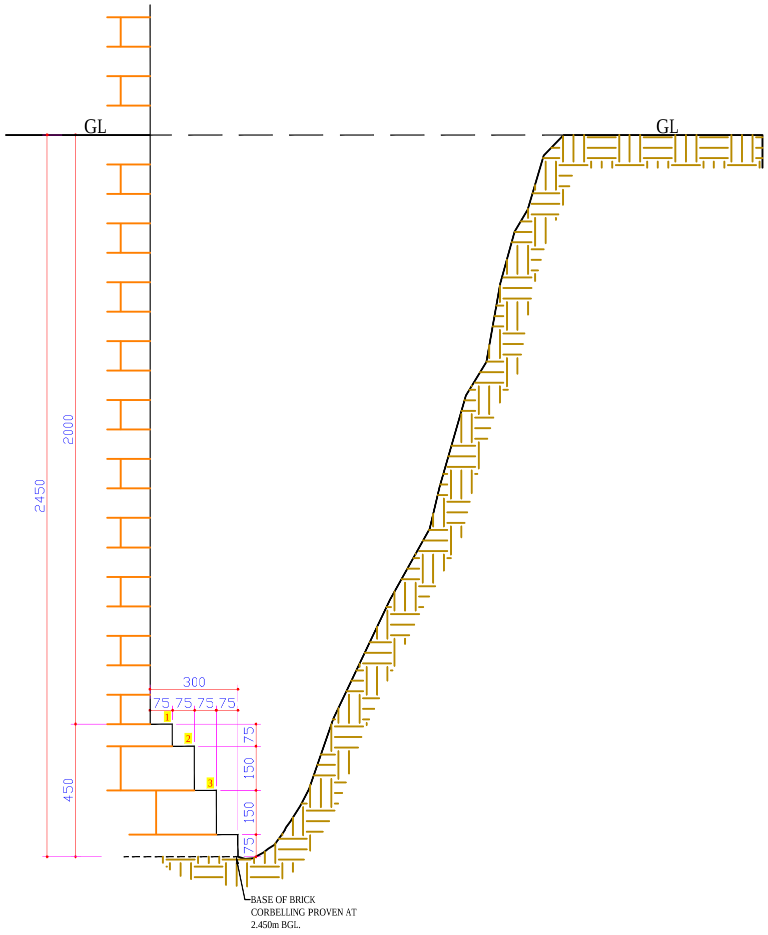
Carried out for **Buro Happold Limited**

Trial Pit

HTP01

Sheet 1 of 1

TRIAL PIT DETAIL


GL
GL
2450
2000
450
300
75 75 75 75
1
2
3
75
150
150
75
BASE OF BRICK
CORBELLING PROVEN AT
2.450m BGL.

HTP01 COMPLETED INTERNAL TO BRICK ARCH
STRUCTURE

NOTE:-
SKETCH DETAILS FOUNDATION DIMENSIONS ONLY, GROUND
CONDITIONS AND ANY OTHER DETAILS (INCLUDING BURIED SERVICES)
ARE PRESENTED ON THE RELEVANT TP LOG.

Scale: 1:20
0 0.1m 0.2m 0.4m 0.6m 0.8m

Project: THE FACTORY
MANCHESTER
Project No: A6053-16
Carried out for: BURO HAPPOLD LIMITED

Figure
HTP01

Trial Pit Log

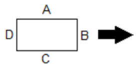
Logged	RS	**Start**	08/07/2016
Checked	PH	**End**	08/07/2016
Approved	PH		

Equipment, Methods and Remarks

14 tonne excavator.
Hand and machine excavated.

Dimension and Orientation

Width 1.00 m
Length 3.00 m



Ground Level	26.62 mOD
Coordinates (m)	E 382984.49
National Grid	N 397942.26

Samples and Tests

Depth	Type & No.	Records
0.10 - 0.40	B2	
0.30	ES1	
0.80	ES3	
0.90 - 1.20	B4	
		08/07/16 dry

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Strong light grey CONCRETE, 60-70% aggregate of angular to subangular fine to coarse gravel of limestone, quartzite, mudstone and quartz. (MADE GROUND)		(0.10) 0.10 +26.52	▨	▒
Light grey slightly sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone and sandstone. (SUB BASE) (MADE GROUND)		(0.35) 0.45 +26.17	▨	
Brownish yellow slightly sandy slightly clayey angular to subangular fine to coarse GRAVEL of sandstone with medium cobble content. Cobbles are angular to subangular of sandstone. (MADE GROUND)	0.50 metal strip	(0.20) 0.65 +25.97	▨	
Light brown slightly sandy gravelly slightly ashy CLAY with medium cobble content. Gravel is angular to subangular fine to coarse of concrete, brick, sandstone, coal, clinker, quartzite and granite. Rare glass and plastic fragments. Cobbles are angular to subangular of brick, sandstone and concrete. (MADE GROUND)		(0.55) 1.20 +25.42	▨	
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depths (m)	Remarks
0.00 - 1.20	No groundwater encountered during excavation.
0.00 - 1.20	100mm drain pipe running down with face to base of pit with horizontal perpendicular continuation.
1.20	Trial pit terminated on client's approval due to 200mm gas main in foundation pit.

Stability	Stable
Shoring	None
Weather	Overcast

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:48:07

Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

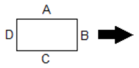
Trial Pit

HTP02

Sheet 1 of 1

Trial Pit Log

Logged TRB **Checked** PH **Approved** PH	**Start** 11/07/2016 **End** 11/07/2016	**Equipment, Methods and Remarks** Micro digger. Hand and machine excavated. Strata description for Face D. See sheet 2 for foundation details.	**Dimension and Orientation** Width 1.00 m Length 2.00 m	**Ground Level** **Coordinates (m)** **National Grid**



Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			CONCRETE. (MADE GROUND)		(0.30) 0.30	▨	▒
0.30	ES1		Grey sandy angular fine to coarse GRAVEL of various lithologies with high cobble content. Cobbles are angular of predominantly brick. (MADE GROUND)	0.90 230mm diameter drain pipe	(1.60) 1.90	▨	▒
1.90	ES2	11/07/16 dry	Grey and brown sandy clayey angular to subangular fine to coarse GRAVEL of various lithologies.		(0.30) 2.20	▨	▒
			END OF EXPLORATORY HOLE				

Groundwater Entries

No.	**Depth Strike (m)**	**Remarks**

Remarks

Depths (m)	Remarks
0.00 - 2.20	No groundwater encountered during excavation.
2.20	Trial pit terminated at base of foundation.

Stability Partially Stable

Shoring Trench sheets

Weather Dry

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:48:28

AGS

Project **THE FACTORY, MANCHESTER**

Project No. **A6053-16**

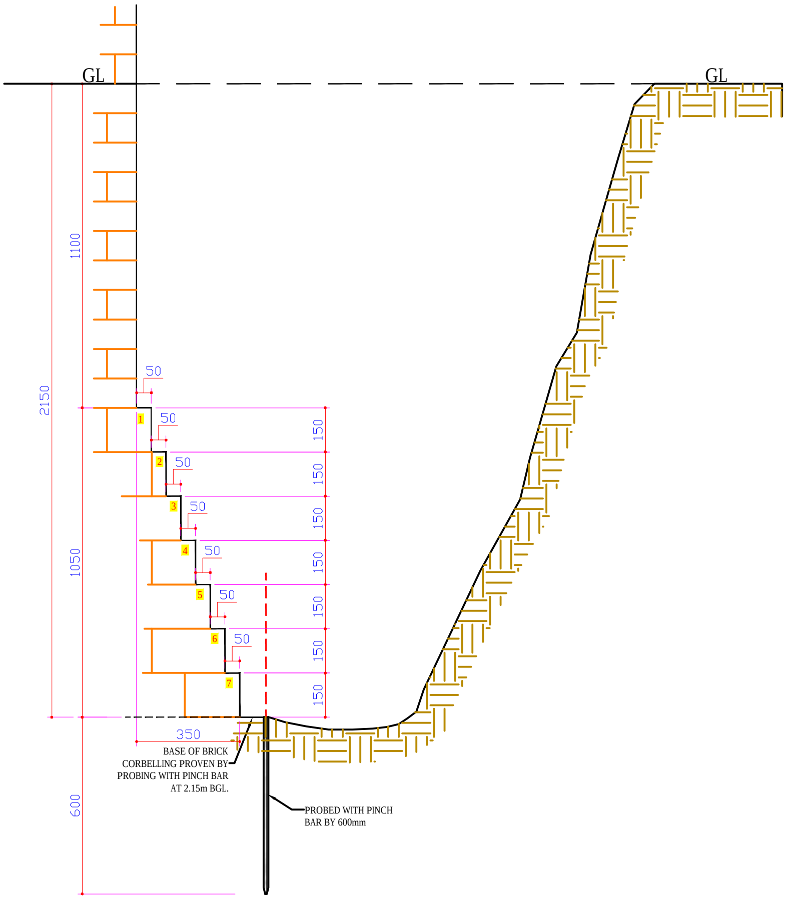
Carried out for **Buro Happold Limited**

Trial Pit

HTP03

Sheet 1 of 1

TRIAL PIT DETAIL


GL
GL
2150
1100
1050
600
50
50
50
50
50
50
50
1
2
3
4
5
6
7
150
150
150
150
150
150
150
350
BASE OF BRICK CORBELLING PROVEN BY PROBING WITH PINCH BAR AT 2.15m BGL.
PROBED WITH PINCH BAR BY 600mm

HTP03 COMPLETED INTERNAL TO BRICK ARCH STRUCTURE

NOTE:-
SKETCH DETAILS FOUNDATION DIMENSIONS ONLY, GROUND CONDITIONS AND ANY OTHER DETAILS (INCLUDING BURIED SERVICES) ARE PRESENTED ON THE RELEVANT TP LOG.

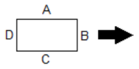
Scale: 1:20
0 0.1m 0.2m 0.4m 0.6m 0.8m

Project: THE FACTORY
MANCHESTER
Project No: A6053-16
Carried out for: BURO HAPPOLD LIMITED

Figure
HTP03

Trial Pit Log

Logged RS **Checked** PH **Approved** PH	**Start** 07/07/2016 **End** 07/07/2016	**Equipment, Methods and Remarks** CX145CXR. Hand excavated to 1.20m, machine excavated to 2.90m. Strata description for Face D. See sheet 2 for foundation details.	**Dimension and Orientation** Width 1.50 m Length 3.00 m



Ground Level	26.53 mOD
Coordinates (m)	E 383006.88
National Grid	N 397946.56

Samples and Tests

Depth	Type & No.	Records
0.50 - 0.90	B2	
0.80	ES1	
0.90 - 1.20	B4	
1.00	ES3	
1.30	ES5	
1.50	HV	p 25kPa, r 5kPa
1.50 - 2.00	B6	
2.20	HV	p 43kPa, r 11kPa
2.50 - 2.90	B7	
		07/07/16 dry

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Strong light grey CONCRETE, aggregate 60-70% of angular to subrounded fine to coarse gravel of mudstone, limestone, quartz and quartzite. (MADE GROUND)		(0.10) 0.10 +26.43	▨	░
Light brown slightly sandy GRAVEL with medium cobble content. Gravel is angular to subangular fine to coarse of limestone and sandstone. Cobbles are subangular of sandstone. (MADE GROUND)		(0.40) 0.50 +26.03	▨	░
Dark brown sandy clayey GRAVEL with medium cobble content and occasional pockets of sandy clay. Sand is of ash. Gravel is angular to subrounded fine to coarse of brick, concrete, slate, coal, sandstone, limestone, chert and slag. Occasional timber fragments. Cobbles are subangular of brick and sandstone. (MADE GROUND)		(0.40) 0.90 +25.63	▨	░
Soft to firm light grey mottled yellowish brown sandy gravelly CLAY with medium cobble content. Sand is of ash. Gravel is angular to subangular fine to coarse of brick, clinker, coal, slag and sandstone. Cobbles are subangular of brick and sandstone. (MADE GROUND)		(0.30) 1.20 +25.33	▨	░
Soft to firm orangish brown mottled grey sandy gravelly CLAY. Gravel is subangular to rounded fine to coarse of sandstone, mudstone and quartzite.		(1.30) 2.50 +24.03	▤	░
Light brown SAND AND GRAVEL with medium cobble content. Gravel is subangular to rounded fine to coarse of sandstone, mudstone, quartz, quartzite and granite. Cobbles are subrounded of sandstone.		(0.40) 2.90 +23.63	⁘	░
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depths (m)	Remarks
0.00 - 2.90	No groundwater encountered during excavation.
2.90	Trial pit terminated at base of foundation.

Stability Unstable from 1.30m to 1.50m.

Shoring None

Weather Overcast

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:48:46

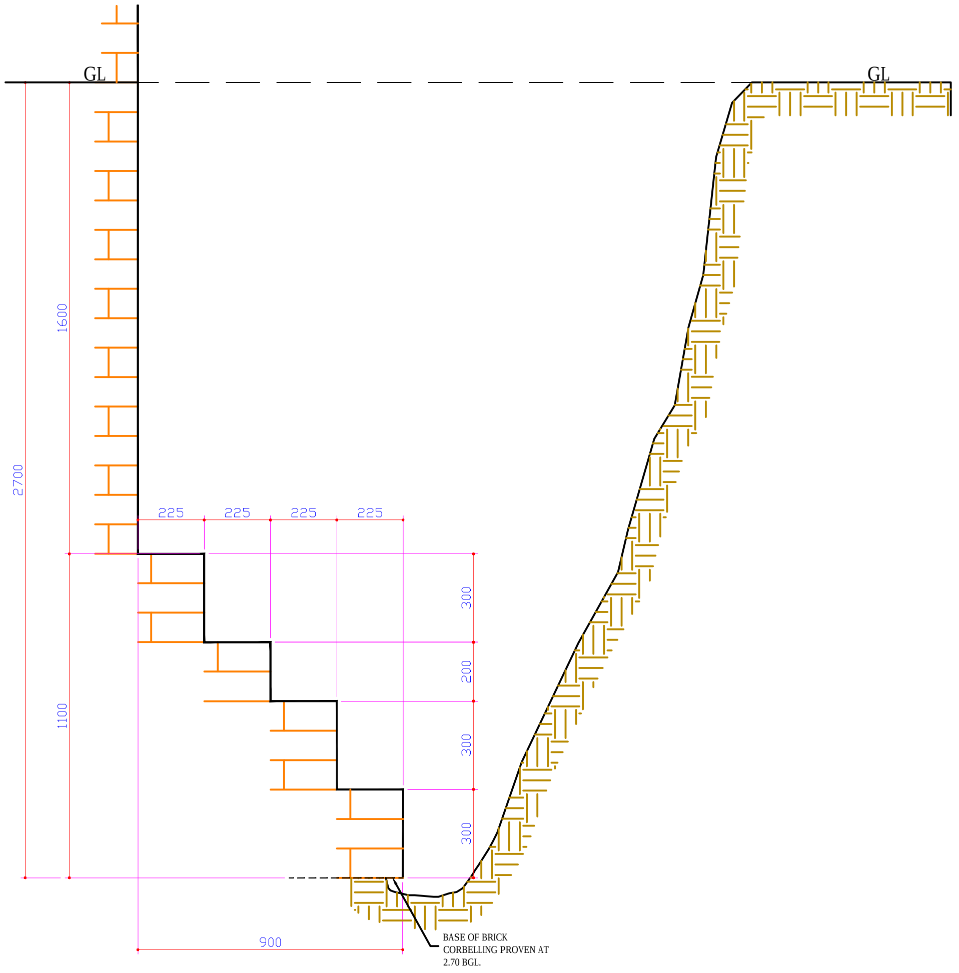
Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Trial Pit

HTP04

Sheet 1 of 1

TRIAL PIT DETAIL


GL
GL
2700
1600
1100
225
225
225
225
300
200
300
300
900
BASE OF BRICK CORBELLING PROVEN AT 2.70 BGL.

NOTE:-
SKETCH DETAILS FOUNDATION DIMENSIONS ONLY, GROUND CONDITIONS AND ANY OTHER DETAILS (INCLUDING BURIED SERVICES) ARE PRESENTED ON THE RELEVANT TP LOG.

Scale: 1:20
0 0.1m 0.2m 0.4m 0.6m 0.8m

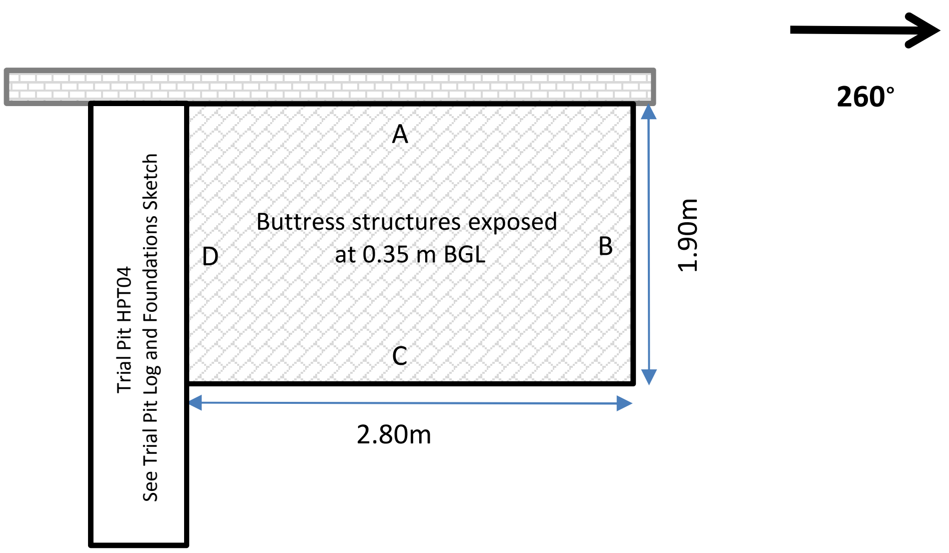
Project: THE FACTORY
MANCHESTER
Project No: A6053-16
Carried out for: BURO HAPPOLD LIMITED

Figure
HTP04

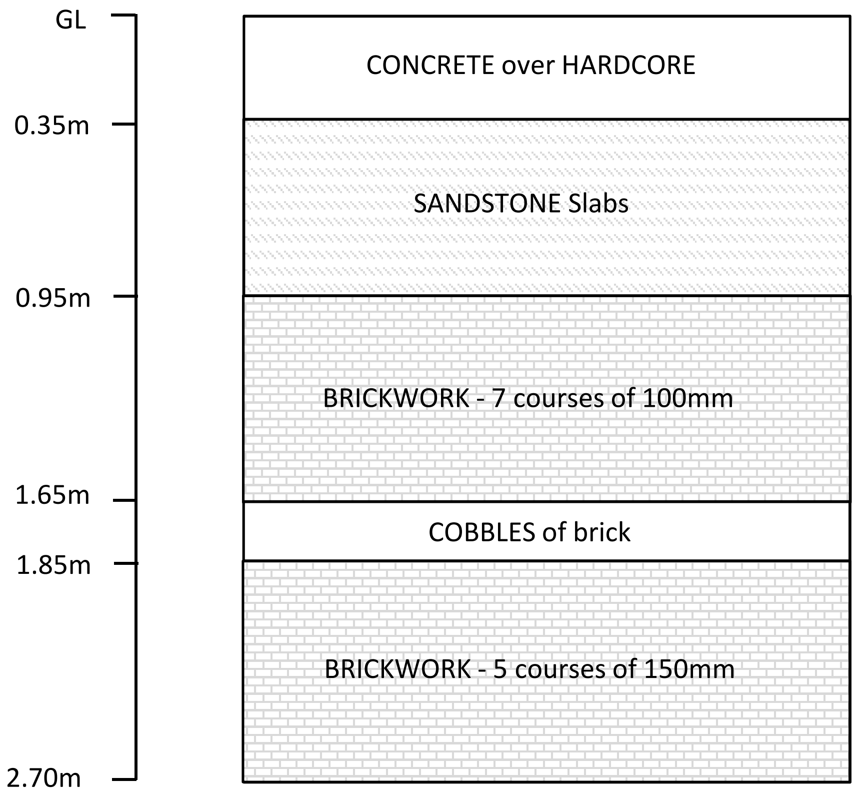
Trial Pit Detail

HTP04 - Buttress structure exposed perpendicular to wall - See associated photographs.

PLAN


260°
A
Buttress structures exposed at 0.35 m BGL
D
B
C
1.90m
2.80m
Trial Pit HPT04
See Trial Pit Log and Foundations Sketch

FACE D


GL
0.35m
0.95m
1.65m
1.85m
2.70m
CONCRETE over HARDCORE
SANDSTONE Slabs
BRICKWORK - 7 courses of 100mm
COBBLES of brick
BRICKWORK - 5 courses of 150mm

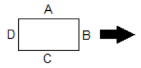
Notes:

Project THE FACTORY, MANCHESTER
Project No. A6053-16
Carried out for Buro Happold Limited

Figure
HTP04

Trial Pit Log

Logged TRB **Checked** PH **Approved** PH	**Start** 12/07/2016 **End** 12/07/2016	**Equipment, Methods and Remarks** Micro digger. Hand and machine excavated. Strata description for Face D. See sheet 2 for foundation details.	**Dimension and Orientation** Width Length



Ground Level	26.31 mOD
Coordinates (m)	E 383038.61
National Grid	N 397942.18

Samples and Tests / Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)
			CONCRETE. (MADE GROUND)		(0.20) 0.20 +26.11
0.40	ES1		Grey angular to subangular fine to coarse GRAVEL of various lithologies. (SUB-BASE) (MADE GROUND)	0.30 horizontal drain (disused)	(0.20) 0.40 +25.91
			MACADAM. (MADE GROUND)		(0.20) 0.60 +25.71
			Greyish brown gravelly clayey SAND. Gravel is subangular to subrounded fine to coarse of various lithologies. (MADE GROUND)		(0.40) 1.00 +25.31
1.20 2.00	ES2 ES3	 12/07/16 dry	Firm brown and grey sandy gravelly CLAY with medium cobble content. Gravel is subangular to rounded fine to coarse of sandstone, mudstone and brick. Cobbles are subangular to rounded of sandstone. (MADE GROUND)		(1.20) 2.20 +24.11
			END OF EXPLORATORY HOLE		

Groundwater Entries

No. Depth Strike (m) Remarks

Remarks

Depths (m)	Remarks
0.00 - 2.20	No groundwater encountered during excavation.
2.20	Trial pit terminated at base of foundation.

Stability Stable

Shoring Trench sheets

Weather Dry

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:49:02

AGS

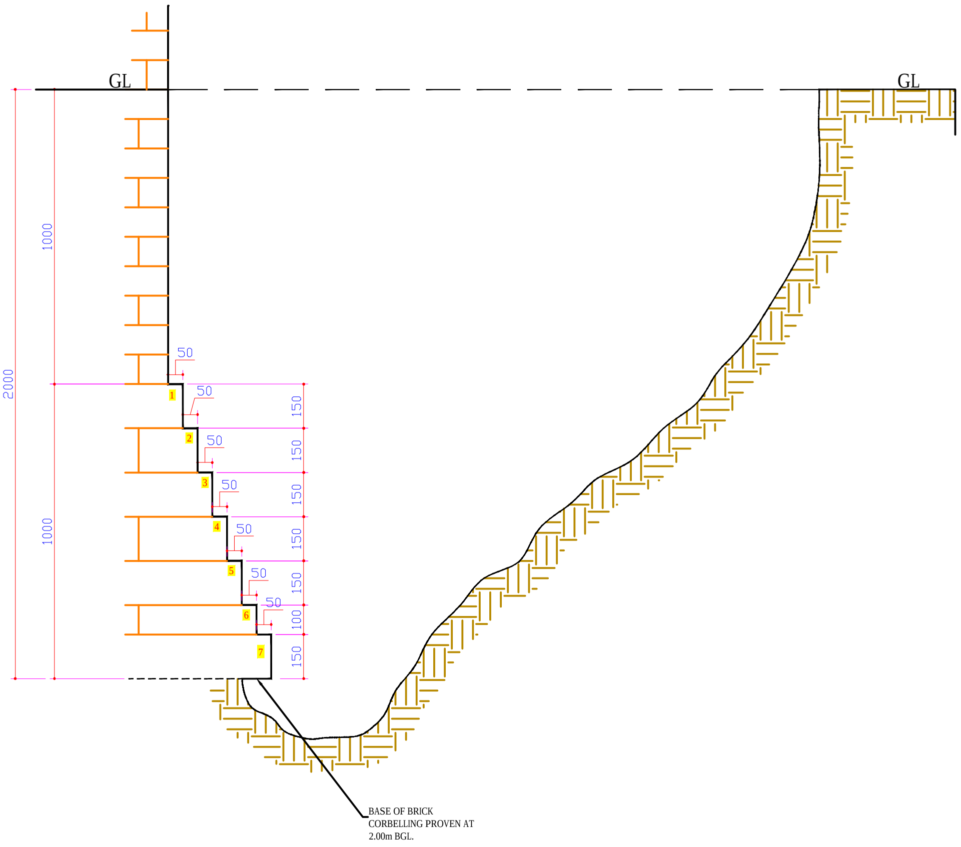
Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Trial Pit

HTP05

Sheet 1 of 1

TRIAL PIT DETAIL


GL
GL
2000
1000
1000
50
50
50
50
50
50
50
1
2
3
4
5
6
7
150
150
150
150
150
100
150
BASE OF BRICK
CORBELLING PROVEN AT
2.00m BGL.

NOTE:-
SKETCH DETAILS FOUNDATION DIMENSIONS ONLY, GROUND CONDITIONS AND ANY OTHER DETAILS (INCLUDING BURIED SERVICES) ARE PRESENTED ON THE RELEVANT TP LOG.

Scale: 1:20

0 0.1m 0.2m 0.4m 0.6m 0.8m

Project: THE FACTORY
MANCHESTER

Project No: A6053-16

Carried out for: BURO HAPPOLD LIMITED

Figure

HTP05

Trial Pit Log

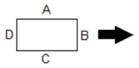
Logged	RS
Checked	PH
Approved	PH
Start	07/07/2016
End	07/07/2016

Equipment, Methods and Remarks

CX145CXR.
Hand excavated to 1.20m, machine excavated to 2.90m.
Strata description for Face D. See sheet 2 for foundation details.

Dimension and Orientation

Width 1.00 m
Length 3.00 m



Ground Level	26.32 mOD
Coordinates (m)	E 383039.52
National Grid	N 397947.41

Samples and Tests / Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)
			Medium strong to strong light pink CONCRETE, aggregate 60-70% of subangular to subrounded fine to coarse gravel of mudstone, quartz, limestone, quartzite and chert. (MADE GROUND)		(0.05) 0.05 +26.27
			Light grey slightly sandy angular to subrounded fine to coarse GRAVEL of limestone. (MADE GROUND)		(0.45) 0.50 +25.82
0.60	ES1		Black MACADAM. (MADE GROUND)		(0.15) 0.65 +25.67
0.70 - 1.20 1.20	B2 HV	 p 43kPa, r 18kPa	Soft to firm brownish yellow mottled grey sandy gravelly CLAY with medium cobble content. Gravel is angular to subrounded fine to coarse of sandstone, quartzite, coal, clinker, concrete and brick. Cobbles are subangular of sandstone and brick. (MADE GROUND)		(1.15) 1.80 +24.52
1.90 1.90 1.90 - 2.00	HV ES3 B4	p 45kPa, r 21kPa 07/07/16 dry	Soft to firm brownish yellow mottled grey sandy CLAY.		(0.50) 2.30 +24.02
			END OF EXPLORATORY HOLE		

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depths (m)	Remarks
0.00 - 2.30	No groundwater encountered during excavation.
2.30	Trial pit terminated at base of foundation.

Stability	Stable
Shoring	None
Weather	Overcast

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:49:21

AGS

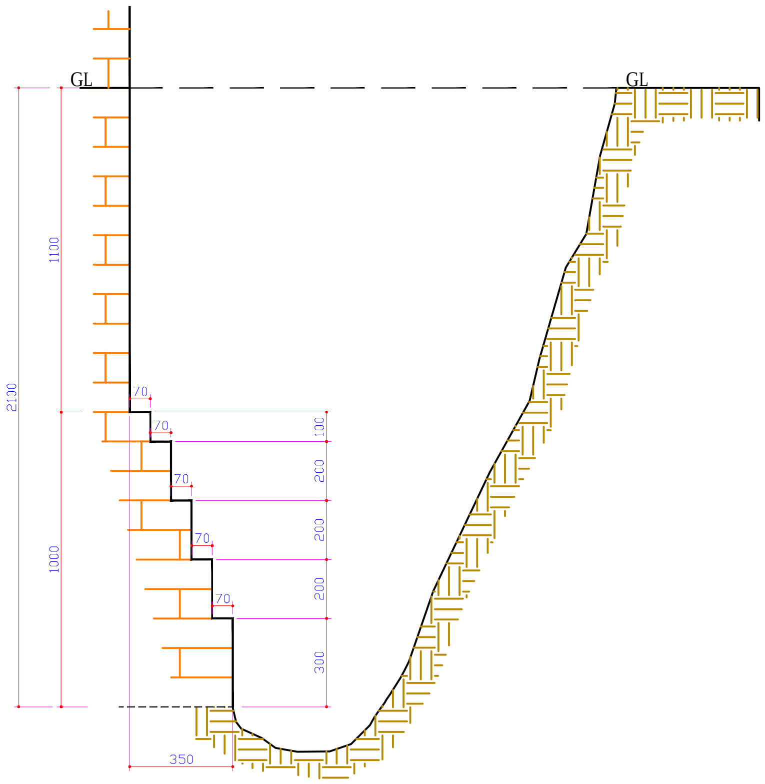
Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Trial Pit

HTP06

Sheet 1 of 1

TRIAL PIT DETAIL


GL
GL
2100
1100
1000
70
70
70
70
70
100
200
200
200
300
350

NOTE:-
SKETCH DETAILS FOUNDATION DIMENSIONS ONLY, GROUND
CONDITIONS AND ANY OTHER DETAILS (INCLUDING BURIED SERVICES)
ARE PRESENTED ON THE RELEVANT TP LOG.

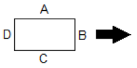
Scale: 1:20

0 0.1m 0.2m 0.4m 0.6m 0.8m

Project:	THE FACTORY MANCHESTER	Figure
Project No:	A6053-16	HTP06
Carried out for:	BURO HAPPOLD LIMITED	

Trial Pit Log

Logged TRB **Checked** PH **Approved** PH	**Start** 11/07/2016 **End** 11/07/2016	**Equipment, Methods and Remarks** JCB 3CX Machine excavated.	**Dimension and Orientation** Width 4.00 m Length 6.50 m 90 (Deg)	**Ground Level** 32.60 mOD **Coordinates (m)** E 383032.95 **National Grid** N 397937.32	



Samples and Tests

Depth	Type & No.	Records
0.50	D1	
0.50	ES3	
0.50 - 1.20	B2	
1.00		11/07/16 dry
1.20	ES4	

Strata Description

Main	Detail	Depth	Level	(Thickness)	Legend	Backfill
MACADAM. (MADE GROUND)		0.20	+32.40	(0.20)	▨	▒
CONCRETE. (MADE GROUND)		0.50	+32.10	(0.30)	▨	▒
Brown gravelly SAND. Gravel is angular to subangular fine to coarse of various lithologies. (MADE GROUND)		0.60	+32.00	(0.10)	▨	▒
Black and grey sandy slightly clayey GRAVEL with low cobble content. Gravel is angular to subangular fine to coarse of various lithologies. Cobbles are angular of brick and concrete. (MADE GROUND)		1.00	+31.60	(0.40)	▨	▒
Red sandy angular fine to coarse GRAVEL of predominantly brick. (MADE GROUND)		1.20	+31.40	(0.20)	▨	▒
END OF EXPLORATORY HOLE						

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depths (m)	Remarks
0.00 - 1.20	No groundwater encountered during excavation.
1.20	Geophysical survey carried out.

Stability Stable

Shoring None

Weather Raining

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:52:42

AGS

Project **THE FACTORY, MANCHESTER**

Project No. **A6053-16**

Carried out for **Buro Happold Limited**

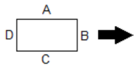
Trial Pit

HTP07

Sheet 1 of 1

Trial Pit Log

Logged RS **Checked** PH **Approved** PH	**Start** 11/07/2016 **End** 11/07/2016	**Equipment, Methods and Remarks** CX145CXR. Hand and machine excavated.	**Dimension and Orientation** Width 1.00 m Length 2.70 m



Ground Level	26.54 mOD
Coordinates (m)	E 383016.64
National Grid	N 397947.25

Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
			Strong light grey CONCRETE, 60-70% aggregate of angular to subrounded fine to coarse gravel of mudstone, limestone and quartzite. (MADE GROUND)		0.10 +26.44 (0.10)		
0.20	ES1		Yellowish brown and light grey slightly sandy slightly clayey angular to subangular fine to coarse GRAVEL of limestone and sandstone. (MADE GROUND)		0.60 +25.94 (0.50)		
0.40 - 0.50	B2						
0.65 - 0.95	B4		Dark brown slightly sandy slightly gravelly CLAY with high cobble content and rare roots up to 3mm. Gravel is angular to subangular fine to coarse of brick, coal, sandstone, limestone, bitumen, slate, quartzite and concrete. Rare glass bottles and glass and plastic fragments. Cobbles are angular to subangular of sandstone and brick. (MADE GROUND)		1.05 +25.49 (0.45)		
1.00	ES3						
			Very soft to soft orangish brown, mottled grey, slightly gravelly sandy CLAY with occasional bands 30-50mm of slightly silty sand. Gravel is subangular to rounded fine to coarse of flint, sandstone and mudstone.		1.75 +24.79 (0.70)		
1.30	ES5						
1.40 - 1.80	B6						
1.80 - 2.20	B7	11/07/16 dry	Orangish brown slightly silty SAND AND GRAVEL with low cobble content. Gravel is subangular to rounded fine to coarse of sandstone, flint, mudstone, granite and quartzite. Cobbles are subrounded of sandstone and mudstone.		2.20 +24.34 (0.45)		
			END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depths (m)	Remarks
0.00 - 2.20	No groundwater encountered during excavation.
2.20	Trial pit terminated at base of foundation.

Stability	Stable
Shoring	None
Weather	Raining

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
12/10/2016 14:53:04

AGS

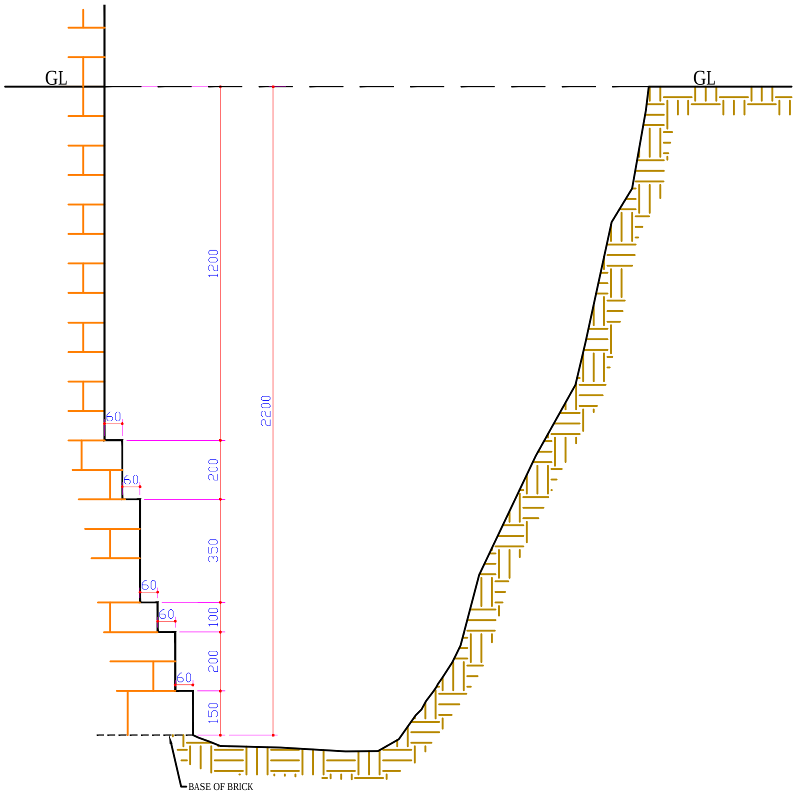
Project	**THE FACTORY, MANCHESTER**
Project No.	**A6053-16**
Carried out for	**Buro Happold Limited**

Trial Pit

HTP08

Sheet 1 of 1

TRIAL PIT DETAIL


GL
GL
1200
2200
60
200
60
350
60
100
60
200
60
150

BASE OF BRICK
CORBELLING PROVEN AT
2.20m BGL.

NOTE:-
SKETCH DETAILS FOUNDATION DIMENSIONS ONLY, GROUND
CONDITIONS AND ANY OTHER DETAILS (INCLUDING BURIED SERVICES)
ARE PRESENTED ON THE RELEVANT TP LOG.

Scale: 1:20
0 0.1m 0.2m 0.4m 0.6m 0.8m

Project: THE FACTORY
MANCHESTER
Project No: A6053-16
Carried out for: BURO HAPPOLD LIMITED

Figure
HTP08

APPENDIX C

INSTRUMENTATION AND MONITORING

Groundwater Installation Details	Table C1
Groundwater Monitoring	Table C2
Gas Monitoring	Table C3

Groundwater Installation Details

Instrument Reference	Instrument Type (See Notes)	Installation Date, dd/mm/yyyy	Pipe Diameter, mm	Instrument Base, mbgl	Response Zone Range, mbgl	Pipe Top Details	Headworks	Remarks
BH01 (D)	SPIE	04/07/2016	19	12.00	10.00 to 12.50	Open	Stop cock cover	
BH01 (S)	SP	04/07/2016	50	4.00	2.00 to 4.00	Gas tap	Stop cock cover	
BH02 (D)	SPIE	07/07/2016	19	3.50	2.50 to 3.50	Open	Stop cock cover	
BH02 (S)	SP	07/07/2016	50	1.50	1.00 to 1.50	Gas tap	Stop cock cover	
BH03 (D)	SPIE	08/07/2016	19	4.20	4.00 to 4.50	Open	Stop cock cover	
BH03 (S)	SP	08/07/2016	50	3.00	1.50 to 3.00	Gas tap	Stop cock cover	
WS02 (1)	SP	24/06/2016	50	2.00	1.00 to 2.00	Gas tap	Flush cover.	
WS06 (1)	SP	23/06/2016	50	2.00	1.00 to 2.00	Gas tap	Flush cover.	
WS08 (1)	SP	23/06/2016	50	3.50	2.00 to 3.50	Gas tap	Flush cover.	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well

AGS

Project	**THE FACTORY, MANCHESTER**	**Table**
Project No.	**A6053-16**	**C1**
Carried out for	**Buro Happold Limited**	

Groundwater Monitoring

Instrument Reference	Instrument Type	Instrument Base, mbgl	Date Time dd/mm/yyyy hh:mm:ss	Depth to groundwater, mbgl	Comments
BH01 (D)	SPIE	12.00	05/07/2016 15:10:00	2.80	
			28/07/2016 12:20:00	3.04	
			11/08/2016 12:30:00	3.07	
			25/08/2016 14:30:00	3.00	
			Early September	-	No access to site due to filming
			22/09/2016	-	No access due to parked vehicles
			27/09/2016	3.15	
BH01 (S)	SP	4.00	05/07/2016 15:10:00	2.35	
			28/07/2016 12:15:00	3.00	
			11/08/2016 12:25:00	2.92	
			25/08/2016 14:25:00	2.13	
			Early September	-	No access to site due to filming
			22/09/2016	-	No access due to parked vehicles
			27/09/2016	3.20	
BH02 (D)	SPIE	3.50	05/07/2016	-	Not installed at this time.
			28/07/2016 12:35:00	Dry	
			11/08/2016 12:40:00	Dry	
			25/08/2016 14:15:00	Dry	
			Early September	-	No access to site due to filming
			22/09/2016	-	No access due to parked vehicles
			27/09/2016	Dry	
BH02 (S)	SP	1.50	05/07/2016	-	Not installed at this time.
			28/07/2016 12:30:00	Dry	
			11/08/2016 12:35:00	Dry	
			25/08/2016 14:10:00	Dry	
			Early September	-	No access to site due to filming
			22/09/2016	-	No access due to parked vehicles
			27/09/2016	Dry	
BH03 (D)	SPIE	4.20	05/07/2016	-	Not installed at this time.
			28/07/2016 12:05:00	3.80	
			11/08/2016	-	
			25/08/2016 14:45:00	3.76	
			Early September	-	No access to site due to filming
			22/09/2016	3.58	
			27/09/2016	3.65	
BH03 (S)	SP	3.00	05/07/2016	-	Not installed at this time.
			28/07/2016 12:00:00	Dry	
			11/08/2016	-	
			25/08/2016 14:40:00	Dry	
			Early September	-	No access to site due to filming
			22/09/2016	3.00	
			27/09/2016	3.05	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well

Project	**THE FACTORY, MANCHESTER**	**Table**
Project No.	**A6053-16**	**C2**
Carried out for	**Buro Happold Limited**	Sheet 1 of 2

Groundwater Monitoring

Instrument Reference	Instrument Type	Instrument Base, mbgl	Date Time dd/mm/yyyy hh:mm:ss	Depth to groundwater, mbgl	Comments
WS02 (1)	SP	2.00	05/07/2016 15:00:00	1.80	
			28/07/2016 12:45:00	Dry	
			11/08/2016 12:45:00	Dry	
			25/08/2016 14:00:00	Dry	
			Early September	-	No access to site due to filming
			22/09/2016	-	No access due to parked vehicles
			27/09/2016	1.86	
WS06 (1)	SP	2.00	05/07/2016 14:55:00	Dry	
			28/07/2016 12:55:00	Dry	
			11/08/2016 12:55:00	Dry	
			25/08/2016 13:50:00	Dry	
			Early September	-	No access to site due to filming
			22/09/2016	Dry	
			27/09/2016	Dry	
WS08 (1)	SP	3.50	05/07/2016 14:50:00	3.12	
			28/07/2016 13:05:00	Dry	
			11/08/2016 13:05:00	Dry	
			25/08/2016 13:40:00	Dry	
			Early September	-	No access to site due to filming
			22/09/2016	Dry	
			27/09/2016	Dry	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well

AGS

Project	**THE FACTORY, MANCHESTER**	**Table**
Project No.	**A6053-16**	**C2**
Carried out for	**Buro Happold Limited**	Sheet 2 of 2

Gas Monitoring

							Gas Concentrations						
Instrument Reference	Date Time dd/mm/yyyy hh:mm:ss	Air Temperature, oC	Barometric Pressure, mbar	Instrument Base, mbgl	Gas Differential Pressure, Pa	Gas Flow Rate, l/hr	Carbon Dioxide, %vol	Carbon Monoxide, ppm	Hydrogen Sulphide, ppm	Methane, %LEL	Methane, %vol	Nitrogen, %vol	Oxygen, %vol
BH01 (S)	28/07/2016	16.0	1008	4.00	Unable to monitor gas due to damaged gas tap / bung								
	11/08/2016	18.0	1017										
	25/08/2016	16.0	1014										
	Early Sept	-	-		Site inaccessible due to filming								
	22/09/2016	-	-		No access due to parked vehicles								
	27/09/2016	17.0	1008		0.0	0.1	0.0	0.0	0.0	0.0	0.0	79.0	20.9
BH02 (S)	28/07/2016 12:30:00	16.0	1008	1.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.1	20.8
	11/08/2016 12:35:00	18.0	1017		0.0	0.0	0.2	0.0	0.0	0.0	0.0	78.8	20.9
	25/08/2016 14:10:00	16.0	1014		0.0	0.0	0.1	0.0	0.0	0.0	0.0	79.0	20.8
	Early Sept	-	-		Site inaccessible due to filming								
	22/09/2016	-	-		No access due to parked vehicles								
	27/09/2016	17.0	1008		0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.2	20.2
BH03 (S)	28/07/2016 12:00:00	16.0	1008	3.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.7	21.2
	11/08/2016	-	-		No access								
	25/08/2016 14:40:00	16.0	1014		0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.9	21.0
	Early Sept	-	-		Site inaccessible due to filming								
	22/09/2016		1015		0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.3	20.6
	27/09/2016	17.0	1008		0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.3	20.6
WS02 (1)	28/07/2016 12:45:00	16.0	1008	2.00	0.0	0.1	0.3	0.0	0.0	0.0	0.0	79.6	20.0
	11/08/2016 12:45:00	18.0	1017	2.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.7	21.2
	25/08/2016 14:00:00	16.0	1014	2.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.8	21.1
	Early Sept	-	-		Site inaccessible due to filming								
	22/09/2016	-	-		No access due to parked vehicles								
	27/09/2016	17.0	1008	2.00	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	79.2	20.8
WS06 (1)	28/07/2016 12:55:00	16.0	1008	2.00	0.0	0.1	0.6	0.0	0.0	0.0	0.0	79.6	19.7
	11/08/2016 12:55:00	18.0	1017		0.0	0.0	0.1	0.0	0.0	0.0	0.0	78.8	20.9
	25/08/2016 13:50:00	16.0	1014		0.0	0.1	0.8	0.0	0.0	0.0	0.0	79.4	19.7
	Early Sept	-	-		Site inaccessible due to filming								
	22/09/2016		1015		0.0	0.0	1.1	0.0	0.0	0.0	0.0	79.2	19.6
	27/09/2016	17.0	1008		0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.0	20.9
WS08 (1)	28/07/2016 13:05:00	16.0	1008	3.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.2	20.7
	11/08/2016 13:05:00	18.0	1017		0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.8	21.1
	25/08/2016 13:40:00	16.0	1014		0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.7	21.2
	Early Sept	-	-		Site inaccessible due to filming								
	22/09/2016		1015		0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.2	20.7
	27/09/2016	17.0	1008		0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.1	20.8

Notes: ND - not detected

Project	**THE FACTORY, MANCHESTER**	**Table**
Project No.	**A6053-16**	**C3**
Carried out for	**Buro Happold Limited**	

APPENDIX D

GEOTECHNICAL LABORATORY TEST RESULTS

Index Properties – Summary of Results	INDX 1
Particle Size Distribution Analyses	PSD 1 to 5
Dry Density / Moisture Content Relationship	COMPH 1 to 3
Point Load Index Testing	PLT 1 and 2
Uniaxial Compressive Strength of Rock	RUCS 1
pH and Water Soluble Sulphate Content of Soils	CHEM 1

INDEX PROPERTIES - SUMMARY OF RESULTS

Project No	Project Name
A6053-16	THE FACTORY

Hole No.	Sample				Soil Description	p	p_d	w	< 425 µm sieve	W_L	W_P	I_P	p_s	Remarks
	No.	Depth (m)		type										
		from	to			Mg/m^3		%	%	%	%		Mg/m^3	
MTP03	6	1.60	2.00	B	Brown slightly sandy CLAY.			24	100 n	48 a	27	21		
MTP04	5	1.40		D	Brown slightly sandy CLAY.			26	96 s	38 a	25	13		
MTP05	9	2.60	3.00	B	Brown slightly sandy slightly gravelly CLAY			27	95 s	36 a	24	12		
MTP06	6	1.50	1.80	B	Yellowish brown mottled dark brown slightly sandy slightly gravelly CLAY.			30	99 s	45 a	27	18		
WS02	7	1.80	2.30	B	Greyish brown slightly sandy slightly gravelly CLAY.			17	93 s	36 a	22	14		
WS08	4	1.20	1.65	D	Brown slightly sandy slightly gravelly CLAY.			23						

General notes: All above tests carried out to BS1377 : 1990 unless annotated otherwise. See individual test reports for further details.

Key :	p bulk density, linear	W_L Liquid limit	W_P	Plastic limit	<425um preparation	p_s particle density
	p_d dry density	a 4 point cone test	NP	non - plastic	n from natural soil	-g = gas jar
	w moisture content	b 1 point cone test	I_P	Plasticity Index	s sieved specimen	-p = small pyknometer

QA Ref

SLR 1
Rev 91
Mar 12

ESG Environmental Scientifics Group

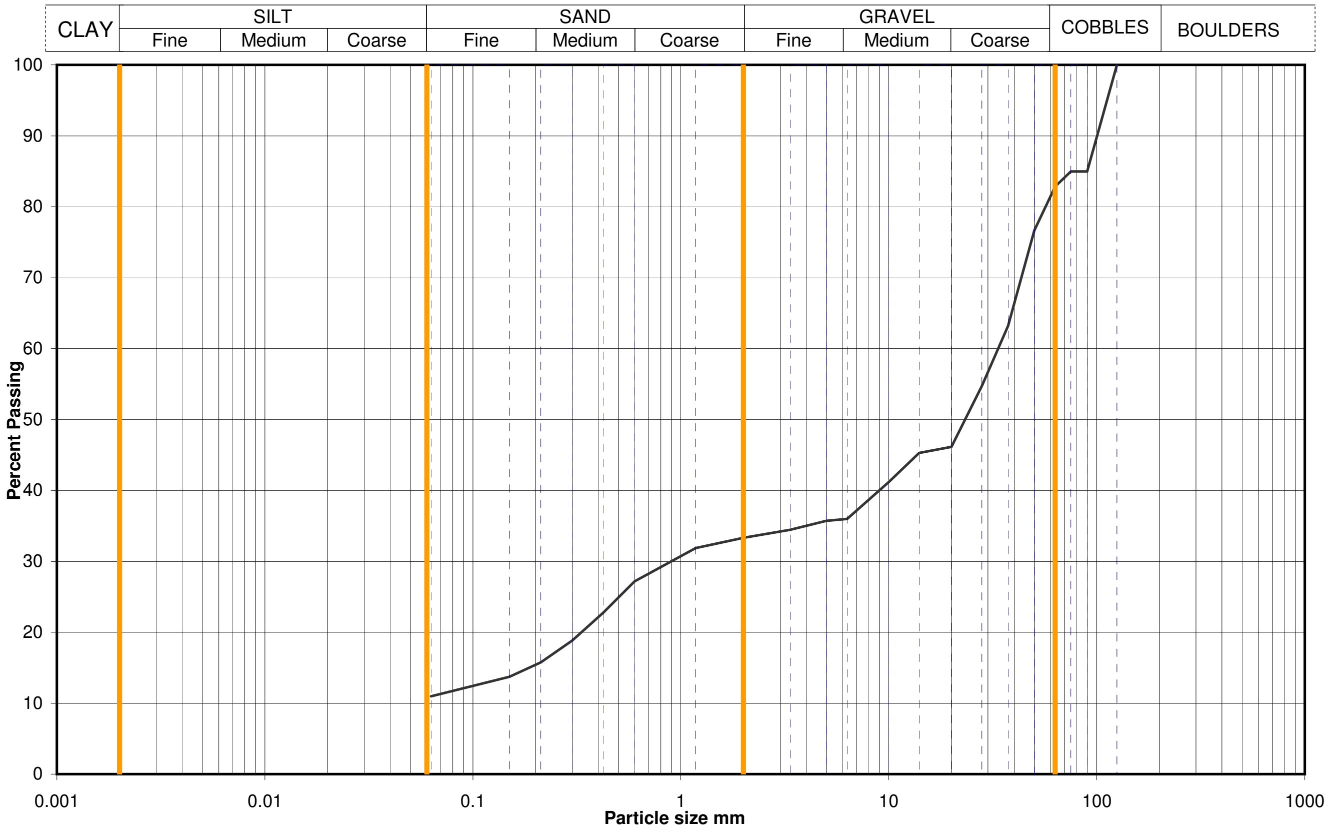
Printed:25/08/2016 12:29

Table

INDX

Particle Size Distribution Analysis

Project No	A6053-16	Sample Details:	Hole No	MTP06		
Project Name	THE FACTORY		Depth (m BGL)	2.00		
			Samp No	7	Type	B
			ID	A6053-1620160707113942		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	85		
75	85		
63	83		
50	77		
37.5	63		
28	55		
20	46		
14	45		
10	41		
6.3	36		
5.0	36		
3.35	34		
2.00	33		
1.18	32		
0.600	27		
0.425	23		
0.300	19	Dry mass of sample, kg	
0.212	16		
0.150	14	20.5	
0.063	11		

Soil description	Brown sandy clayey GRAVEL with two cobbles.		
Preparation / Pretreatment	Sieve: pre dried,		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	17	0
	Gravel	50	60
	Sand	22	27
	Silt	silt+clay =	
	Clay	11	13

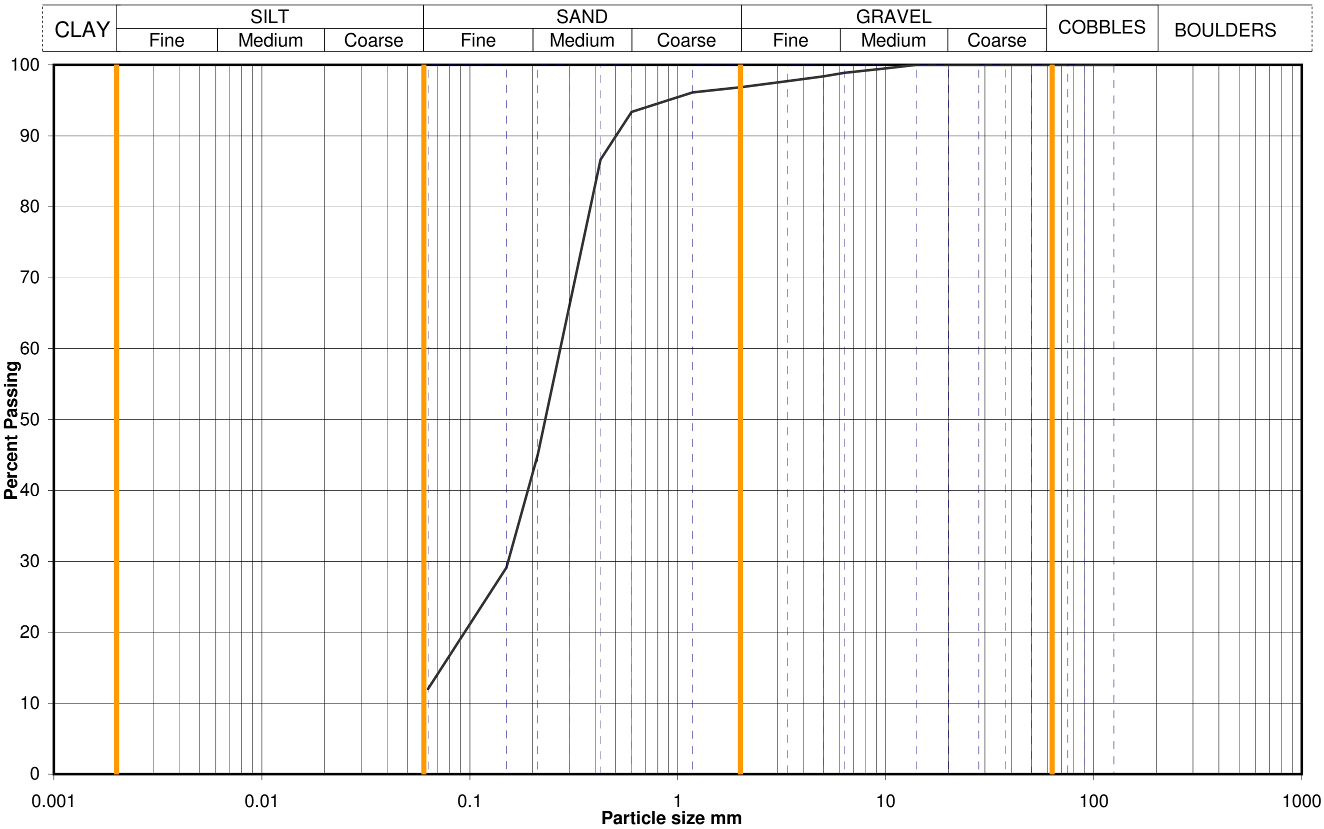
Uniformity Coefficient	**D_{60} / D_{10}**	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group UKAS TESTING 1157	Printed:25/08/2016 12:37	**Figure** **PSD**

Particle Size Distribution Analysis

Project No	A6053-16	Sample Details:	Hole No	WS02
Project Name	THE FACTORY		Depth (m BGL)	3.50
			Samp No	11
			Type	B
			ID	A6053-1620160706020843
			Spec Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	99		
5.0	98		
3.35	98		
2.00	97		
1.18	96		
0.600	93		
0.425	87		
0.300	66	Dry mass of sample, kg	
0.212	45		
0.150	29	2.4	
0.063	12		

Soil description	Reddish brown slightly gravelly clayey SAND
Preparation / Pretreatment	Sieve: pre dried,
Remarks	

		Whole	*<63mm
Sample Proportions *<60mm values to aid description only	Cobbles / boulders	0	0
	Gravel	3	3
	Sand	85	85
	Silt	silt+clay =	
	Clay	12	12

Uniformity Coefficient	D_{60} / D_{10}	Not applicable

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref

SLR 2,9
Rev 88
Aug 11

ESG Environmental Scientifics Group

UKAS TESTING 1157

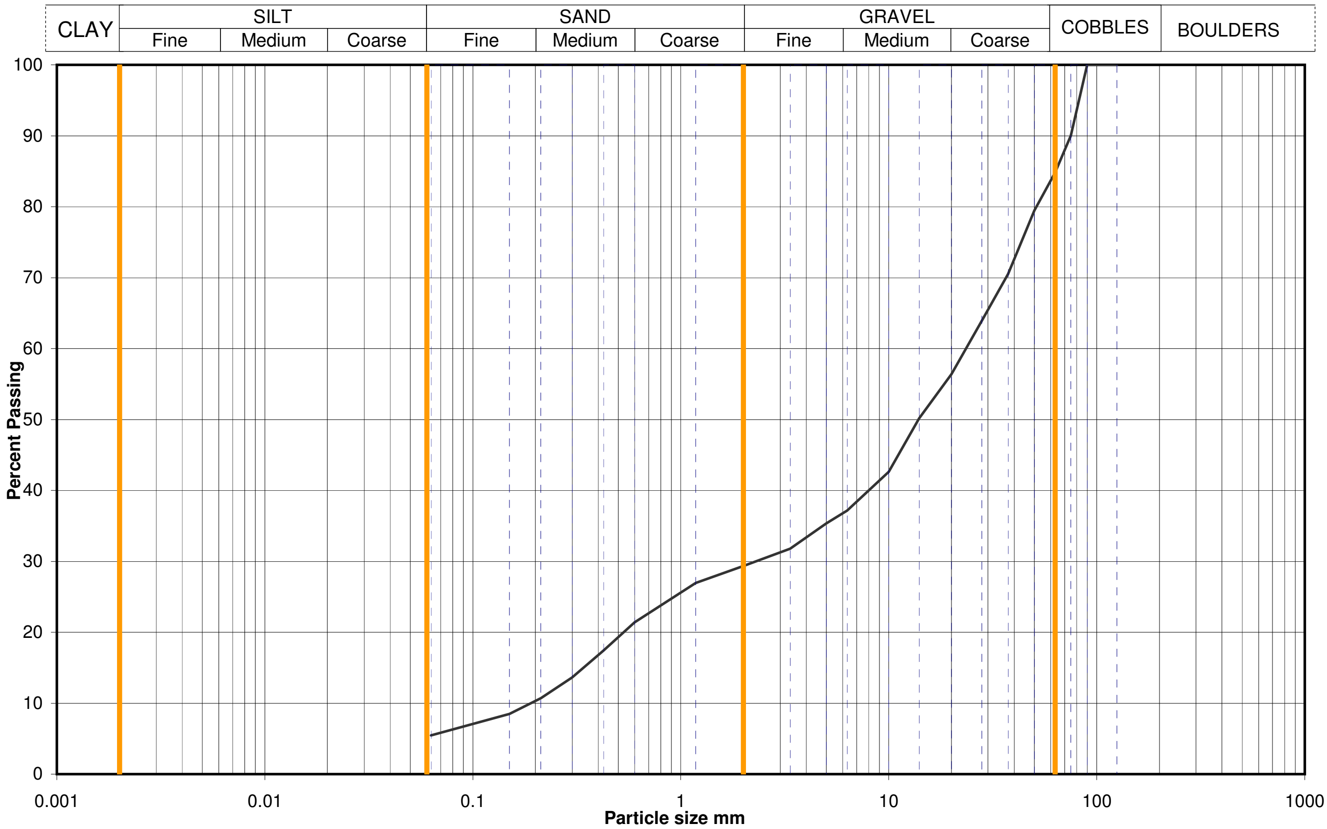
Printed:25/08/2016 12:37

Figure

PSD

Particle Size Distribution Analysis

Project No	A6053-16	Sample Details:	Hole No	WS04		
Project Name	THE FACTORY		Depth (m BGL)	1.80		
			Samp No	6	Type	B
			ID	A6053-1620160706021125		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	90		
63	85		
50	79		
37.5	71		
28	64		
20	56		
14	50		
10	43		
6.3	37		
5.0	35		
3.35	32		
2.00	29		
1.18	27		
0.600	21		
0.425	17		
0.300	14	Dry mass of sample, kg	
0.212	11		
0.150	8	6.2	
0.063	5		

Soil description	Dark brown very sandy clayey GRAVEL. With two cobbles.		
Preparation / Pretreatment	Sieve: natural material		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	15	0
	Gravel	56	66
	Sand	24	28
	Silt	silt+clay =	
	Clay	5	6

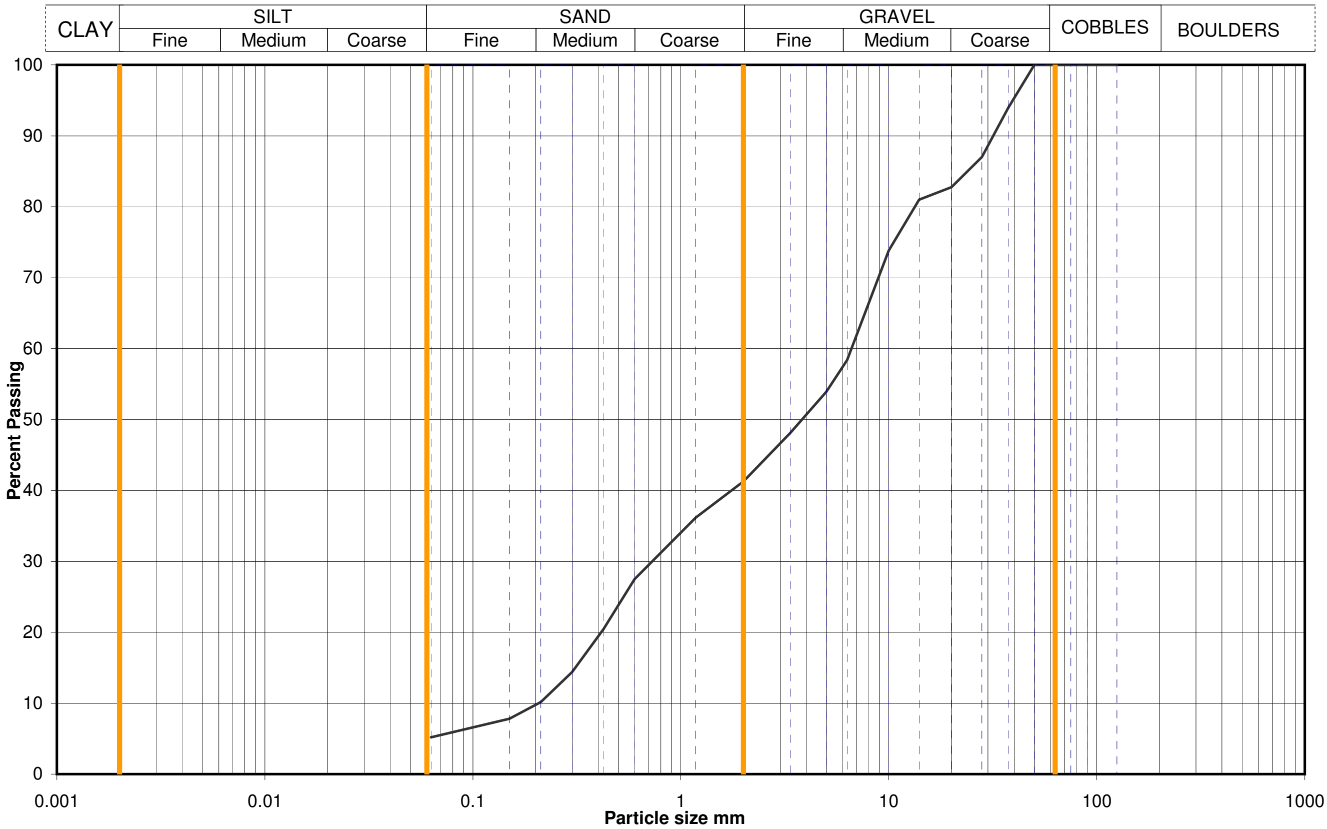
Uniformity Coefficient	**D_{60} / D_{10}**	124

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref SLR 2,9 Rev 88 Aug 11	ESG Environmental Scientifics Group UKAS TESTING 1157	Printed:25/08/2016 12:37	**Figure** **PSD**

Particle Size Distribution Analysis

Project No	A6053-16	Sample Details:	Hole No	WS05		
Project Name	THE FACTORY		Depth (m BGL)	2.60		
			Samp No	7	Type	B
			ID	A6053-1620160706021245		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	94		
28	87		
20	83		
14	81		
10	74		
6.3	58		
5.0	54		
3.35	48		
2.00	41		
1.18	36		
0.600	27		
0.425	20		
0.300	14	Dry mass of sample, kg 3.0	
0.212	10		
0.150	8		
0.063	5		

Soil description	Brown very sandy clayey GRAVEL.
Preparation / Pretreatment	Sieve: pre dried,
Remarks	

Sample Proportions *<60mm values to aid description only		Whole	*<63mm
	Cobbles / boulders	0	0
	Gravel	59	59
	Sand	36	36
	Silt	silt+clay =	
	Clay	5	5

Uniformity Coefficient	**D_{60} / D_{10}**	32

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.3 dry sieve
	Sedimentation	none

QA Ref

SLR 2,9
Rev 88
Aug 11

ESG Environmental Scientifics Group

UKAS TESTING 1157

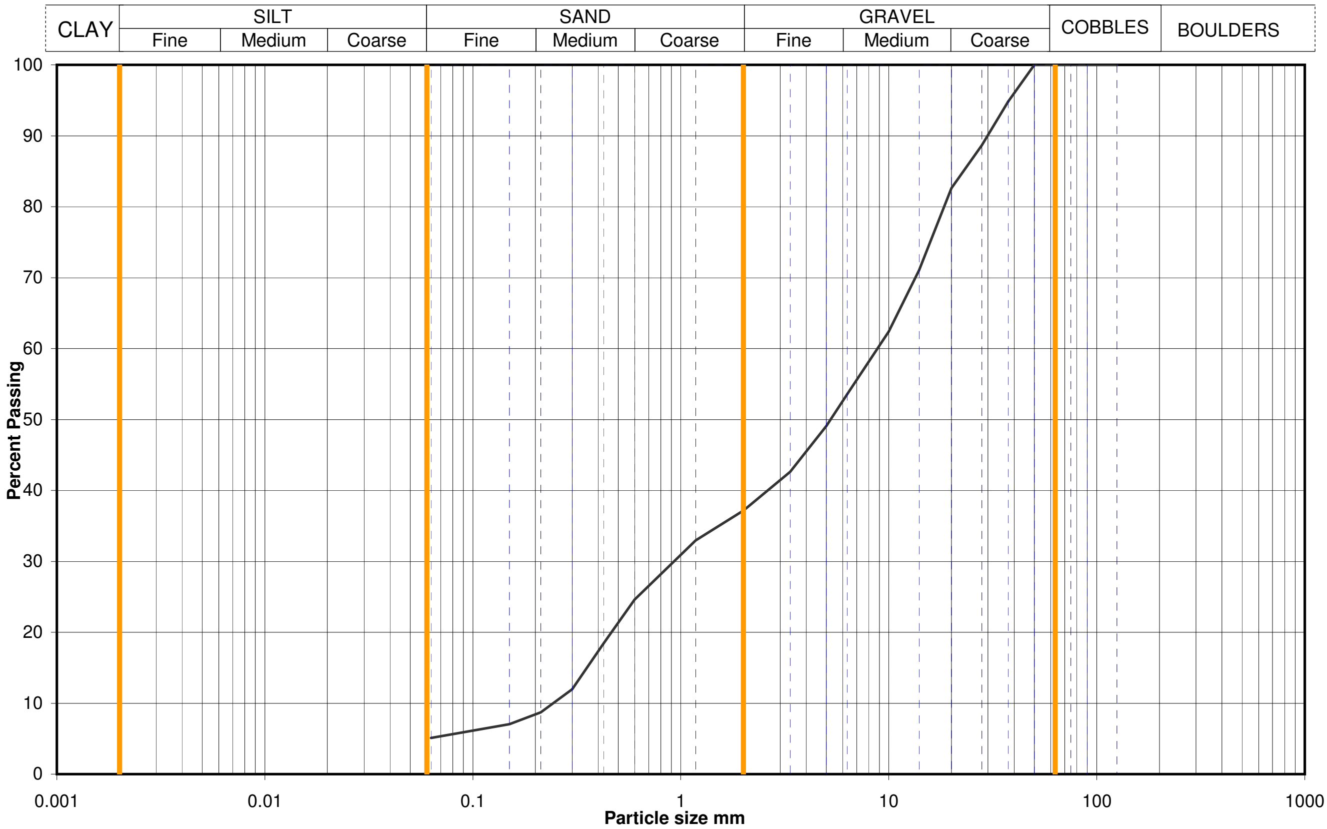
Printed:25/08/2016 12:37

Figure

PSD

Particle Size Distribution Analysis

Project No	A6053-16	Sample Details:	Hole No	WS06		
Project Name	THE FACTORY		Depth (m BGL)	2.00		
			Samp No	8	Type	B
			ID	A6053-1620160706021442		
			Spec Ref			



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	95		
28	89		
20	83		
14	71		
10	62		
6.3	54		
5.0	49		
3.35	43		
2.00	37		
1.18	33		
0.600	25		
0.425	18		
0.300	12	Dry mass of sample, kg	
0.212	9		
0.150	7	6.8	
0.063	5		

Soil description	Greyish brown very sandy clayey GRAVEL.
Preparation / Pretreatment	Sieve: natural material
Remarks	

		Whole	*<63mm
Sample Proportions *<60mm values to aid description only	Cobbles / boulders	0	0
	Gravel	63	63
	Sand	32	32
	Silt	silt+clay =	
	Clay	5	5

Uniformity Coefficient D_{60} / D_{10}	36

Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

QA Ref

SLR 2,9
Rev 88
Aug 11

Environmental Scientifics Group

UKAS TESTING 1157

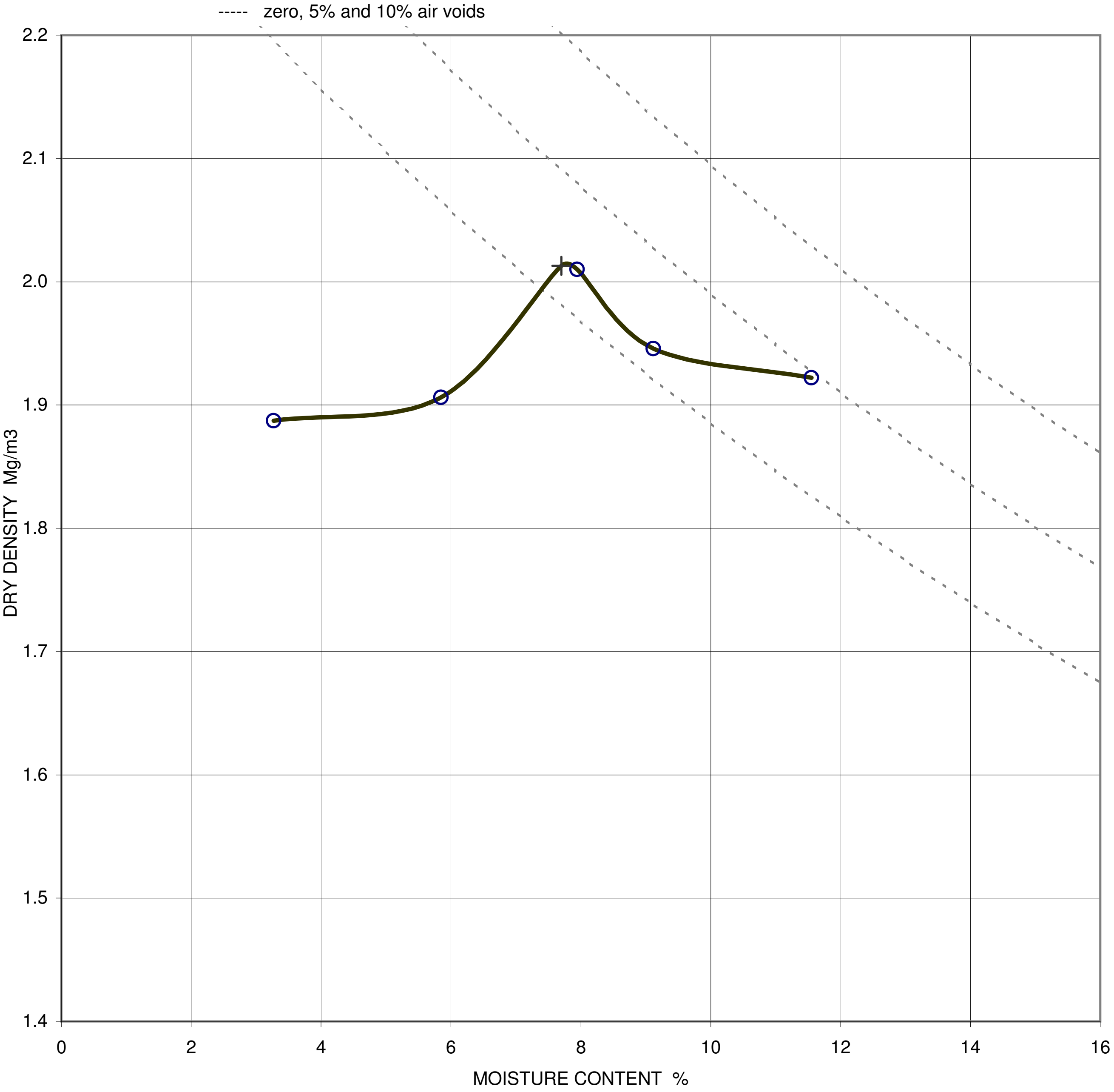
Printed:25/08/2016 12:37

Figure

PSD

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Project No	A6053-16	Sample Details:	Hole No	MTP03		
Project Name	THE FACTORY		Depth (m BGL)	2.00		
			Samp No	7	Type	B
			ID	A6053-1620160707023431		
			Spec Ref			



Soil description	Brown gravelly SAND	
Test method	BS 1377:part 4:1990: clause 3.5, 4.5 kg rammer in a 1 litre mould	
Preparation	Original material was natural, separate specimens tested	
Material > 37.5mm	0	%
Material < 37.5mm > 20mm	0	%
Particle density	2.65	assumed
Remarks		

Derived Parameters +

Maximum dry density, Mg/m3

2.01

Optimum moisture content, %

7.7

QA Ref

SLD 4, 3.5/6
Rev 66
Aug 11

ESG Environmental Scientifics Group

UKAS TESTING 1157

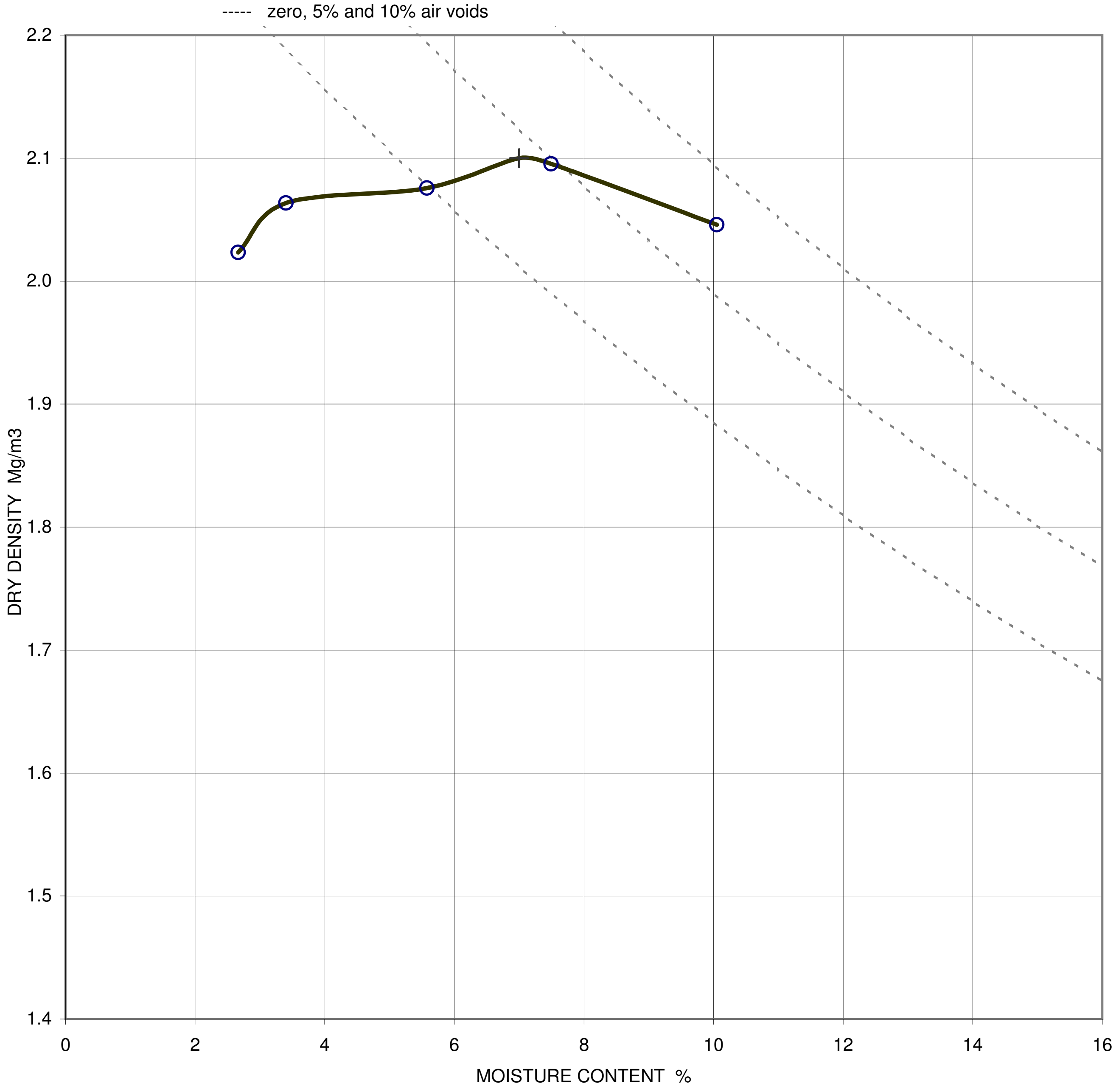
Printed:25/08/2016 12:33

Figure

COMPH

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Project No	A6053-16	Sample Details:	Hole No	MTP04		
Project Name	THE FACTORY		Depth (m BGL)	2.20		
			Samp No	8	Type	B
			ID	A6053-1620160704125049		
			Spec Ref			



Soil description	Brown slightly sandy slightly gravelly CLAY.		
Test method	BS 1377:part 4:1990: clause 3.6, 4.5 kg rammer in a CBR mould		
Preparation	Original material was natural, single sample tested		
Material > 37.5mm	4	%	
Material < 37.5mm > 20mm	8	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3

2.10

Optimum moisture content, %

7.0

QA Ref

SLD 4, 3.5/6
Rev 66
Aug 11

ESG Environmental Scientifics Group

UKAS TESTING 1157

Printed:25/08/2016 12:33

Figure

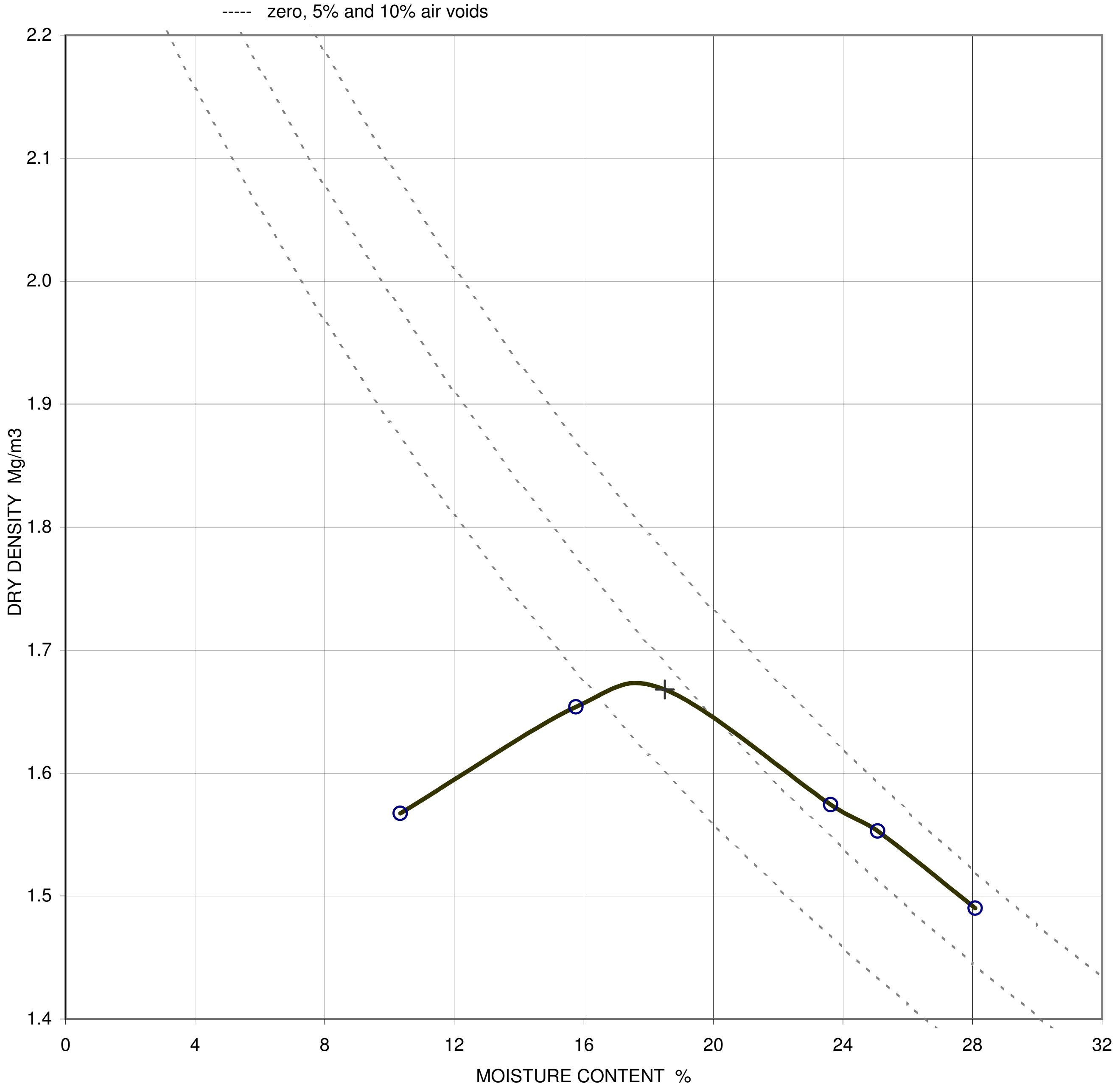
COMPH

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Project No	A6053-16
Project Name	THE FACTORY

Sample Details:

Hole No	MTP06		
Depth (m BGL)	0.90		
Samp No	4	Type	B
ID	A6053-1620160707113929		
Spec Ref			



Soil description	Brown slightly sandy CLAY.	
Test method	BS 1377:part 4:1990: clause 3.5, 4.5 kg rammer in a 1 litre mould	
Preparation	Original material was natural, single sample tested	
Material > 37.5mm	0	%
Material < 37.5mm > 20mm	0	%
Particle density	2.65	assumed
Remarks		

Derived Parameters +

Maximum dry density, Mg/m3

1.67

Optimum moisture content, %

19

QA Ref

SLD 4, 3.5/6
Rev 66
Aug 11

ESG Environmental Scientifics Group

UKAS TESTING 1157

Printed:25/08/2016 12:33

Figure

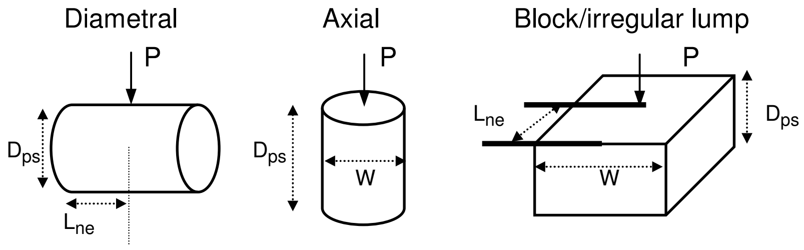
COMPH

Point Load Index Test
ISRM:1985

Project No	Project Name
A6053-16	THE FACTORY

All specimens tested at **as received water content** unless shown otherwise

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction (U = unknown or random)
L - parallel to planes of weakness
P - perpendicular to planes of weakness
Dimensions
D_{ps} - Distance between platens (platen separation)
D_{ps}' - at failure (see ISRM note 6)
L_{ne} - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions				LOAD P	De equivalent diameter, mm	Point Load Index MPa F = (De/50)$^{0.45}$		Remarks
							Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN		I_s	$I_{s(50)}$	
BH01	5.45 - 5.54	11	CS			SANDSTONE	A	U	Y		86.0	52.0	48.0	0.50	72.50	0.10	0.11	
BH01	9.28 - 9.40	12	CS			SANDSTONE	A	U	Y		86.0	51.0	50.0	0.10	73.99	0.02	0.02	
BH01	9.40 - 9.50	13	CS			SANDSTONE	A	L	N		86.4	68.0	66.0	0.10	85.21	0.01	0.02	
BH01	9.50 - 9.60	14	CS			SANDSTONE	A	U	Y		86.3	51.0	50.0	0.10	74.12	0.02	0.02	
BH01	10.50 - 10.60	15	CS			SANDSTONE	A	U	Y		85.5	69.0	62.0	0.10	82.15	0.01	0.02	
BH01	12.33 - 12.50	18	CS			SANDSTONE	A	U	Y		85.0	62.0	60.0	0.40	80.58	0.06	0.08	
BH01	13.51 - 13.68	19	CS			SANDSTONE	A	U	Y		86.2	53.0	51.0	0.90	74.82	0.16	0.19	
BH01	15.28 - 15.42	20	CS			SANDSTONE	A	U	Y		84.8	61.0	60.0	0.30	80.49	0.05	0.06	
BH01	16.91 - 17.02	21	CS			SANDSTONE	A	U	Y		84.8	55.0	54.0	0.50	76.36	0.09	0.10	
BH01	18.34 - 18.46	22	CS			SANDSTONE	A	U	Y		84.0	54.0	53.0	0.50	75.29	0.09	0.11	
BH02	5.20 - 5.28	10	CS			SANDSTONE	A	U	Y		84.7	33.0	32.0	0.20	58.75	0.06	0.06	
BH02	6.44 - 6.63	11	CS			SANDSTONE	A	U	Y		85.6	43.0	41.0	0.30	66.85	0.07	0.08	
BH02	7.47 - 7.55	12	CS			SANDSTONE	A	U	Y		86.6	44.0	43.0	0.40	68.86	0.08	0.10	
BH02	8.30 - 8.46	14	CS			SANDSTONE	A	U	Y		85.9	64.0	62.0	0.20	82.35	0.03	0.04	
BH02	10.53 - 10.68	16	CS			SANDSTONE	A	U	Y		85.6	46.0	45.0	0.20	70.03	0.04	0.05	
BH02	11.45 - 11.55	17	CS			SANDSTONE	A	L	N		85.6	54.0	51.0	0.10	74.56	0.02	0.02	
BH02	12.46 - 12.56	18	CS			SANDSTONE	A	U	Y		85.5	65.0	63.0	0.10	82.81	0.01	0.02	
BH02	13.49 - 13.58	19	CS			SANDSTONE	A	U	Y		85.4	65.0	58.0	0.20	79.41	0.03	0.04	
BH02	14.03 - 14.14	20	CS			SANDSTONE	A	U	Y		6.3	80.0	75.0	0.40	24.53	0.66	0.48	
BH02	18.08 - 18.17	21	CS			SANDSTONE	A	U	Y		85.9	45.0	44.0	0.50	69.37	0.10	0.12	

QA Ref
RLR 104
Rev 65
May 12

Printed:25/08/2016 12:38

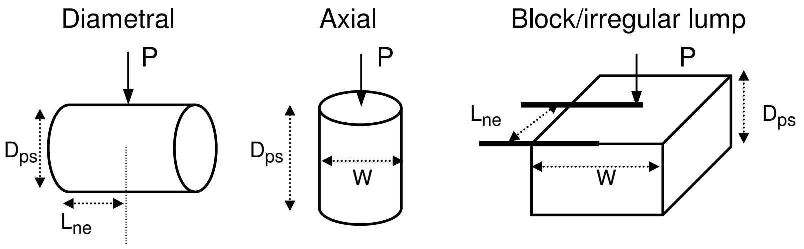
Figure
PLT

Point Load Index Test
ISRM:1985

Project No	Project Name
A6053-16	THE FACTORY

All specimens tested at **as received water content** unless shown otherwise

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction (U = unknown or random)
L - parallel to planes of weakness
P - perpendicular to planes of weakness
Dimensions
D_{ps} - Distance between platens (platen separation)
D_{ps}' - at failure (see ISRM note 6)
L_{ne} - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions				LOAD P	De equivalent diameter, mm	Point Load Index MPa F = (De/50)$^{0.45}$		Remarks
							Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN		I_s	$I_{s(50)}$	
BH02	19.20 - 19.45	22	CS			SANDSTONE	A	U	Y		85.3	38.0	35.0	0.50	61.65	0.13	0.14	
BH03	6.00 - 6.20	1	CS			SANDSTONE	I	U	Y	40.0	73.6	62.0	56.0	0.10	72.44	0.02	0.02	
BH03	8.00 - 8.15	3	CS			MUDSTONE	A	L	Y		86.3	44.0	43.0	0.40	68.74	0.08	0.10	
BH03	9.00 - 9.13	4	CS			SANDSTONE	A	U	Y		89.0	57.0	53.0	0.10	77.50	0.02	0.02	
BH03	10.25 - 10.40	5	CS			SANDSTONE	A	U	Y		86.1	54.0	53.0	0.30	76.22	0.05	0.06	
BH03	11.00 - 11.20	7	CS			SANDSTONE	A	U	Y		86.9	56.0	55.0	0.30	78.01	0.05	0.06	
BH03	12.00 - 12.10	8	CS			SANDSTONE	A	U	Y		85.1	48.0	46.0	0.20	70.60	0.04	0.05	
BH03	13.00 - 13.23	9	CS			SANDSTONE	A	U	Y		85.6	48.0	46.0	0.30	70.81	0.06	0.07	
BH03	14.15 - 14.25	10	CS			SANDSTONE	A	U	Y		85.9	50.0	48.0	0.30	72.46	0.06	0.07	
BH03	15.00 - 15.20	11	CS			SANDSTONE	A	U	Y		85.6	59.0	58.0	0.40	79.51	0.06	0.08	
BH03	17.00 - 17.18	12	CS			SANDSTONE	A	U	Y		86.2	67.0	60.0	0.60	81.15	0.09	0.11	
BH03	18.95 - 19.15	13	CS			SANDSTONE	A	U	Y		86.0	57.0	50.0	1.00	73.99	0.18	0.22	

QA Ref
RLR 104
Rev 65
May 12

ESG Environmental Scientifics Group

UKAS TESTING 1157

Printed:25/08/2016 12:38

Figure
PLT

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK - SUMMARY OF RESULTS

Project No	Project Name
A6053-16	THE FACTORY

Hole No.	Sample				Rock Type	Specimen Dimensions^2			Bulk Density^2	Water Content^1	Uniaxial Compression^3				Remarks
	No.	Depth (m)		type		Dia.	Height	H/D			Load Rate	Time to failure	Mode of failure	UCS	
		from	to			mm	mm		Mg/m^3	%	kN/min	secs		MPa	
BH01	17	12.11	12.30	CS	SANDSTONE	85.2	130.7	1.5	2.27	7.5	10	229	MS	5.50	
BH02	13	7.74	8.01	CS	SANDSTONE	86.0	142.7	1.7	2.19	12.2	10	199	MS	3.15	
BH03	2	6.96	7.16	CS	SANDSTONE	86.0	130.1	1.5	2.22	11.8	10	20	MS	0.276	
BH03	6	10.70	10.90	CS	SANDSTONE	86.0	128.8	1.5	2.38	8.1	10	225	MS	5.46	

Notes :

Test Specification : International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007

1 ISRM p87 test 1, water content at 105 ± 3 °C, specimen as received at the laboratory

2 ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density

3 ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

above notes apply unless annotated otherwise in the remarks

Mode of failure :

S - Single shear	MS - multiple shear
AC - Axial cleavage	F - Fragmented

Ref

RLR 2
Rev 16
Aug 11

Printed:25/08/2016 12:39

Table

RUCS

CHEMICAL TESTS - SUMMARY OF RESULTS

Project No	Project Name
A6053-16	THE FACTORY

Hole No.	Sample				Soil Description	Org	LOI	pH	Sulphate as SO_4				SD1 options		CO_2	Chloride, Cl		<2 mm	Remarks
	No.	Depth (m)		type					Preparation/test *	2:1 water sol.	ground water	acid sol.	TS	Mg mg/L NO_3 mg/L NH_4		water sol.	acid sol.		
		from	to			%	%			g/L	g/L	%	%		%	%	%	%	
BH01	5	3.20	3.65	D	Brown very gravelly SAND.			8.4	1+3	0.05								50	
BH01	12	9.28	9.40	CS	SANDSTONE.			8.8	1+3	0.05								100	
BH01	17	12.11	12.30	CS	SANDSTONE.			8.9	1+3	0.02								100	
BH02	11	6.44	6.63	CS	SANDSTONE.			8.9	1+3	0.02								100	
BH02	14	8.30	8.46	CS	SANDSTONE.			8.5	1+3	0.05								100	
BH03	1	6.00	6.20	CS	SANDSTONE.			8.2	1+3	0.05								100	
BH03	2	6.96	7.16	CS	SANDSTONE.			8.5	1+3	0.05								100	
MTP06	1	0.20	0.40	B	Light brown sandy GRAVEL			9.2	1+3	0.06								44	
MTP06	6	1.50	1.80	B	Yellowish brown mottled dark brown slightly sandy slightly gravelly CLAY.			7.8	1+3	0.09								100	
WS02	8	2.30	3.00	B	Brown slightly gravelly SAND.			8.2	1+3	0.04								78	
WS03A	4	1.20	1.65	D	Brown very gravelly clayey SAND.			9.6	1+3	0.79								40	
WS04	6.1	2.00	2.45	D	Brown sandy clightly clayey GRAVEL.			7.9	1+3	0.03								37	
WS05	3	1.20	1.60	D	Greyish brown slightly sandy slightly gravelly CLAY. With occasional			8.0	1+3	0.13								30	
WS08	3	0.50	1.00	B	Dark brown slightly sandy clayey GRAVEL with two cobbles			8.5	1+3	0.25								46	
WS08	4	1.20	1.65	D	Brown slightly sandy slightly gravelly CLAY.			7.7	1+3	0.15								100	

BS 1377 : definitive method unless stated :

Org Organic matter content
(s-sulphides, c-chlorides identified)
LOI Mass loss on ignition at 440°C
CO_2 Carbonate content (rapid titration)
Cl Chloride content

* Sulphate tests preparation / test methods :

1. BS 1377:Part 3:1990:clause 5.3
2. BS 1377:Part 3:1990:clause 5.4
3. BS 1377:Part 3:1990:clause 5.5
4. TRL447 - 1 water soluble sulphate
5. TRL447 - 2 acid soluble sulphate
6. BR279 - groundwater sulphate

< 2mm material passing 2mm sieve

BRE Special Digest SD1, dependent options :

TS Total Sulphur to BR279 / EN ISO15178
Mg Soluble Magnesium to BR279, colorimetric
NO3 Soluble Nitrate to BR279, colorimetric
NH_4 qualitative

QA Ref

SLR 3
Rev 96
Aug 11

ESG Environmental Scientifics Group

Printed:25/08/2016 12:32

Table

CHEM

APPENDIX E

GEOENVIRONMENTAL LABORATORY TEST RESULTS

Soil Sample Analysis Test Reports	EFS/166092M EFS/166093M EFS/166094M EFS/166095M EFS/166097M
Leachate Analysis Test Reports	EXR/224013 EXR/224014 EXR/224015 EXR/224016
Water Sample Analysis Test Report	EXR/224162

TEST REPORT

1252

Report No. EFS/166092M (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: The Factory

The 2 samples described in this report were registered for analysis by ESG on 27-Jul-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 04-Aug-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (80) Results (Pages 4 to 5)
Table of PCB Congener Results (Page 6)
Table of GRO Results (Page 7)
Table of TPH (Si) banding (std) (Page 8)
Table of TPH Texas banding (std) (Page 9)
GC-FID Chromatograms (Pages 10 to 15)
Table of Asbestos Screening Results (Page 16)
Analytical and Deviating Sample Overview (Pages 17 to 18)
Table of Method Descriptions (Page 19)
Table of Report Notes (Page 20)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns

Managing Director
Multi-Sector Services

Date of Issue: 04-Aug-2016

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105^{o}C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

LAB ID Number CL/	Client Sample Description	Sample Date	GRO (AA) by HSA GC-FID	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	pH units (AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)	Phenol Index.(AR)	^Asbestos Screen
Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	mg/kg	mg/kg	mg/kg	
Method Codes :			GROHSA	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	PHSOIL	SFAPI	SFAPI	SFAPI	Sub002a
Method Reporting Limits :			0.2	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16		0.5	0.5	0.5	
Accreditation Code:				UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	U	U
1624733	MTP05 ES 3 1.00	06-Jul-16	Req	1.4	13	<0.21	19.4	124.8	127.0	<0.53	23.9	0.8	80.0	7.6	<0.7	<0.7	<0.7	NAIIS
1624734	MTP05 ES 8 2.50	06-Jul-16	Req	1.2	8.1	<0.2	19.2	27	24.9	<0.53	15.4	1	43.0	7.6	<0.6	<0.6	<0.6	NAIIS

ESG

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

The Factory

Sample Analysis

Date Printed	**04-Aug-2016**
Report Number	**EFS/166092M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

		Units :	%	mg/kg	mg/kg	mg/kg	% M/M	mg/kg	µg/kg	%	% M/M	µg/kg	mg/kg
		Method Codes :	TMSS	TPHFIDUS	TPHFIDUS	TPHUSSI	FOCS	KONECR	PCBUSECDAR	SSP3	WSLM59	BTEXHSA	PAHMSUS
		Method Reporting Limits :	0.2	10	10	20	0.04	0.1		0.1	0.04	20	
		Accreditation Code:	U	UM			N	N		N	N	N	
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Tot.Moisture @ 105C**	**TPH by GCFID (AR)**	**TPH Carbon Banding.**	**TPH by GCFID (AR/Si)**	**S.O.M. % (Calc)**	**Chromium vi:**	**PCB-7 Congeners Analysis**	**Stone Content %**	**Total Organic Carbon**	**MTBE**	**PAH (16) by GCMS**
1624733	MTP05 ES 3 1.00	**06-Jul-16**	23.3	915	Req	Req	8.59	<0.1	Req	6.5	4.98	<26	Req
1624734	MTP05 ES 8 2.50	**06-Jul-16**	15.6	704	Req	Req	1.24	0.3	Req	14.2	0.72	<25	Req

ESG

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory

Sample Analysis

Date Printed	**04-Aug-2016**
Report Number	**EFS/166092M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	MTP05 ES 3 1.00	**Job Number:**	S16_6092M
LIMS ID Number:	CL1624733	**Date Booked in:**	27-Jul-16
QC Batch Number:	160872	**Date Extracted:**	01-Aug-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-16
Directory:	6\080116GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	2.99	0.22	93	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	4.13	1.51	97	UM
Fluorene	86-73-7	4.49	1.92	99	UM
Phenanthrene	85-01-8	5.27	10.90	100	UM
Anthracene	120-12-7	5.32	0.80	99	U
Fluoranthene	206-44-0	6.54	4.26	96	UM
Pyrene	129-00-0	6.81	2.82	97	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	9.98	0.12	93	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Total (USEPA16) PAHs	-	-	< 23.38	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	92
Acenaphthene-d10	93
Phenanthrene-d10	96
Chrysene-d12	101
Perylene-d12	105

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	105
Terphenyl-d14	93

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	MTP05 ES 8 2.50	**Job Number:**	S16_6092M
LIMS ID Number:	CL1624734	**Date Booked in:**	27-Jul-16
QC Batch Number:	160872	**Date Extracted:**	01-Aug-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-16
Directory:	6\080116GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	4.14	1.40	97	UM
Fluorene	86-73-7	4.49	1.00	99	UM
Phenanthrene	85-01-8	5.27	5.38	99	UM
Anthracene	120-12-7	5.32	0.68	99	U
Fluoranthene	206-44-0	6.54	2.75	96	UM
Pyrene	129-00-0	6.81	2.08	98	UM
Benzo[a]anthracene	56-55-3	8.46	0.37	93	UM
Chrysene	218-01-9	8.51	0.28	93	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Total (USEPA16) PAHs	-	-	< 14.76	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	94
Acenaphthene-d10	93
Phenanthrene-d10	93
Chrysene-d12	92
Perylene-d12	97

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	105
Terphenyl-d14	91

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polychlorinated Biphenyls (congeners)

Customer and Site Details:	ESG Limited Doncaster: The Factory	**Matrix:**	Soil
Job Number:	S16_6092M	**Date Booked in:**	27-Jul-16
QC Batch Number:	160872	**Date Extracted:**	01-Aug-16
Directory:	0801PCB.GC70	**Date Analysed:**	02-Aug-16
Method:	Ultrasonic		
Accreditation code:	N		

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
* CL1624733	MTP05 ES 3 1.00	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5
* CL1624734	MTP05 ES 8 2.50	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Gasoline Range Organics
(BTEX and Aliphatic Carbon Ranges)

Customer and Site Details: ESG Limited Doncaster : The Factory
Job Number: S16_6092
Directory: E:\TES\DATA\2016\0802HSA_GC9\080216 2016-08-02 09-55-05\055F5501.D
Method: Headspace GCFID
Accreditation Code: UM

Matrix: Soil
Date Booked in: 27-Jul-16
Date extracted: 02-Aug-16
Date Analysed: 03-Aug-16, 01:3

*** Sample data with an asterisk are not UKAS accredited.**

		Concentration, (mg/kg) - as dry weight.					**Aliphatics**				
Sample ID	**Client ID**	**Benzene**	**Toluene**	**Ethyl benzene**	**m/p-Xylene**	**o-Xylene**	**C5 - C6**	**>C6 - C7**	**>C7 - C8**	**>C8 - C10**	**Total GRO**
CL1624733	MTP05 ES 3 1.00	<0.013	<0.013	<0.013	<0.013	<0.013	<0.3	<0.3	<0.3	<0.3	<0.3
CL1624734	MTP05 ES 8 2.50	<0.013	<0.013	0.010	0.057	<0.013	<0.3	<0.3	<0.3	1.2	1.4

Note: Benzene elutes between C6 and C7, toluene elutes between C7 and C8, ethyl benzene and the xylenes elute between C8 and C9.

Each BTEX compound is deducted from the appropriate band to give the aliphatic fractions, however aromatic compounds may still be contributing to these fractions

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

ALIPHATIC / AROMATIC FRACTION BY GC/FID

Customer and Site Details: ESG Limited Doncaster : The Factory
Job Number: S16_6092M
QC Batch Number: 160872
Directory: D:\TES\DATA\Y2016\080216TPH_GC3\080216 2016-08-02 17-06-46\057B0901.D
Method: Ultra Sonic

Separation: Silica gel
Eluents: Hexane, DCM

Matrix: Soil
Date Booked in 27-Jul-16
Date Extracted 01-Aug-16
Date Analysed: 02-Aug-16, 18:59:52

This sample data is not MCERTS accredited.

*** This sample data is not ISO17025 accredited.**

		Concentration, (mg/kg) - as dry weight.											
		>C8 - C10		>C10 - C12		>C12 - C16		>C16 - C21		>C21 - C35		>C8 - C40	
Sample ID	**Client ID**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**
CL1624733	MTP05 ES 3 1.00	<5	<5	<5	<5	27.2	15.4	104.7	136	233	286	369	443
CL1624734	MTP05 ES 8 2.50	<5	<5	<5	<5	29	15.7	107.5	112.9	157	169	297	304

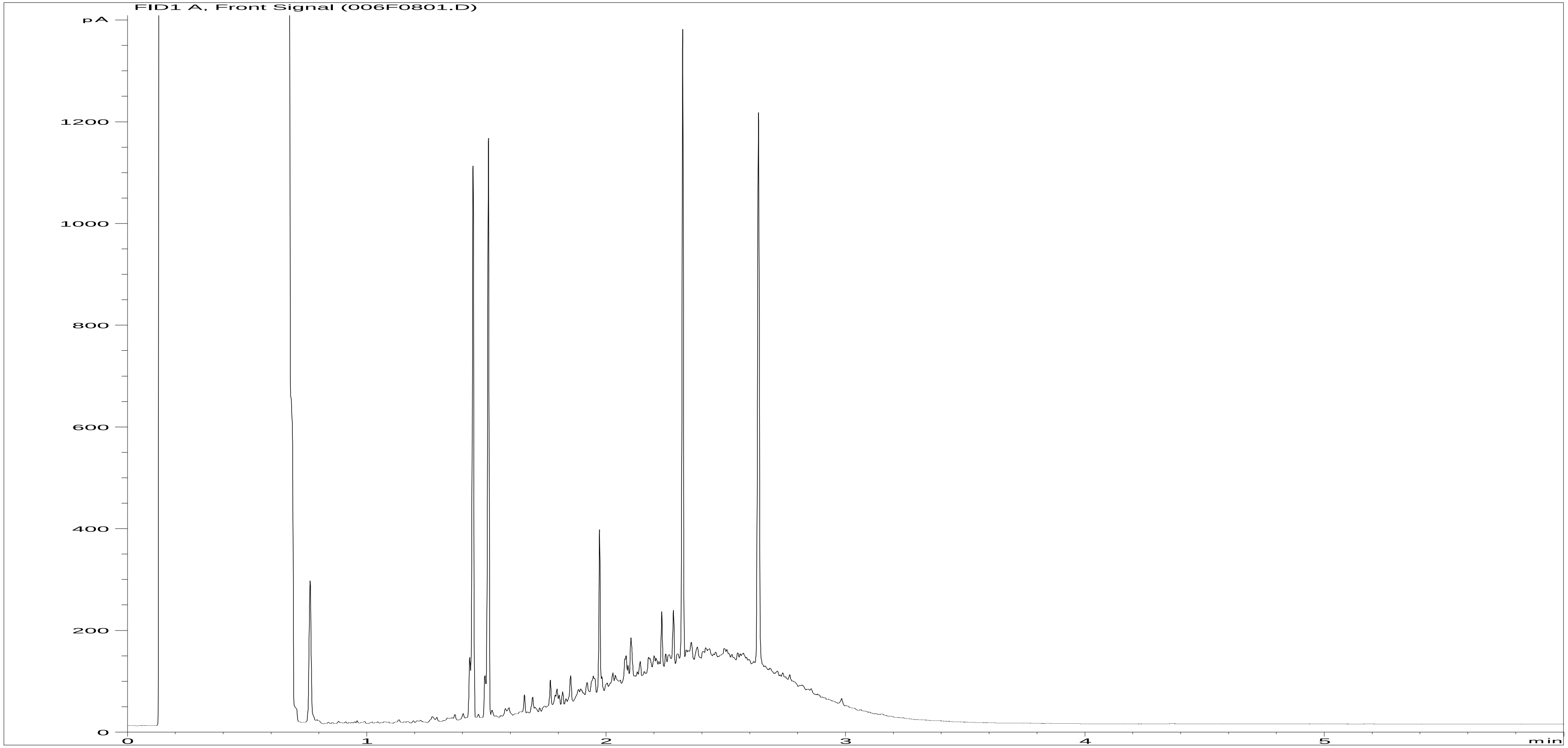
Total Petroleum Hydrocarbons (TPH) Carbon Ranges

Customer and Site Details:	ESG Limited Doncaster : The Factory	**Matrix:**	Soil
Job Number:	S16_6092M	**Date Booked in:**	27-Jul-16
QC Batch Number:	160872	**Date Extracted:**	01-Aug-16
Directory:	D:\TES\DATA\Y2016\080116TPH_GC14\080116 2016-08-01 16-14-40\007F0901.D	**Date Analysed:**	01-Aug-16, 17:56:50
Method:	Ultra Sonic		
Accreditation code:	U		

		Concentration, (mg/kg) - as dry weight.				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
CL1624733	MTP05 ES 3 1.00	<3	3.53	62.3	269	572
CL1624734	MTP05 ES 8 2.50	<3	<3	67.4	259	369

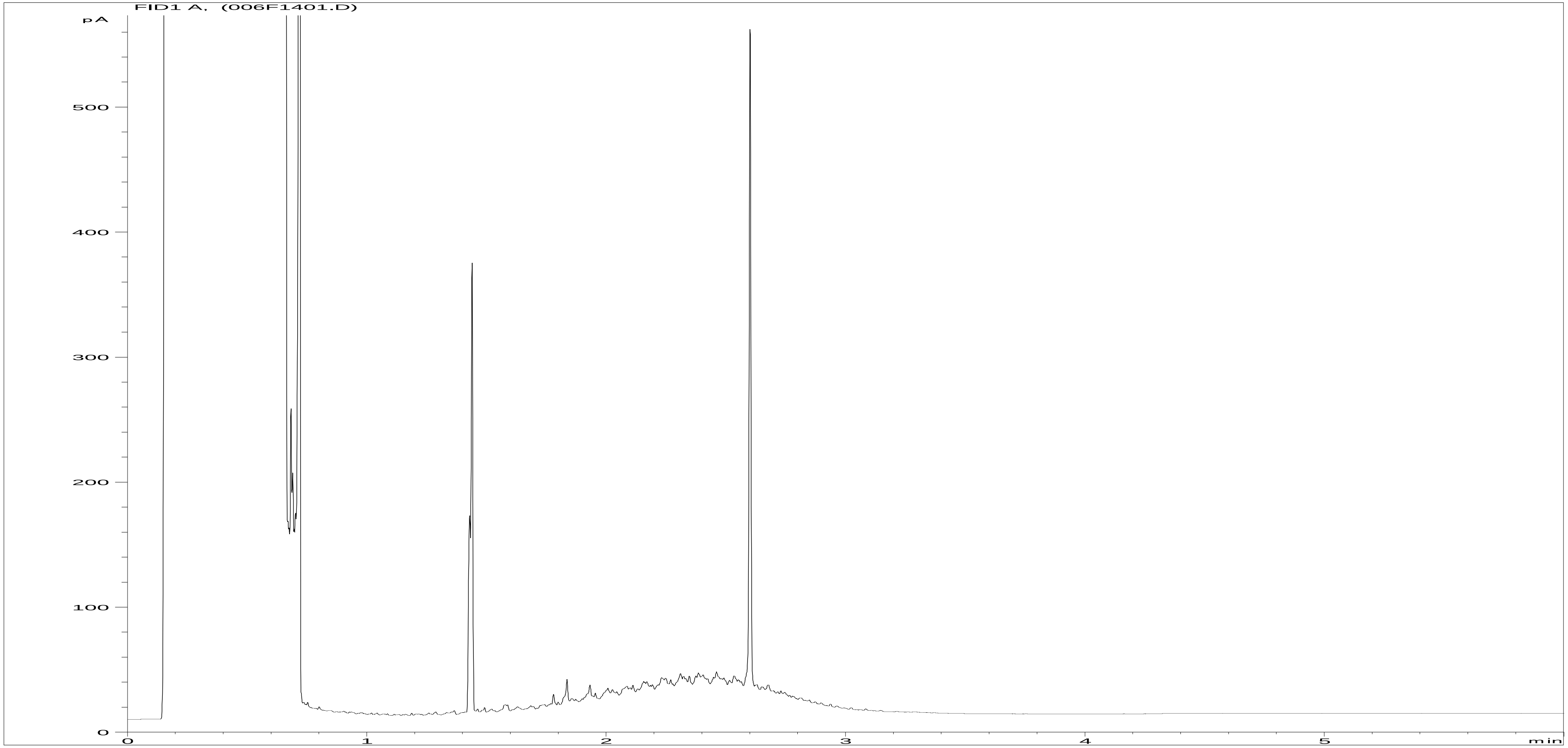
Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



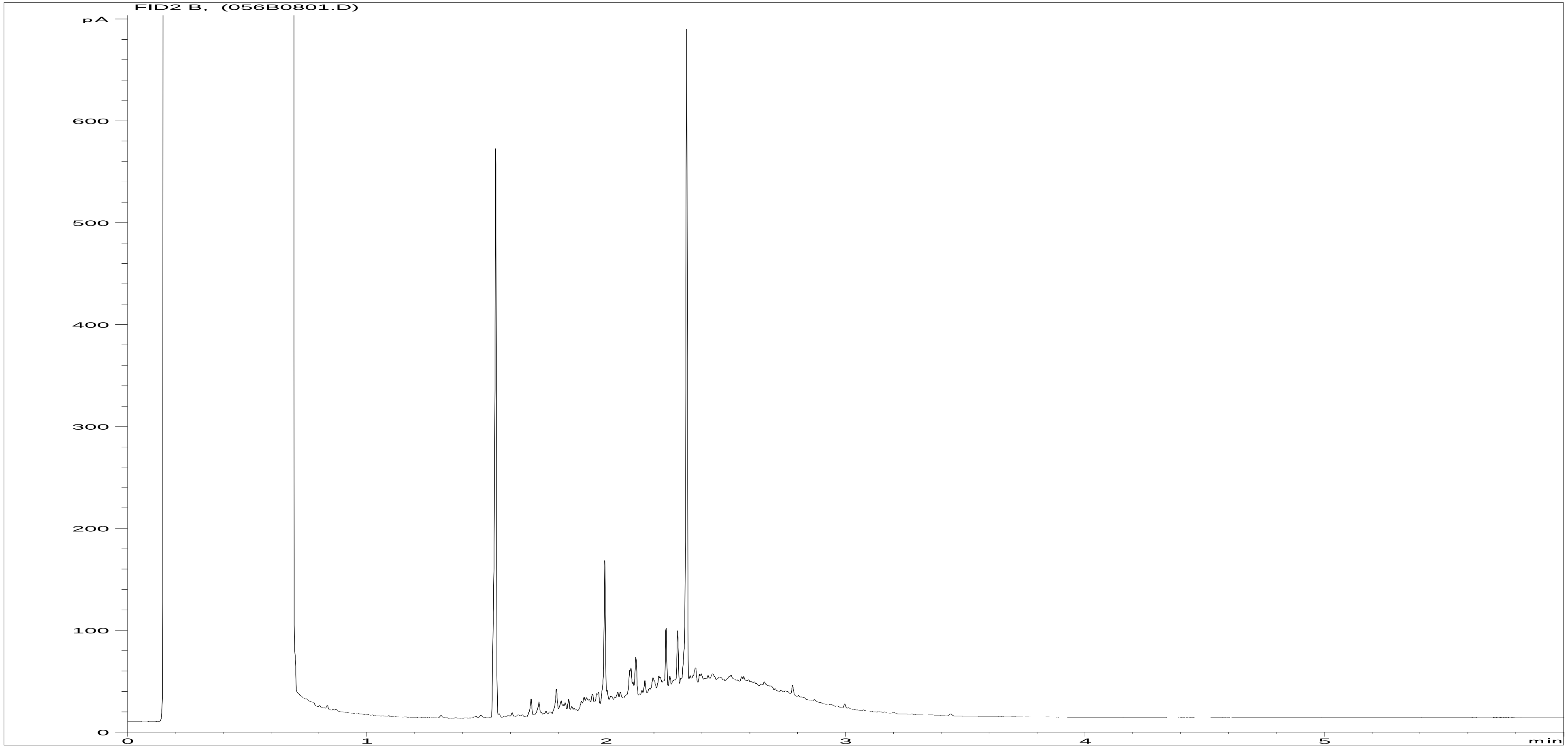
Sample ID:	CL1624733	**Job Number:**	S16_6092M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	MTP05 ES 3 1.00
Acquisition Date/Time:	01-Aug-16, 17:44:46		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC14\080116 2016-08-01 16-14-40\006F0801.D		

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1624733ALI	**Job Number:**	S16_6092M
Multiplier:	16	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	MTP05 ES 3 1.00
Acquisition Date/Time:	02-Aug-16, 20:06:46		
Datafile:	D:\TES\DATA\Y2016\080216TPH_GC3\080216 2016-08-02 17-06-46\006F1401.D		

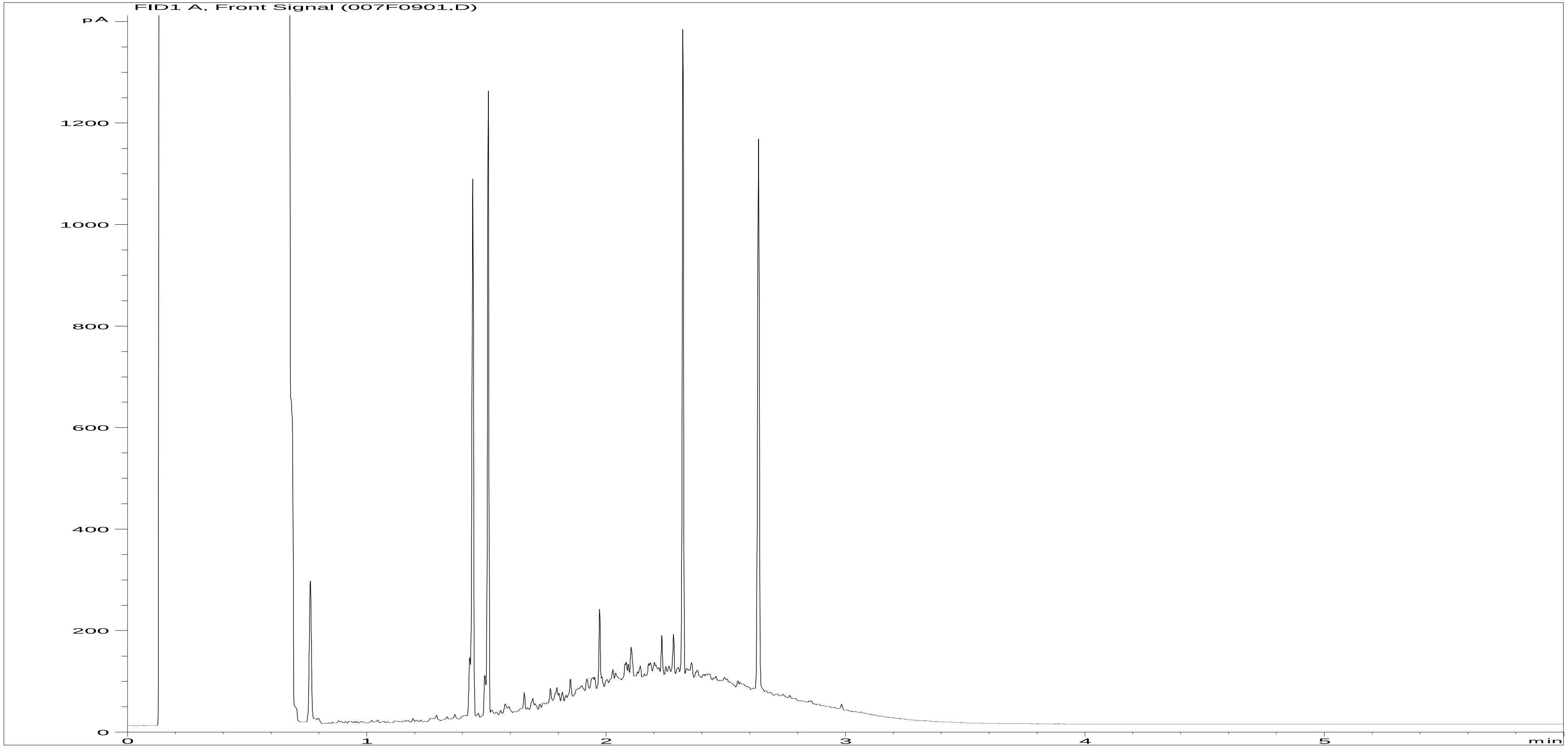
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1624733ARO	**Job Number:**	S16_6092M
Multiplier:	11.68	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	MTP05 ES 3 1.00
Acquisition Date/Time:	02-Aug-16, 18:46:39		
Datafile:	D:\TES\DATA\Y2016\080216TPH_GC3\080216 2016-08-02 17-06-46\056B0801.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

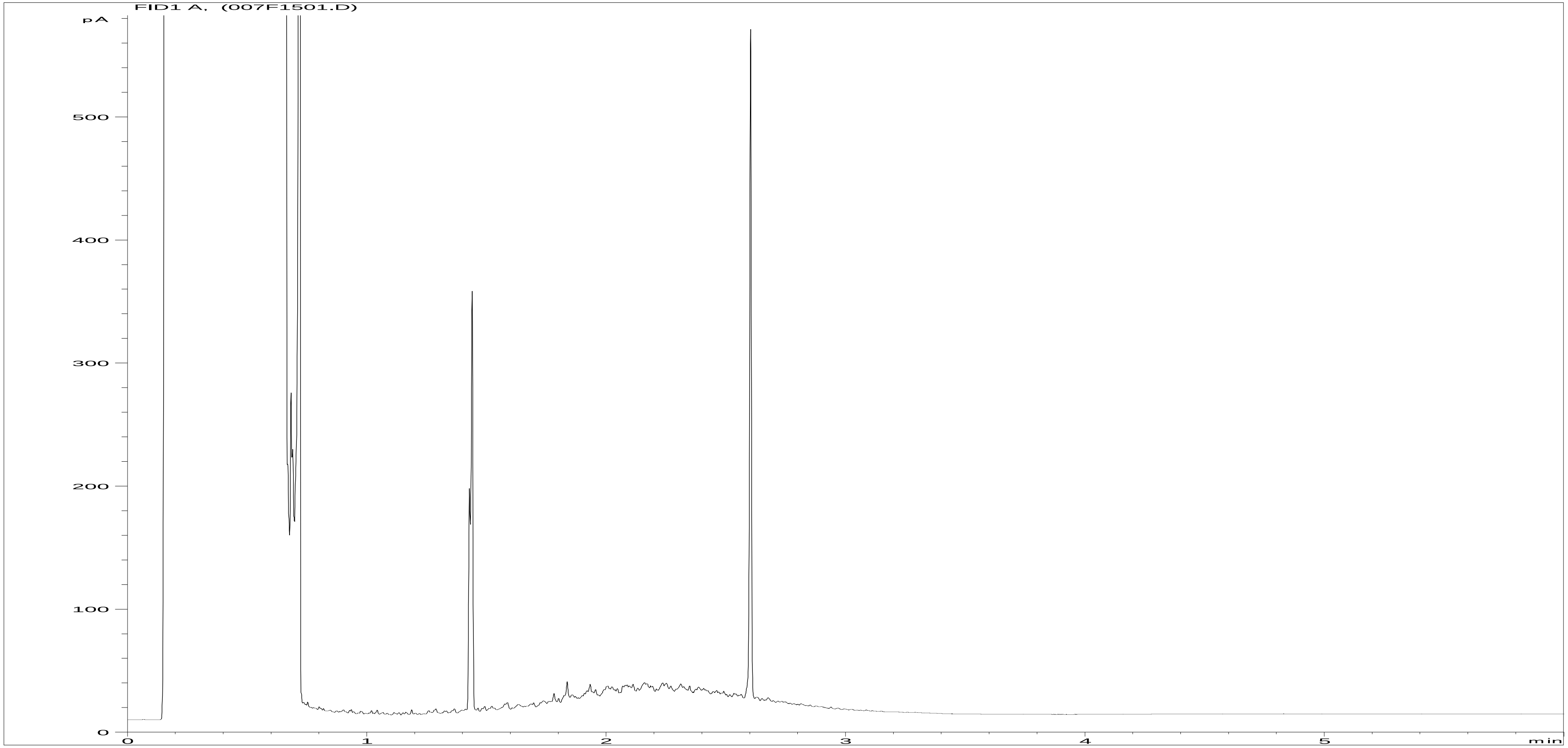
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1624734	**Job Number:**	S16_6092M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	MTP05 ES 8 2.50
Acquisition Date/Time:	01-Aug-16, 17:56:50		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC14\080116 2016-08-01 16-14-40\007F0901.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

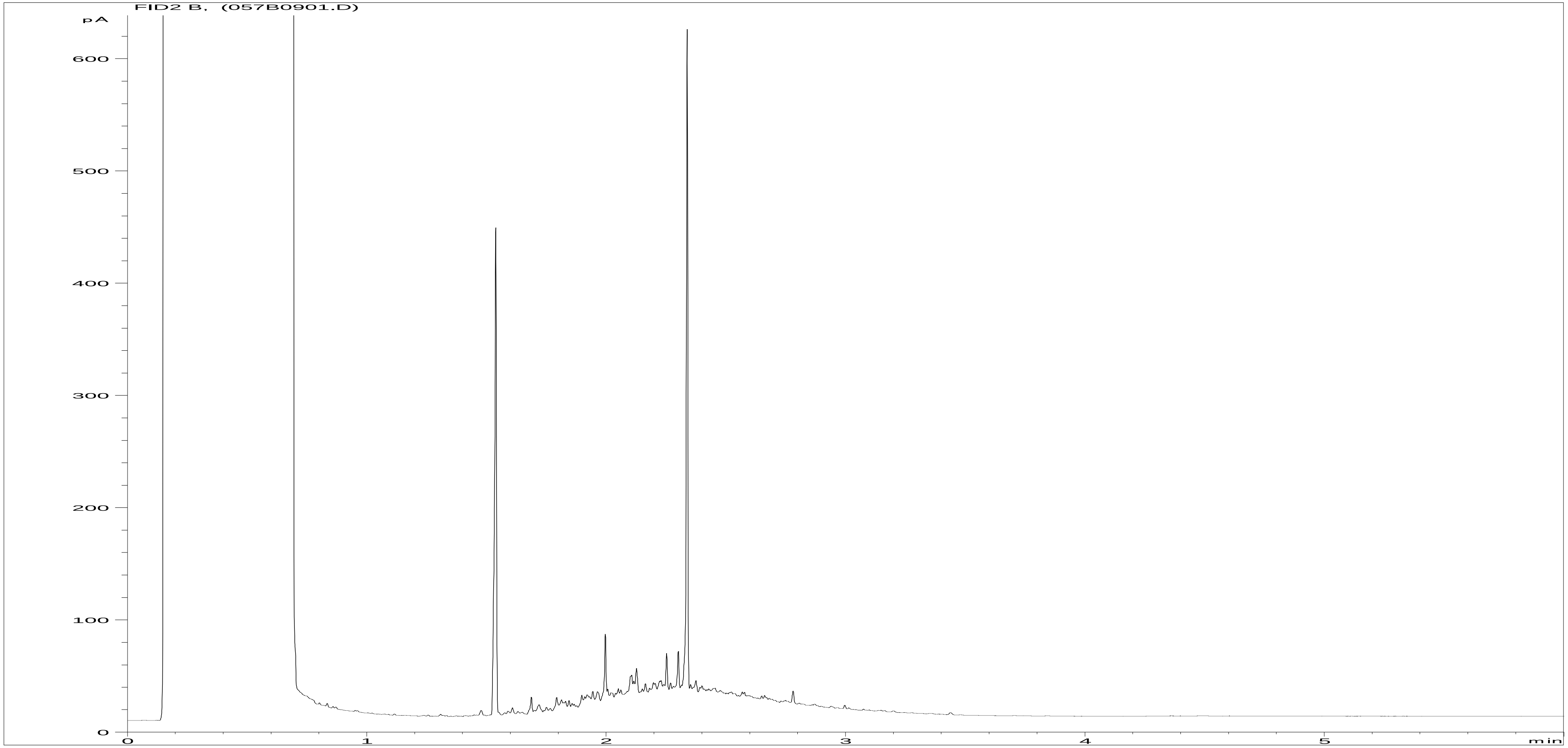
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1624734ALI	**Job Number:**	S16_6092M
Multiplier:	16	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	MTP05 ES 8 2.50
Acquisition Date/Time:	02-Aug-16, 20:20:15		
Datafile:	D:\TES\DATA\Y2016\080216TPH_GC3\080216 2016-08-02 17-06-46\007F1501.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1624734ARO	**Job Number:**	S16_6092M
Multiplier:	12	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	MTP05 ES 8 2.50
Acquisition Date/Time:	02-Aug-16, 18:59:52		
Datafile:	D:\TES\DATA\Y2016\080216TPH_GC3\080216 2016-08-02 17-06-46\057B0901.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

ASBESTOS ANALYSIS RESULTS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils, Sediments and Aggregates

1089

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

Client:	ESG Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	**ANO-0488-12922**
For the attention of:	ESG Limited Doncaster	**Report Date:**	**02/08/2016**
Site Address:	The Factory	**Project Number:**	**S166092**

Sample Number	Sample Date	Sample Location & Matrix	Test Date	Total Sample Dry Weight (g)	Weight of <10mm Fraction (g)	Asbestos(g) in >10mm	Asbestos(g) in <10mm	% Asbestos by weight of Total Dried Sample	Asbestos Fibre Types Identified
CL/1624733	06/07/16	MTP05 1.00 Soils	02/08/2016					Identification	NAIIS
CL/1624734	06/07/16	MTP05 2.50 Soils	02/08/2016					Identification	NAIIS

Keys	**NAACR = Not Analysed at Clients Request**	**NAIIS = No Asbestos Identified in Sample (Identification Only)**	Name:	Chris Mackie	Authorised Signatory:
	*** visible to naked eye**	**NADIS = No Asbestos Detected in Sample (ID & Quant Only)**	Position:	Lab Analyst	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 12 - February 2016. Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0YZ, UKAS Laboratory Number 1089.

Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **S166092M**

Consignment No S57304
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

		MethodID	BTEXHSA	CEN Leachate		CustServ	Dep.Opt	FOCS	GROHSA	ICPBOR	ICPMSS									KONECR	MCertS	PAHMSUS	PCBUSECDAR	PHSOIL	SFAPI		
ID Number	**Description**	**Sampled**	**MTBE (µg/kg)**	**CEN Leac(P)1**	**CEN Leac(P)2**	**REPORT A**	**DO ID & Quant if ASB found**	**S.O.M. % (Calc)**	**GRO (AA) by HSA GC-FID**	**Boron (H20 Soluble)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**Chromium vi:**	**MCertS Analysis**	**PAH (16) by GCMS**	**PCB-7 Congeners Analysis**	**pH units (AR)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**
			✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓	✓
CL/1624733	MTP05 1.00	06/07/16	🟩 E	🟩	🟩	🟩	🟩	🟩	🟩 E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩 E	🟩	🟩 E	🟩 E	🟩 E	🟩 E
CL/1624734	MTP05 2.50	06/07/16	🟩 E			🟩		🟩	🟩 E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩 E	🟩	🟩 E	🟩 E	🟩 E	🟩 E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **S166092M**

Consignment No S57304
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

ID Number	Description	MethodID / Sampled	SSP3	Sub002	Sub002a	TMSS	TPHFIDUS		TPHUSSI	WSLM59
			Stone Content %	**^Asbestos ID and Quantification**	**^Asbestos Screen**	**Tot.Moisture @ 105C**	**TPH by GCFID (AR)**	**TPH Carbon Banding.**	**TPH by GCFID (AR/Si)**	**Total Organic Carbon**
				✓	✓	✓	✓	✓	✓	
CL/1624733	MTP05 1.00	06/07/16	🟩	🟨	🟩	🟩	E	E	E	🟩
CL/1624734	MTP05 2.50	06/07/16	🟩	🟨	🟩	🟩	E	E	E	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	FOCS	Oven Dried @ < 35°C	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in soil samples by aqua regia digestion followed by ICPMS
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SSP3	As Received	Determination of stones content by dry sieving at the required particle size
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	TPHUSSI	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection including quantitation of Aromatic and Aliphatic fractions.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis
Unless stated otherwise results are expressed as mg/l
Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Doncaster
Site : The Factory
Report Number : S16_6092

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1624733	MTP05 ES 3 1.00	Grey MADE GROUND
CL/1624734	MTP05 ES 8 2.50	Grey Stone CLAY

TEST REPORT

1252

Report No. EFS/166093M (Ver. 2)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: The Factory

The 2 samples described in this report were registered for analysis by ESG on 27-Jul-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 19-Aug-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Pages 5 to 6)
Table of PCB Congener Results (Page 7)
Table of TPH Texas banding (std) (Page 8)
GC-FID Chromatograms (Pages 9 to 10)
Table of Asbestos Screening Results (Page 11)
Analytical and Deviating Sample Overview (Pages 12 to 13)
Table of Method Descriptions (Page 14)
Table of Report Notes (Page 15)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns
Managing Director
Multi-Sector Services

Date of Issue: 19-Aug-2016

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

LAB ID Number CL/	Client Sample Description	Sample Date	GRO	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	SO4-- (H2O sol) mg/l	pH units (AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)	Phenol Index.(AR)
		Units :	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	mg/kg	mg/kg	mg/kg
		Method Codes :	GROHSA	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPWSS	PHSOIL	SFAPI	SFAPI	SFAPI
		Method Reporting Limits :	0.2	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16	10		0.5	0.5	0.5
		Accreditation Code:	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	U
1624735	MTP03 ES 1 0.50	07-Jul-16	<0.2	0.8	24.4	0.84	18.0	133.4	253.8	0.65	42.1	1.1	219.6	90	8.6	<0.6	<0.6	<0.6
1624736	MTP03 ES 3 0.90	07-Jul-16	<0.2	2	28.5	0.24	19.4	68.4	169.1	0.64	33.0	1	89.4	129	8.5	<0.6	<0.6	<0.6

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

The Factory

Sample Analysis

Date Printed	**19-Aug-2016**
Report Number	**EFS/166093M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

LAB ID Number CL/	Client Sample Description	Sample Date	^Asbestos Screen	Tot.Moisture @ 105C	TPH by GCFID (AR)	TPH Carbon Banding.	S.O.M. % (Calc)	Chromium vi:	PCB-7 Congeners Analysis	Stone Content %	Total Organic Carbon	Benzene	Toluene	Ethyl Benzene	MTBE	Xylenes	m/p Xylenes	o Xylene
		Units :		%	mg/kg	mg/kg	% M/M	mg/kg	µg/kg	%	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
		Method Codes :	Sub002a	TMSS	TPHFIDUS	TPHFIDUS	FOCS	KONECR	PCBUSECDAR	SSP3	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
		Method Reporting Limits :		0.2	10	10	0.04	0.1		0.1	0.04	10	10	10	20	30	20	10
		Accreditation Code:	U	U	UM		N	N		N	N	UM	UM	UM	N	UM	UM	UM
1624735	MTP03 ES 1 0.50	07-Jul-16	NAIIS	9.4	1140	Req	21.8	<0.1	Req	7.5	12.7	<11	<11	<11	<23	<34	<23	<11
1624736	MTP03 ES 3 0.90	07-Jul-16	NAIIS	17.9	74	Req	14.9	<0.1	Req	5.9	8.7	<12	<12	<12	<24	<37	<24	<12

ESG

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

The Factory

Sample Analysis

Date Printed	**19-Aug-2016**
Report Number	**EFS/166093M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

		Units :	mg/kg
		Method Codes :	PAHMSUS
		Method Reporting Limits :	
		Accreditation Code:	
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**PAH (16) by GCMS**
1624735	MTP03 ES 1 0.50	**07-Jul-16**	Req
1624736	MTP03 ES 3 0.90	**07-Jul-16**	Req

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory

Sample Analysis

Date Printed	**19-Aug-2016**
Report Number	**EFS/166093M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	MTP03 ES 1 0.50	**Job Number:**	S16_6093M
LIMS ID Number:	CL1624735	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-16
Directory:	\072916MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	2.89	2.81	99	**UM**
Acenaphthylene	208-96-8	3.93	1.43	97	U
Acenaphthene	83-32-9	4.03	2.59	94	UM
Fluorene	86-73-7	4.38	4.06	92	UM
Phenanthrene	85-01-8	5.13	29.60	100	UM
Anthracene	120-12-7	5.17	7.21	98	U
Fluoranthene	206-44-0	6.36	24.20	95	UM
Pyrene	129-00-0	6.62	24.50	97	UM
Benzo[a]anthracene	56-55-3	8.23	12.70	98	UM
Chrysene	218-01-9	8.28	9.90	99	UM
Benzo[b]fluoranthene	205-99-2	9.73	12.30	98	UM
Benzo[k]fluoranthene	207-08-9	9.76	3.62	96	UM
Benzo[a]pyrene	50-32-8	10.14	10.40	96	UM
Indeno[1,2,3-cd]pyrene	193-39-5	11.49	7.10	95	UM
Dibenzo[a,h]anthracene	53-70-3	11.53	1.68	95	UM
Benzo[g,h,i]perylene	191-24-2	11.78	5.58	90	UM
Total (USEPA16) PAHs	-	-	159.67	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	87
Acenaphthene-d10	84
Phenanthrene-d10	93
Chrysene-d12	120
Perylene-d12	134

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	98
Terphenyl-d14	80

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	MTP03 ES 3 0.90	**Job Number:**	s16_6093M
LIMS ID Number:	CL1624736	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-16
Directory:	\072916MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	5.13	0.30	98	UM
Anthracene	120-12-7	5.18	0.11	92	U
Fluoranthene	206-44-0	6.36	0.76	92	UM
Pyrene	129-00-0	6.62	1.01	77	UM
Benzo[a]anthracene	56-55-3	8.23	0.60	96	UM
Chrysene	218-01-9	8.28	0.54	96	UM
Benzo[b]fluoranthene	205-99-2	9.73	0.82	91	UM
Benzo[k]fluoranthene	207-08-9	9.76	0.35	92	UM
Benzo[a]pyrene	50-32-8	10.14	0.76	95	UM
Indeno[1,2,3-cd]pyrene	193-39-5	11.50	0.60	97	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	11.78	0.52	89	UM
Total (USEPA16) PAHs	-	-	< 6.86	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	85
Acenaphthene-d10	80
Phenanthrene-d10	82
Chrysene-d12	90
Perylene-d12	102

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	102
Terphenyl-d14	83

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polychlorinated Biphenyls (congeners)

Customer and Site Details:	ESG Limited Doncaster: The Factory	**Matrix:**	Soil
Job Number:	S16_6093M	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Directory:	0801PCB.GC70	**Date Analysed:**	02-Aug-16
Method:	Ultrasonic		
Accreditation code:	N		

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
* CL1624735	MTP03 ES 1 0.50	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7
* CL1624736	MTP03 ES 3 0.90	<6.1	<6.1	<6.1	<6.1	<6.1	<6.1	<6.1

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

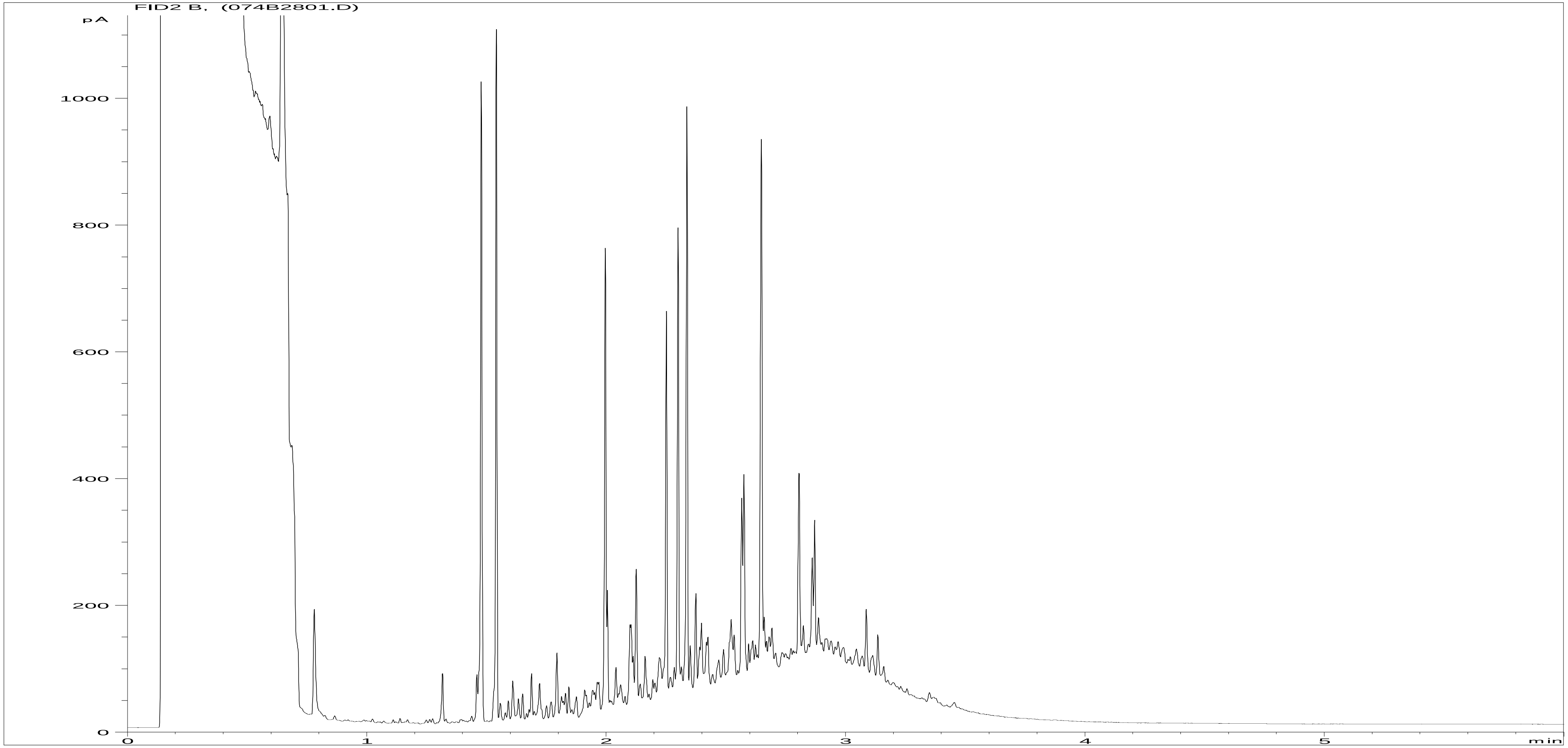
Customer and Site Details: ESG Limited Doncaster : The Factory
Job Number: S16_6093M
QC Batch Number: 160870
Directory: D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\075B2901.D
Method: Ultra Sonic
Accreditation code: U

Matrix: Soil
Date Booked in: 27-Jul-16
Date Extracted: 29-Jul-16
Date Analysed: 29-Jul-16, 19:28:02

		Concentration, (mg/kg) - as dry weight.				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
CL1624735	MTP03 ES 1 0.50	<2	8.17	44.3	212	803
CL1624736	MTP03 ES 3 0.90	<2	<2	<2	9.21	56.9

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

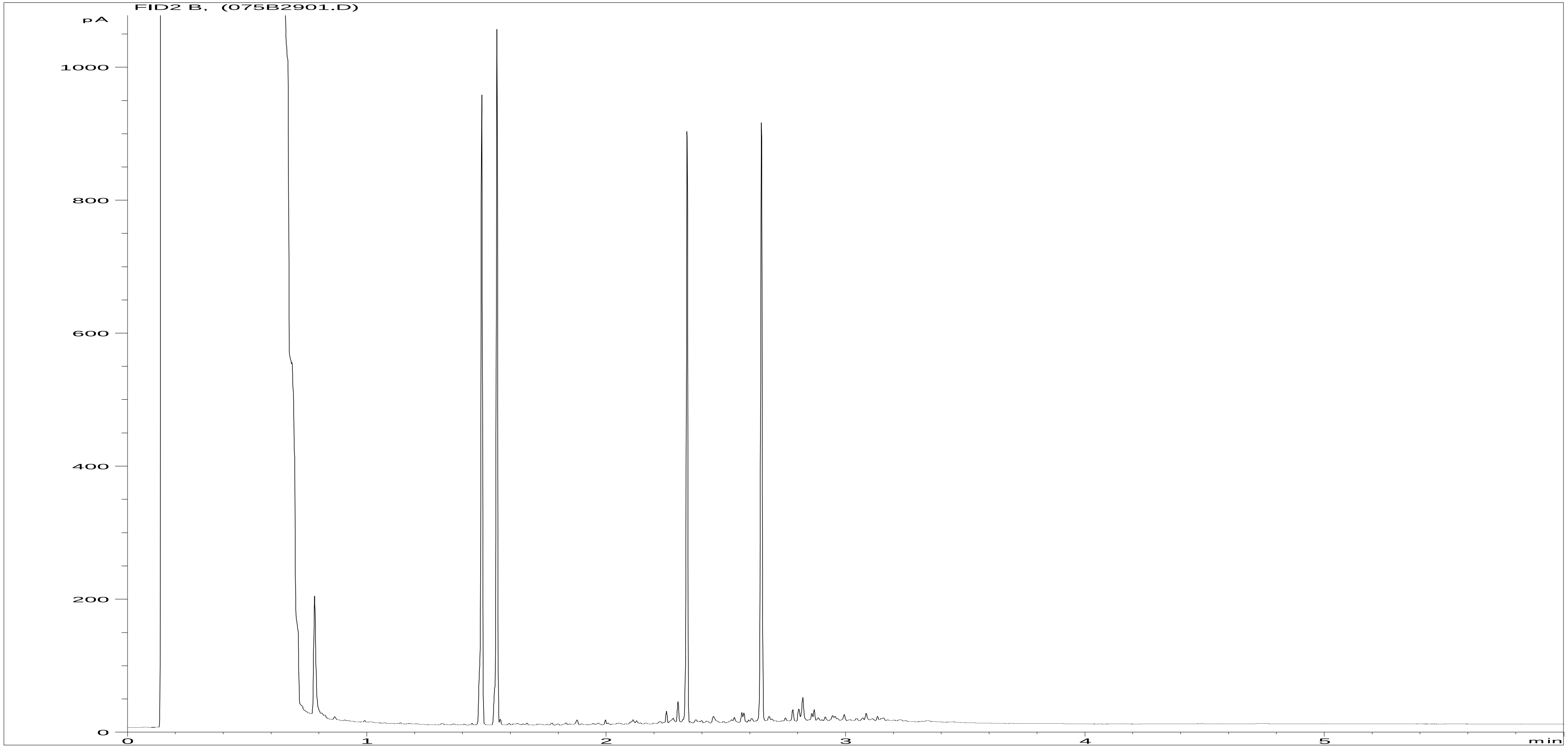
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1624735	**Job Number:**	S16_6093M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	MTP03 ES 1 0.50
Acquisition Date/Time:	29-Jul-16, 19:14:34		
Datafile:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\074B2801.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1624736	**Job Number:**	S16_6093M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	MTP03 ES 3 0.90
Acquisition Date/Time:	29-Jul-16, 19:28:02		
Datafile:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\075B2901.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

ASBESTOS ANALYSIS RESULTS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils, Sediments and Aggregates

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

1089

Client:	ESG Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	**ANO-0488-12923**
For the attention of:	ESG Limited Doncaster	**Report Date:**	**02/08/2016**
Site Address:	The Factory	**Project Number:**	**S166093**

Sample Number	Sample Date	Sample Location & Matrix	Test Date	Total Sample Dry Weight (g)	Weight of <10mm Fraction (g)	Asbestos(g) in >10mm	Asbestos(g) in <10mm	% Asbestos by weight of Total Dried Sample	Asbestos Fibre Types Identified
CL/1624735	07/07/16	MTP03 0.5 Soils	02/08/2016					Identification	NAIIS
CL/1624736	07/07/16	MTP03 0.9 Soils	02/08/2016					Identification	NAIIS

Keys	**NAACR = Not Analysed at Clients Request**	**NAIIS = No Asbestos Identified in Sample (Identification Only)**	Name:	Chris Mackie	Authorised Signatory:
	*** visible to naked eye**	**NADIS = No Asbestos Detected in Sample (ID & Quant Only)**	Position:	Lab Analyst	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 12 - February 2016. Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0YZ, UKAS Laboratory Number 1089.

Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **S166093M**

Consignment No S57212
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

ID Number	Description	Sampled	BTEX-HSA + MTBE analysis	MTBE (µg/kg)	CEN Leac(P)1	CEN Leac(P)2	REPORT A	DO ID and QUANT if ASB Found	S.O.M. % (Calc)	GRO	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	SO4-- (H2O sol) mg/l	Chromium vi:	MCertS Analysis	PAH (16) by GCMS	PCB-7 Congeners Analysis	pH units (AR)	Cyanide(Free) (AR)
		MethodID	BTEXHSA		CEN Leachate		CustServ	Dep.Opt	FOCS	GROHSA	ICPBOR	ICPMSS									ICPWSS	KONECR	MCertS	PAHMSUS	PCBUSECDAR	PHSOIL	SFAPI
			✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓
CL/1624735	MTP03 0.5	07/07/16	E	E	🟩	🟩	🟩	🟩	🟩	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	🟩	E	E
CL/1624736	MTP03 0.9	07/07/16	E	E			🟩		🟩	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	🟩	E	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
⬜	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Sample Analysis **ESG Environmental Chemistry** **S166093M**

Analytical and Deviating Sample Overview

Customer	**ESG Limited Doncaster**
Site	**The Factory**
Report No	**S166093M**

Consignment No S57212
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

		MethodID	SFAPI		SSP3	Sub002a	Sub020	TMSS	TPHFIDUS		WSLM59
ID Number	**Description**	**Sampled**	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**	**Stone Content %**	**^Asbestos Screen**	**^Asbestos ID & Quan**	**Tot.Moisture @ 105C**	**TPH by GCFID (AR)**	**TPH Carbon Banding.**	**Total Organic Carbon**
			✓	✓		✓	✓	✓	✓	✓	
CL/1624735	MTP03 0.5	07/07/16	🟩 E	🟩 E	🟩	🟩	🟨	🟩	🟩 E	🟩 E	🟩
CL/1624736	MTP03 0.9	07/07/16	🟩 E	🟩 E	🟩	🟩	🟨	🟩	🟩 E	🟩 E	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
⬜	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	FOCS	Oven Dried @ < 35°C	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in soil samples by aqua regia digestion followed by ICPMS
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SSP3	As Received	Determination of stones content by dry sieving at the required particle size
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis
Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
TR Denotes Tremolite
AC Denotes Actinolite
AN Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined
N.Det Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Doncaster
Site : The Factory
Report Number : S16_6093

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1624735	MTP03 ES 1 0.50	Brown MADE GROUND
CL/1624736	MTP03 ES 3 0.90	Brown MADE GROUND

TEST REPORT

1252

Report No. EFS/166094M (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: The Factory

The 1 sample described in this report were registered for analysis by ESG on 27-Jul-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 03-Aug-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Page 5)
Table of PCB Congener Results (Page 6)
Table of TPH Texas banding (std) (Page 7)
GC-FID Chromatograms (Page 8)
Table of Asbestos Screening Results (Page 9)
Analytical and Deviating Sample Overview (Pages 10 to 11)
Table of Method Descriptions (Page 12)
Table of Report Notes (Page 13)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns
Managing Director
Multi-Sector Services

Date of Issue: 03-Aug-2016

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105^{o}C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	mg/kg	mg/kg	mg/kg
Method Codes :			GROHSA	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPWSS	PHSOIL	SFAPI	SFAPI	SFAPI
Method Reporting Limits :			0.2	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16	10		0.5	0.5	0.5
Accreditation Code:			UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	U
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**GRO**	**Boron (H20 Soluble)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**SO4-- (H2O sol) mg/l**	**pH units (AR)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**
1624737	BH01 ES 2 1.0	**29-Jun-16**	<0.2	1.4	15.0	0.77	14.8	69	178.1	<0.50	32.5	1.1	293.7	276	8.5	<0.6	<0.6	<0.6

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory

Sample Analysis

Date Printed	**03-Aug-2016**
Report Number	**EFS/166094M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

LAB ID Number CL/	Client Sample Description	Sample Date	^Asbestos Screen	Tot.Moisture @ 105C	TPH by GCFID (AR)	TPH Carbon Banding.	S.O.M. % (Calc)	Chromium vi:	PCB-7 Congeners Analysis	Stone Content %	Total Organic Carbon	Benzene	Toluene	Ethyl Benzene	MTBE	Xylenes	m/p Xylenes	o Xylene
		Units :		%	mg/kg	mg/kg	% M/M	mg/kg	µg/kg	%	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
		Method Codes :	Sub002a	TMSS	TPHFIDUS	TPHFIDUS	FOCS	KONECR	PCBUSECDAR	SSP3	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
		Method Reporting Limits :		0.2	10	10	0.04	0.1		0.1	0.04	10	10	10	20	30	20	10
		Accreditation Code:	U	U	UM		N	N		N	N	UM	UM	UM	N	UM	UM	UM
1624737	BH01 ES 2 1.0	29-Jun-16	NAIIS	16.1	411	Req	25.9	<0.1	Req	8.7	15.0	<12	<12	<12	<24	<36	<24	<12

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

The Factory

Sample Analysis

Date Printed	**03-Aug-2016**
Report Number	**EFS/166094M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

		Units :	mg/kg															
		Method Codes :	PAHMSUS															
		Method Reporting Limits :																
		Accreditation Code:																
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**PAH (16) by GCMS**															
1624737	BH01 ES 2 1.0	**29-Jun-16**	Req															

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

The Factory

Sample Analysis

Date Printed	**03-Aug-2016**
Report Number	**EFS/166094M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	BH01 ES 2 1.0	**Job Number:**	s16_6094M
LIMS ID Number:	CL1624737	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-16
Directory:	\072916MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	5.13	1.11	99	UM
Anthracene	120-12-7	5.18	0.30	95	U
Fluoranthene	206-44-0	6.36	1.13	94	UM
Pyrene	129-00-0	6.62	1.30	96	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	9.73	1.13	79	UM
Benzo[k]fluoranthene	207-08-9	9.76	0.43	83	UM
Benzo[a]pyrene	50-32-8	10.14	0.97	97	UM
Indeno[1,2,3-cd]pyrene	193-39-5	11.50	0.77	91	UM
Dibenzo[a,h]anthracene	53-70-3	11.53	0.17	76	UM
Benzo[g,h,i]perylene	191-24-2	11.78	0.70	90	UM
Total (USEPA16) PAHs	-	-	< 8.59	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	77
Acenaphthene-d10	72
Phenanthrene-d10	74
Chrysene-d12	81
Perylene-d12	95

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	106
Terphenyl-d14	84

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polychlorinated Biphenyls (congeners)

Customer and Site Details:	ESG Limited Doncaster: The Factory	**Matrix:**	Soil
Job Number:	S16_6094M	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Directory:	0801PCB.GC70	**Date Analysed:**	02-Aug-16
Method:	Ultrasonic		
Accreditation code:	N		

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
* CL1624737	BH01 ES 2 1.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

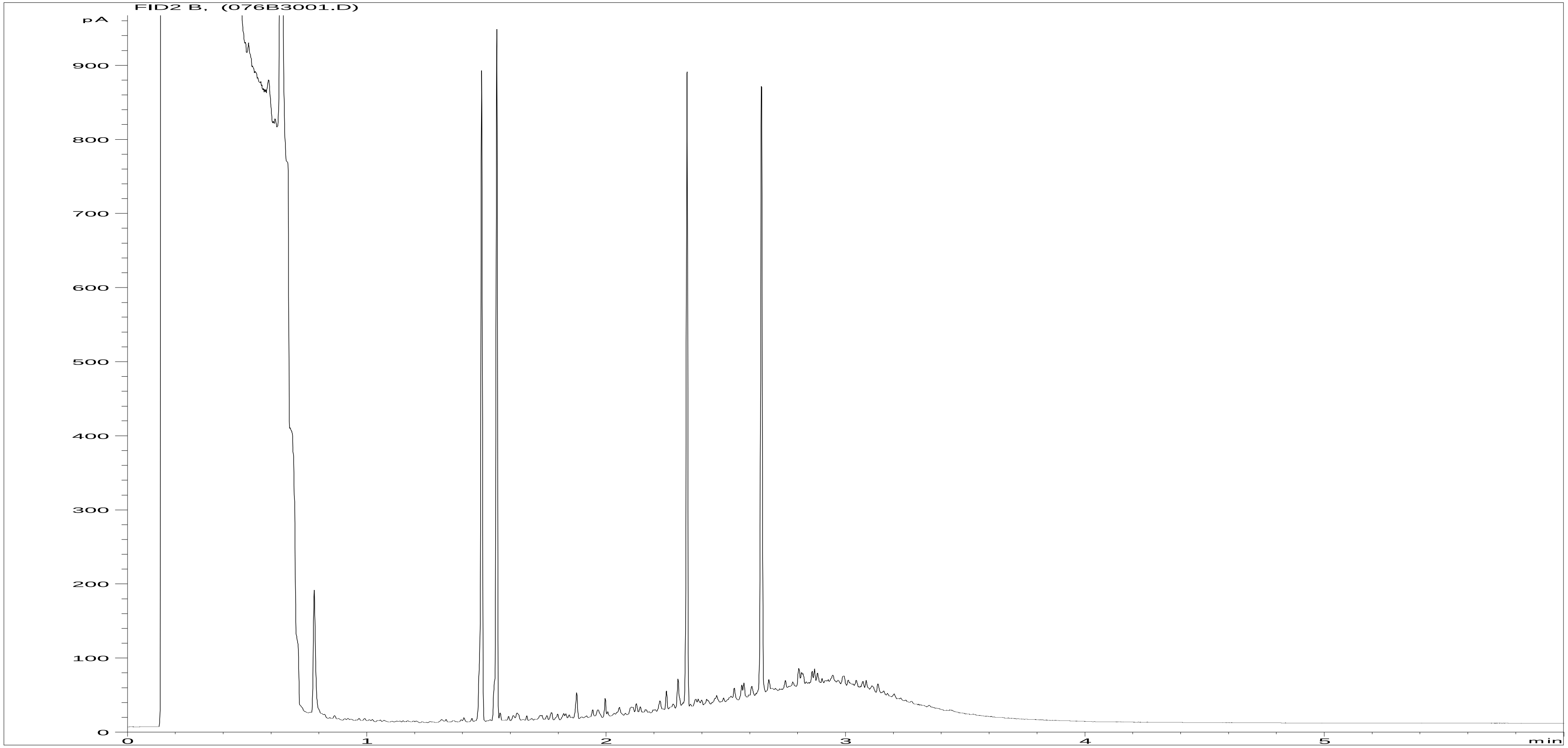
Total Petroleum Hydrocarbons (TPH) Carbon Ranges

Customer and Site Details:	ESG Limited Doncaster : The Factory	**Matrix:**	Soil
Job Number:	S16_6094M	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Directory:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\076B3001.D	**Date Analysed:**	29-Jul-16, 19:41:32
Method:	Ultra Sonic		
Accreditation code:	U		

		Concentration, (mg/kg) - as dry weight.				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
CL1624737	BH01 ES 2 1.0	<2	<2	13.5	46.6	304

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1624737	**Job Number:**	S16_6094M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH01 ES 2 1.0
Acquisition Date/Time:	29-Jul-16, 19:41:32		
Datafile:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\076B3001.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

ASBESTOS ANALYSIS RESULTS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils, Sediments and Aggregates

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

1089

Client:	ESG Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	**ANO-0488-12921**
For the attention of:	ESG Limited Doncaster	**Report Date:**	**02/08/2016**
Site Address:	The Factory	**Project Number:**	**S166094**

Sample Number	Sample Date	Sample Location & Matrix	Test Date	Total Sample Dry Weight (g)	Weight of <10mm Fraction (g)	Asbestos(g) in >10mm	Asbestos(g) in <10mm	% Asbestos by weight of Total Dried Sample	Asbestos Fibre Types Identified
CL/1624737	29/06/16	BH01 1.0 Soils	02/08/2016					Identification	NAIIS

Keys	**NAACR = Not Analysed at Clients Request**	**NAIIS = No Asbestos Identified in Sample (Identification Only)**	Name:	Chris Mackie	Authorised Signatory:
	*** visible to naked eye**	**NADIS = No Asbestos Detected in Sample (ID & Quant Only)**	Position:	Lab Analyst	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 12 - February 2016. Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0YZ, UKAS Laboratory Number 1089.

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S166094M

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **S166094M**

Consignment No S57131
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

		MethodID	BTEXHSA		CustServ	Dep.Opt	FOCS	GROHSA	ICPBOR	ICPMSS									ICPWSS	KONECR	MCertS	PAHMSUS	PCBUSECDAR	PHSOIL	SFAPI		
ID Number	**Description**	**Sampled**	**BTEX-HSA + MTBE analysis**	**MTBE (µg/kg)**	**REPORT A**	**DO ID & Quant if ASB found**	**S.O.M. % (Calc)**	**GRO**	**Boron (H20 Soluble)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**SO4-- (H2O sol) mg/l**	**Chromium vi:**	**MCertS Analysis**	**PAH (16) by GCMS**	**PCB-7 Congeners Analysis**	**pH units (AR)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**
			✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓	✓
CL/1624737	BH01 1.0	29/06/16	E	E	🟩	🟩	🟩	E	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	🟩	🟩	E	🟩	E	E	E	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S166094M

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **S166094M**

Consignment No S57131
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

ID Number	**Description**	**MethodID**	**SSP3**	**Sub002**	**Sub002a**	**TMSS**	**TPHFIDUS**		**WSLM59**
		Sampled	**Stone Content %**	**^Asbestos ID and Quantification**	**^Asbestos Screen**	**Tot.Moisture @ 105C**	**TPH by GCFID (AR)**	**TPH Carbon Banding.**	**Total Organic Carbon**
				✓	✓	✓	✓	✓	
CL/1624737	BH01 1.0	29/06/16	🟩	🟨	🟩	E	E	E	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	FOCS	Oven Dried @ < 35°C	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in soil samples by aqua regia digestion followed by ICPMS
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SSP3	As Received	Determination of stones content by dry sieving at the required particle size
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis
Unless stated otherwise results are expressed as mg/l
Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
TR Denotes Tremolite
AC Denotes Actinolite
AN Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Doncaster

Site : The Factory

Report Number : S16_6094

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1624737	BH01 ES 2 1.0	Brown MADE GROUND

TEST REPORT

1252

Report No. EFS/166095M (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: The Factory

The 6 samples described in this report were registered for analysis by ESG on 27-Jul-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 04-Aug-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Pages 5 to 10)
Table of PCB Congener Results (Page 11)
Table of GRO Results (Page 12)
Table of TPH (Si) banding (std) (Page 13)
Table of TPH Texas banding (std) (Page 14)
GC-FID Chromatograms (Pages 15 to 32)
Table of WAC Analysis Results (Page 33)
Table of Asbestos Screening Results (Page 34)
Analytical and Deviating Sample Overview (Pages 35 to 36)
Table of Additional Report Notes (Page 37)
Table of Method Descriptions (Pages 38 to 39)
Table of Report Notes (Page 40)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns
Managing Director
Multi-Sector Services

Date of Issue: 04-Aug-2016

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105^{o}C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

LAB ID Number CL/	Client Sample Description	Sample Date	GRO	GRO (AA) by HSA GC-FID	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	SO4-- (H2O sol) mg/l	pH units (AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
Units :			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	mg/kg	mg/kg
Method Codes :			GROHSA	GROHSA	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPWSS	PHSOIL	SFAPI	SFAPI
Method Reporting Limits :			0.2	0.2	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16	10		0.5	0.5
Accreditation Code:			UM		UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM
1624738	WS1 ES 2 0.50	06-Jul-16	<0.2		0.5	2.5	0.74	20.4	10.1	39	<0.5	16.7	<0.5	57	56	11.8	<0.6	<0.6
1624739	WS6 ES 2 0.50	06-Jul-16	<0.2		<0.5	1.9	0.44	22.1	8	21.3	<0.5	18.3	<0.5	41.9	141	11.1	<0.6	<0.6
1624740	WS7 ES 4 1.10	06-Jul-16	<0.2		<0.5	6.3	0.53	11.8	38.9	99.0	<0.5	9.6	0.7	160.5	129	9.3	<0.5	<0.5
1624741	WS8 ES 5 1.20	06-Jul-16	<0.3		0.8	9.7	<0.2	24.4	29.0	318	<0.5	15.3	0.8	77.9	205	8.3	<0.6	<0.6
1624742	WS9 ES 6 2.00	06-Jul-16	<0.3		1	12.5	0.89	28.1	130.4	359.7	<0.53	23.5	0.8	358.1	265	7.7	<0.7	<0.7
1624743	WS9 ES 10 3.30	06-Jul-16	0.3	Req	0.6	9.8	0.22	22.3	24.7	32.4	<0.5	25.3	<0.5	61.7	1260	7.8	<0.6	<0.6

ESG

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

Sample Analysis

The Factory

Date Printed	**04-Aug-2016**
Report Number	**EFS/166095M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

		Units :	mg/kg		%	mg/kg	mg/kg	mg/kg	% M/M	mg/kg	µg/kg	%	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
		Method Codes :	SFAPI	Sub002a	TMSS	TPHFIDUS	TPHFIDUS	TPHUSSI	FOCS	KONECR	PCBUSECDAR	SSP3	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
		Method Reporting Limits :	0.5		0.2	10	10	20	0.04	0.1		0.1	0.04	10	10	10	20	30
		Accreditation Code:	U	U	U	UM			N	N		N	N	UM	UM	UM	N	UM
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**Phenol Index.(AR)**	**^Asbestos Screen**	**Tot.Moisture @ 105C**	**TPH by GCFID (AR)**	**TPH Carbon Banding.**	**TPH by GCFID (AR/Si)**	**S.O.M. % (Calc)**	**Chromium vi:**	**PCB-7 Congeners Analysis**	**Stone Content %**	**Total Organic Carbon**	**Benzene**	**Toluene**	**Ethyl Benzene**	**MTBE**	**Xylenes**
1624738	WS1 ES 2 0.50	06-Jul-16	<0.6	NAIIS	15.4	22	Req	Req	0.72	<0.1	Req	9.8	0.42	<12	<12	<12	<24	<35
1624739	WS6 ES 2 0.50	06-Jul-16	<0.6	NAIIS	9.9	16	Req	Req	0.31	<0.1	Req	7.6	0.18	<11	<11	<11	<22	<33
1624740	WS7 ES 4 1.10	06-Jul-16	<0.5	NAIIS	3.1	513	Req	Req	2.44	<0.1	Req	8.1	1.41	<10	<10	<10	<21	<31
1624741	WS8 ES 5 1.20	06-Jul-16	<0.6	NAIIS	22.5	15	Req	Req	2.58	<0.1	Req	7.1	1.50	<13	<13	<13	<26	<39
1624742	WS9 ES 6 2.00	06-Jul-16	0.7	NAIIS	24.8	315	Req	Req	4.00	<0.1	Req	5.7	2.32	<13	<13	<13	<27	<40
1624743	WS9 ES 10 3.30	06-Jul-16	<0.6	NAIIS	8.3	561	Req	Req	0.90	<0.1	Req	6.2	0.53				<22	

ESG

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

Sample Analysis

The Factory

Date Printed	**04-Aug-2016**
Report Number	**EFS/166095M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

		Units :	µg/kg	µg/kg	mg/kg
		Method Codes :	BTEXHSA	BTEXHSA	PAHMSUS
		Method Reporting Limits :	20	10	
		Accreditation Code:	UM	UM	
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**m/p Xylenes**	**o Xylene**	**PAH (16) by GCMS**
1624738	WS1 ES 2 0.50	06-Jul-16	<24	<12	Req
1624739	WS6 ES 2 0.50	06-Jul-16	<22	<11	Req
1624740	WS7 ES 4 1.10	06-Jul-16	<21	<10	Req
1624741	WS8 ES 5 1.20	06-Jul-16	<26	<13	Req
1624742	WS9 ES 6 2.00	06-Jul-16	<27	<13	Req
1624743	WS9 ES 10 3.30	06-Jul-16			Req

ESG

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory

Sample Analysis

Date Printed	**04-Aug-2016**
Report Number	**EFS/166095M**
Table Number	**1**

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	WS1 ES 2 0.50	**Job Number:**	S16_6095M
LIMS ID Number:	CL1624738	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-16
Directory:	\072916MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Total (USEPA16) PAHs	-	-	< 1.51	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	87
Acenaphthene-d10	80
Phenanthrene-d10	81
Chrysene-d12	87
Perylene-d12	90

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	99
Terphenyl-d14	82

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	WS6 ES 2 0.50	**Job Number:**	s16_6095M
LIMS ID Number:	CL1624739	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-16
Directory:	\072916MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Total (USEPA16) PAHs	-	-	< 1.42	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	87
Acenaphthene-d10	81
Phenanthrene-d10	85
Chrysene-d12	82
Perylene-d12	79

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	100
Terphenyl-d14	82

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	WS7 ES 4 1.10	**Job Number:**	S16_6095M
LIMS ID Number:	CL1624740	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	29-Jul-16
Directory:	\072916MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	2.89	0.70	97	**UM**
Acenaphthylene	208-96-8	3.93	0.12	81	U
Acenaphthene	83-32-9	4.03	1.31	98	UM
Fluorene	86-73-7	4.38	1.50	92	UM
Phenanthrene	85-01-8	5.13	11.20	100	UM
Anthracene	120-12-7	5.18	2.78	92	U
Fluoranthene	206-44-0	6.36	9.93	95	UM
Pyrene	129-00-0	6.62	9.55	98	UM
Benzo[a]anthracene	56-55-3	8.23	5.31	97	UM
Chrysene	218-01-9	8.28	4.53	99	UM
Benzo[b]fluoranthene	205-99-2	9.73	4.94	99	UM
Benzo[k]fluoranthene	207-08-9	9.76	1.52	97	UM
Benzo[a]pyrene	50-32-8	10.14	4.50	96	UM
Indeno[1,2,3-cd]pyrene	193-39-5	11.49	3.04	94	UM
Dibenzo[a,h]anthracene	53-70-3	11.53	0.73	90	UM
Benzo[g,h,i]perylene	191-24-2	11.78	2.40	91	UM
Total (USEPA16) PAHs	-	-	64.12	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	88
Acenaphthene-d10	81
Phenanthrene-d10	89
Chrysene-d12	114
Perylene-d12	139

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	97
Terphenyl-d14	76

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	WS8 ES 5 1.20	**Job Number:**	s16_6095M
LIMS ID Number:	CL1624741	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	30-Jul-16
Directory:	\072916MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	6.36	0.10	72	UM
Pyrene	129-00-0	6.63	0.10	64	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Total (USEPA16) PAHs	-	-	< 1.70	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	81
Acenaphthene-d10	76
Phenanthrene-d10	77
Chrysene-d12	82
Perylene-d12	91

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	108
Terphenyl-d14	88

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	WS9 ES 6 2.00	**Job Number:**	S16_6095M
LIMS ID Number:	CL1624742	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	30-Jul-16
Directory:	\072916MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	2.89	3.78	97	**UM**
Acenaphthylene	208-96-8	-	< 0.11	-	U
Acenaphthene	83-32-9	4.03	0.15	96	UM
Fluorene	86-73-7	-	< 0.11	-	UM
Phenanthrene	85-01-8	5.13	1.81	99	UM
Anthracene	120-12-7	5.18	0.43	93	U
Fluoranthene	206-44-0	6.36	1.22	94	UM
Pyrene	129-00-0	6.62	1.14	96	UM
Benzo[a]anthracene	56-55-3	8.23	0.65	93	UM
Chrysene	218-01-9	8.28	0.60	97	UM
Benzo[b]fluoranthene	205-99-2	9.73	0.90	93	UM
Benzo[k]fluoranthene	207-08-9	9.76	0.36	92	UM
Benzo[a]pyrene	50-32-8	10.14	0.85	98	UM
Indeno[1,2,3-cd]pyrene	193-39-5	11.50	0.92	92	UM
Dibenzo[a,h]anthracene	53-70-3	11.53	0.15	82	UM
Benzo[g,h,i]perylene	191-24-2	11.78	0.92	89	UM
Total (USEPA16) PAHs	-	-	< 14.08	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	86
Acenaphthene-d10	78
Phenanthrene-d10	82
Chrysene-d12	96
Perylene-d12	112

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	107
Terphenyl-d14	87

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	WS9 ES 10 3.30	**Job Number:**	s16_6095M
LIMS ID Number:	CL1624743	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	30-Jul-16
Directory:	\072916MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	2.89	0.36	98	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	4.03	1.62	98	UM
Fluorene	86-73-7	4.38	0.41	97	UM
Phenanthrene	85-01-8	5.13	0.53	95	UM
Anthracene	120-12-7	5.18	0.38	93	U
Fluoranthene	206-44-0	6.36	1.81	95	UM
Pyrene	129-00-0	6.62	3.16	97	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	9.73	0.26	80	UM
Benzo[k]fluoranthene	207-08-9	9.76	0.10	84	UM
Benzo[a]pyrene	50-32-8	10.14	0.21	94	UM
Indeno[1,2,3-cd]pyrene	193-39-5	11.50	0.10	77	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	11.78	0.10	68	UM
Total (USEPA16) PAHs	-	-	< 9.42	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	89
Acenaphthene-d10	85
Phenanthrene-d10	95
Chrysene-d12	111
Perylene-d12	124

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	94
Terphenyl-d14	78

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polychlorinated Biphenyls (congeners)

Customer and Site Details: ESG Limited Doncaster: The Factory
Job Number: S16_6095M
QC Batch Number: 160870
Directory: 0801PCB.GC70
Method: Ultrasonic
Accreditation code: N

Matrix: Soil
Date Booked in: 27-Jul-16
Date Extracted: 29-Jul-16
Date Analysed: 02-Aug-16

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
* CL1624738	WS1 ES 2 0.50	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9
* CL1624739	WS6 ES 2 0.50	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5
* CL1624740	WS7 ES 4 1.10	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2
* CL1624741	WS8 ES 5 1.20	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5
* CL1624742	WS9 ES 6 2.00	<6.6	<6.6	<6.6	<6.6	<6.6	<6.6	<6.6
* CL1624743	WS9 ES 10 3.30	<5.6	<5.6	<5.6	<5.6	<5.6	<5.6	<5.6

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Gasoline Range Organics
(BTEX and Aliphatic Carbon Ranges)

Customer and Site Details: ESG Limited Doncaster : The Factory
Job Number: S16_6095
Directory: E:\TES\DATA\2016\0802HSA_GC9\080216 2016-08-02 09-55-05\114B1401.D
Method: Headspace GCFID
Accreditation Code: UM

Matrix: Soil
Date Booked in: 27-Jul-16
Date extracted: 02-Aug-16
Date Analysed: 02-Aug-16, 13:5

*** Sample data with an asterisk are not UKAS accredited.**

		Concentration, (mg/kg) - as dry weight.					Aliphatics				
Sample ID	**Client ID**	**Benzene**	**Toluene**	**Ethyl benzene**	**m/p-Xylene**	**o-Xylene**	**C5 - C6**	**>C6 - C7**	**>C7 - C8**	**>C8 - C10**	**Total GRO**
CL1624743	WS9 ES 10 3.30	<0.011	<0.011	<0.011	<0.011	<0.011	<0.2	<0.2	<0.2	0.2	0.3

Note: Benzene elutes between C6 and C7, toluene elutes between C7 and C8, ethyl benzene and the xylenes elute between C8 and C9.

Each BTEX compound is deducted from the appropriate band to give the aliphatic fractions, however aromatic compounds may still be contributing to these fractions

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

ALIPHATIC / AROMATIC FRACTION BY GC/FID

Customer and Site Details: ESG Limited Doncaster : The Factory
Job Number: S16_6095M
QC Batch Number: 160870
Directory: D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\064B2201.D
Method: Ultra Sonic

Separation: Silica gel
Eluents: Hexane, DCM

Matrix: Soil
Date Booked i 27-Jul-16
Date Extracted 29-Jul-16
Date Analysed: 01-Aug-16, 20:49:06

This sample data is not MCERTS accredited.

*** This sample data is not ISO17025 accredited.**

		Concentration, (mg/kg) - as dry weight.											
		>C8 - C10		**>C10 - C12**		**>C12 - C16**		**>C16 - C21**		**>C21 - C35**		**>C8 - C40**	
Sample ID	**Client ID**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**	**Aliphatics**	**Aromatics**
CL1624738	WS1 ES 2 0.50	<5	<5	<5	<5	<5	<5	<5	<5	11.2	<10.35	<24	<24
CL1624739	WS6 ES 2 0.50	<4	<4	<4	<4	<4	<4	<4	<4	<9.72	<9.72	<22	<22
CL1624740	WS7 ES 4 1.10	<4	<4	<4	<4	10	19.7	23	86.5	88.2	207	128	327
CL1624741	WS8 ES 5 1.20	<5.21	<5	<5.21	<5	<5.21	<5	<5.21	<5	<11.42	<11.30	<26.1	<26
CL1624742	WS9 ES 6 2.00	<5	<5	<5	5.74	<5	7.9	31	13	68.4	62	102	89.5
CL1624743	WS9 ES 10 3.30	29.2	<4	67.2	<4	199	23.4	108.8	44.5	88.9	25	496	94.5

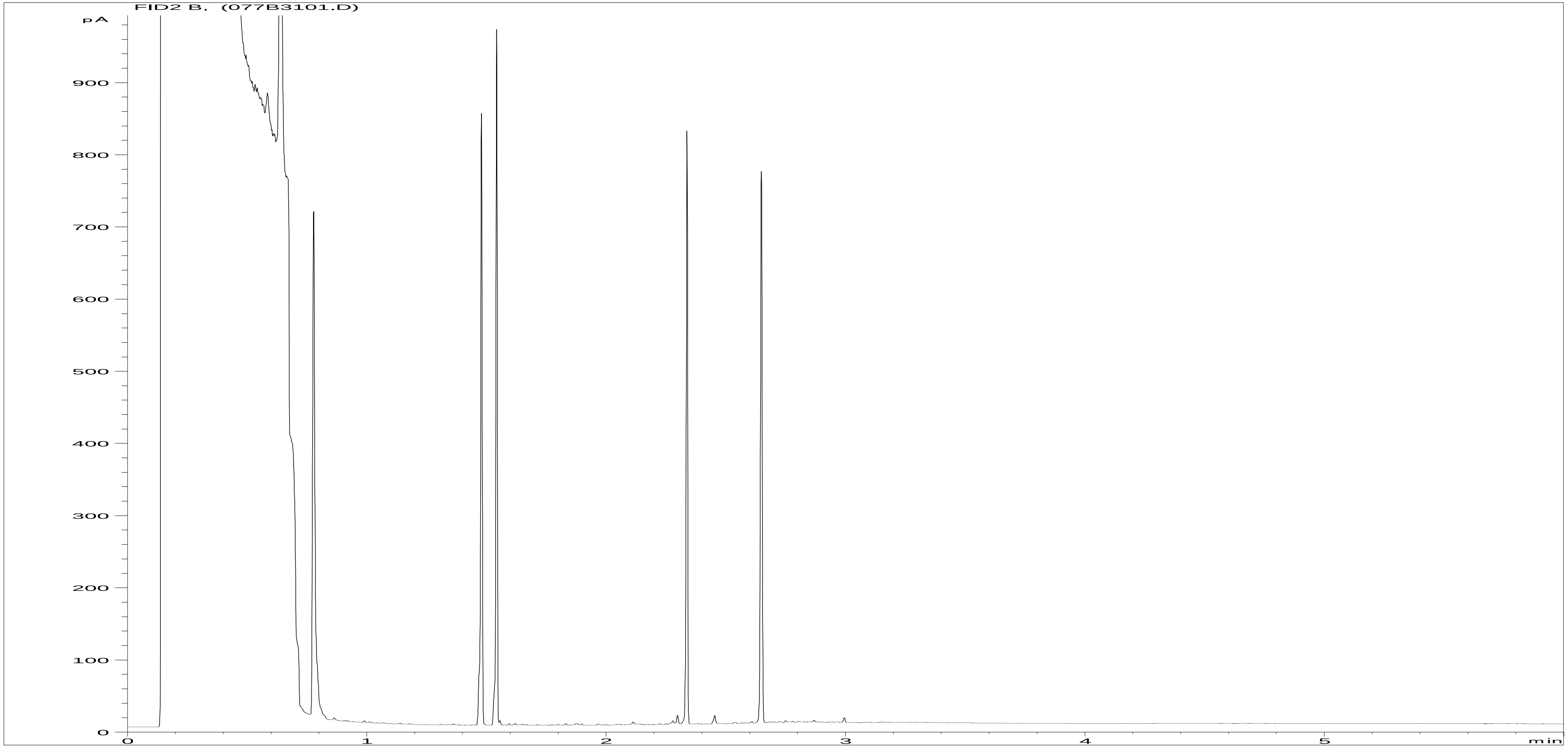
Total Petroleum Hydrocarbons (TPH) Carbon Ranges

Customer and Site Details:	ESG Limited Doncaster : The Factory	**Matrix:**	Soil
Job Number:	S16_6095M	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Directory:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\082B3601.D	**Date Analysed:**	29-Jul-16, 21:02:35
Method:	Ultra Sonic		
Accreditation code:	U		

		Concentration, (mg/kg) - as dry weight.				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
CL1624738	WS1 ES 2 0.50	<2	<2	<2	2.88	17.3
CL1624739	WS6 ES 2 0.50	<2	<2	<2	<2	10.9
CL1624740	WS7 ES 4 1.10	<2	<2	21.4	116	352
CL1624741	WS8 ES 5 1.20	<3	<3	<3	<3	11.37
CL1624742	WS9 ES 6 2.00	<3	5.96	10.29	61.8	227
CL1624743	WS9 ES 10 3.30	10	57.4	208	155	124

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

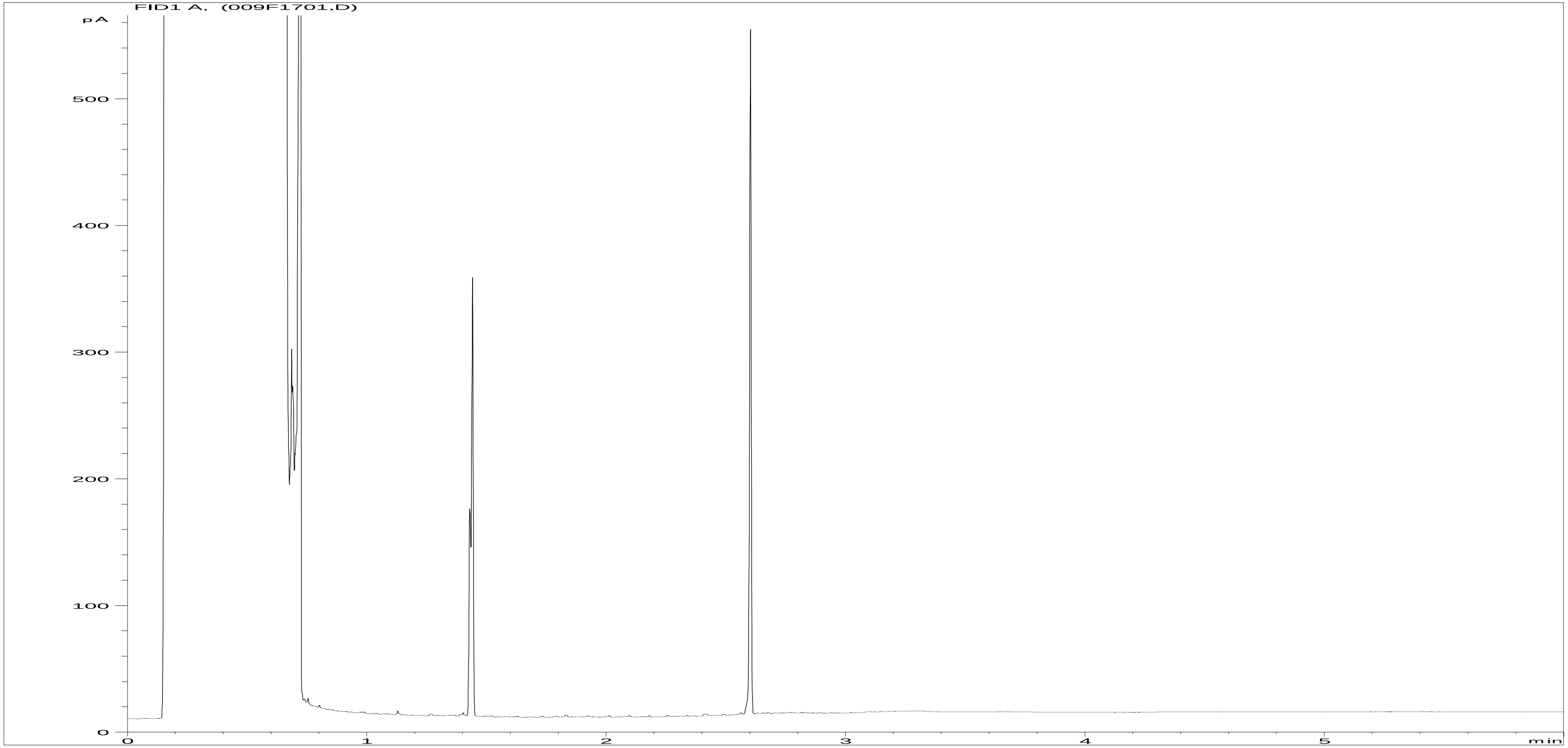
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1624738	**Job Number:**	S16_6095M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS1 ES 2 0.50
Acquisition Date/Time:	29-Jul-16, 19:55:03		
Datafile:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\077B3101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

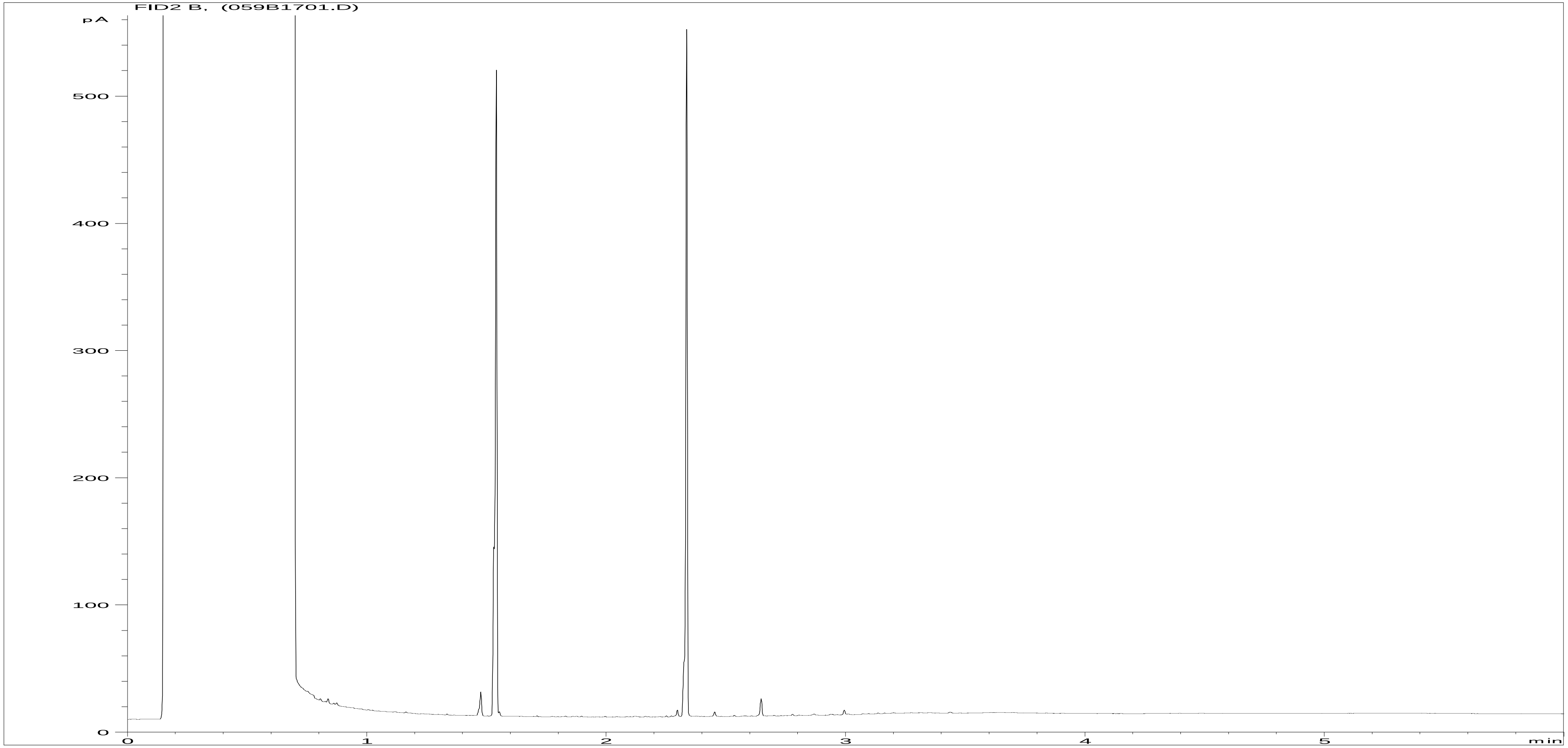
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1624738ALI	**Job Number:**	S16_6095M
Multiplier:	16	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS1 ES 2 0.50
Acquisition Date/Time:	01-Aug-16, 19:43:20		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\009F1701.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

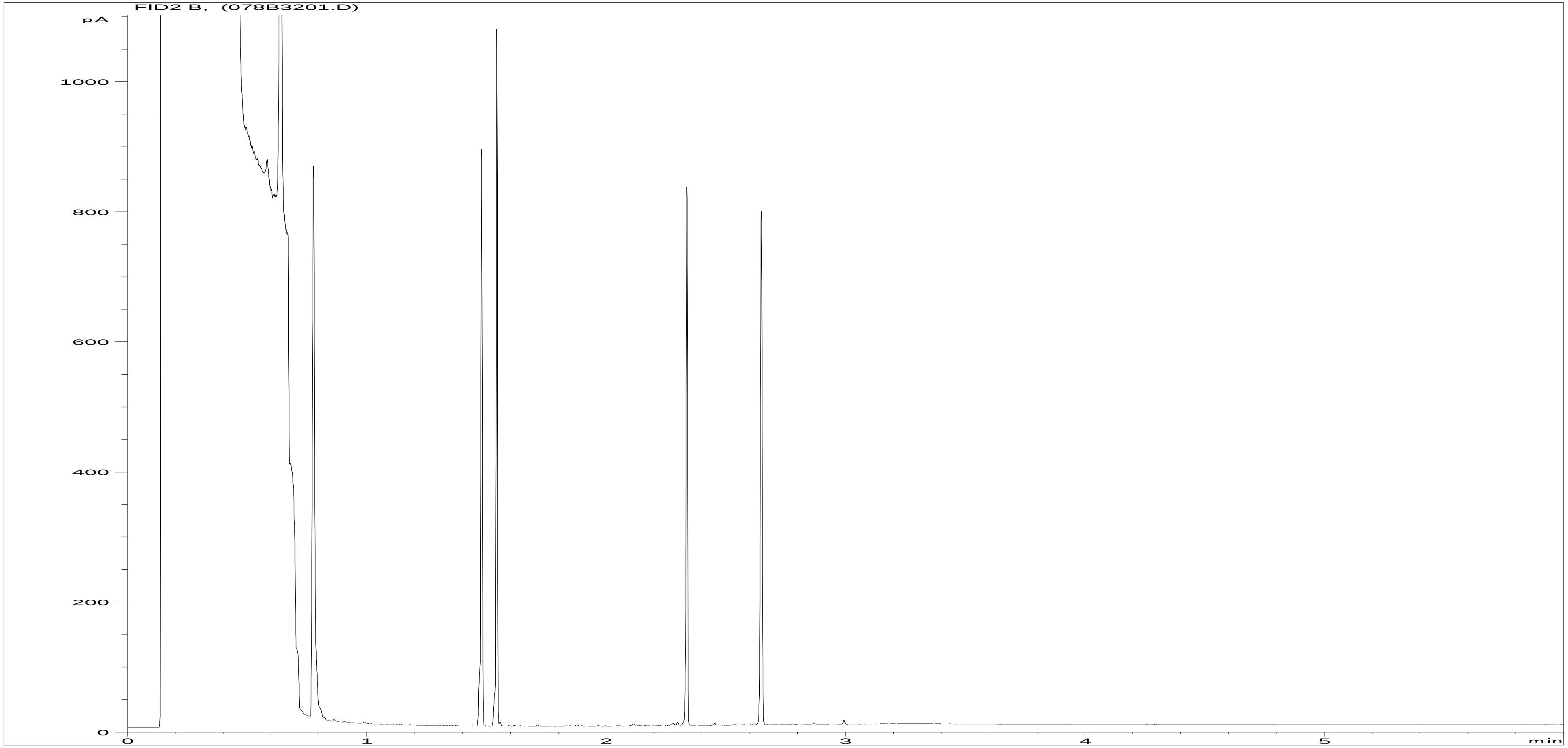
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1624738ARO	**Job Number:**	S16_6095M
Multiplier:	12	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS1 ES 2 0.50
Acquisition Date/Time:	01-Aug-16, 19:43:20		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\059B1701.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

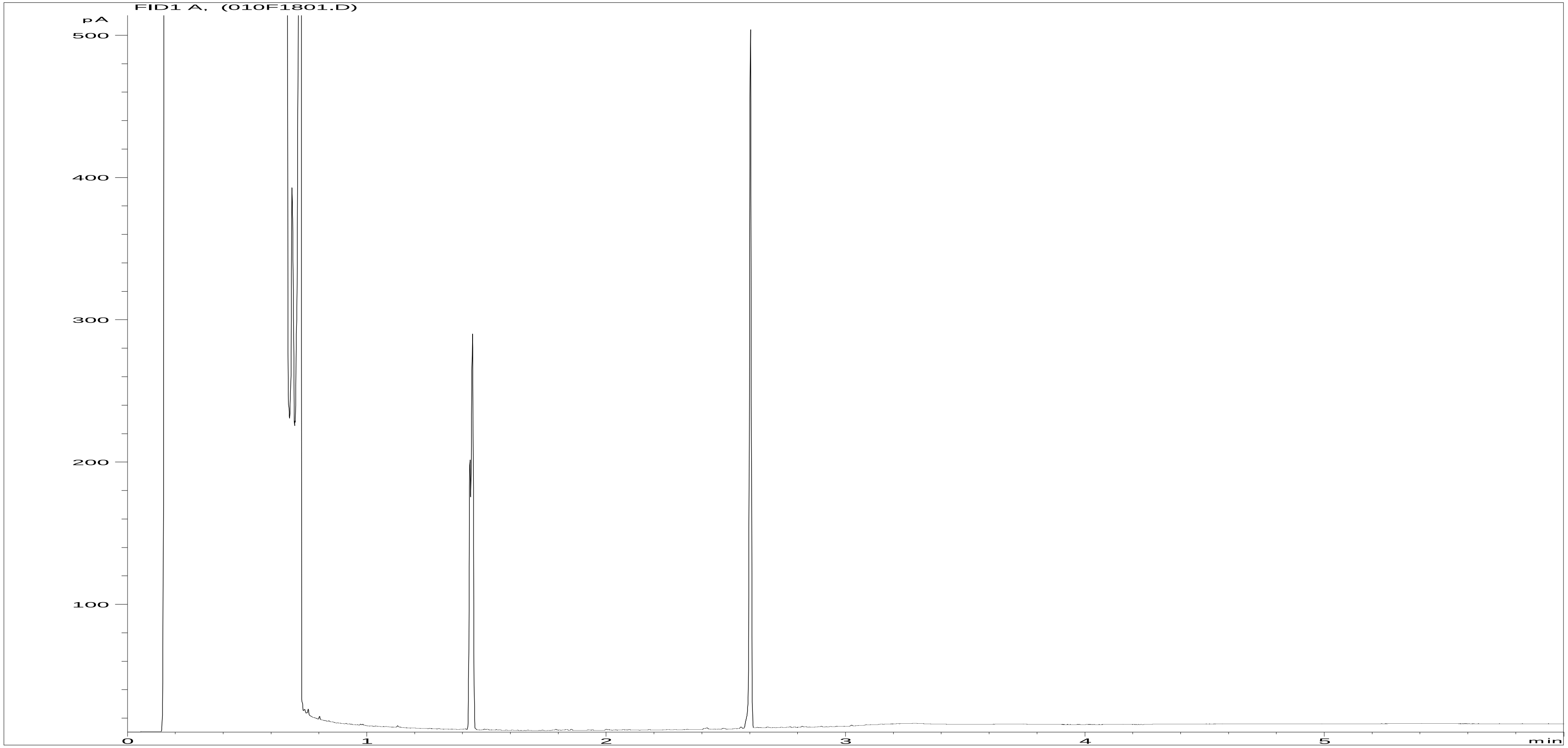
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1624739	**Job Number:**	S16_6095M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS6 ES 2 0.50
Acquisition Date/Time:	29-Jul-16, 20:08:34		
Datafile:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\078B3201.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

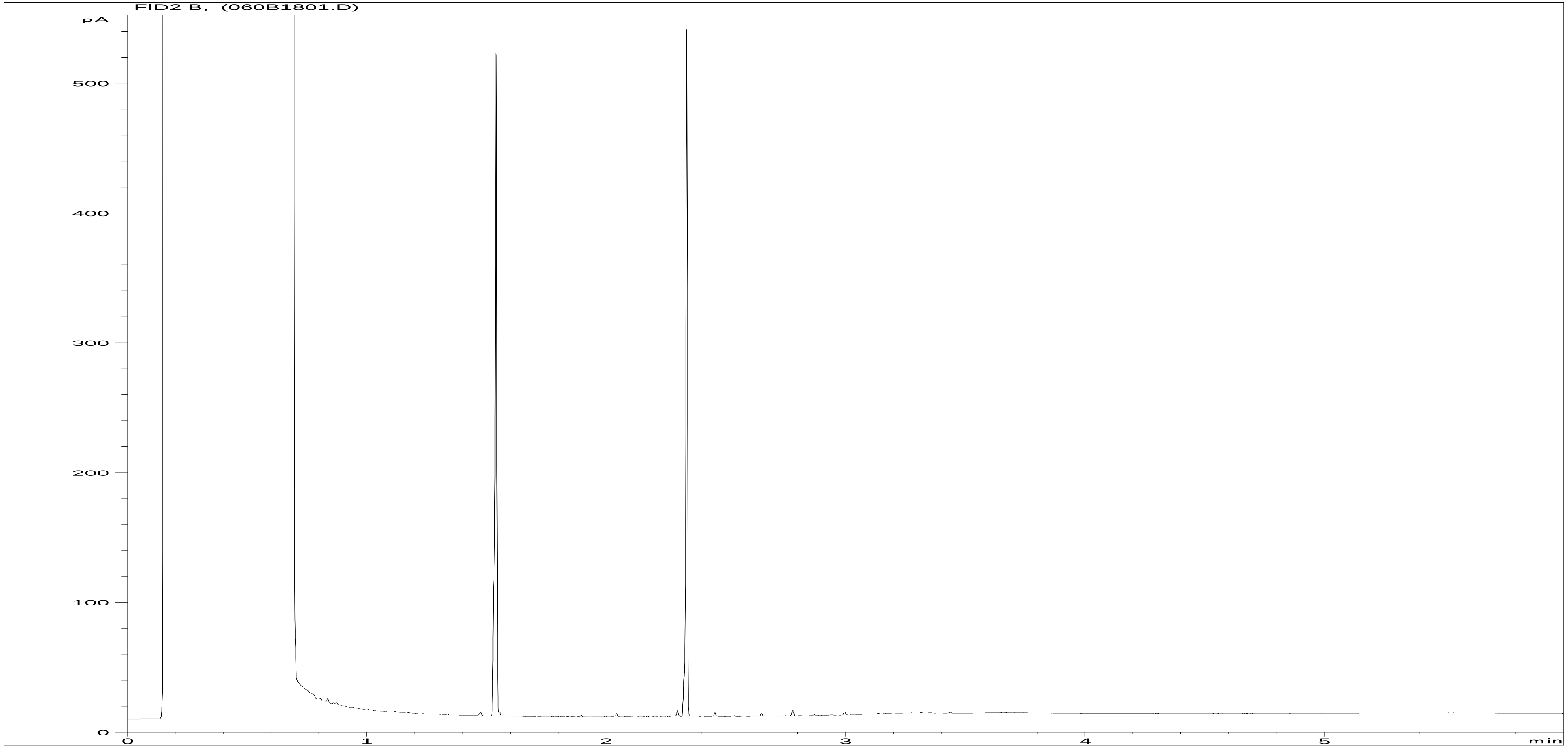
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1624739ALI	**Job Number:**	S16_6095M
Multiplier:	16	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS6 ES 2 0.50
Acquisition Date/Time:	01-Aug-16, 19:56:31		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\010F1801.D		

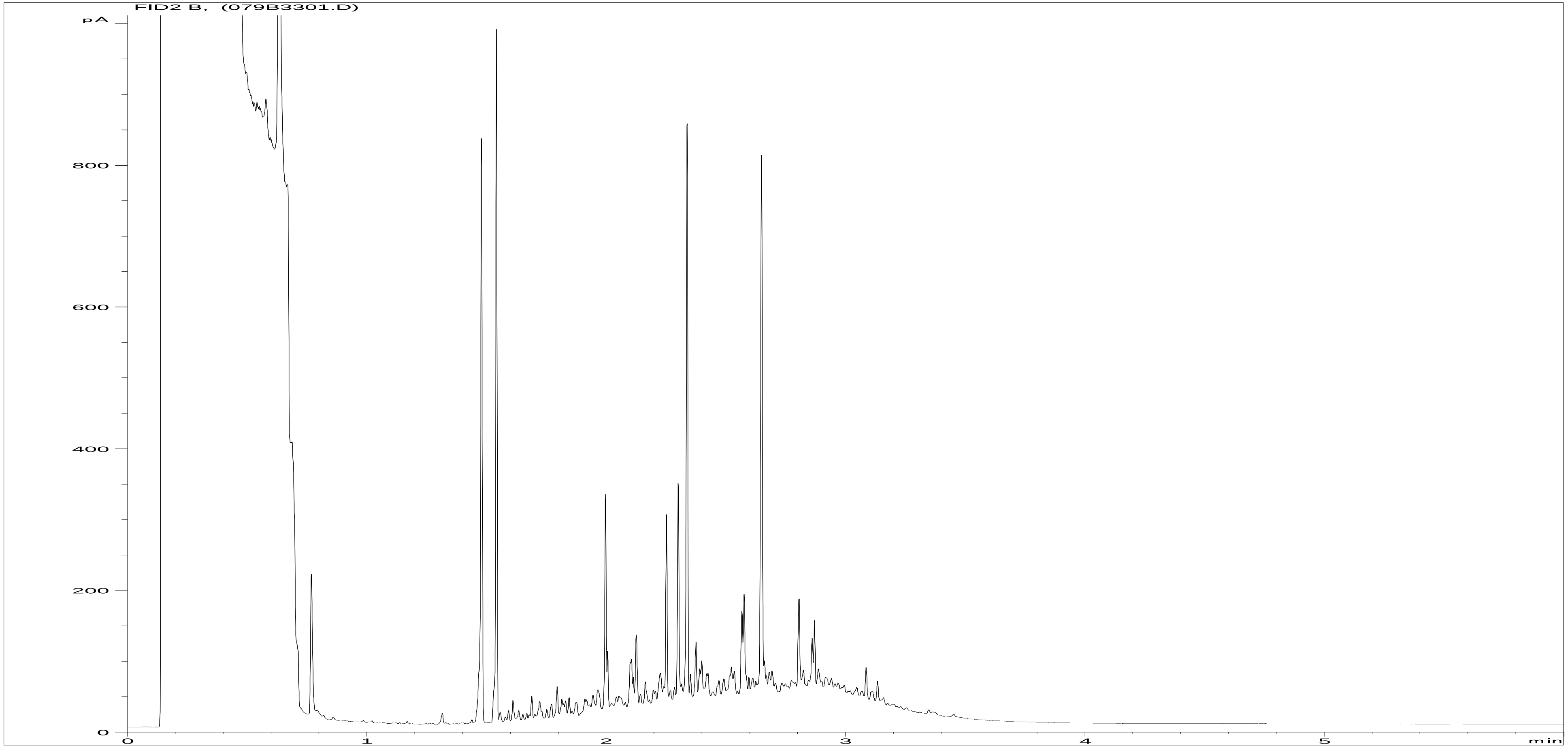
Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1624739ARO	**Job Number:**	S16_6095M
Multiplier:	11.84	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS6 ES 2 0.50
Acquisition Date/Time:	01-Aug-16, 19:56:31		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\060B1801.D		

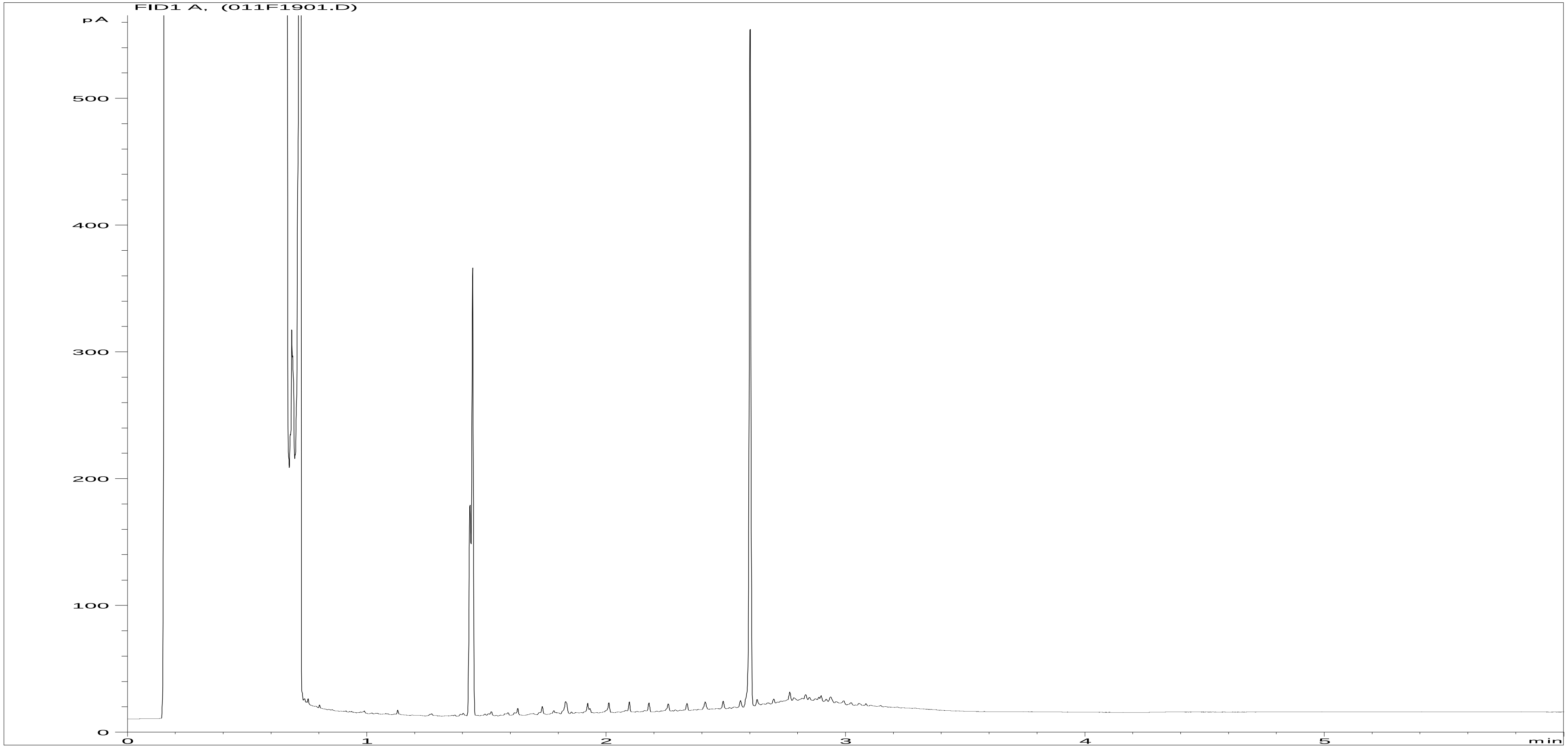
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1624740	**Job Number:**	S16_6095M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS7 ES 4 1.10
Acquisition Date/Time:	29-Jul-16, 20:22:02		
Datafile:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\079B3301.D		

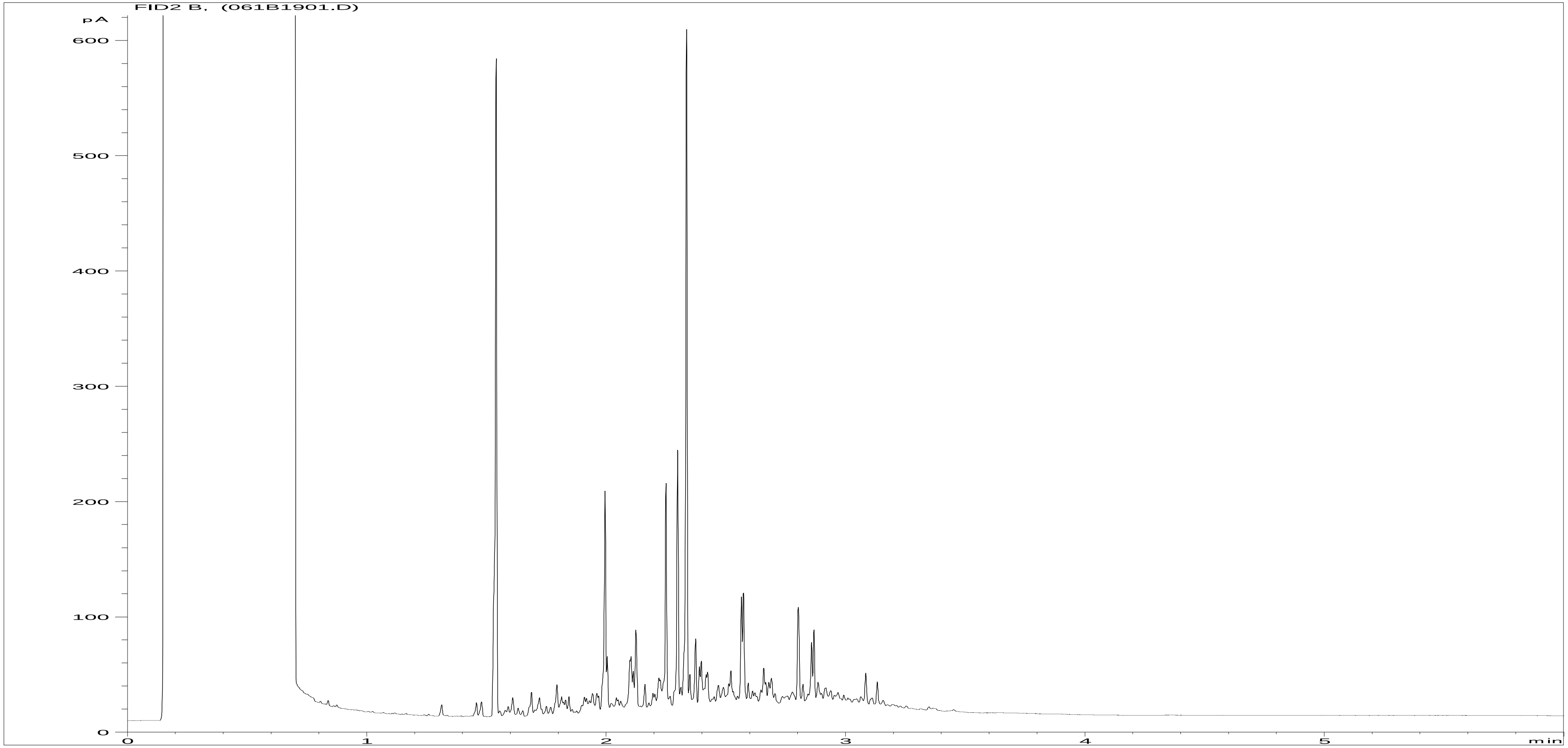
Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1624740ALI	**Job Number:**	S16_6095M
Multiplier:	16	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS7 ES 4 1.10
Acquisition Date/Time:	01-Aug-16, 20:09:41		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\011F1901.D		

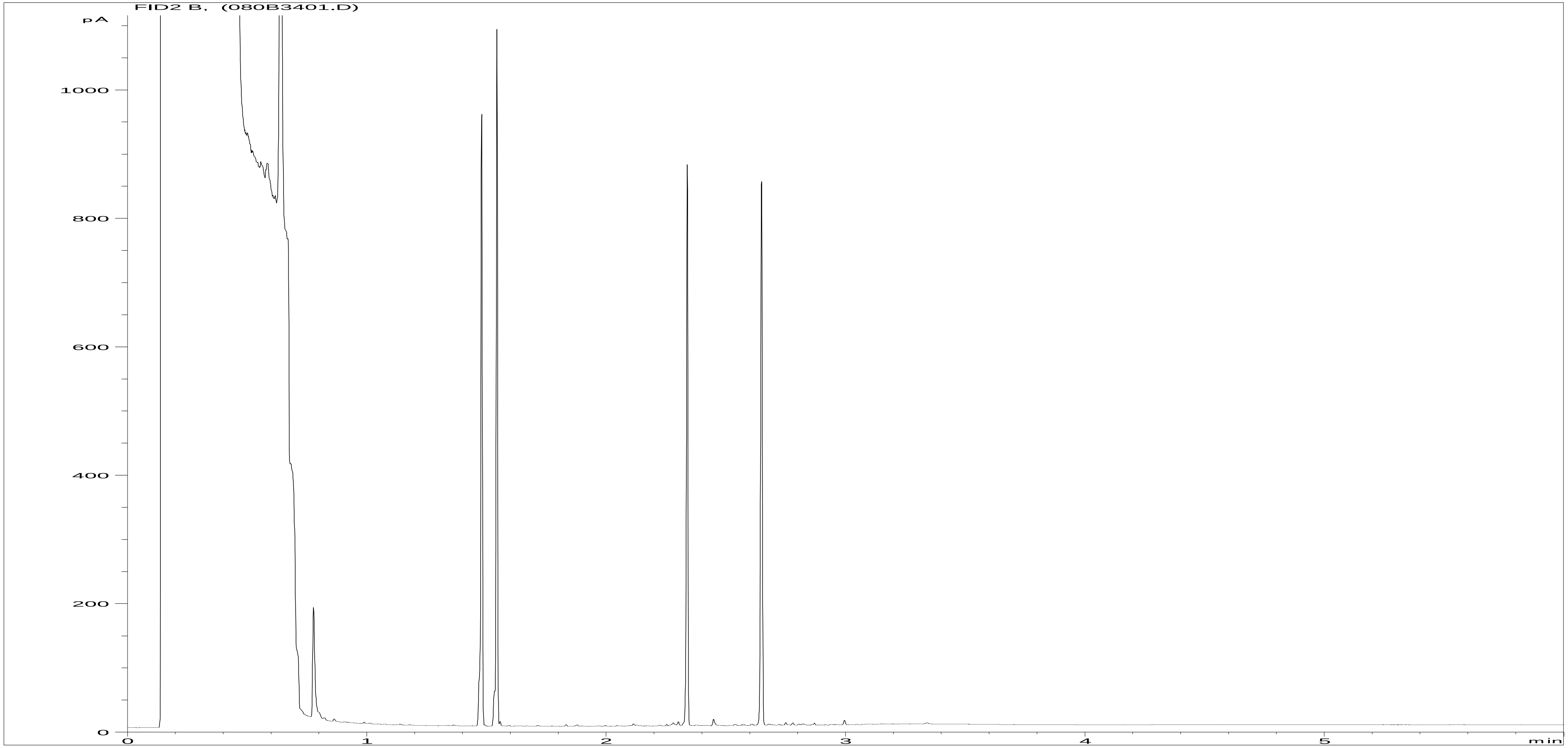
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1624740ARO	**Job Number:**	S16_6095M
Multiplier:	12	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS7 ES 4 1.10
Acquisition Date/Time:	01-Aug-16, 20:09:41		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\061B1901.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

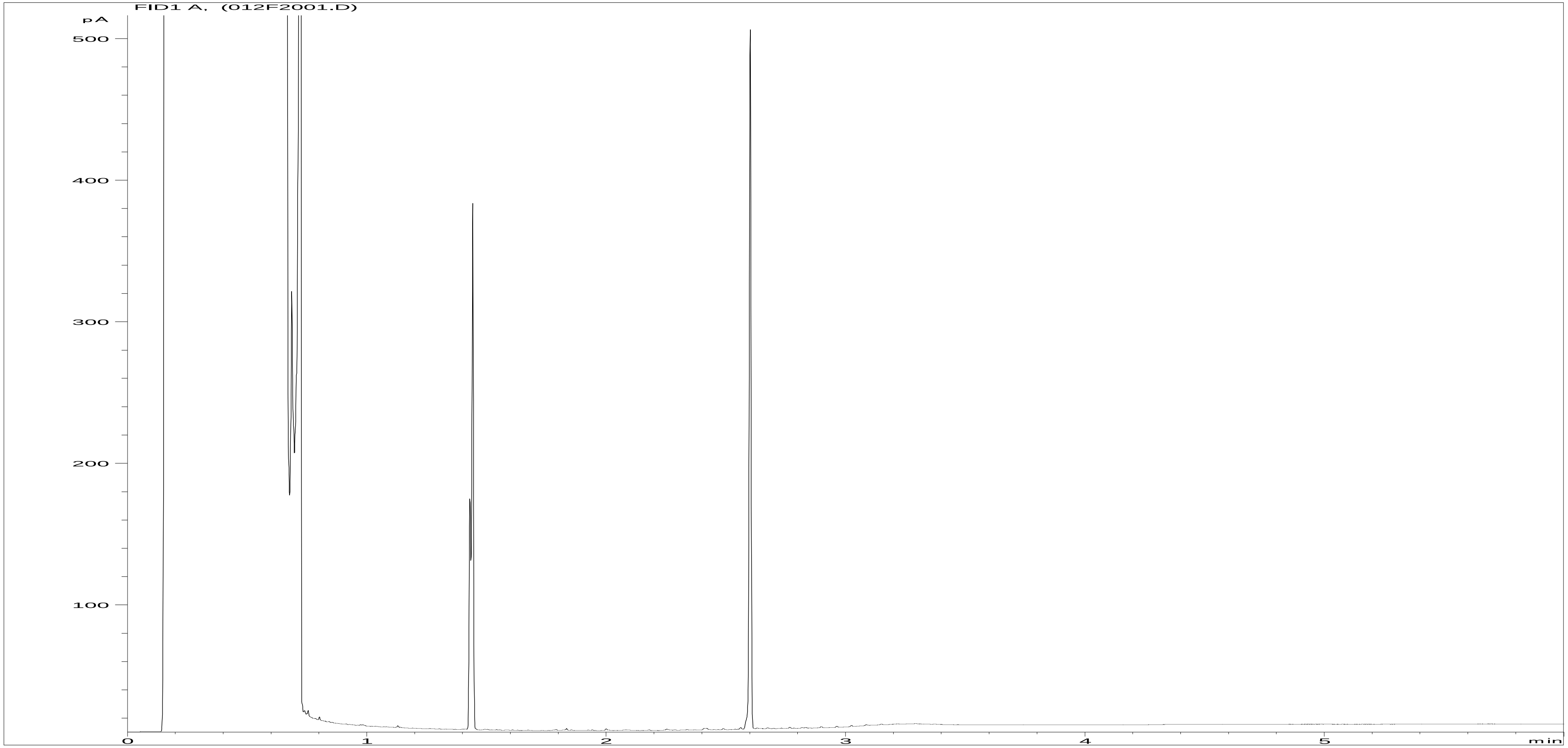
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1624741	**Job Number:**	S16_6095M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS8 ES 5 1.20
Acquisition Date/Time:	29-Jul-16, 20:36:22		
Datafile:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\080B3401.D		

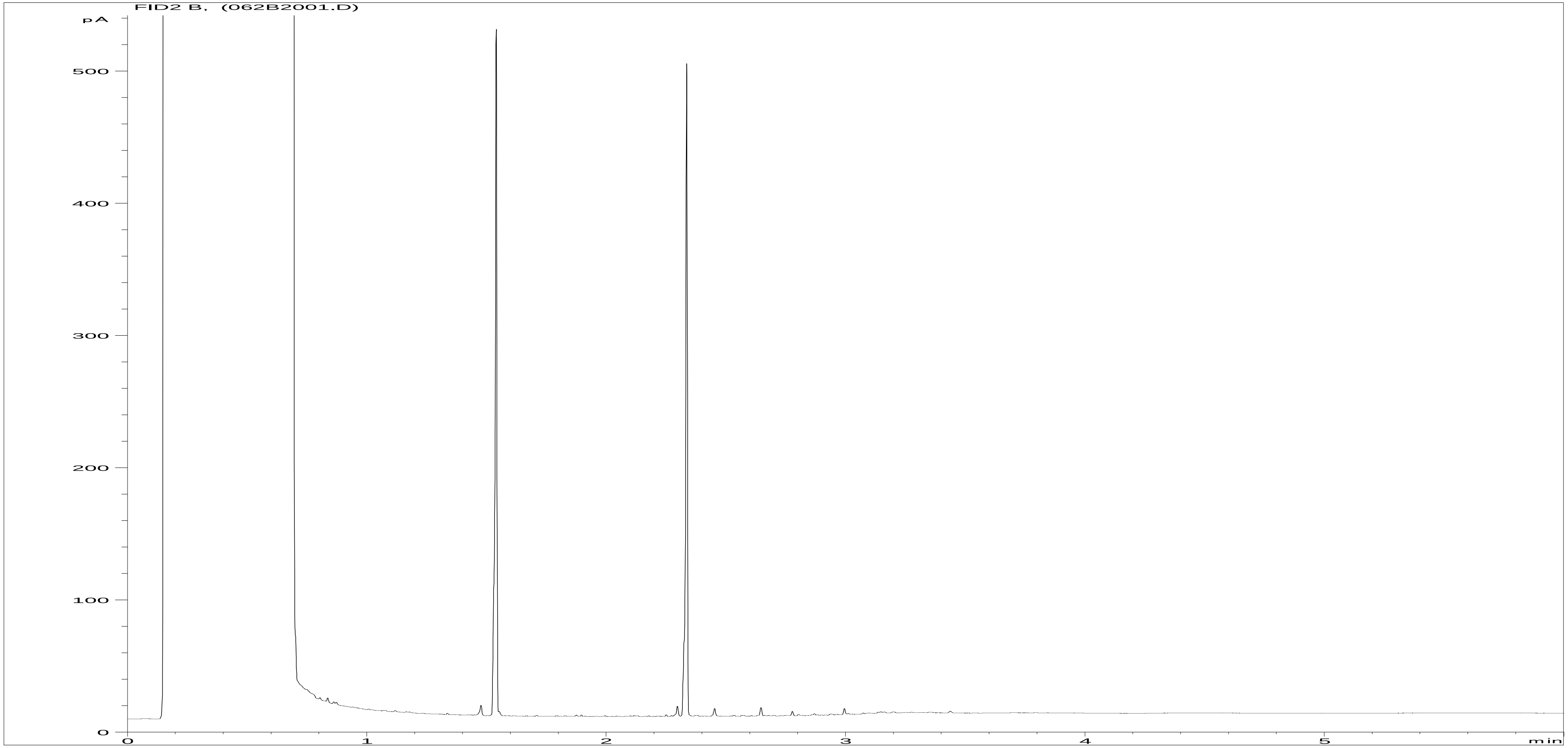
Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1624741ALI	**Job Number:**	S16_6095M
Multiplier:	16.16	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS8 ES 5 1.20
Acquisition Date/Time:	01-Aug-16, 20:22:52		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\012F2001.D		

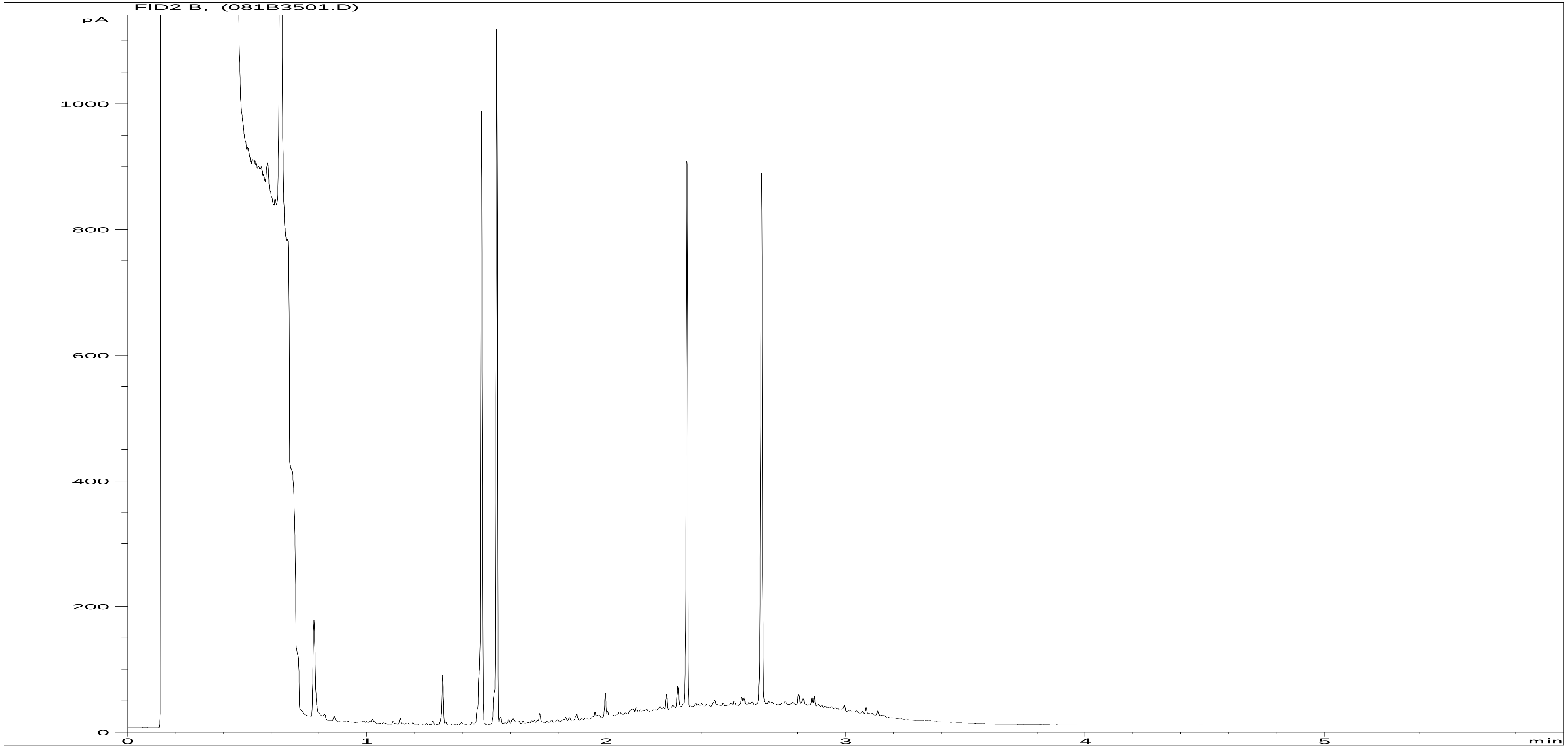
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1624741ARO	**Job Number:**	S16_6095M
Multiplier:	12	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS8 ES 5 1.20
Acquisition Date/Time:	01-Aug-16, 20:22:52		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\062B2001.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

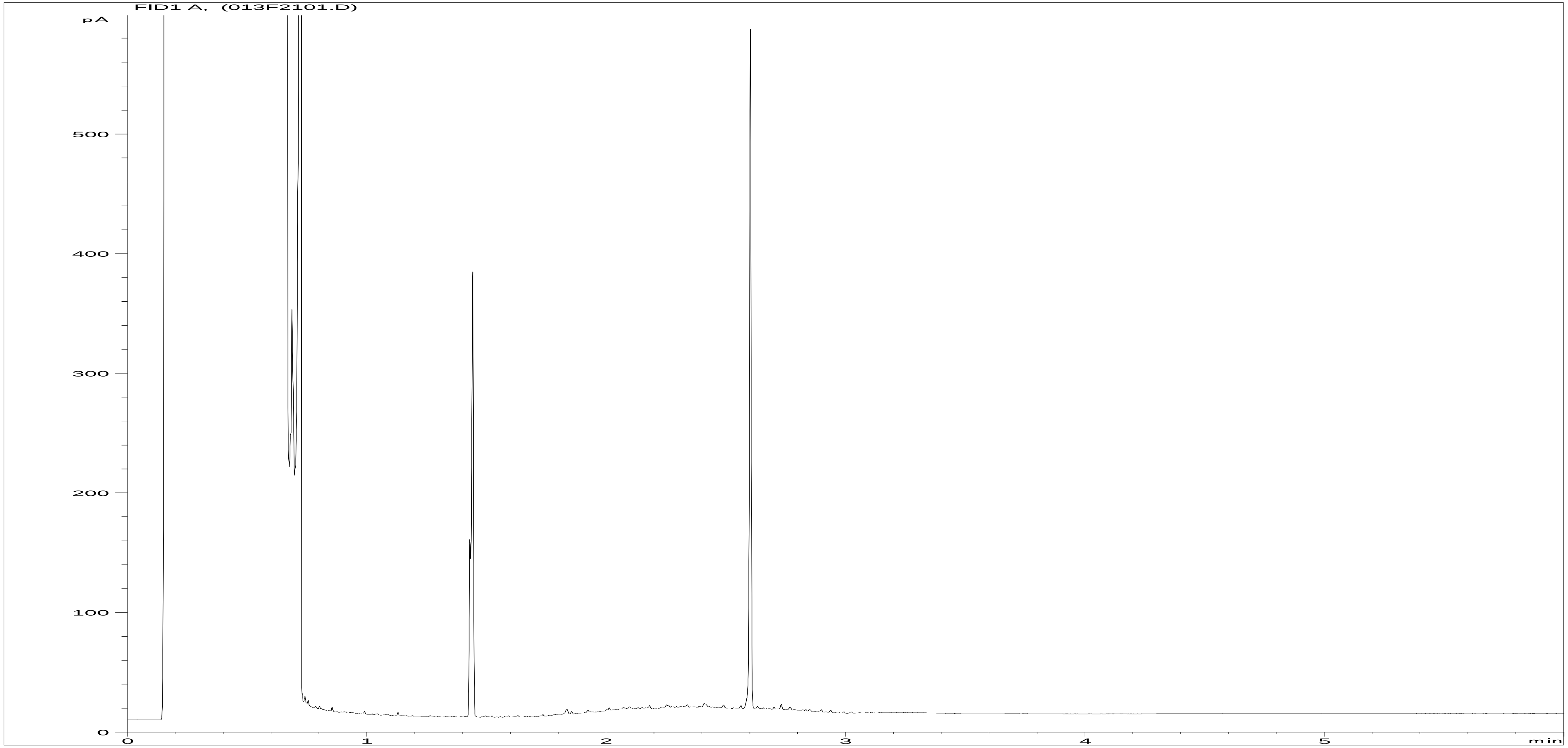
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1624742	**Job Number:**	S16_6095M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS9 ES 6 2.00
Acquisition Date/Time:	29-Jul-16, 20:49:07		
Datafile:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\081B3501.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

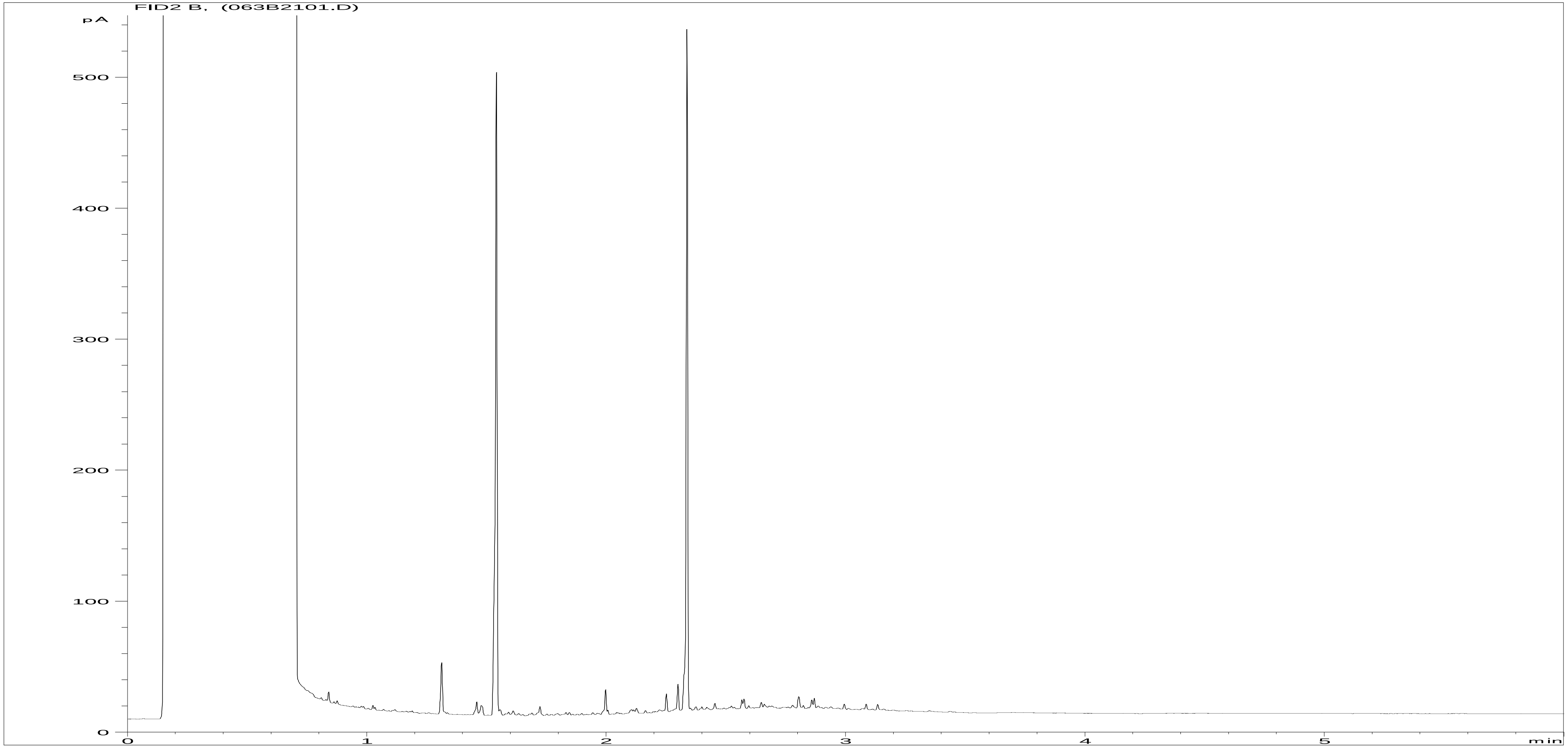
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1624742ALI	**Job Number:**	S16_6095M
Multiplier:	15.84	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS9 ES 6 2.00
Acquisition Date/Time:	01-Aug-16, 20:35:59		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\013F2101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

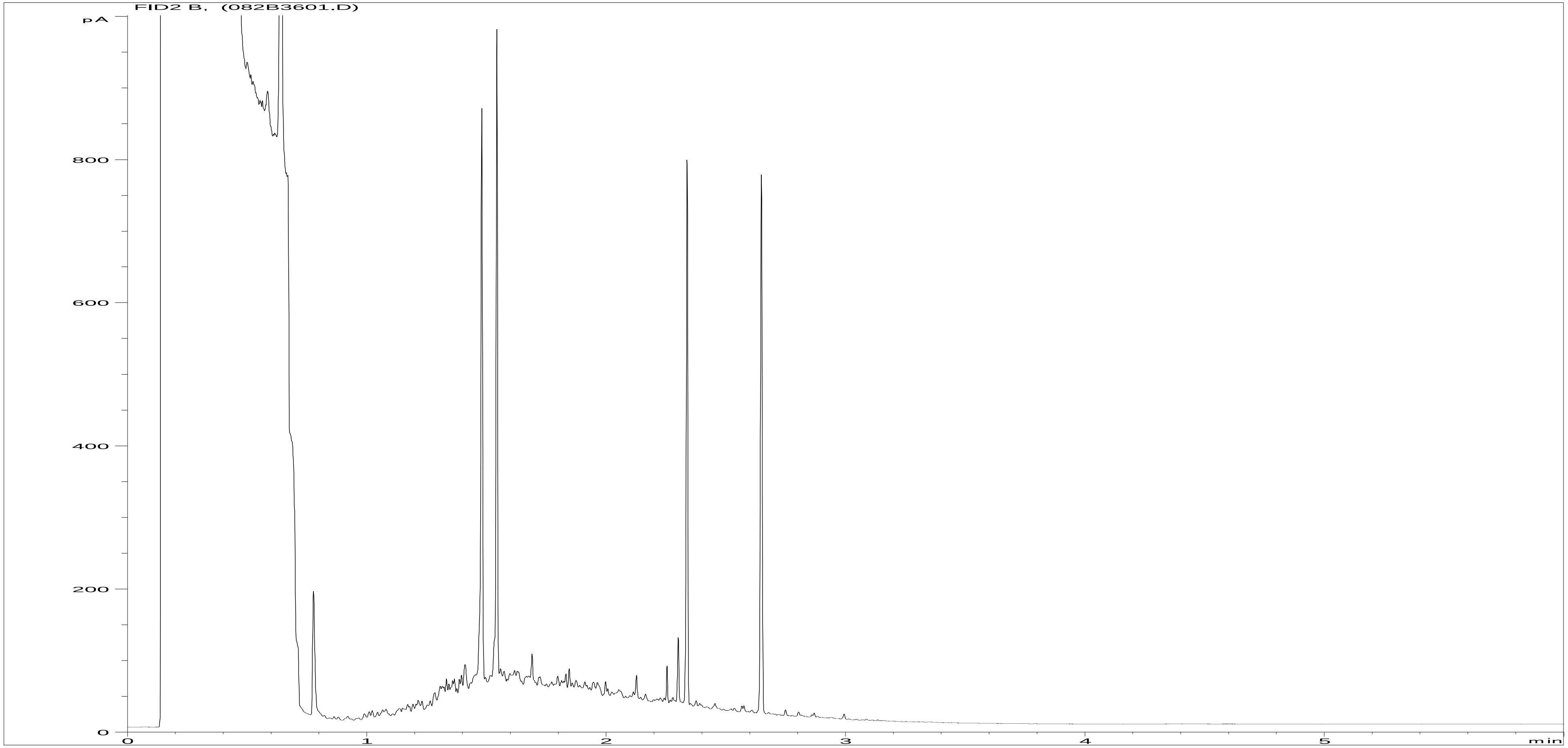
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1624742ARO	**Job Number:**	S16_6095M
Multiplier:	11.84	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS9 ES 6 2.00
Acquisition Date/Time:	01-Aug-16, 20:35:59		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\063B2101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

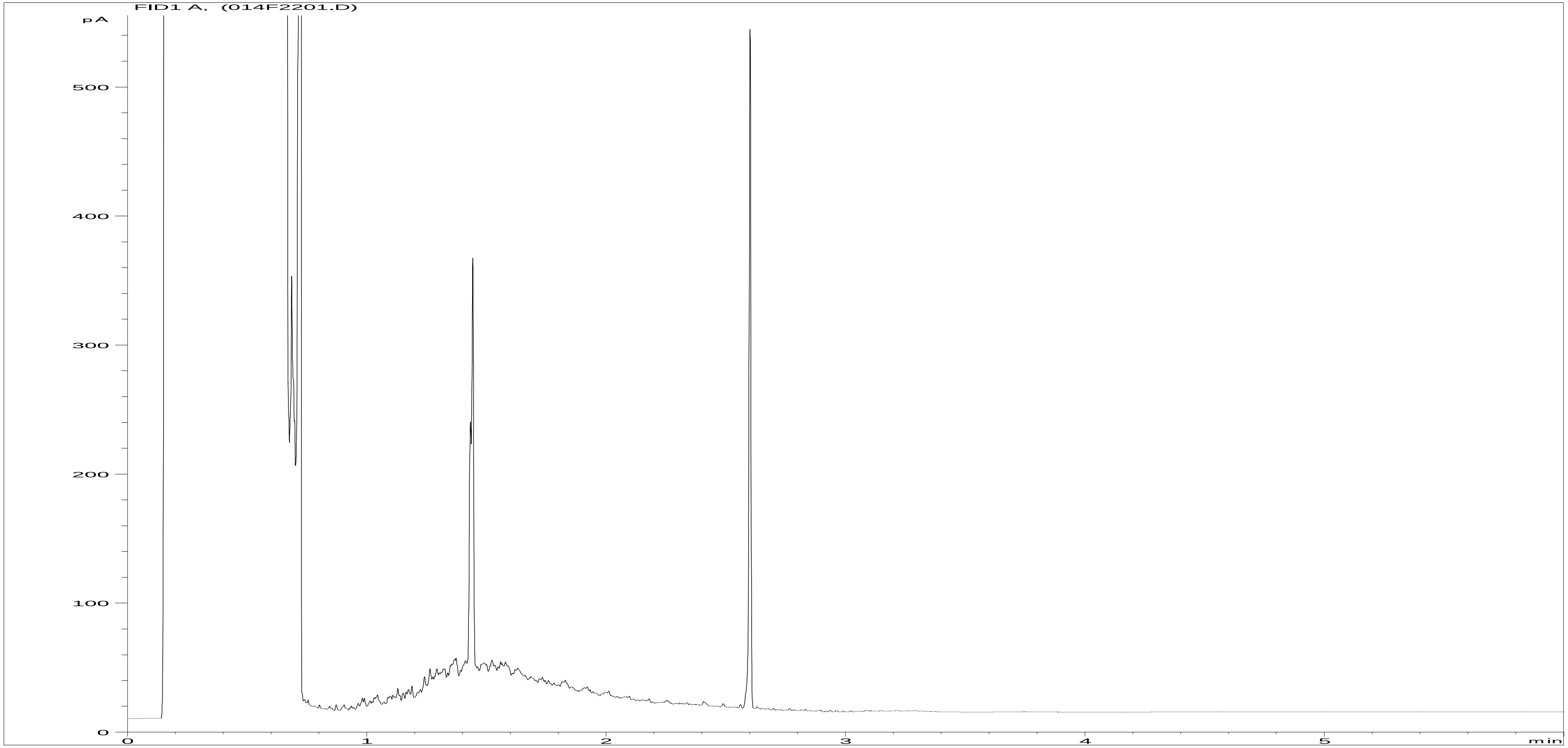
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1624743	**Job Number:**	S16_6095M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS9 ES 10 3.30
Acquisition Date/Time:	29-Jul-16, 21:02:35		
Datafile:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\082B3601.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

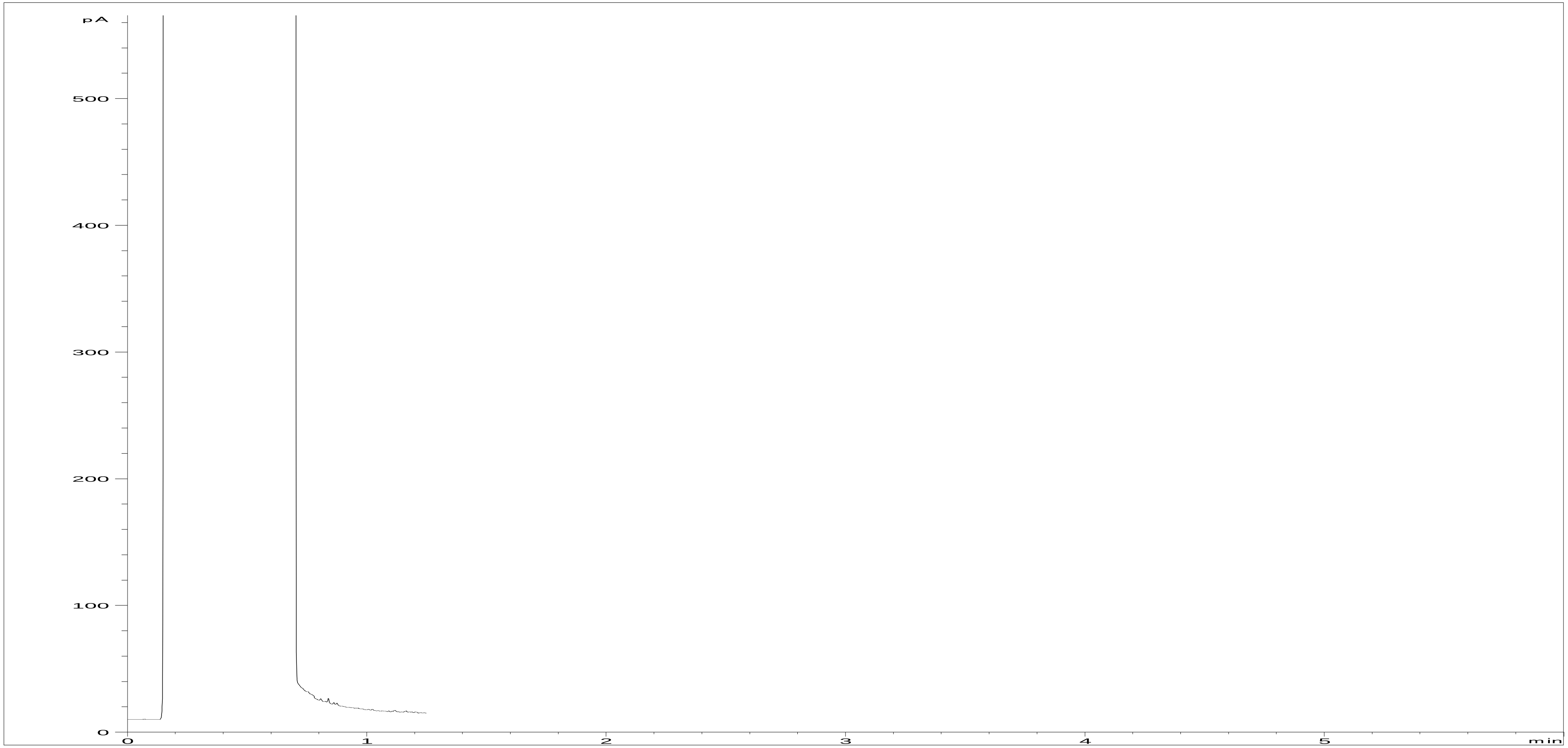
Petroleum Hydrocarbons (C8 to C40) by GC/FID Aliphatics Fraction.



Sample ID:	CL1624743ALI	**Job Number:**	S16_6095M
Multiplier:	15.84	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS9 ES 10 3.30
Acquisition Date/Time:	01-Aug-16, 20:49:06		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\014F2201.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID Aromatics Fraction.



Sample ID:	CL1624743ARO	**Job Number:**	S16_6095M
Multiplier:	11.68	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	WS9 ES 10 3.30
Acquisition Date/Time:	01-Aug-16, 20:49:06		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC3\080116 2016-08-01 16-10-08\064B2201.D		

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	ESG Limited Doncaster
Contact	Richard Hardwick
Site	The Factory

Sample Description	Report No	Sample No	Issue Date
WS9 ES 10 3.30	s16_6095M	CL/1624743	04-Aug-16

Leaching Data	
Weight of sample (kg)	0.250
Moisture content @ 105°C (% of Wet Weight)	10.5
Equivalent Weight based on drying at 105°C (kg)	0.225
Volume of water required to carry out 2:1 stage (litres)	0.425
Fraction of sample above 4 mm %	74.500
Fraction of non-crushable material %	0.000
Volume to undertake analysis (2:1 Stage) (litres)	0.300
Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	0.53	3	5	6
	LOI450	Loss on Ignition (%)				10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.055	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
	TPHFIDUS	Mineral Oil (mg/kg)		500		
	PAHMSUS	PAH Sum of 17 (mg/kg)		100		
U	PHSOIL	pH (pH units)	7.8		>6	
	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	7.6	7.7	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	1010	283					
U	ICPMSW	Arsenic	<0.001	<0.001	<0.002	<0.01	0.5	2	25
U	ICPWATVAR	Barium	0.13	0.08	0.26	0.9	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.001	<0.002	<0.01	0.5	10	70
U	ICPMSW	Copper	0.003	0.004	0.006	0.04	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.004	0.005	0.008	0.05	0.5	10	30
U	ICPMSW	Nickel	<0.001	<0.001	<0.002	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.001	<0.002	<0.01	0.5	10	50
U	ICPMSW	Antimony	0.001	0.001	0.002	0.01	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.066	0.024	0.132	0.3	4	50	200
U	KONENS	Chloride	26	10	52	121	800	15000	25000
U	ISEF	Fluoride	0.5	0.5	1	5	10	150	500
U	ICPWATVAR	Sulphate as SO4	542	90.1	1084	1504	1000	20000	50000
N	WSLM27	Total Dissolved Solids	787	220	1574	2956	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	10	3.8	20	46	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

ASBESTOS ANALYSIS RESULTS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils, Sediments and Aggregates

1089

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

Client:	ESG Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	**ANO-0488-12917**
For the attention of:	ESG Limited Doncaster	**Report Date:**	**02/08/2016**
Site Address:	The Factory	**Project Number:**	**S166095**

Sample Number	Sample Date	Sample Location & Matrix	Test Date	Total Sample Dry Weight (g)	Weight of <10mm Fraction (g)	Asbestos(g) in >10mm	Asbestos(g) in <10mm	% Asbestos by weight of Total Dried Sample	Asbestos Fibre Types Identified
CL/1624738	06/07/16	WS1 0.5 Soils	02/08/2016					Identification	NAIIS
CL/1624739	06/07/16	WS6 0.5 Soils	02/08/2016					Identification	NAIIS
CL/1624740	06/07/16	WS7 1.10 Soils	02/08/2016					Identification	NAIIS
CL/1624741	06/07/16	WS8 1.2 Soils	02/08/2016					Identification	NAIIS
CL/1624742	06/07/16	WS9 2.0 Soils	02/08/2016					Identification	NAIIS
CL/1624743	06/07/16	WS9 3.3-3.5 Soils	02/08/2016					Identification	NAIIS

Keys	**NAACR = Not Analysed at Clients Request**	**NAIIS = No Asbestos Identified in Sample (Identification Only)**	Name:	Stacey Innes	Authorised Signatory:
	*** visible to naked eye**	**NADIS = No Asbestos Detected in Sample (ID & Quant Only)**	Position:	Lab Analyst	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 12 - February 2016. Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0YZ, UKAS Laboratory Number 1089.

Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **S166095M**

Consignment No S56981
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

ID Number	Description	MethodID	BTEXHSA		CEN Leachate		CustServ	Dep.Opt	FOCS	GROHSA		ICPBOR	ICPMSS									ICPWSS	KONECR	MCertS	PAHMSUS	PCBUSECDAR	PHSOIL
		Sampled	BTEX-HSA + MTBE analysis	MTBE (µg/kg)	CEN Leac(P)1	CEN Leac(P)2	REPORT A	DO ID and QUANT if ASB Found	S.O.M. % (Calc)	GRO	GRO (AA) by HSA GC-FID	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	SO4-- (H2O sol) mg/l	Chromium vi:	MCertS Analysis	PAH (16) by GCMS	PCB-7 Congeners Analysis	pH units (AR)
			✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓
CL/1624738	WS1 0.5	06/07/16	E	E			🟩	🟩	🟩	E		🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	🟩	E
CL/1624739	WS6 0.5	06/07/16	E	E			🟩		🟩	E		🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	🟩	E
CL/1624740	WS7 1.10	06/07/16	E	E			🟩		🟩	E		🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	🟩	E
CL/1624741	WS8 1.2	06/07/16	E	E			🟩		🟩	E		🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	🟩	E
CL/1624742	WS9 2.0	06/07/16	E	E			🟩		🟩	E		🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	🟩	E
CL/1624743	WS9 3.3-3.5	06/07/16		E	🟩	🟩	🟩		🟩	E	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	🟩	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **S166095M**

Consignment No S56981
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

		MethodID	**SFAPI**			**SSP3**	**Sub002a**	**Sub020**	**TMSS**	**TPHFIDUS**		**TPHUSSI**	**WSLM59**
ID Number	**Description**	**Sampled**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**	**Stone Content %**	**^Asbestos Screen**	**^Asbestos ID & Quan**	**Tot.Moisture @ 105C**	**TPH by GCFID (AR)**	**TPH Carbon Banding.**	**TPH by GCFID (AR/Si)**	**Total Organic Carbon**
			✓	✓	✓		✓	✓	✓	✓	✓	✓	
CL/1624738	WS1 0.5	06/07/16	E	E	E	🟩	🟩	🟨	🟩	E	E	E	🟩
CL/1624739	WS6 0.5	06/07/16	E	E	E	🟩	🟩	🟨	🟩	E	E	E	🟩
CL/1624740	WS7 1.10	06/07/16	E	E	E	🟩	🟩	🟨	🟩	E	E	E	🟩
CL/1624741	WS8 1.2	06/07/16	E	E	E	🟩	🟩	🟨	🟩	E	E	E	🟩
CL/1624742	WS9 2.0	06/07/16	E	E	E	🟩	🟩	🟨	🟩	E	E	E	🟩
CL/1624743	WS9 3.3-3.5	06/07/16	E	E	E	🟩	🟩	🟨	🟩	E	E	E	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.
The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
Mcerts	S1624740 and S1624743	When reviewed at the reporting stage the total moisture at 105°C was lower than the loss on oven drying moisture at 35°C. The laboratory repeated the analysis and confirmed the original data. Having examined the sample it is our opinion that the homogeneity of the sample is inconsistent due to stone content which has led this discrepancy. As all quality control parameters pass we consider that the data obtained from both tests is analytically valid has therefore been included in the final report. However as the total moisture data has been used to correct all other analysis on to a dry basis this should be taken into consideration when interpreting the data. If you wish we can use the loss on oven drying moisture at 35°C to carry out this calculation and report the data on this basis however under these circumstances we would be required to remove the MCerts accreditation from the data.

Method Descriptions

Matrix	**MethodID**	**Analysis Basis**	**Method Description**
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	FOCS	Oven Dried @ < 35°C	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in soil samples by aqua regia digestion followed by ICPMS
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SSP3	As Received	Determination of stones content by dry sieving at the required particle size
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	TPHUSSI	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection including quantitation of Aromatic and Aliphatic fractions.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table. All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
TR Denotes Tremolite
AC Denotes Actinolite
AN Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined
N.Det Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Doncaster
Site : The Factory
Report Number : S16_6095

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1624738	WS1 ES 2 0.50	Brown Stone SAND
CL/1624739	WS6 ES 2 0.50	Brown MADE GROUND
CL/1624740	WS7 ES 4 1.10	Brown MADE GROUND
CL/1624741	WS8 ES 5 1.20	Brown MADE GROUND
CL/1624742	WS9 ES 6 2.00	Brown MADE GROUND
CL/1624743	WS9 ES 10 3.30	Brown Stone SAND

TEST REPORT

1252

Report No. EFS/166097M (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: The Factory

The 1 sample described in this report were registered for analysis by ESG on 27-Jul-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 03-Aug-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Page 5)
Table of PCB Congener Results (Page 6)
Table of TPH Texas banding (std) (Page 7)
GC-FID Chromatograms (Page 8)
Table of Asbestos Screening Results (Page 9)
Analytical and Deviating Sample Overview (Pages 10 to 11)
Table of Method Descriptions (Page 12)
Table of Report Notes (Page 13)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns

Managing Director
Multi-Sector Services

Date of Issue: 03-Aug-2016

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105^{o}C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

		Units :	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	mg/kg	mg/kg	mg/kg
		Method Codes :	GROHSA	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPWSS	PHSOIL	SFAPI	SFAPI	SFAPI
		Method Reporting Limits :	0.2	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16	10		0.5	0.5	0.5
		Accreditation Code:	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	U
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**GRO**	**Boron (H20 Soluble)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**SO4-- (H2O sol) mg/l**	**pH units (AR)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**
1624746	MTP04 ES 1 0.50	**14-Jul-16**	<0.3	0.9	29.8	0.48	45.0	108.4	267.7	0.73	52.2	1	167.5	120	8.7	<0.6	<0.6	<0.6

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

Sample Analysis

The Factory

Date Printed	**03-Aug-2016**
Report Number	**EFS/166097M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

LAB ID Number CL/	Client Sample Description	Sample Date	^Asbestos Screen	Tot.Moisture @ 105C	TPH by GCFID (AR)	TPH Carbon Banding.	S.O.M. % (Calc)	Chromium vi:	PCB-7 Congeners Analysis	Stone Content %	Total Organic Carbon	Benzene	Toluene	Ethyl Benzene	MTBE	Xylenes	m/p Xylenes	o Xylene
Units :				%	mg/kg	mg/kg	% M/M	mg/kg	µg/kg	%	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Method Codes :			Sub002a	TMSS	TPHFIDUS	TPHFIDUS	FOCS	KONECR	PCBUSECDAR	SSP3	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
Method Reporting Limits :				0.2	10	10	0.04	0.1		0.1	0.04	10	10	10	20	30	20	10
Accreditation Code:			U	U	UM		N	N		N	N	UM	UM	UM	N	UM	UM	UM
1624746	MTP04 ES 1 0.50	14-Jul-16	NAIIS	22.8	109	Req	17.0	<0.1	Req	5.1	9.8	<13	<13	<13	<26	<39	<26	<13

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory

Sample Analysis

Date Printed	**03-Aug-2016**
Report Number	**EFS/166097M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

		Units :	mg/kg
		Method Codes :	PAHMSUS
		Method Reporting Limits :	
		Accreditation Code:	
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**PAH (16) by GCMS**
1624746	MTP04 ES 1 0.50	**14-Jul-16**	Req

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

Sample Analysis

The Factory

Date Printed	**03-Aug-2016**
Report Number	**EFS/166097M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	MTP04 ES 1 0.50	**Job Number:**	S16_6097M
LIMS ID Number:	CL1624746	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	30-Jul-16
Directory:	\072916MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	5.13	0.58	99	UM
Anthracene	120-12-7	5.18	0.19	92	U
Fluoranthene	206-44-0	6.36	0.87	92	UM
Pyrene	129-00-0	6.62	1.05	96	UM
Benzo[a]anthracene	56-55-3	8.23	0.80	92	UM
Chrysene	218-01-9	8.28	0.71	95	UM
Benzo[b]fluoranthene	205-99-2	9.73	1.20	97	UM
Benzo[k]fluoranthene	207-08-9	9.76	0.49	99	UM
Benzo[a]pyrene	50-32-8	10.14	1.05	97	UM
Indeno[1,2,3-cd]pyrene	193-39-5	11.50	0.90	93	UM
Dibenzo[a,h]anthracene	53-70-3	11.53	0.16	71	UM
Benzo[g,h,i]perylene	191-24-2	11.78	0.88	89	UM
Total (USEPA16) PAHs	-	-	< 9.27	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	85
Acenaphthene-d10	77
Phenanthrene-d10	79
Chrysene-d12	90
Perylene-d12	105

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	107
Terphenyl-d14	86

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polychlorinated Biphenyls (congeners)

Customer and Site Details: ESG Limited Doncaster: The Factory
Job Number: S16_6097M
QC Batch Number: 160870
Directory: 0801PCB.GC70
Method: Ultrasonic
Accreditation code: N

Matrix: Soil
Date Booked in: 27-Jul-16
Date Extracted: 29-Jul-16
Date Analysed: 02-Aug-16

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
* CL1624746	MTP04 ES 1 0.50	8.7	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

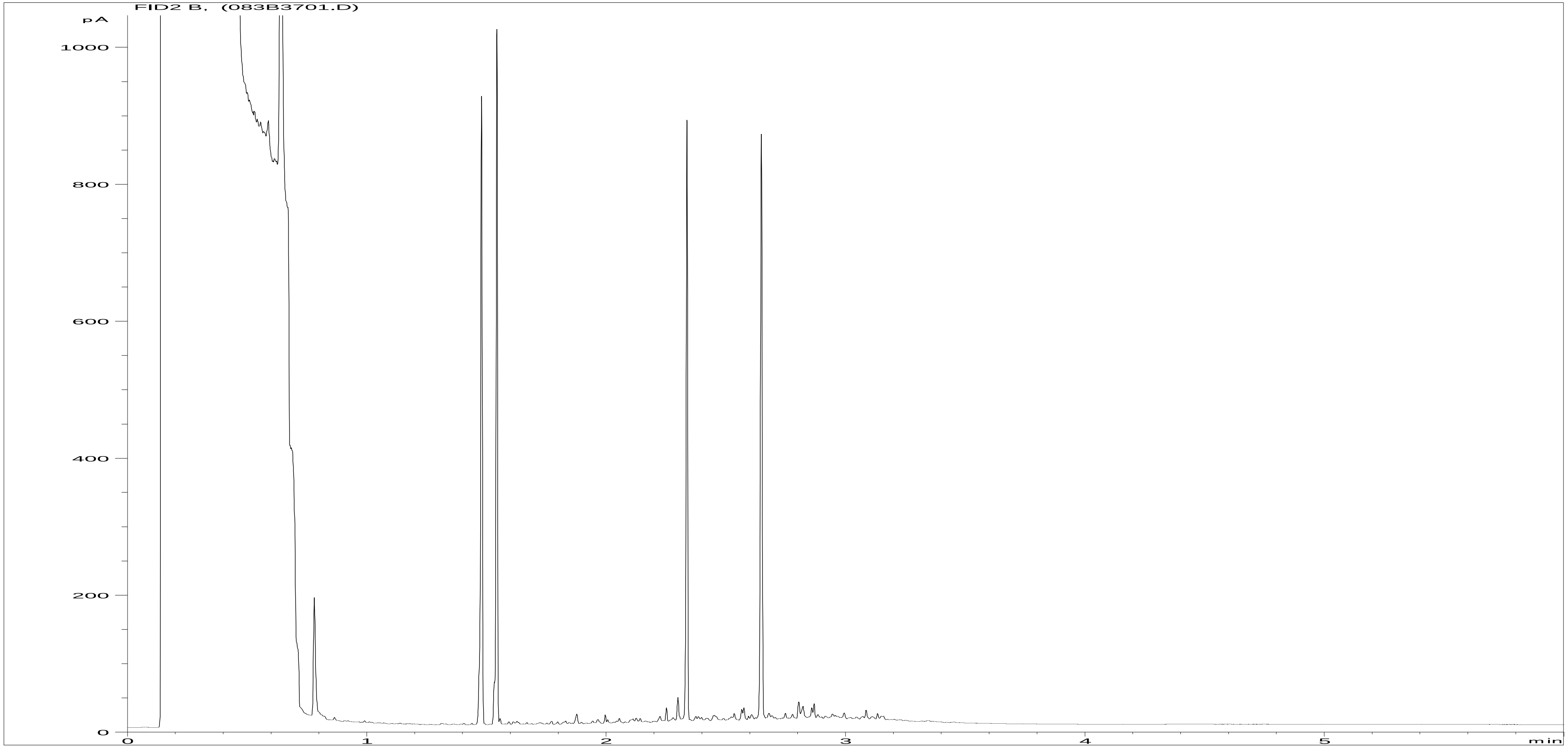
Total Petroleum Hydrocarbons (TPH) Carbon Ranges

Customer and Site Details:	ESG Limited Doncaster : The Factory	**Matrix:**	Soil
Job Number:	S16_6097M	**Date Booked in:**	27-Jul-16
QC Batch Number:	160870	**Date Extracted:**	29-Jul-16
Directory:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\083B3701.D	**Date Analysed:**	29-Jul-16, 21:15:59
Method:	Ultra Sonic		
Accreditation code:	U		

		Concentration, (mg/kg) - as dry weight.				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
CL1624746	MTP04 ES 1 0.50	<3	<3	3.48	16.1	81.9

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1624746	**Job Number:**	S16_6097M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	MTP04 ES 1 0.50
Acquisition Date/Time:	29-Jul-16, 21:15:59		
Datafile:	D:\TES\DATA\Y2016\072916TPH_GC3\072916 2016-07-29 13-03-36\083B3701.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

ASBESTOS ANALYSIS RESULTS

ESG Asbestos Limited Certificate of Analysis for Asbestos in Soils, Sediments and Aggregates

1089

Detection limit of Method SCI-ASB-020 is 0.001%

Sampling has been carried out by a third party

Client:	ESG Environmental Chemistry	**Page 1 of 1**	
Address:	Etwall House, Bretby Business Park, Ashby Road, Burton upon Trent	**Report No:**	**ANO-0488-12920**
For the attention of:	ESG Limited Doncaster	**Report Date:**	**02/08/2016**
Site Address:	The Factory	**Project Number:**	**S166097**

Sample Number	Sample Date	Sample Location & Matrix	Test Date	Total Sample Dry Weight (g)	Weight of <10mm Fraction (g)	Asbestos(g) in >10mm	Asbestos(g) in <10mm	% Asbestos by weight of Total Dried Sample	Asbestos Fibre Types Identified
CL/1624746	14/07/16	MTP04 0.5	02/08/2016					Identification	NAIIS

Keys	**NAACR = Not Analysed at Clients Request**	**NAIIS = No Asbestos Identified in Sample (Identification Only)**	Name:	Laura Atkins	Authorised Signatory:
	*** visible to naked eye**	**NADIS = No Asbestos Detected in Sample (ID & Quant Only)**	Position:	Lab Analyst	

The sample analysis for the above results was carried out using the procedures detailed in ESG Asbestos Limited in house method (SCI-ASB-020) based on EA document Quantification of asbestos in soil and associated materials - Draft 12 - February 2016. Fibre identification was carried out using ESG Asbestos Limited in house method of transmitted/polarised light microscopy and centre stop dispersion staining (SCI-ASB-007), based on HSE's HSG 248. The analysis of the < 10mm fraction for asbestos content only includes ACMs and fibres and does not discriminate non-asbestos fibres. All fibres are assumed, unless specified, to be amphiboles. All tests were carried out at ESG Asbestos Laboratory, Ashbourne House, Bretby Business Park, Ashby Road, Burton-upon-Trent, Staffordshire. DE15 0YZ, UKAS Laboratory Number 1089.

Where individual results are flagged see report notes for status.

Sample Analysis **S166097M**

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **S166097M**

Consignment No S57131
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

		MethodID	BTEXHSA		CustServ	Dep.Opt	FOCS	GROHSA	ICPBOR	ICPMSS								ICPWSS	KONECR	MCertS	PAHMSUS	PCBUSECDAR	PHSOIL	SFAPI		
ID Number	**Description**	**Sampled**	**BTEX-HSA + MTBE analysis**	**MTBE (µg/kg)**	**REPORT A**	**DO ID and QUANT if ASB Found**	**S.O.M. % (Calc)**	**GRO**	**Boron (H20 Soluble)**	**Arsenic (MS)**	**Cadmium (MS)**	**Chromium (MS)**	**Copper (MS)**	**Lead (MS)**	**Mercury (MS)**	**Nickel (MS)**	**Selenium (MS)**	**Zinc (MS)**	**SO4-- (H2O sol) mg/l**	**Chromium vi:**	**MCertS Analysis**	**PAH (16) by GCMS**	**PCB-7 Congeners Analysis**	**pH units (AR)**	**Cyanide(Free) (AR)**	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**
			✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓	✓
CL/1624746	MTP04 0.5	14/07/16	E	E	🟩	🟩	🟩	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	E	E	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Analytical and Deviating Sample Overview

Customer	**ESG Limited Doncaster**
Site	**The Factory**
Report No	**S166097M**

Consignment No S57131
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

ID Number	**Description**	**Sampled**	SSP3 **Stone Content %**	Sub002a **^Asbestos Screen**	Sub020 **^Asbestos ID & Quan**	TMSS **Tot.Moisture @ 105C**	TPHFIDUS **TPH by GCFID (AR)**	**TPH Carbon Banding.**	WSLM59 **Total Organic Carbon**
				✓	✓	✓	✓	✓	
CL/1624746	MTP04 0.5	14/07/16	🟩	🟩	🟨	🟩	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	FOCS	Oven Dried @ < 35°C	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in soil samples by aqua regia digestion followed by ICPMS
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SSP3	As Received	Determination of stones content by dry sieving at the required particle size
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis
Unless stated otherwise results are expressed as mg/l
Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Doncaster
Site : The Factory
Report Number : S16_6097

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1624746	MTP04 ES 1 0.50	Grey MADE GROUND

TEST REPORT

1252

Report No. EXR/224013 (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: The Factory

The 1 sample described in this report were registered for analysis by ESG on 27-Jul-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 04-Aug-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (10) Results (Page 4)
Table of TPH Interpretations (Page 5)
Table of TPH Texas banding (0.01) (Page 6)
GC-FID Chromatograms (Page 7)
Analytical and Deviating Sample Overview (Pages 8 to 9)
Table of Method Descriptions (Page 10)
Table of Report Notes (Page 11)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns Managing Director
Multi-Sector Services

Date of Issue: 04-Aug-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

LAB ID Number EX/	Client Sample Description	Sample Date	pH units w	Conductivity uS/cm @ 25C w	Chloride as Cl w	Fluoride as F a	Total Sulphur as SO4 (Dissolved) a	Barium as Ba (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Dissolved)	Cadmium as Cd (Dissolved)	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Arsenic as As (Dissolved)	Mercury as Hg (Dissolved)	Selenium as Se (Dissolved)	Molybdenum as Mo (Dissolved)
		Units :	pH units	uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		Method Codes :	WSLM3	WSLM2	KONENS	ISEF	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW
		Method Reporting Limits :		100	1	0.1	3	0.01	0.001	0.001	0.0001	0.001	0.001	0.002	0.001	0.0001	0.001	0.001
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1717026	MTP05 ES 3 1.00	27-Jul-16	7.7	471	32	0.4	78.9	0.17	0.001	0.001	<0.0001	0.015	0.011	0.107	0.003	<0.0001	0.001	0.006

ESG

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory

CEN 2/10 Stage 1 Leachate

Date Printed	**04-Aug-2016**
Report Number	**EXR/224013**
Table Number	**1**

Where individual results are flagged see report notes for status.

		Units :	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	
		Method Codes :	ICPMSW	SFAPI	TPHFID	TPHFID	WSLM27	PAHMSW	WSLM13	TPHFID
		Method Reporting Limits :	0.001	0.05	0.01	0.01	60		0.2	
		UKAS Accredited :	Yes	Yes	Yes	Yes	No	No	No	No
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**Antimony as Sb (Dissolved)**	**Phenol Index as C6H5OH**	**Carbon Banding**	**TPH GC**	**Total Dissolved Solids**	**PAH GC-MS (16) o**	**Dissolved Organic Carbon w**	**Interpretation**
1717026	MTP05 ES 3 1.00	**27-Jul-16**	0.002	<0.05	Req	0.25	367	Req	22	Req

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory

CEN 2/10 Stage 1 Leachate

Date Printed	**04-Aug-2016**
Report Number	**EXR/224013**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	MTP05 ES 3 1.00	**Job Number:**	W22_4013
LIMS ID Number:	EX1717026	**Date Booked in:**	27-Jul-16
QC Batch Number:	160479	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-16
Directory:	116PAH.MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	4.16	0.127	95
Acenaphthene	83-32-9	4.27	0.322	97
Fluorene	86-73-7	4.64	0.027	19
Phenanthrene	85-01-8	5.45	0.062	94
Anthracene	120-12-7	5.50	0.060	93
Fluoranthene	206-44-0	6.75	0.273	76
Pyrene	129-00-0	7.02	0.160	97
Benzo[a]anthracene	56-55-3	8.68	0.055	87
Chrysene	218-01-9	8.73	0.045	74
Benzo[b]fluoranthene	205-99-2	10.19	0.025	77
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	10.61	0.014	80
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 1.230	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	92
Acenaphthene-d10	92
Phenanthrene-d10	93
Chrysene-d12	79
Perylene-d12	76

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	63
Terphenyl-d14	68

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Where individual results are flagged see report notes for status.

Interpretation of GC/FID Chromatographic Data

Client:	ESG Limited Doncaster
Site:	The Factory
Report Number:	W224013
Date:	03/08/2016

Assessment Type	Standard Interpretation
Assessor:	R.P
Analysis:	TPH by GCFID (AR)

Sample ID	Client Description	Interpretation
EX1717026	MTP05 ES 3 1.00	Low level Mineral Oil style UCM in the range nC18-nC40+. n-Alkane series in range C12-C38. Suggest GC-MS for better I.D.

Where individual results are flagged see report notes for status.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

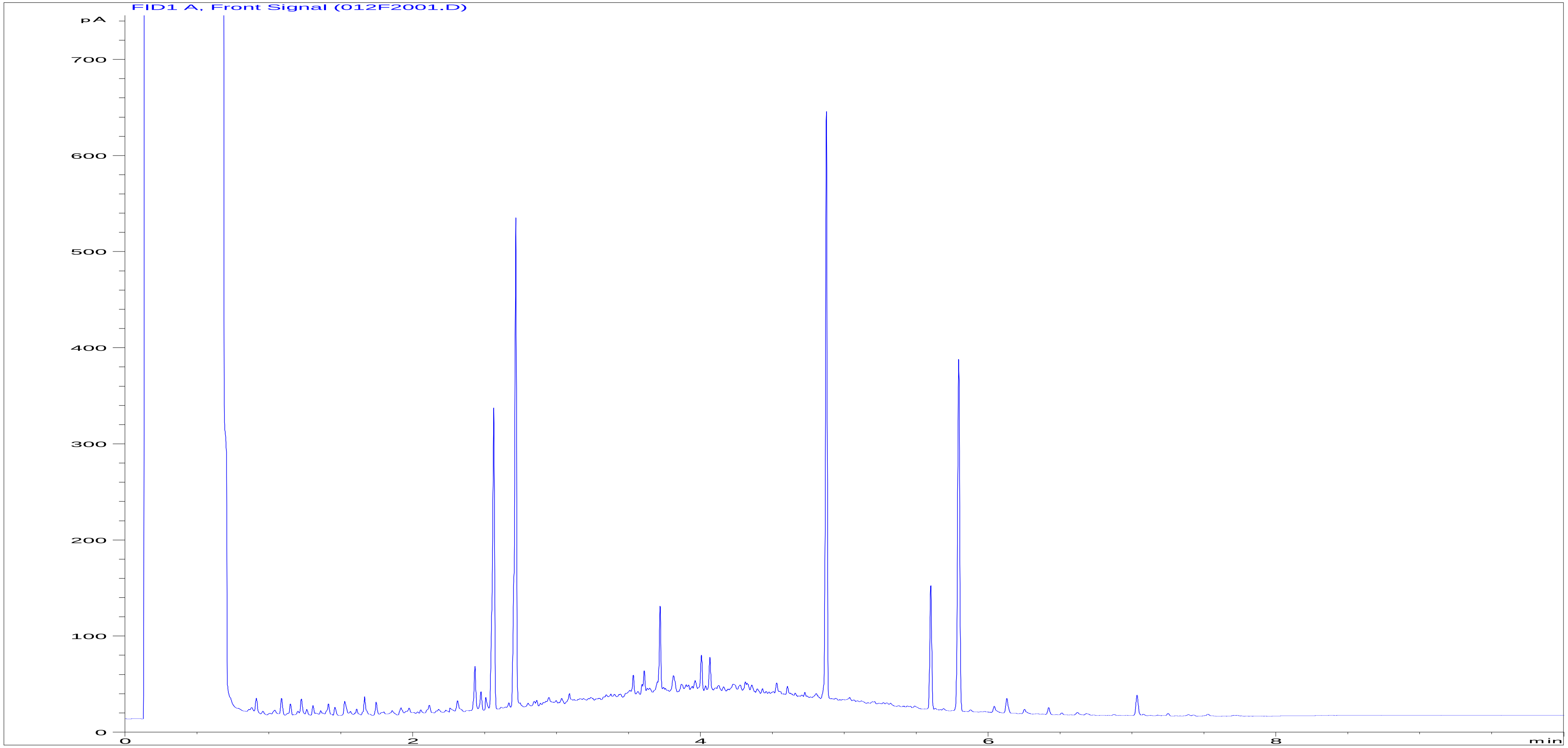
Customer and Site Details:	ESG Limited Doncaster : The Factory	**Matrix:**	Leachate
Job Number:	W22_4013	**Date Booked in:**	27-Jul-16
QC Batch Number:	160479	**Date Extracted:**	01-Aug-16
Directory:	D:\TES\DATA\Y2016\080116TPH_GC17\080116 2016-08-01 12-41-14\012F2001.D	**Date Analysed:**	01-Aug-16, 20:41:22
Method:	Bottle		

*** Sample data with an asterisk are not UKAS accredited.**

		Concentration, (mg/l)				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
EX1717026	MTP05 ES 3 1.00	<0.01	<0.01	0.05	0.112	0.07

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1717026	**Job Number:**	W22_4013
Multiplier:	0.005	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	MTP05 ES 3 1.00
Acquisition Date/Time:	01-Aug-16, 20:41:22		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC17\080116 2016-08-01 12-41-14\012F2001.D		

Where individual results are flagged see report notes for status.

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **W224013**

Consignment No S57304
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

			MethodID	CUSTSERV	ICPMSW											ICPWATVAR		ISEF	KONENS	LeachPrep	PAHMSW
ID Number	**Description**	**Matrix Type**	**Sampled**	**Report A (CEN1)**	**Nickel as Ni MS (Dissolved)**	**Chromium as Cr MS (Dissolved)**	**Cadmium as Cd MS (Dissolved)**	**Copper as Cu MS (Dissolved)**	**Lead as Pb MS (Dissolved)**	**Zinc as Zn MS (Dissolved)**	**Arsenic as As MS (Dissolved)**	**Mercury as Hg MS (Dissolved)**	**Selenium as Se MS (Dissolved)**	**Molybdenum as Mo MS (Dissolved)**	**Antimony as Sb MS (Dissolved)**	**Total Sulphur as SO4 (Diss) VAR**	**Barium as Ba (Dissolved) VAR**	**Fluoride as F**	**Chloride as Cl (Kone)**	**Leachate Prep**	**PAH GC-MS (16)**
					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
EX/1717026	MTP05 1.00	Laboratory Produced Leachate	27/07/16	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
⬜	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

CEN 2/10 Stage 1 Leachate Analysi

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W224013

Customer	**ESG Limited Doncaster**
Site	**The Factory**
Report No	**W224013**

Consignment No S57304
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

		MethodID		SFAPI	TPHFID			WSLM13	WSLM2	WSLM27		WSLM3
ID Number	**Description**	**Matrix Type**	**Sampled**	**Phenol Index SFA**	**TPH Carbon Banding**	**TPH GC**	**TPH Interpretation**	**Dissolved Organic Carbon**	**Conductivity uS/cm @ 25C**	**Total Dissolved Solids (Calc)**	**Total Dissolved Solids**	**pH units**
				✓	✓	✓			✓			✓
EX/1717026	MTP05 1.00	Laboratory Produced Leachate	27/07/16	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟨	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis
Unless stated otherwise results are expressed as mg/l
Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile	**TR** Denotes Tremolite
CR Denotes Crocidolite	**AC** Denotes Actinolite
AM Denotes Amosite	**AN** Denotes Anthophylite

NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Doncaster
Site : The Factory
Report Number : W22_4013

Lab ID Number	Client ID	Description
EX/1717026	MTP05 ES 3 1.00	Laboratory Produced Leachate

TEST REPORT

1252

Report No. EXR/224014 (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: The Factory

The 1 sample described in this report were registered for analysis by ESG on 27-Jul-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 04-Aug-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (10) Results (Page 4)
Table of TPH Interpretations (Page 5)
Table of TPH Texas banding (0.01) (Page 6)
GC-FID Chromatograms (Page 7)
Analytical and Deviating Sample Overview (Pages 8 to 9)
Table of Method Descriptions (Page 10)
Table of Report Notes (Page 11)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns

Managing Director
Multi-Sector Services

Date of Issue: 04-Aug-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

LAB ID Number EX/	Client Sample Description	Sample Date	pH units w	Conductivity uS/cm @ 25C w	Chloride as Cl w	Fluoride as F a	Total Sulphur as SO4 (Dissolved) a	Barium as Ba (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Dissolved)	Cadmium as Cd (Dissolved)	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Arsenic as As (Dissolved)	Mercury as Hg (Dissolved)	Selenium as Se (Dissolved)	Molybdenum as Mo (Dissolved)
		Units :	pH units	uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		Method Codes :	WSLM3	WSLM2	KONENS	ISEF	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW
		Method Reporting Limits :		100	1	0.1	3	0.01	0.001	0.001	0.0001	0.001	0.001	0.002	0.001	0.0001	0.001	0.001
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1717027	MTP05 ES 3 1.00	27-Jul-16	7.4	151	3	0.4	23.7	0.08	0.006	0.012	0.0002	0.019	0.029	0.16	0.004	<0.0001	0.001	0.002

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

CEN 2/10 Stage 2 Leachate

The Factory

Date Printed	**04-Aug-2016**
Report Number	**EXR/224014**
Table Number	**1**

		Units :	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	
		Method Codes :	ICPMSW	SFAPI	TPHFID	TPHFID	WSLM27	PAHMSW	WSLM13	TPHFID
		Method Reporting Limits :	0.001	0.05	0.01	0.01	60		0.2	
		UKAS Accredited :	Yes	Yes	Yes	Yes	No	No	No	No
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**Antimony as Sb (Dissolved)**	**Phenol Index as C6H5OH**	**Carbon Banding**	**TPH GC**	**Total Dissolved Solids**	**PAH GC-MS (16) o**	**Dissolved Organic Carbon w**	**Interpretation**
1717027	MTP05 ES 3 1.00	**27-Jul-16**	0.002	<0.05	Req	0.25	117	Req	5.9	Req

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory

CEN 2/10 Stage 2 Leachate

Date Printed	**04-Aug-2016**
Report Number	**EXR/224014**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	MTP05 ES 3 1.00	**Job Number:**	W22_4014
LIMS ID Number:	EX1717027	**Date Booked in:**	27-Jul-16
QC Batch Number:	160479	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-16
Directory:	116PAH.MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	4.16	0.833	99
Acenaphthene	83-32-9	4.27	0.016	73
Fluorene	86-73-7	4.65	0.061	M
Phenanthrene	85-01-8	5.45	0.046	89
Anthracene	120-12-7	5.50	0.021	88
Fluoranthene	206-44-0	6.74	0.089	96
Pyrene	129-00-0	7.02	0.062	96
Benzo[a]anthracene	56-55-3	8.68	0.027	83
Chrysene	218-01-9	8.73	0.027	78
Benzo[b]fluoranthene	205-99-2	10.19	0.017	74
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 1.269	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	100
Acenaphthene-d10	107
Phenanthrene-d10	106
Chrysene-d12	95
Perylene-d12	102

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	87
Terphenyl-d14	76

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Where individual results are flagged see report notes for status.

Interpretation of GC/FID Chromatographic Data

Client:	ESG Limited Doncaster
Site:	The Factory
Report Number:	W224014
Date:	03/08/2016

Assessment Type	Standard Interpretation
Assessor:	R.P
Analysis:	TPH by GCFID (AR)

Sample ID	Client Description	Interpretation
EX1717027	MTP05 ES 3 1.00	n-Alkane series in range C12-C38

Where individual results are flagged see report notes for status.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

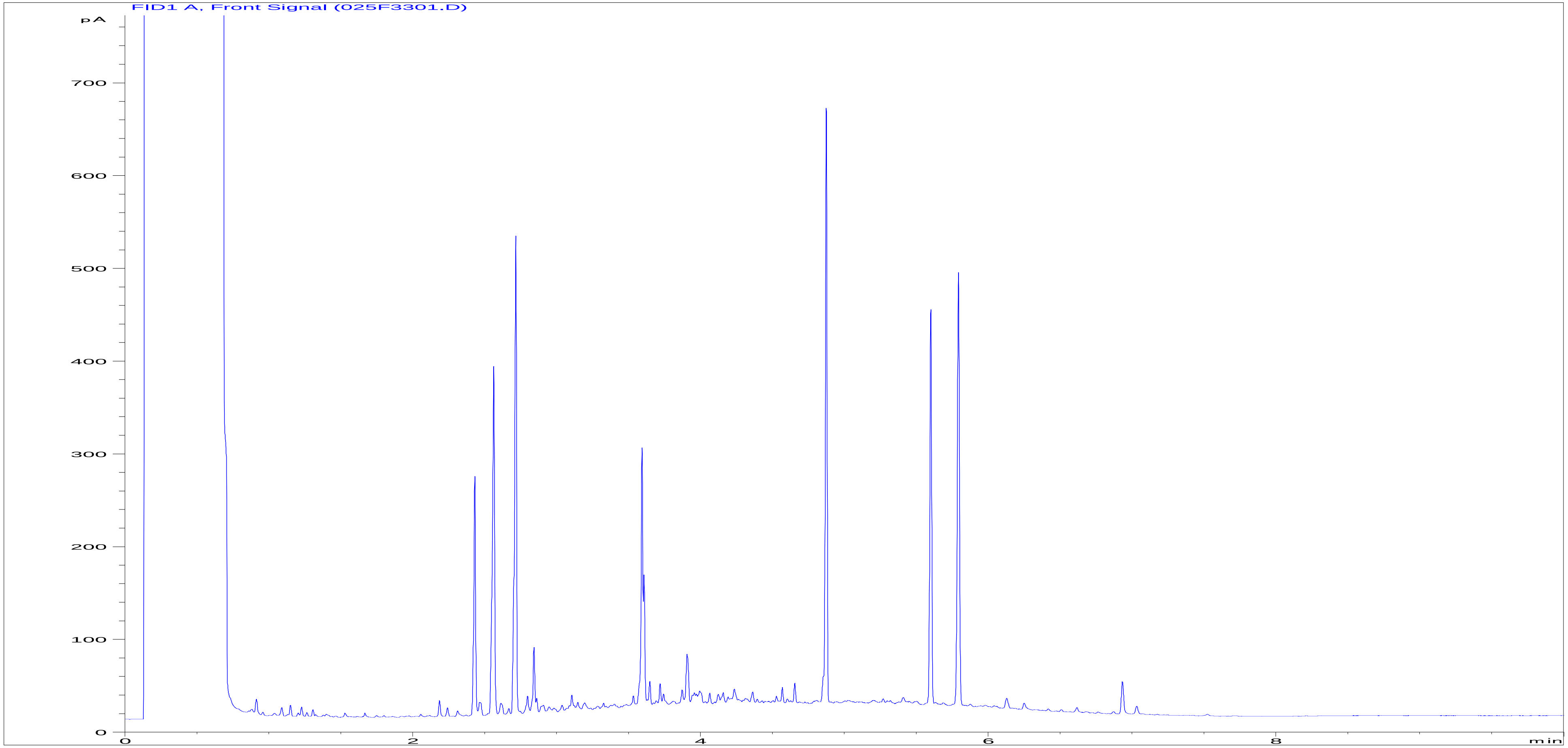
Customer and Site Details:	ESG Limited Doncaster : The Factory	**Matrix:**	Leachate
Job Number:	W22_4014	**Date Booked in:**	27-Jul-16
QC Batch Number:	160479	**Date Extracted:**	01-Aug-16
Directory:	D:\TES\DATA\Y2016\080116TPH_GC17\080116 2016-08-01 12-41-14\025F3301.D	**Date Analysed:**	02-Aug-16, 00:34:01
Method:	Bottle		

*** Sample data with an asterisk are not UKAS accredited.**

		Concentration, (mg/l)				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
EX1717027	MTP05 ES 3 1.00	<0.01	<0.01	0.043	0.088	0.107

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1717027	**Job Number:**	W22_4014
Multiplier:	0.005	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	MTP05 ES 3 1.00
Acquisition Date/Time:	02-Aug-16, 00:34:01		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC17\080116 2016-08-01 12-41-14\025F3301.D		

Where individual results are flagged see report notes for status.

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **W224014**

Consignment No S57304
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

			MethodID	CUSTSERV	ICPMSW											ICPWATVAR		ISEF	KONENS	LeachPrep	PAHMSW
ID Number	**Description**	**Matrix Type**	**Sampled**	**Report A (CEN2)**	**Nickel as Ni MS (Dissolved)**	**Chromium as Cr MS (Dissolved)**	**Cadmium as Cd MS (Dissolved)**	**Copper as Cu MS (Dissolved)**	**Lead as Pb MS (Dissolved)**	**Zinc as Zn MS (Dissolved)**	**Arsenic as As MS (Dissolved)**	**Mercury as Hg MS (Dissolved)**	**Selenium as Se MS (Dissolved)**	**Molybdenum as Mo MS (Dissolved)**	**Antimony as Sb MS (Dissolved)**	**Total Sulphur as SO4 (Diss) VAR**	**Barium as Ba (Dissolved) VAR**	**Fluoride as F**	**Chloride as Cl (Kone)**	**Leachate Prep**	**PAH GC-MS (16)**
					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
EX/1717027	MTP05 1.00	Laboratory Produced Leachate	27/07/16	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

CEN 2/10 Stage 2 Leachate Ar

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W224014

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **W224014**

Consignment No S57304
Date Logged 27-Jul-2016

Report Due 03-Aug-2016

			MethodID	SFAPI	TPHFID			WSLM13	WSLM2	WSLM27		WSLM3
ID Number	**Description**	**Matrix Type**	**Sampled**	**Phenol Index SFA**	**TPH Carbon Banding**	**TPH GC**	**TPH Interpretation**	**Dissolved Organic Carbon**	**Conductivity uS/cm @ 25C**	**Total Dissolved Solids (Calc)**	**Total Dissolved Solids**	**pH units**
				✓	✓	✓			✓			✓
EX/1717027	MTP05 1.00	Laboratory Produced Leachate	27/07/16	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟨	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis
Unless stated otherwise results are expressed as mg/l
Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile	**TR** Denotes Tremolite
CR Denotes Crocidolite	**AC** Denotes Actinolite
AM Denotes Amosite	**AN** Denotes Anthophylite

NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client :	ESG Limited Doncaster
Site :	The Factory
Report Number :	W22_4014

Lab ID Number	Client ID	Description
EX/1717027	MTP05 ES 3 1.00	Laboratory Produced Leachate

TEST REPORT

1252

Report No. EXR/224015 (Ver. 2)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: The Factory

The 1 sample described in this report were registered for analysis by ESG on 27-Jul-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 16-Sep-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (10) Results (Page 4)
Table of TPH Interpretations (Page 5)
Table of TPH Texas banding (0.01) (Page 6)
GC-FID Chromatograms (Page 7)
Analytical and Deviating Sample Overview (Pages 8 to 9)
Table of Method Descriptions (Page 10)
Table of Report Notes (Page 11)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Barnes

Operations Director
Energy & Waste Services

Date of Issue: 16-Sep-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. ESG accepts no responsibility for any sampling not carried out by our personnel.

		Units :	pH units	uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		Method Codes :	WSLM3	WSLM2	KONENS	ISEF	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW
		Method Reporting Limits :		100	1	0.1	3	0.01	0.001	0.001	0.0001		0.001	0.001	0.002	0.001	0.0001	0.001
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EX/	Client Sample Description	Sample Date	pH units w	Conductivity uS/cm @ 25C w	Chloride as Cl w	Fluoride as F a	Total Sulphur as SO4 (Dissolved) a	Barium as Ba (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Dissolved)	Cadmium as Cd (Dissolved)	PAH GC-MS (16) o	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Arsenic as As (Dissolved)	Mercury as Hg (Dissolved)	Selenium as Se (Dissolved)
1717028	MTP03 ES 1 0.50	27-Jul-16	7.8	392	8	2.0	77.3	0.13	<0.001	0.012	<0.0001	Req §	0.007	0.001	0.034	0.005	<0.0001	0.001

ESG

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

CEN 2/10 Stage 1 Leachate

The Factory

Date Printed	**16-Sep-2016**
Report Number	**EXR/224015**
Table Number	**1**

Where individual results are flagged see report notes for status.

			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
		Units :	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
		Method Codes :	ICPMSW	ICPMSW	SFAPI	TPHFID	TPHFID	WSLM27	WSLM13	TPHFID
		Method Reporting Limits :	0.001	0.001	0.05	0.01	0.01	60	0.2	
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	No	No	No
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**Molybdenum as Mo (Dissolved)**	**Antimony as Sb (Dissolved)**	**Phenol Index as C6H5OH**	**Carbon Banding**	**TPH GC**	**Total Dissolved Solids**	**Dissolved Organic Carbon w**	**Interpretation**
1717028	MTP03 ES 1 0.50	**27-Jul-16**	0.07	0.013	<0.05	Req	0.03	306	9.9	Req

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory

CEN 2/10 Stage 1 Leachate

Date Printed	**16-Sep-2016**
Report Number	**EXR/224015**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	MTP03 ES 1 0.50	**Job Number:**	W22_4015
LIMS ID Number:	EX1717028	**Date Booked in:**	27-Jul-16
QC Batch Number:	160479	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-16
Directory:	116PAH.MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.11	0.051	98
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.28	0.036	93
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	5.45	0.035	99
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.74	0.024	75
Pyrene	129-00-0	7.02	0.018	83
Benzo[a]anthracene	56-55-3	8.69	0.017	68
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	10.20	0.015	64
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	10.61	0.010	76
Indeno[1,2,3-cd]pyrene	193-39-5	11.98	0.010	60
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	12.27	0.014	68
Total (USEPA16) PAHs	-	-	< 0.290	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	98
Acenaphthene-d10	105
Phenanthrene-d10	97
Chrysene-d12	99
Perylene-d12	93

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	98
Terphenyl-d14	84

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Where individual results are flagged see report notes for status.

Interpretation of GC/FID Chromatographic Data

Client:	ESG Limited Doncaster
Site:	The Factory
Report Number:	W224015
Date:	03/08/2016

Assessment Type	Standard Interpretation
Assessor:	R.P
Analysis:	TPH by GCFID (AR)

Sample ID	Client Description	Interpretation
EX1717028	MTP03 ES 1 0.50	Lean extract, insufficient for ID.

Where individual results are flagged see report notes for status.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

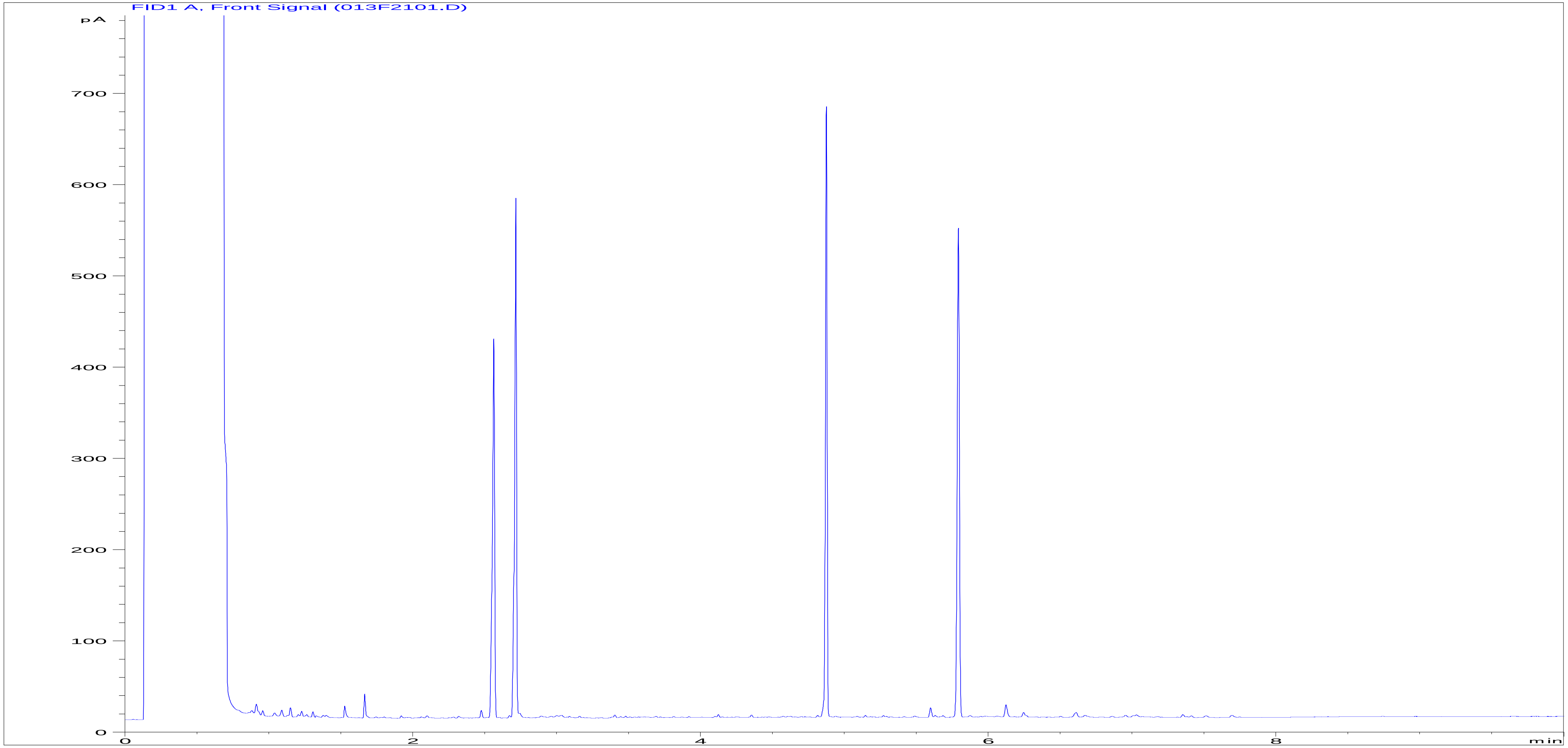
Customer and Site Details:	ESG Limited Doncaster : The Factory	**Matrix:**	Leachate
Job Number:	W22_4015	**Date Booked in:**	27-Jul-16
QC Batch Number:	160479	**Date Extracted:**	01-Aug-16
Directory:	D:\TES\DATA\Y2016\080116TPH_GC17\080116 2016-08-01 12-41-14\013F2101.D	**Date Analysed:**	01-Aug-16, 20:59:18
Method:	Bottle		

*** Sample data with an asterisk are not UKAS accredited.**

		Concentration, (mg/l)				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
EX1717028	MTP03 ES 1 0.50	<0.01	<0.01	<0.01	<0.01	0.013

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID: EX1717028
Multiplier: 0.005
Dilution: 1
Acquisition Method: TPH_RUNF.M
Acquisition Date/Time: 01-Aug-16, 20:59:18
Datafile: D:\TES\DATA\Y2016\080116TPH_GC17\080116 2016-08-01 12-41-14\013F2101.D

Job Number: W22_4015
Client: ESG Limited Doncaster
Site: The Factory
Client Sample Ref: MTP03 ES 1 0.50

CEN 2/10 Stage 1 Leachate Analysi

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W224015

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **W224015**

Consignment No S57212
Date Logged 27-Jul-2016

Report Due 18-Aug-2016

			MethodID	CUSTSERV	ICPMSW											ICPWATVAR		ISEF	KONENS	LeachPrep	PAHMSW
ID Number	**Description**	**Matrix Type**	**Sampled**	**Report A (CEN1)**	**Nickel as Ni MS (Dissolved)**	**Chromium as Cr MS (Dissolved)**	**Cadmium as Cd MS (Dissolved)**	**Copper as Cu MS (Dissolved)**	**Lead as Pb MS (Dissolved)**	**Zinc as Zn MS (Dissolved)**	**Arsenic as As MS (Dissolved)**	**Mercury as Hg MS (Dissolved)**	**Selenium as Se MS (Dissolved)**	**Molybdenum as Mo MS (Dissolved)**	**Antimony as Sb MS (Dissolved)**	**Total Sulphur as SO4 (Diss) VAR**	**Barium as Ba (Dissolved) VAR**	**Fluoride as F**	**Chloride as Cl (Kone)**	**Leachate Prep**	**PAH GC-MS (16)**
					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
EX/1717028	MTP03 0.5	Laboratory Produced Leachate	27/07/16	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **W224015**

Consignment No S57212
Date Logged 27-Jul-2016

Report Due 18-Aug-2016

			MethodID	**SFAPI**	**TPHFID**			**WSLM13**	**WSLM2**	**WSLM27**		**WSLM3**
ID Number	**Description**	**Matrix Type**	**Sampled**	**Phenol Index SFA**	**TPH Carbon Banding**	**TPH GC**	**TPH Interpretation**	**Dissolved Organic Carbon**	**Conductivity uS/cm @ 25C**	**Total Dissolved Solids (Calc)**	**Total Dissolved Solids**	**pH units**
				✓	✓	✓			✓			✓
EX/1717028	MTP03 0.5	Laboratory Produced Leachate	27/07/16	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟨	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	**MethodID**	**Analysis Basis**	**Method Description**
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile	**TR** Denotes Tremolite
CR Denotes Crocidolite	**AC** Denotes Actinolite
AM Denotes Amosite	**AN** Denotes Anthophylite

NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client :	ESG Limited Doncaster
Site :	The Factory
Report Number :	W22_4015

Lab ID Number	Client ID	Description
EX/1717028	MTP03 ES 1 0.50	Laboratory Produced Leachate

TEST REPORT

UKAS TESTING
1252

Report No. EXR/224016 (Ver. 2)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: The Factory

The 1 sample described in this report were registered for analysis by ESG on 27-Jul-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 16-Sep-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (10) Results (Page 4)
Table of TPH Interpretations (Page 5)
Table of TPH Texas banding (0.01) (Page 6)
GC-FID Chromatograms (Page 7)
Analytical and Deviating Sample Overview (Pages 8 to 9)
Table of Method Descriptions (Page 10)
Table of Report Notes (Page 11)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Barnes

Operations Director
Energy & Waste Services

Date of Issue: 16-Sep-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

LAB ID Number EX/	Client Sample Description	Sample Date	pH units w	Conductivity uS/cm @ 25C w	Chloride as Cl w	Fluoride as F a	Total Sulphur as SO4 (Dissolved) a	Barium as Ba (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Dissolved)	Cadmium as Cd (Dissolved)	PAH GC-MS (16) o	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Arsenic as As (Dissolved)	Mercury as Hg (Dissolved)	Selenium as Se (Dissolved)
		Units :	pH units	uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		Method Codes :	WSLM3	WSLM2	KONENS	ISEF	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW
		Method Reporting Limits :		100	1	0.1	3	0.01	0.001	0.001	0.0001		0.001	0.001	0.002	0.001	0.0001	0.001
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1717029	MTP03 ES 1 0.50	27-Jul-16	8.1	159	1	2.0	12.3 *	0.05 *	<0.001 *	0.003 *	<0.0001 *	Req §	0.006 *	0.007 *	0.018 *	0.006 *	<0.0001 *	<0.001 *

ESG

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory

CEN 2/10 Stage 2 Leachate

Date Printed	**16-Sep-2016**
Report Number	**EXR/224016**
Table Number	**1**

Where individual results are flagged see report notes for status.

Units :			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
Method Codes :			ICPMSW	ICPMSW	SFAPI	TPHFID	TPHFID	WSLM27	WSLM13	TPHFID
Method Reporting Limits :			0.001	0.001	0.05	0.01	0.01	60	0.2	
UKAS Accredited :			Yes	Yes	Yes		Yes	No	No	
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**Molybdenum as Mo (Dissolved)**	**Antimony as Sb (Dissolved)**	**Phenol Index as C6H5OH**	**Carbon Banding**	**TPH GC**	**Total Dissolved Solids**	**Dissolved Organic Carbon w**	**Interpretation**
1717029	MTP03 ES 1 0.50	**27-Jul-16**	0.018 *	0.006 *	<0.05	Req	0.06	124	3.1	Req

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory

CEN 2/10 Stage 2 Leachate

Date Printed	**16-Sep-2016**
Report Number	**EXR/224016**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory		
Sample Details:	MTP03 ES 1 0.50	**Job Number:**	W22_4016
LIMS ID Number:	EX1717029	**Date Booked in:**	27-Jul-16
QC Batch Number:	160479	**Date Extracted:**	29-Jul-16
Quantitation File:	Initial Calibration	**Date Analysed:**	01-Aug-16
Directory:	116PAH.MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.12	0.244	93
Acenaphthylene	208-96-8	4.16	0.015	80
Acenaphthene	83-32-9	4.27	0.094	98
Fluorene	86-73-7	4.64	0.034	98
Phenanthrene	85-01-8	5.45	0.094	100
Anthracene	120-12-7	5.50	0.024	99
Fluoranthene	206-44-0	6.74	0.068	96
Pyrene	129-00-0	7.02	0.058	96
Benzo[a]anthracene	56-55-3	8.68	0.030	86
Chrysene	218-01-9	8.72	0.029	78
Benzo[b]fluoranthene	205-99-2	10.20	0.041	60
Benzo[k]fluoranthene	207-08-9	10.23	0.016	61
Benzo[a]pyrene	50-32-8	10.62	0.030	75
Indeno[1,2,3-cd]pyrene	193-39-5	11.98	0.026	65
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	12.27	0.033	86
Total (USEPA16) PAHs	-	-	< 0.846	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	95
Acenaphthene-d10	101
Phenanthrene-d10	93
Chrysene-d12	94
Perylene-d12	89

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	87
Terphenyl-d14	81

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Where individual results are flagged see report notes for status.

Interpretation of GC/FID Chromatographic Data

Client:	ESG Limited Doncaster
Site:	The Factory
Report Number:	W224016
Date:	03/08/2016

Assessment Type	Standard Interpretation
Assessor:	R.P
Analysis:	TPH by GCFID (AR)

Sample ID	Client Description	Interpretation
EX1717029	MTP03 ES 1 0.50	Lean extract, insufficient for ID.

Where individual results are flagged see report notes for status.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

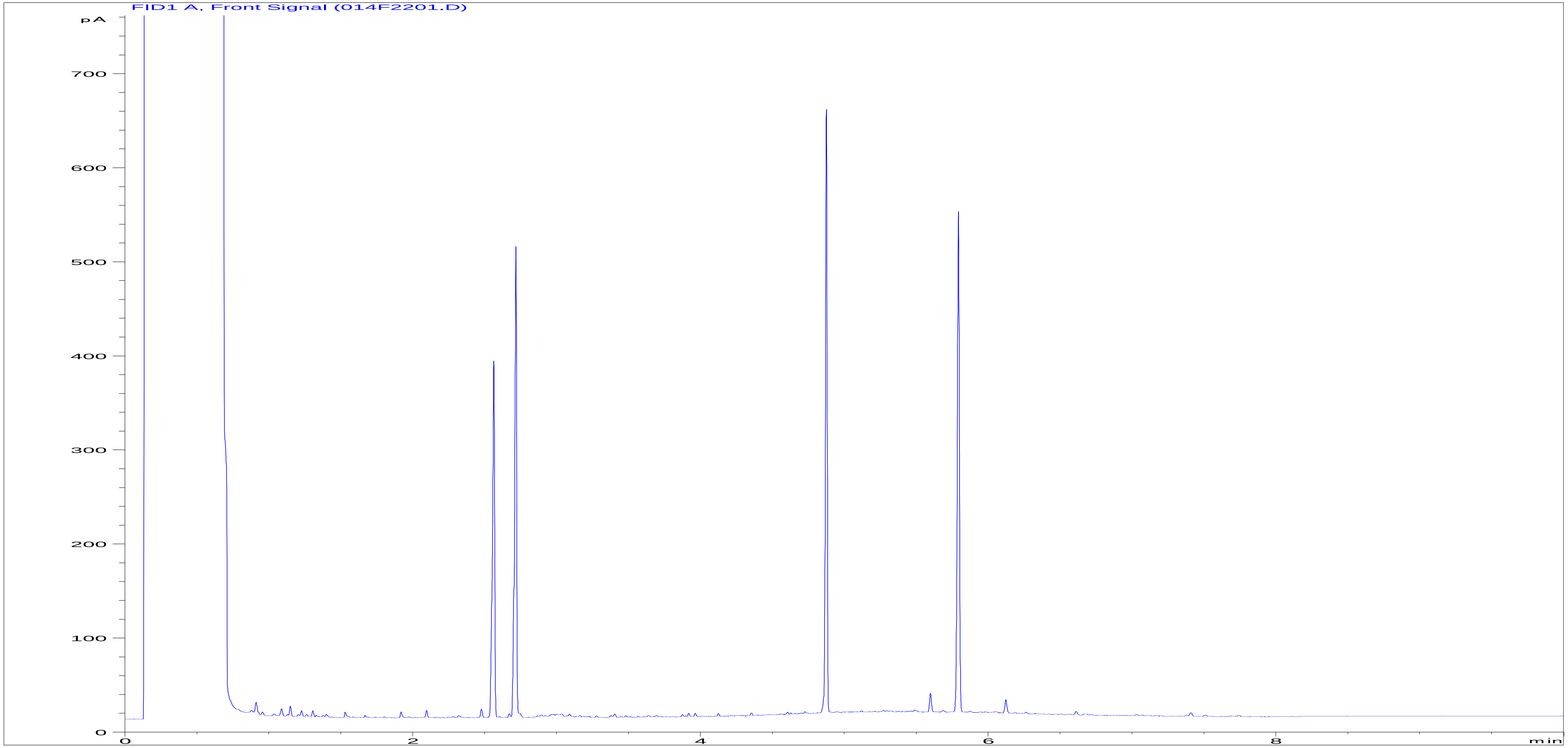
Customer and Site Details:	ESG Limited Doncaster : The Factory	**Matrix:**	Leachate
Job Number:	W22_4016	**Date Booked in:**	27-Jul-16
QC Batch Number:	160479	**Date Extracted:**	01-Aug-16
Directory:	D:\TES\DATA\Y2016\080116TPH_GC17\080116 2016-08-01 12-41-14\014F2201.D	**Date Analysed:**	01-Aug-16, 21:17:03
Method:	Bottle		

*** Sample data with an asterisk are not UKAS accredited.**

		Concentration, (mg/l)				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
EX1717029	MTP03 ES 1 0.50	<0.01	<0.01	<0.01	<0.01	0.042

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1717029	**Job Number:**	W22_4016
Multiplier:	0.005	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory
Acquisition Method:	TPH_RUNF.M	**Client Sample Ref:**	MTP03 ES 1 0.50
Acquisition Date/Time:	01-Aug-16, 21:17:03		
Datafile:	D:\TES\DATA\Y2016\080116TPH_GC17\080116 2016-08-01 12-41-14\014F2201.D		

Where individual results are flagged see report notes for status.

CEN 2/10 Stage 2 Leachate Analysi

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W224016

Customer	**ESG Limited Doncaster**
Site	**The Factory**
Report No	**W224016**

Consignment No S57212
Date Logged 27-Jul-2016

Report Due 18-Aug-2016

			MethodID	CUSTSERV	ICPMSW											ICPWATVAR		ISEF	KONENS	LeachPrep	PAHMSW
ID Number	**Description**	**Matrix Type**	**Sampled**	**Report A (CEN2)**	**Nickel as Ni MS (Dissolved)**	**Chromium as Cr MS (Dissolved)**	**Cadmium as Cd MS (Dissolved)**	**Copper as Cu MS (Dissolved)**	**Lead as Pb MS (Dissolved)**	**Zinc as Zn MS (Dissolved)**	**Arsenic as As MS (Dissolved)**	**Mercury as Hg MS (Dissolved)**	**Selenium as Se MS (Dissolved)**	**Molybdenum as Mo MS (Dissolved)**	**Antimony as Sb MS (Dissolved)**	**Total Sulphur as SO4 (Diss) VAR**	**Barium as Ba (Dissolved) VAR**	**Fluoride as F**	**Chloride as Cl (Kone)**	**Leachate Prep**	**PAH GC-MS (16)**
					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
EX/1717029	MTP03 0.5	Laboratory Produced Leachate	27/07/16	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
☐	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **The Factory**
Report No **W224016**

Consignment No S57212
Date Logged 27-Jul-2016

Report Due 18-Aug-2016

			MethodID	**SFAPI**	**TPHFID**			**WSLM13**	**WSLM2**	**WSLM27**		**WSLM3**
ID Number	**Description**	**Matrix Type**	**Sampled**	**Phenol Index SFA**	**TPH Carbon Banding**	**TPH GC**	**TPH Interpretation**	**Dissolved Organic Carbon**	**Conductivity uS/cm @ 25C**	**Total Dissolved Solids (Calc)**	**Total Dissolved Solids**	**pH units**
				✓	✓	✓			✓			✓
EX/1717029	MTP03 0.5	Laboratory Produced Leachate	27/07/16	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟨	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	**MethodID**	**Analysis Basis**	**Method Description**
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis
Unless stated otherwise results are expressed as mg/l
Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
TR Denotes Tremolite
AC Denotes Actinolite
AN Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined
N.Det Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client :	ESG Limited Doncaster
Site :	The Factory
Report Number :	W22_4016

Lab ID Number	Client ID	Description
EX/1717029	MTP03 ES 1 0.50	Laboratory Produced Leachate

TEST REPORT

1252

Report No. EXR/224162 (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: The Factory, Manchester

The 1 sample described in this report were registered for analysis by ESG on 29-Jul-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 09-Aug-2016

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (10) Results (Page 5)
Table of PCB Congener Results (Page 6)
Table of TPH Interpretations (Page 7)
Table of TPH Texas banding (0.01) (Page 8)
GC-FID Chromatograms (Page 9)
Analytical and Deviating Sample Overview (Pages 10 to 11)
Table of Method Descriptions (Page 12)
Table of Report Notes (Page 13)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns

Managing Director
Multi-Sector Services

Date of Issue: 09-Aug-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.
ESG accepts no responsibility for any sampling not carried out by our personnel.

LAB ID Number EX/	Client Sample Description	Sample Date	pH units w	Conductivity uS/cm @ 25C w	Total Hardness as CaCO3	Chloride as Cl w	Fluoride as F a	Total Sulphur as SO4 (Dissolved) a	Calcium as Ca (Dissolved) a	Magnesium as Mg (Dissolved) a	Nickel as Ni (Dissolved)	Chromium as Cr (Dissolved)	Cadmium as Cd (Dissolved)	Copper as Cu (Dissolved)	Lead as Pb (Dissolved)	Zinc as Zn (Dissolved)	Arsenic as As (Dissolved)	Boron as B (Dissolved) a
		Units :	pH units	uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		Method Codes :	WSLM3	WSLM2	Calc_HD	KONENS	ISEF	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW	ICPWATVAR
		Method Reporting Limits :		100	7	1	0.1	3	1	1	0.001	0.001	0.0001	0.001	0.001	0.002	0.001	0.01
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1717905	BH01 EW 1 3.00	28-Jul-16	7.2	249	64	10	0.1	23.1	22.1	2.2	0.003	<0.001	0.0001	0.009	0.004	0.022	<0.001	0.02

ESG

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

The Factory, Manchester

Sample Analysis

Date Printed	**09-Aug-2016**
Report Number	**EXR/224162**
Table Number	**1**

Where individual results are flagged see report notes for status.

LAB ID Number EX/	Client Sample Description	Sample Date	Mercury as Hg (Dissolved)	Selenium as Se (Dissolved)	Antimony as Sb (Dissolved)	Cyanide (Total) as CN	Sulphide as S	Carbon Banding	TPH GC	PAH GC-MS (16) o	Dissolved Organic Carbon w	PCB - 7 Congeners o	Interpretation	Ethyl Benzene	Benzene	Toluene	MTBE	Xylenes
		Units :	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	µg/l		µg/l	µg/l	µg/l	µg/l	µg/l
		Method Codes :	ICPMSW	ICPMSW	ICPMSW	SFAPI	SFAS	TPHFID	TPHFID	PAHMSW	WSLM13	PCBCONEC	TPHFID	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
		Method Reporting Limits :	0.0001	0.001	0.001	0.02	0.02	0.01	0.01		0.2	0.05		5	5	5	10	15
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes
1717905	BH01 EW 1 3.00	28-Jul-16	<0.0001	<0.001	<0.001	<0.02	<0.02	Req	0.59	Req	11	Req	Req	<5	<5	<5	<10	<15

ESG

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

Sample Analysis

The Factory, Manchester

Date Printed	**09-Aug-2016**
Report Number	**EXR/224162**
Table Number	**1**

Where individual results are flagged see report notes for status.

LAB ID Number EX/	Client Sample Description	Sample Date	m/p Xylenes	o Xylene	Phenol	Cresols	Dimethylphenols	Trimethylphenols
		Units :	µg/l	µg/l	mg/l	mg/l	mg/l	mg/l
		Method Codes :	BTEXHSA	BTEXHSA	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL
		Method Reporting Limits :	10	5	0.0005	0.0005	0.0005	0.0005
		UKAS Accredited :	Yes	Yes	No	No	No	No
1717905	BH01 EW 1 3.00	**28-Jul-16**	<10	<5	<0.0005	<0.0005	<0.0005	<0.0005

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

The Factory, Manchester

Sample Analysis

Date Printed	**09-Aug-2016**
Report Number	**EXR/224162**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: The Factory, Manchester		
Sample Details:	BH01 EW 1 3.00	**Job Number:**	W22_4162
LIMS ID Number:	EX1717905	**Date Booked in:**	29-Jul-16
QC Batch Number:	160484	**Date Extracted:**	02-Aug-16
Quantitation File:	Initial Calibration	**Date Analysed:**	03-Aug-16
Directory:	116PAH.MS10\	**Matrix:**	Water
Dilution:	1.0	**Ext Method:**	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.27	0.057	93
Fluorene	86-73-7	4.64	0.019	94
Phenanthrene	85-01-8	5.45	0.155	99
Anthracene	120-12-7	5.49	0.032	95
Fluoranthene	206-44-0	6.74	0.334	94
Pyrene	129-00-0	7.02	0.326	96
Benzo[a]anthracene	56-55-3	8.68	0.164	93
Chrysene	218-01-9	8.72	0.225	98
Benzo[b]fluoranthene	205-99-2	10.19	0.243	75
Benzo[k]fluoranthene	207-08-9	10.23	0.086	75
Benzo[a]pyrene	50-32-8	10.61	0.178	93
Indeno[1,2,3-cd]pyrene	193-39-5	11.98	0.137	83
Dibenzo[a,h]anthracene	53-70-3	12.01	0.033	71
Benzo[g,h,i]perylene	191-24-2	12.27	0.130	97
Total (USEPA16) PAHs	-	-	< 2.149	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	91
Acenaphthene-d10	97
Phenanthrene-d10	97
Chrysene-d12	101
Perylene-d12	114

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	76
Terphenyl-d14	76

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Where individual results are flagged see report notes for status.

Polychlorinated Biphenyls (congeners)

Customer and Site Details: ESG Limited Doncaster: The Factory, Manchester
Job Number: W22_4162
QC Batch Number: 160088
Directory: 0801PCB.GC8
Method: Separating Funnel

Matrix: Water
Date Booked in: 29-Jul-16
Date Extracted: 01-Aug-16
Date Analysed: 02-Aug-16

*** This sample data is not UKAS accredited.**

		Concentration, (µg/l)						
Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
* EX1717905	BH01 EW 1 3.00	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Where individual results are flagged see report notes for status.

Interpretation of GC/FID Chromatographic Data

Client:	ESG Limited Doncaster
Site:	The Factory, Manchester
Report Number:	W224162
Date:	04/08/2016

Assessment Type	Standard Interpretation
Assessor:	R.P
Analysis:	TPH by GCFID (AR)

Sample ID	Client Description	Interpretation
EX1717905	BH01 EW 1 3.00	Mineral Oil style UCM in the range nC14-nC40+. Presence of PAHs. Suggest GC-MS for better I.D.

Where individual results are flagged see report notes for status.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

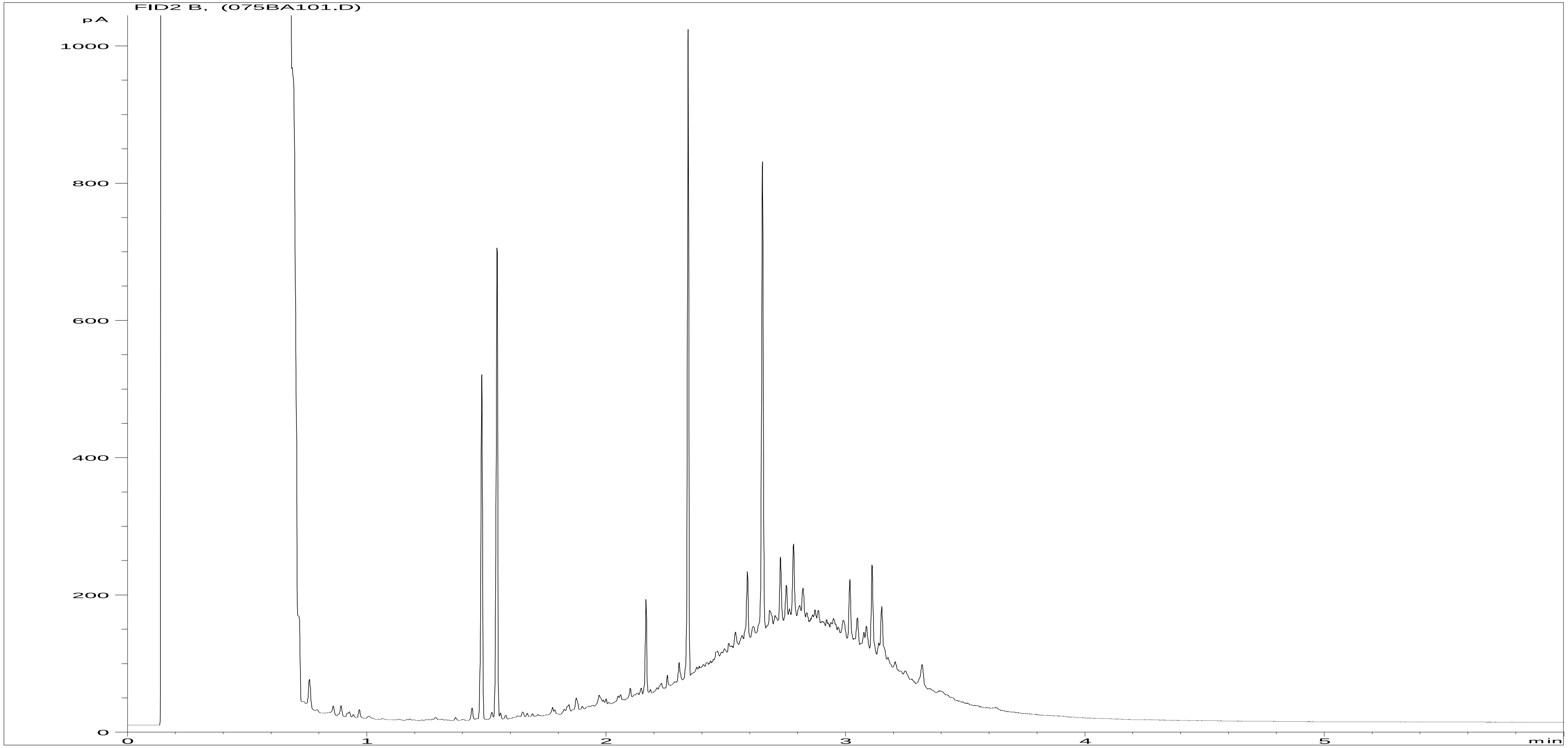
Customer and Site Details:	ESG Limited Doncaster : The Factory, Manchester	**Matrix:**	Water
Job Number:	W22_4162	**Date Booked in:**	29-Jul-16
QC Batch Number:	160484	**Date Extracted:**	02-Aug-16
Directory:	D:\TES\DATA\Y2016\080216TPH_GC3\080216 2016-08-02 17-06-46\075BA101.D	**Date Analysed:**	03-Aug-16, 18:23:04
Method:	Bottle		

*** Sample data with an asterisk are not UKAS accredited.**

		Concentration, (mg/l)				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
EX1717905	BH01 EW 1 3.00	<0.01	<0.01	0.011	0.059	0.455

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1717905	**Job Number:**	W22_4162
Multiplier:	0.005	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	The Factory, Manchester
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH01 EW 1 3.00
Acquisition Date/Time:	03-Aug-16, 18:23:04		
Datafile:	D:\TES\DATA\Y2016\080216TPH_GC3\080216 2016-08-02 17-06-46\075BA101.D		

Where individual results are flagged see report notes for status.

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **The Factory, Manchester**
Report No **W224162**

Consignment No W107295
Date Logged 29-Jul-2016

Report Due 05-Aug-2016

			MethodID	BTEXHSA	Calc_HD	CUSTSERV	ICPMSW										ICPWATVAR				**ISEF**
ID Number	**Description**	**Matrix Type**	**Sampled**	**BTEX-HSA + MTBE analysis**	**Total Hardness as CaCO3 (CALC)**	**Report A**	**Nickel as Ni MS (Dissolved)**	**Chromium as Cr MS (Dissolved)**	**Cadmium as Cd MS (Dissolved)**	**Copper as Cu MS (Dissolved)**	**Lead as Pb MS (Dissolved)**	**Zinc as Zn MS (Dissolved)**	**Arsenic as As MS (Dissolved)**	**Mercury as Hg MS (Dissolved)**	**Selenium as Se MS (Dissolved)**	**Antimony as Sb MS (Dissolved)**	**Total Sulphur as SO4 (Diss) VAR**	**Calcium as Ca (Dissolved) VAR**	**Magnesium as Mg (Dissolved) VAR**	**Boron as B (Dissolved) VAR**	**Fluoride as F**
				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EX/1717905	BH01 3.00	Groundwater	28/07/16	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W224162

Customer **ESG Limited Doncaster**
Site **The Factory, Manchester**
Report No **W224162**

Consignment No W107295
Date Logged 29-Jul-2016

Report Due 05-Aug-2016

			MethodID	KONENS	PAHMSW	PCBCONEC	PHEHPLCVL	SFAPI	SFAS	TPHFID			WSLM13	WSLM2	WSLM3
ID Number	**Description**	**Matrix Type**	**Sampled**	**Chloride as Cl (Kone)**	**PAH GC-MS (16)**	**PCB - 7 Congeners**	**Phenols by HPLC (Low Level)**	**Cyanide (Total) as CN SFA**	**Sulphide as S SFA**	**TPH Carbon Banding**	**TPH GC**	**TPH Interpretation**	**Dissolved Organic Carbon**	**Conductivity uS/cm @ 25C**	**pH units**
				✓				✓	✓	✓	✓			✓	✓
EX/1717905	BH01 3.00	Groundwater	28/07/16	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	**MethodID**	**Analysis Basis**	**Method Description**
Water	BTEXHSA	As Received	Benzene, Toluene, Ethylbenzene, & Xylenes by headspace extraction GCFID quantitation
Water	Calc_HD	As Received	Calculation based on Dissolved metals analysis by ICPOES
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	PCBCONEC	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners by pentane extraction followed by GCECD detection
Water	PHEHPLCVL	As Received	Determination of Phenols by HPLC
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis
Unless stated otherwise results are expressed as mg/l
Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile	**TR** Denotes Tremolite
CR Denotes Crocidolite	**AC** Denotes Actinolite
AM Denotes Amosite	**AN** Denotes Anthophylite

NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined　　**N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

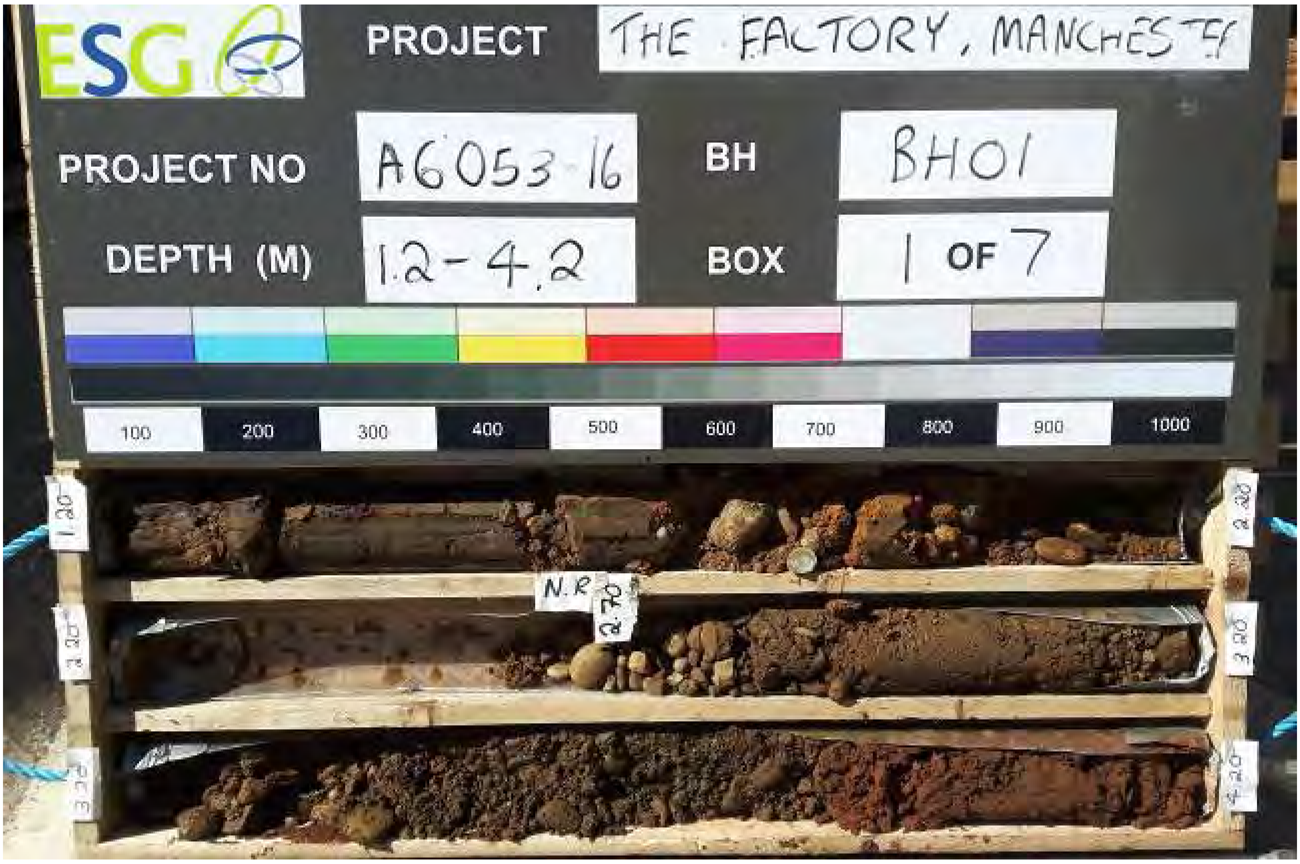
Client : ESG Limited Doncaster
Site : The Factory, Manchester
Report Number : W22_4162

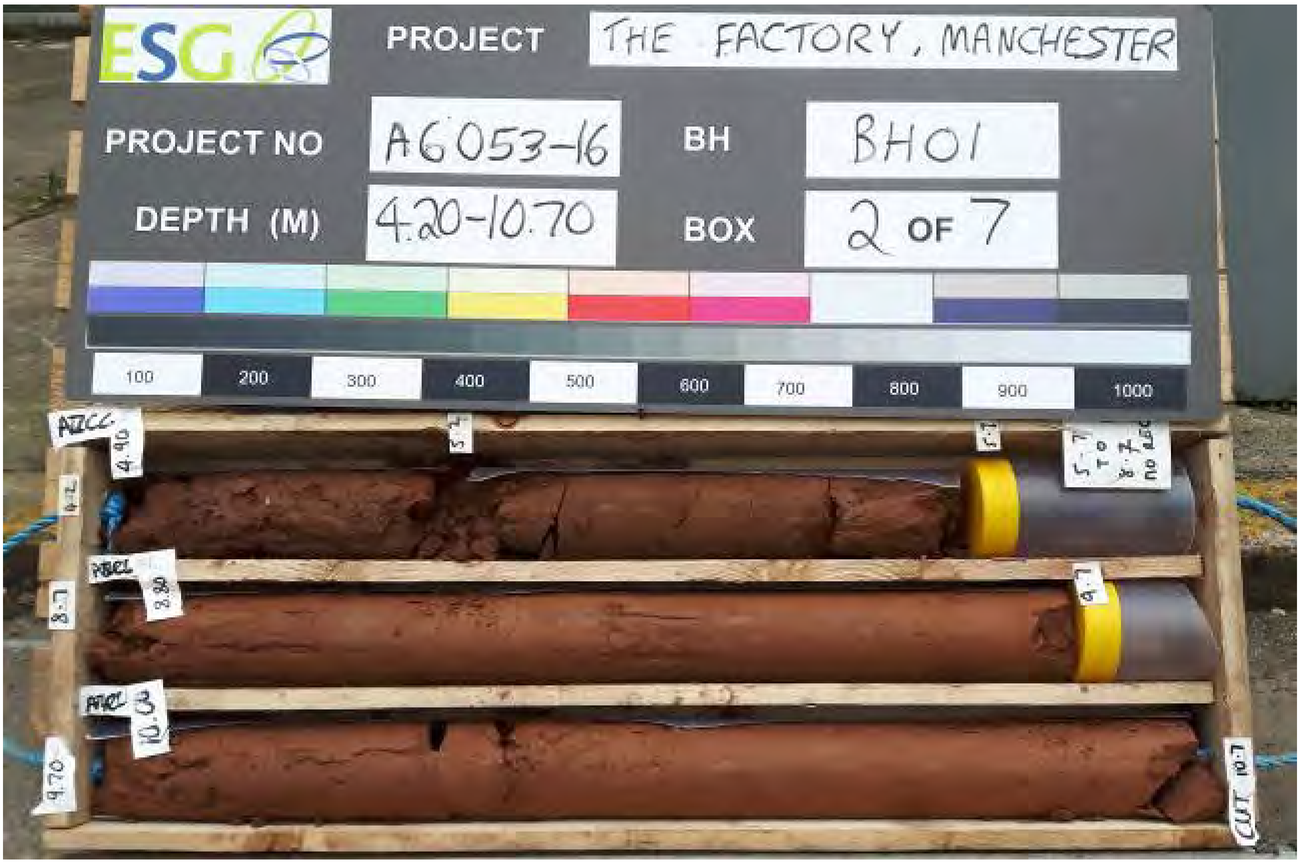
Lab ID Number	Client ID	Description
EX/1717905	BH01 EW 1 3.00	Groundwater

APPENDIX F
PHOTOGRAPHS

Rotary Cores	Plates 1 to 12
Trial Pits – Machine Excavated	Plates 1 to 8
Trail Pits – Hand Excavated	Plates 1 to 13

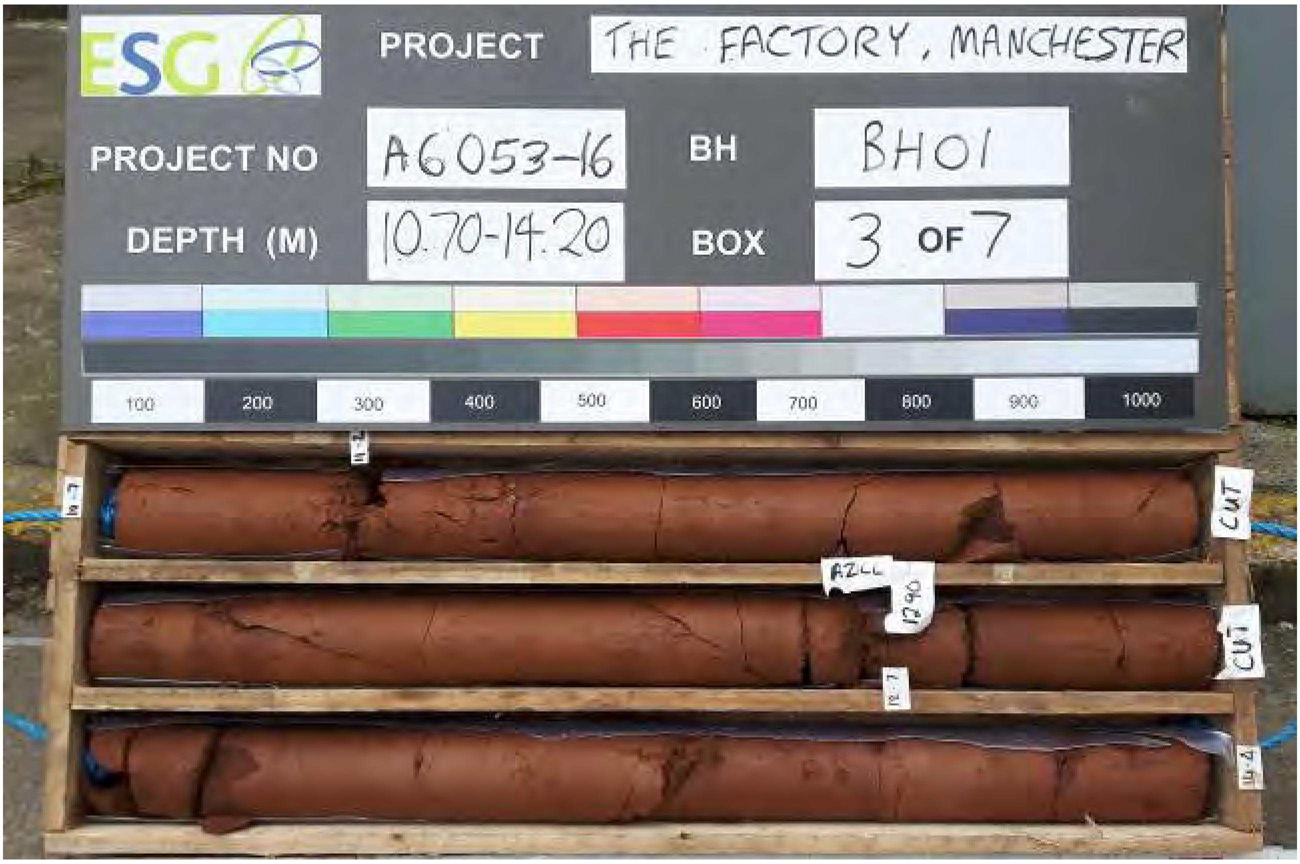
Core Photographs

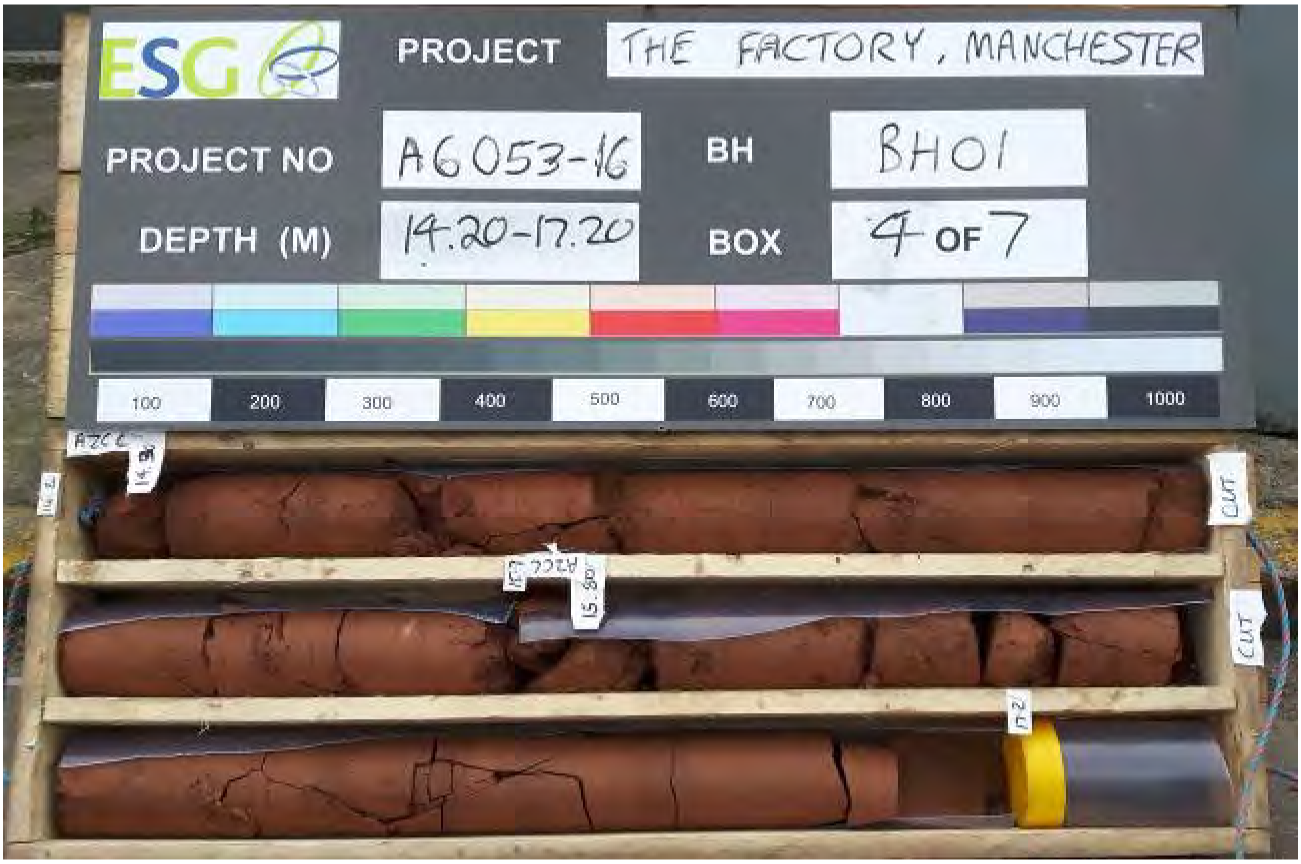

ESG
PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053 16
BH
BH01
DEPTH (M)
1.2-4.2
BOX
1 OF 7
100
200
300
400
500
600
700
800
900
1000
1.20
2.20
N.R
2.70
3.20
3.20
4.20


ESG
PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH01
DEPTH (M)
4.20-10.70
BOX
2 OF 7
100
200
300
400
500
600
700
800
900
1000
4.40
5.2
5.7
5.7 TO 8.7 NO REC
8.7
8.80
9.7
9.70
10.3
CUT 10.7

Notes:	Project	THE FACTORY, MANCHESTER	**Plate**
	Project No.	A6053-16	1
	Carried out for	Buro Happold Limited	

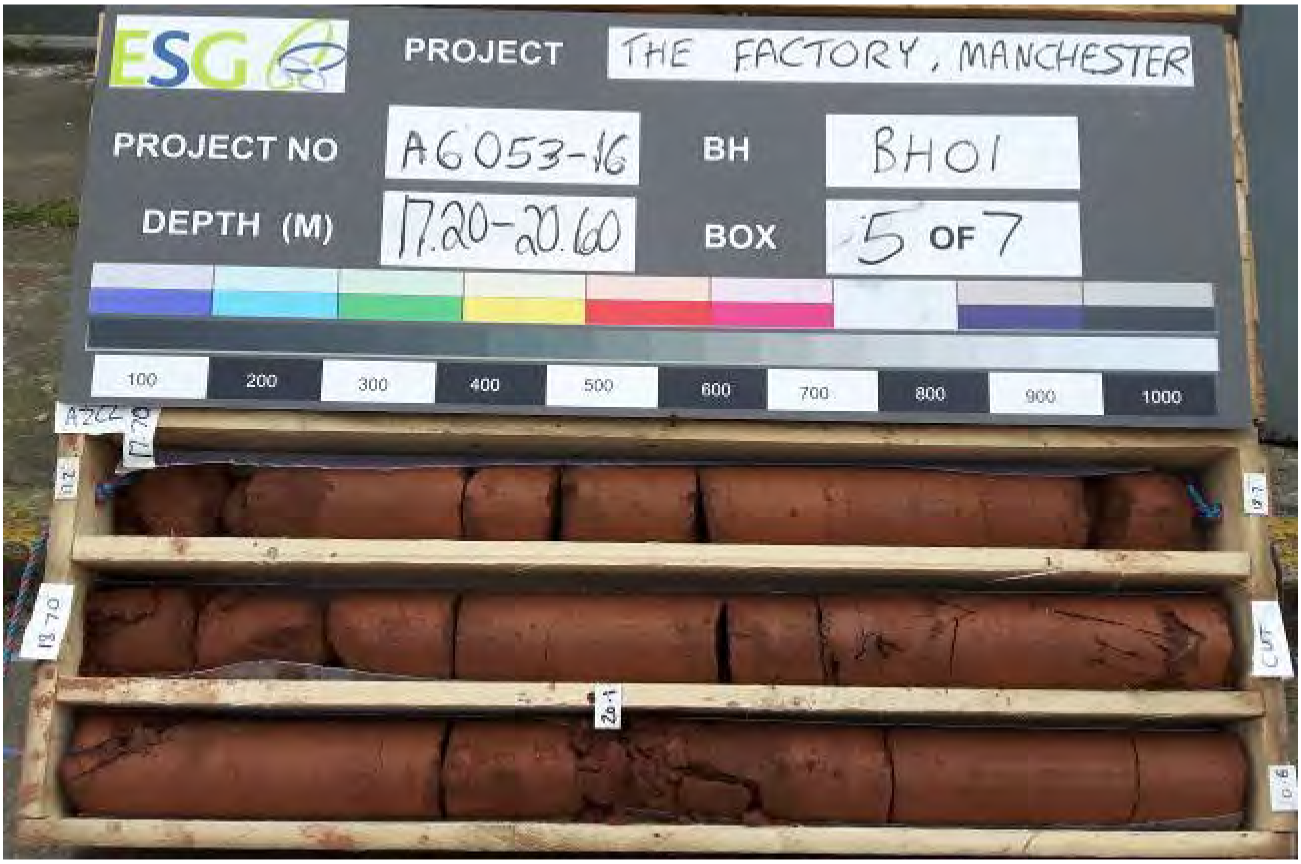
Core Photographs

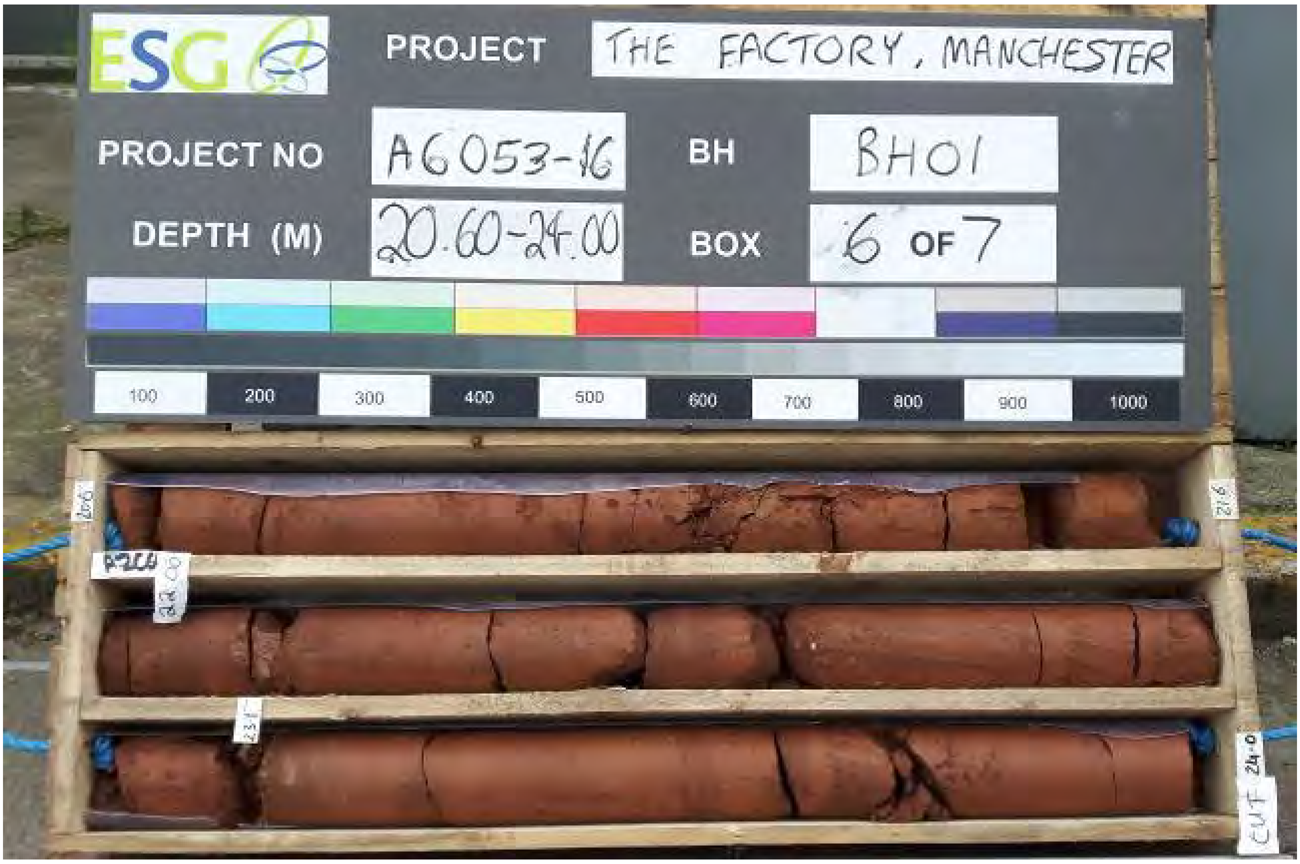

ESG
PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH01
DEPTH (M)
10.70-14.20
BOX
3 OF 7
100
200
300
400
500
600
700
800
900
1000
CUT
AZLL
12.90
CUT


ESG
PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH01
DEPTH (M)
14.20-17.20
BOX
4 OF 7
100
200
300
400
500
600
700
800
900
1000
AZCL
14.2
CUT
AZCL
15.80
CUT

Notes:	Project	THE FACTORY, MANCHESTER	**Plate**
	Project No.	A6053-16	2
	Carried out for	Buro Happold Limited	

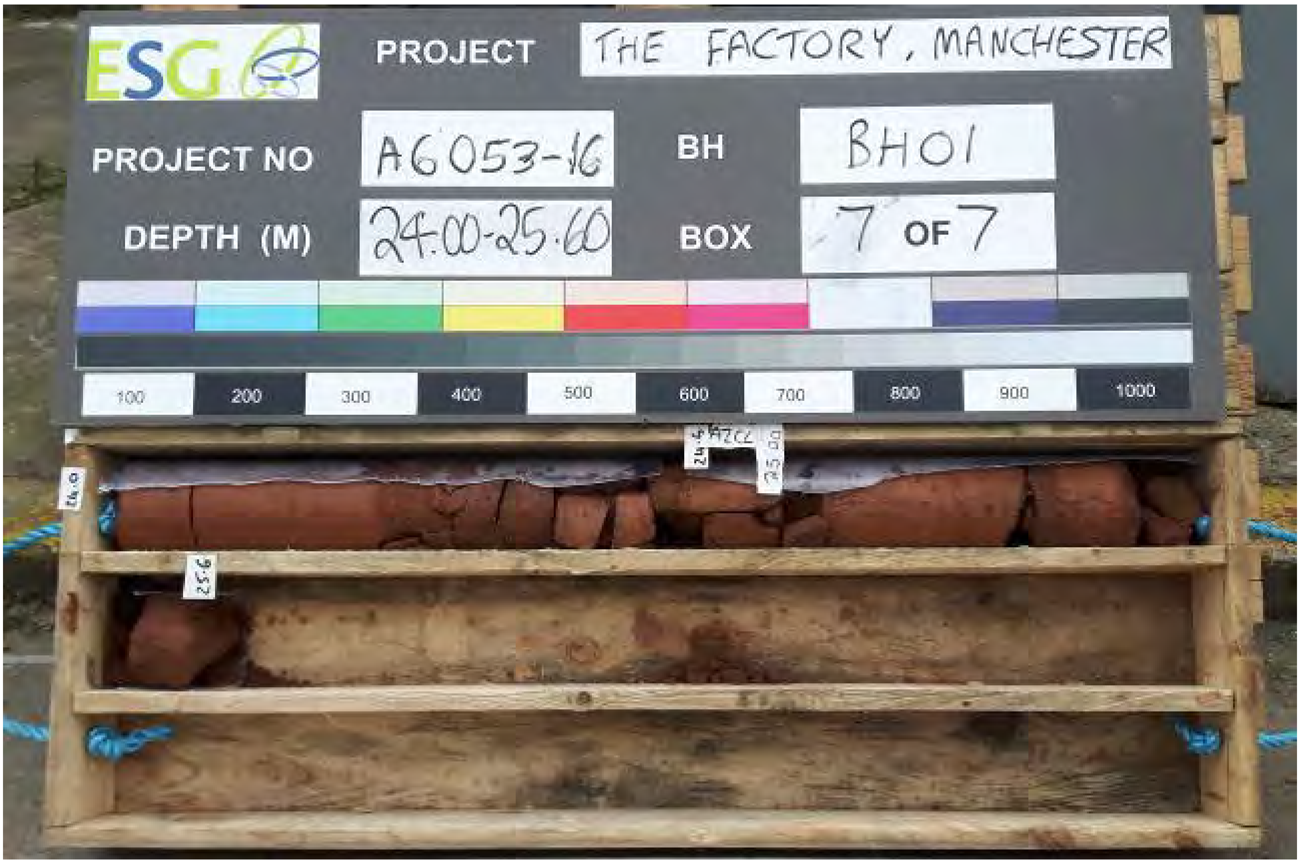
Core Photographs


ESG
PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH01
DEPTH (M)
17.20-20.60
BOX
5 OF 7
100
200
300
400
500
600
700
800
900
1000
17.70
18.70
20.1
CUT
19.6


ESG
PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH01
DEPTH (M)
20.60-24.00
BOX
6 OF 7
100
200
300
400
500
600
700
800
900
1000
20.6
21.6
22.00
23.1
CUT 24.0

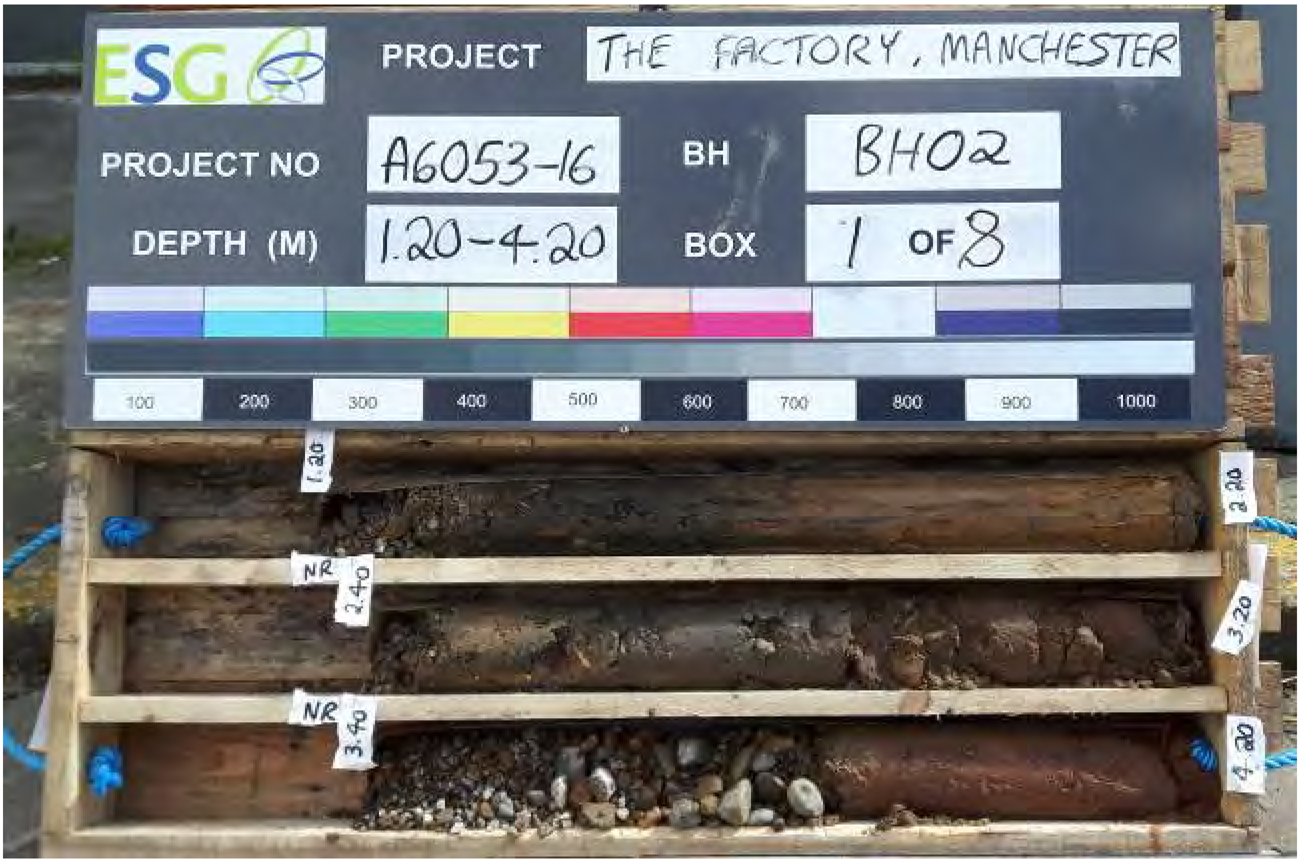
Notes:	Project	THE FACTORY, MANCHESTER	Plate
	Project No.	A6053-16	3
	Carried out for	Buro Happold Limited	

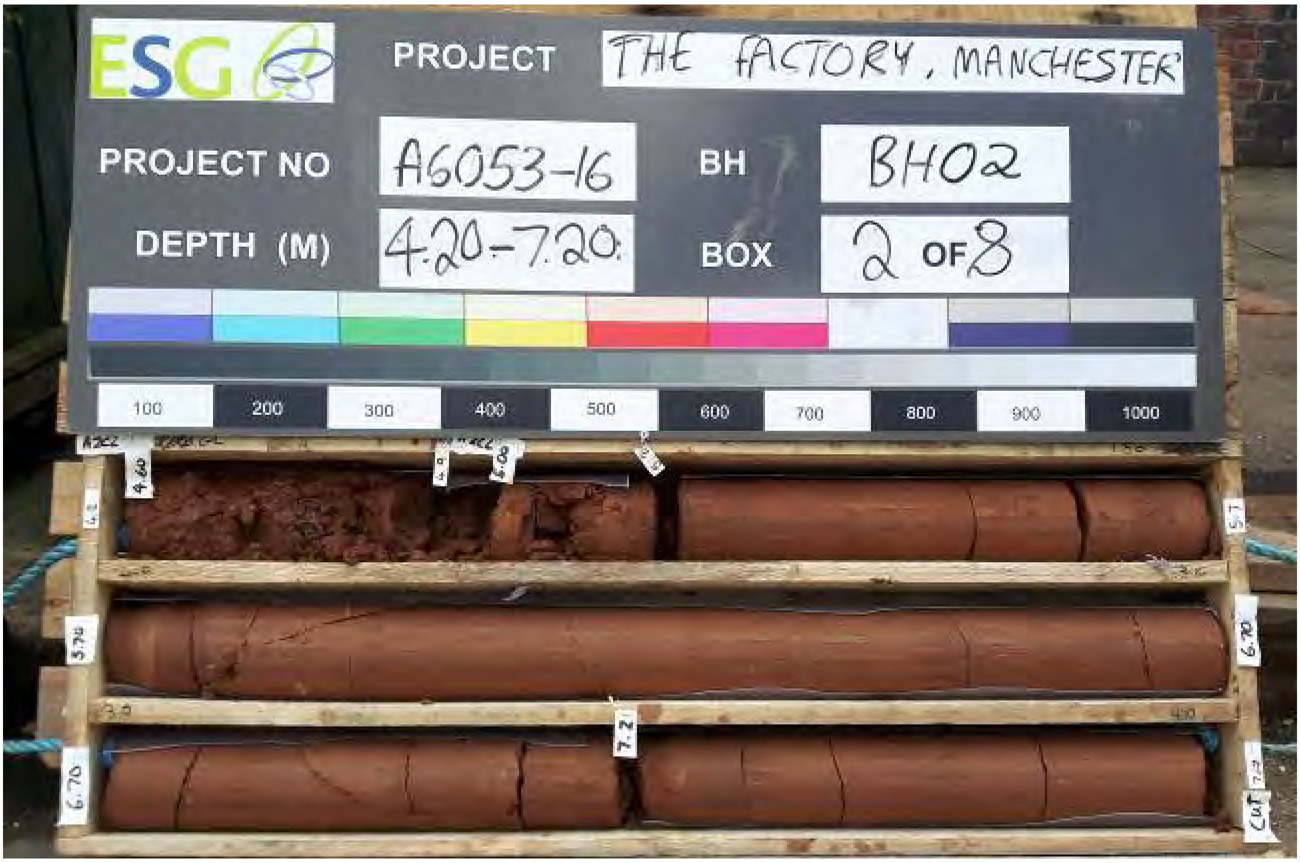
Core Photographs


PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH01
DEPTH (M)
24.00-25.60
BOX
7 OF 7
100
200
300
400
500
600
700
800
900
1000
24.0
24.4
25.0
25.52

Notes:	Project	THE FACTORY, MANCHESTER	Plate
	Project No.	A6053-16	4
	Carried out for	Buro Happold Limited	

Core Photographs

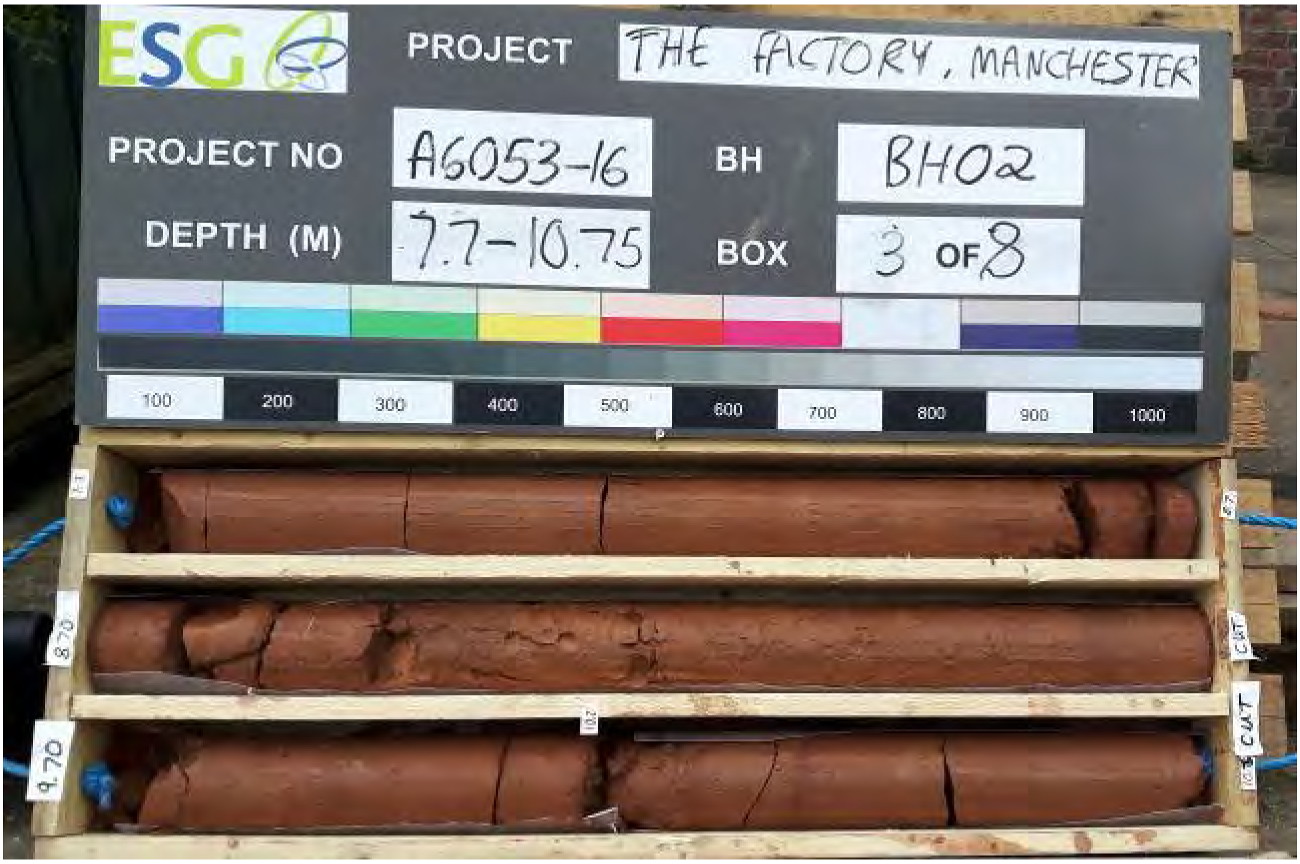

PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH02
DEPTH (M)
1.20-4.20
BOX
1 OF 8
100
200
300
400
500
600
700
800
900
1000
1.20
2.20
NR
2.40
3.20
NR
3.40
4.20

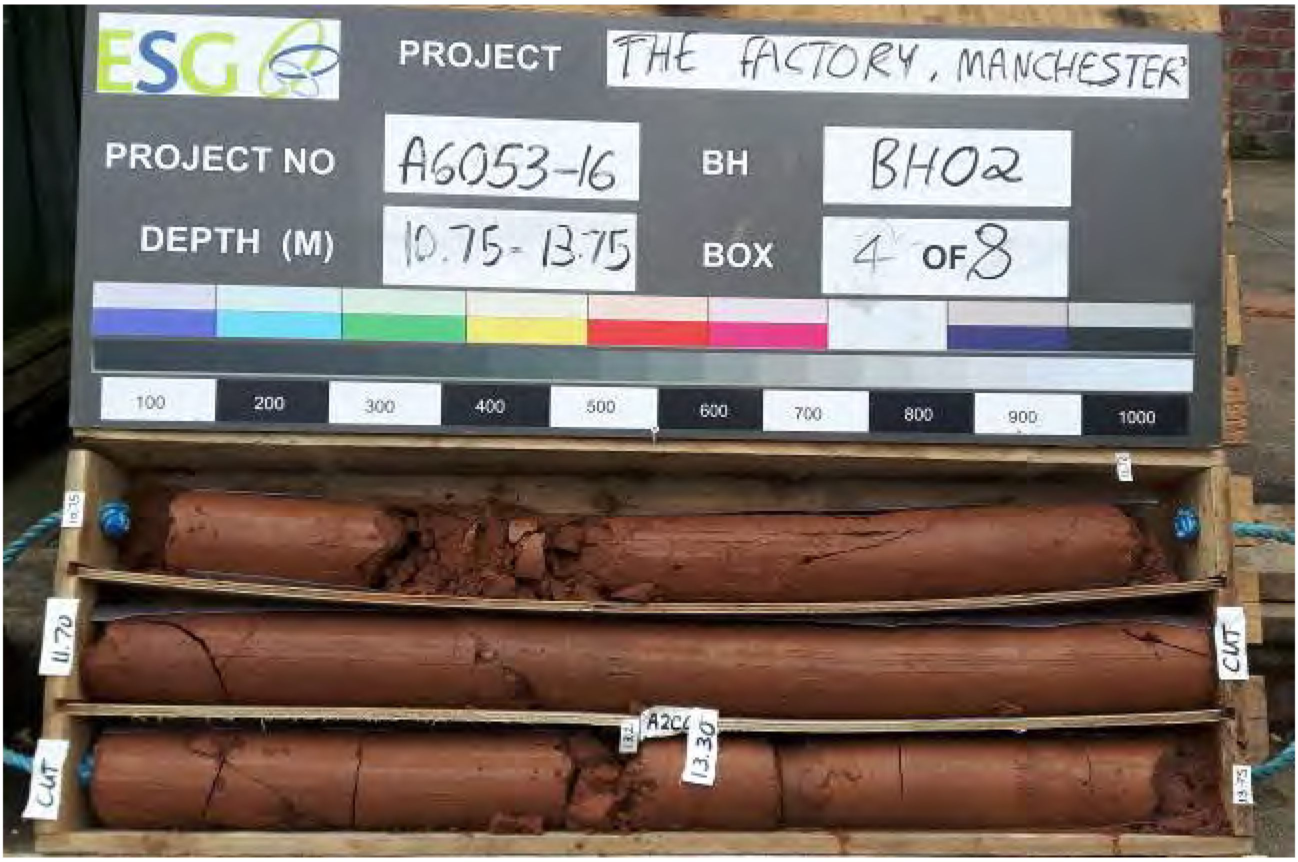

PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH02
DEPTH (M)
4.20-7.20
BOX
2 OF 8
100
200
300
400
500
600
700
800
900
1000
4.60
5.70
6.70
6.70
7.2
Cut

Notes:

Project	THE FACTORY, MANCHESTER	Plate
Project No.	A6053-16	5
Carried out for	Buro Happold Limited	

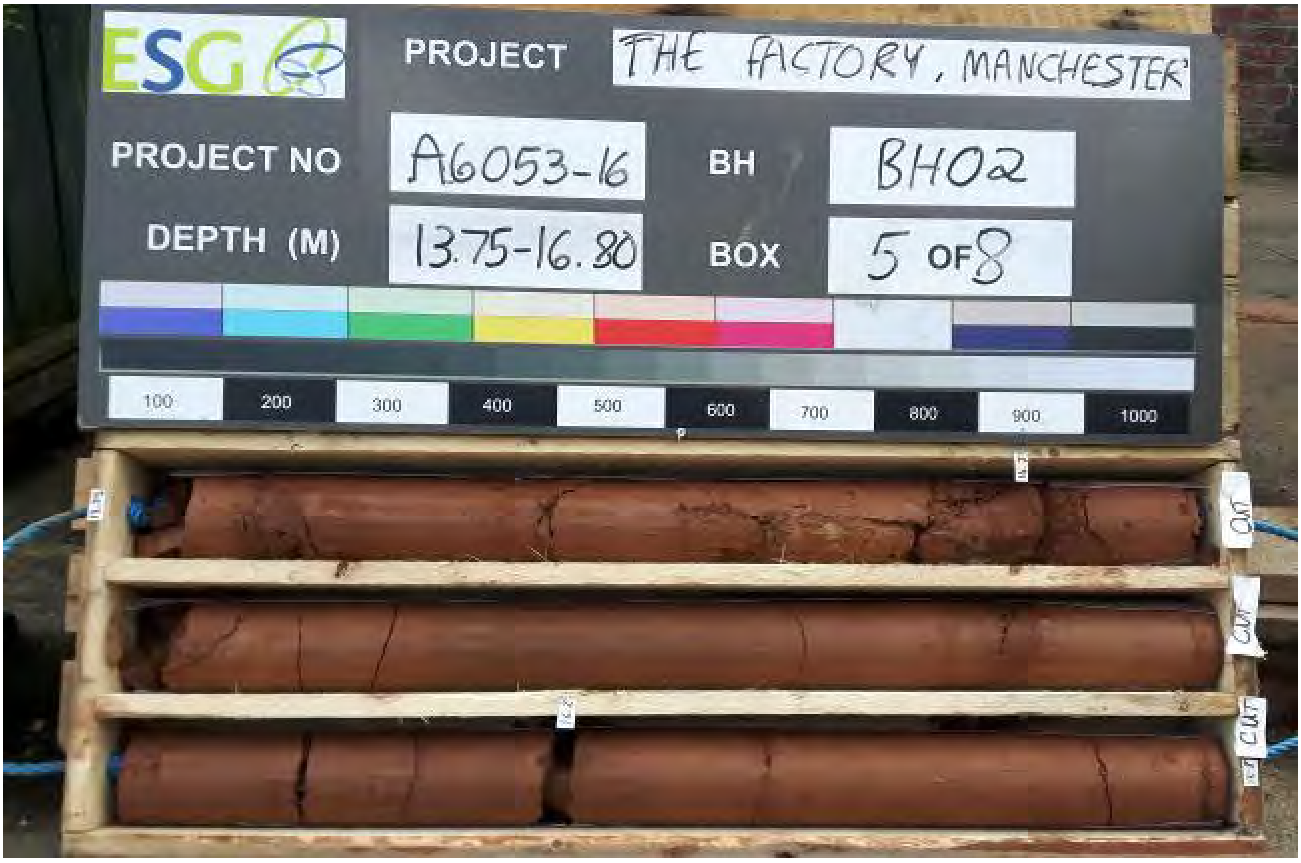
Core Photographs

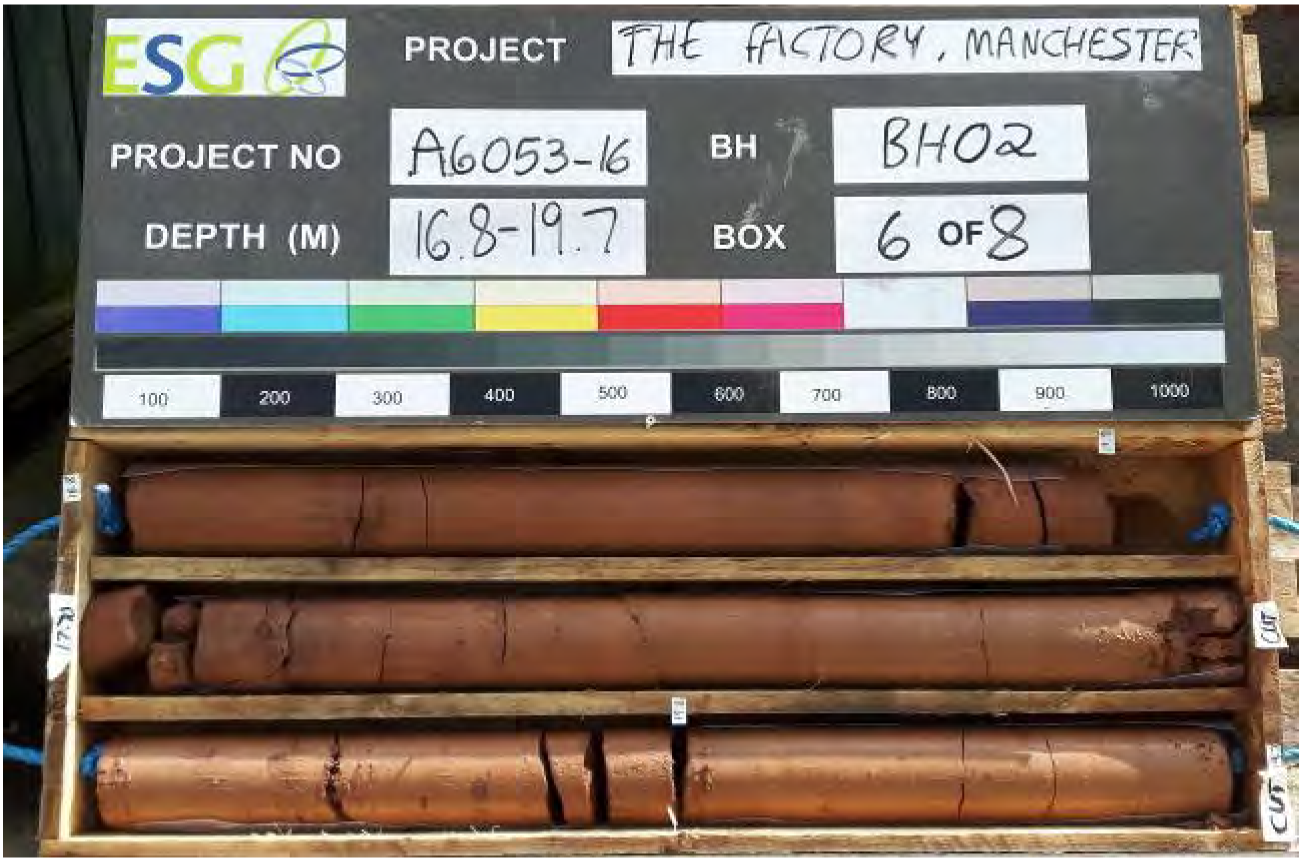

ESG
PROJECT THE FACTORY, MANCHESTER
PROJECT NO A6053-16
BH BH02
DEPTH (M) 7.7-10.75
BOX 3 OF 8
100
200
300
400
500
600
700
800
900
1000
8.70
9.70
CUT
CUT


ESG
PROJECT THE FACTORY, MANCHESTER
PROJECT NO A6053-16
BH BH02
DEPTH (M) 10.75-13.75
BOX 4 OF 8
100
200
300
400
500
600
700
800
900
1000
10.75
11.70
CUT
CUT
A2C
13.30
13.75

Notes:	Project	THE FACTORY, MANCHESTER	Plate
	Project No.	A6053-16	6
	Carried out for	Buro Happold Limited	

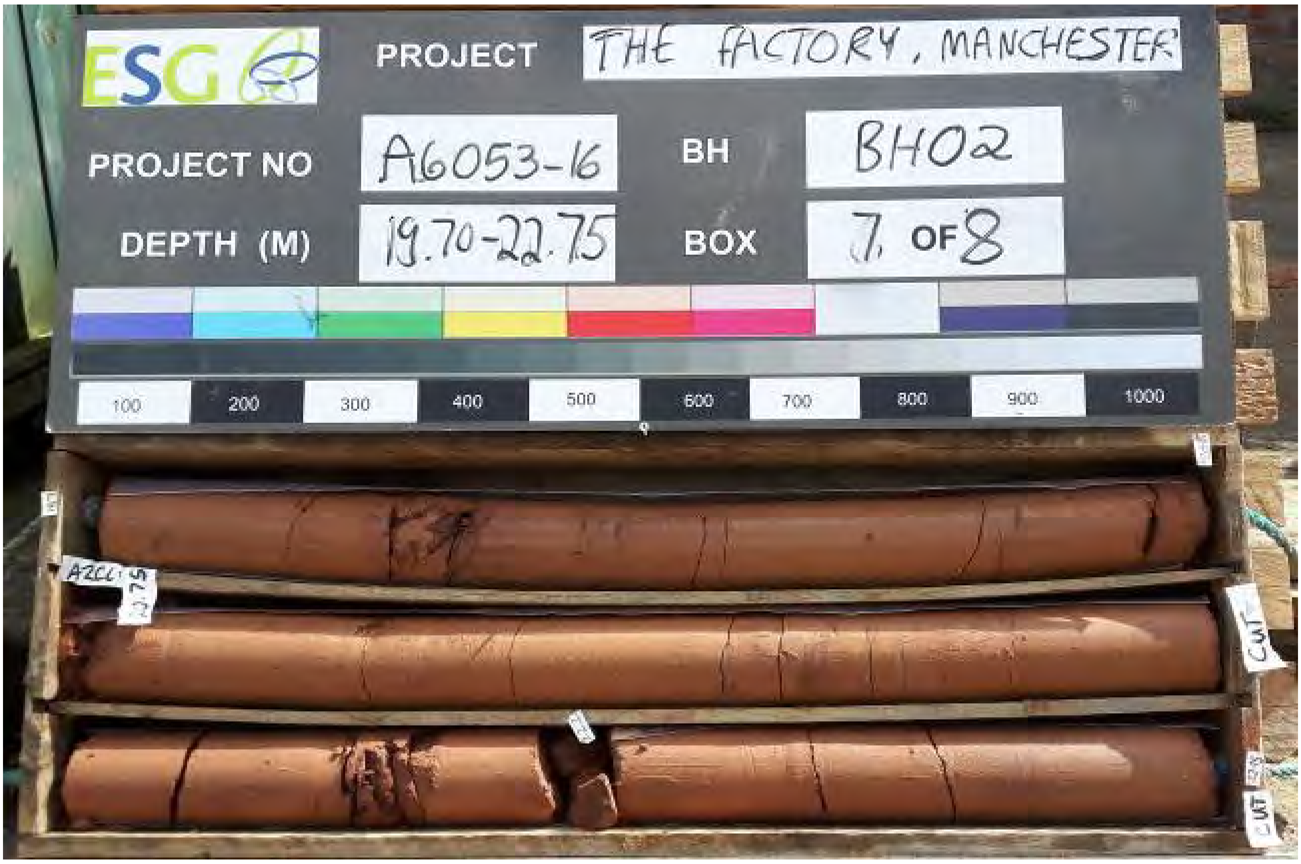
Core Photographs

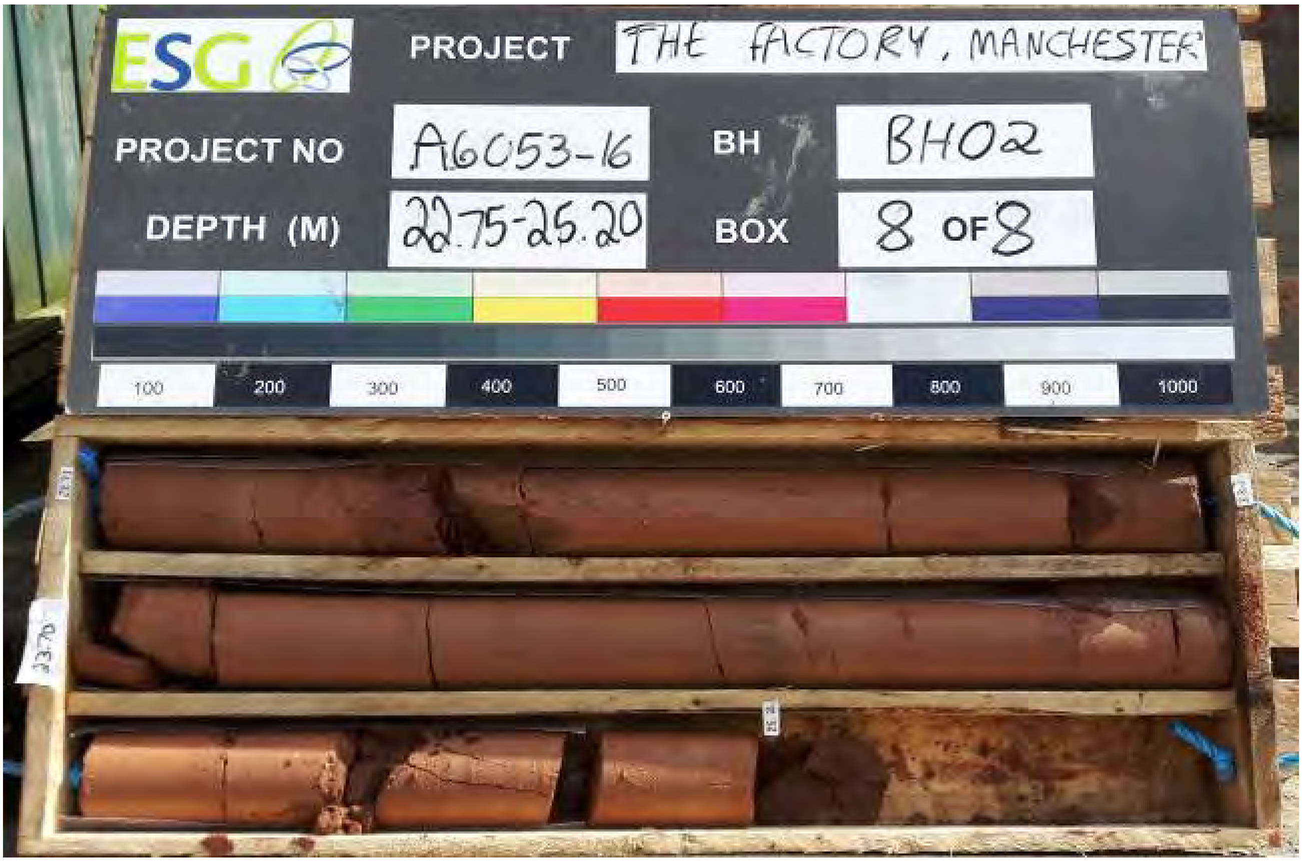

ESG
PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH02
DEPTH (M)
13.75-16.80
BOX
5 OF 8
100
200
300
400
500
600
700
800
900
1000
CUT
CUT
CUT


ESG
PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH02
DEPTH (M)
16.8-19.7
BOX
6 OF 8
100
200
300
400
500
600
700
800
900
1000
CUT
CUT

Notes:	**Project**	**THE FACTORY, MANCHESTER**	**Plate**
	Project No.	**A6053-16**	**7**
	Carried out for	**Buro Happold Limited**	

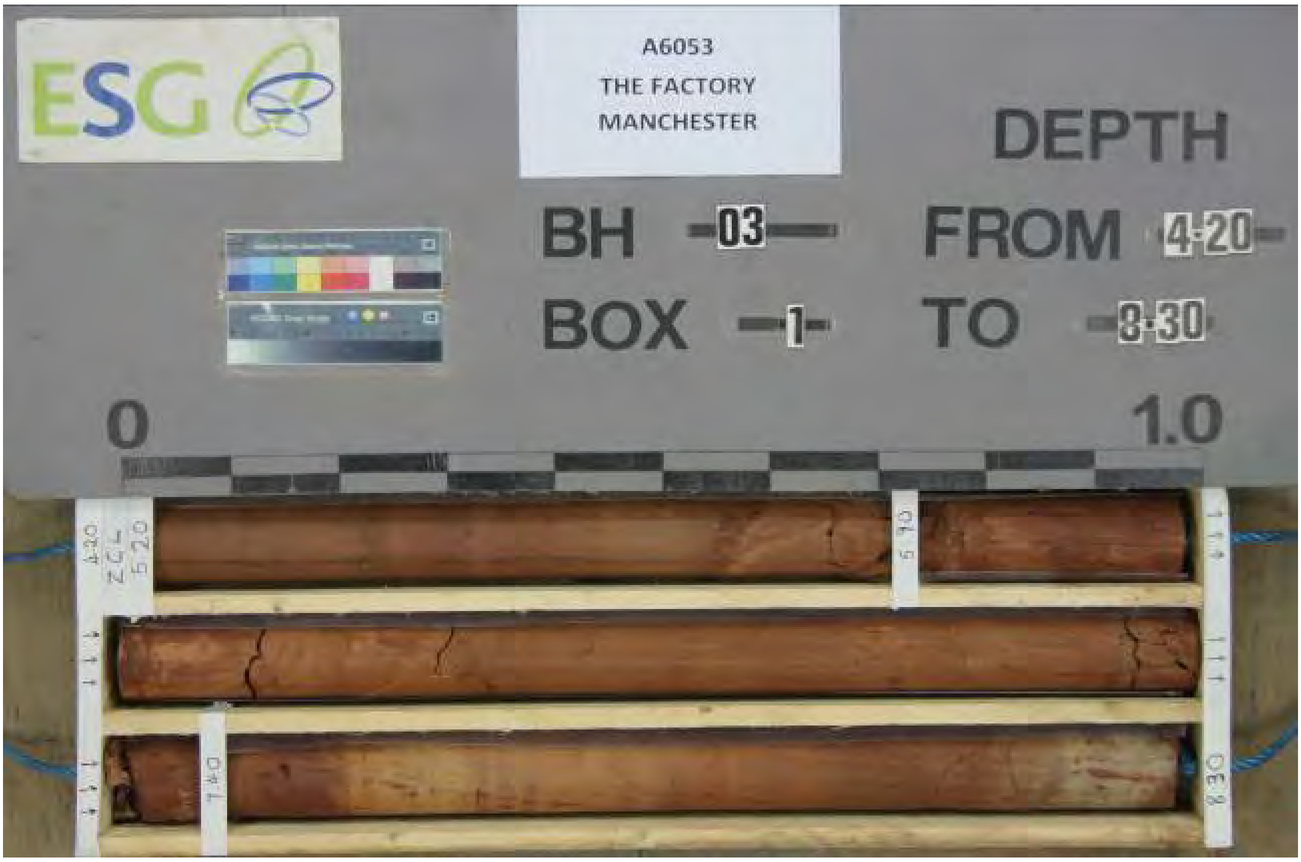
Core Photographs

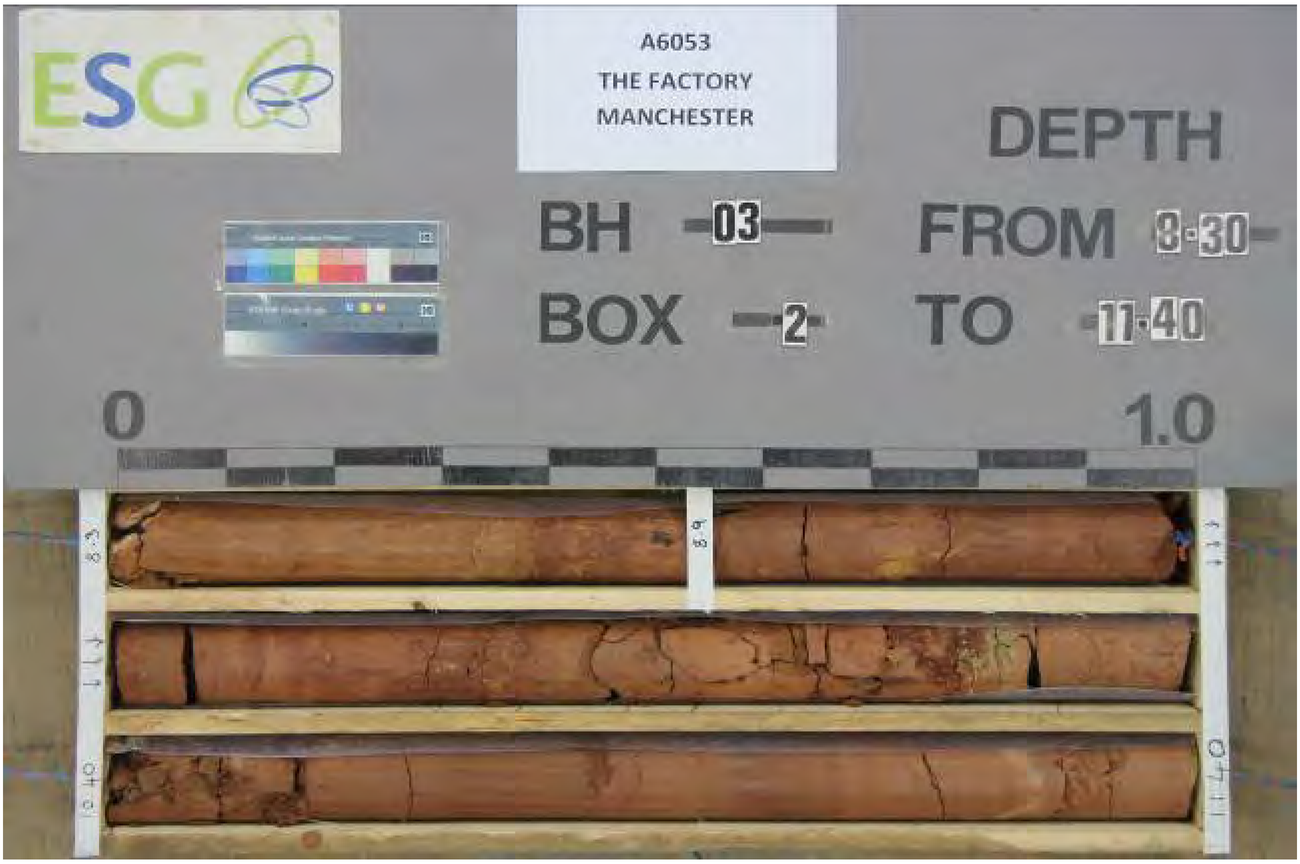

ESG
PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH02
DEPTH (M)
19.70-22.75
BOX
7 OF 8
100
200
300
400
500
600
700
800
900
1000
CUT
CUT


ESG
PROJECT
THE FACTORY, MANCHESTER
PROJECT NO
A6053-16
BH
BH02
DEPTH (M)
22.75-25.20
BOX
8 OF 8
100
200
300
400
500
600
700
800
900
1000
23.70

Notes:	Project Project No. Carried out for	THE FACTORY, MANCHESTER A6053-16 Buro Happold Limited	Plate 8

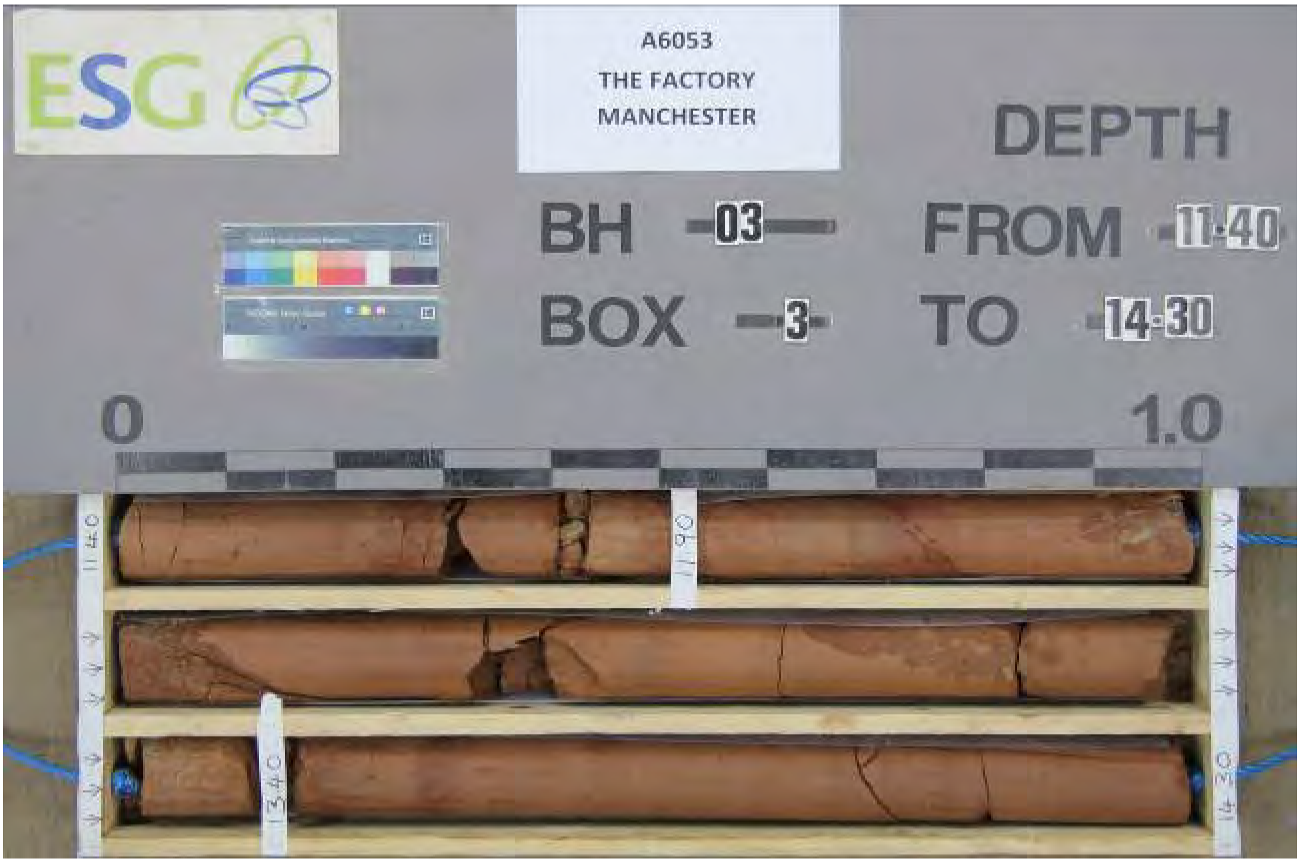
Core Photographs

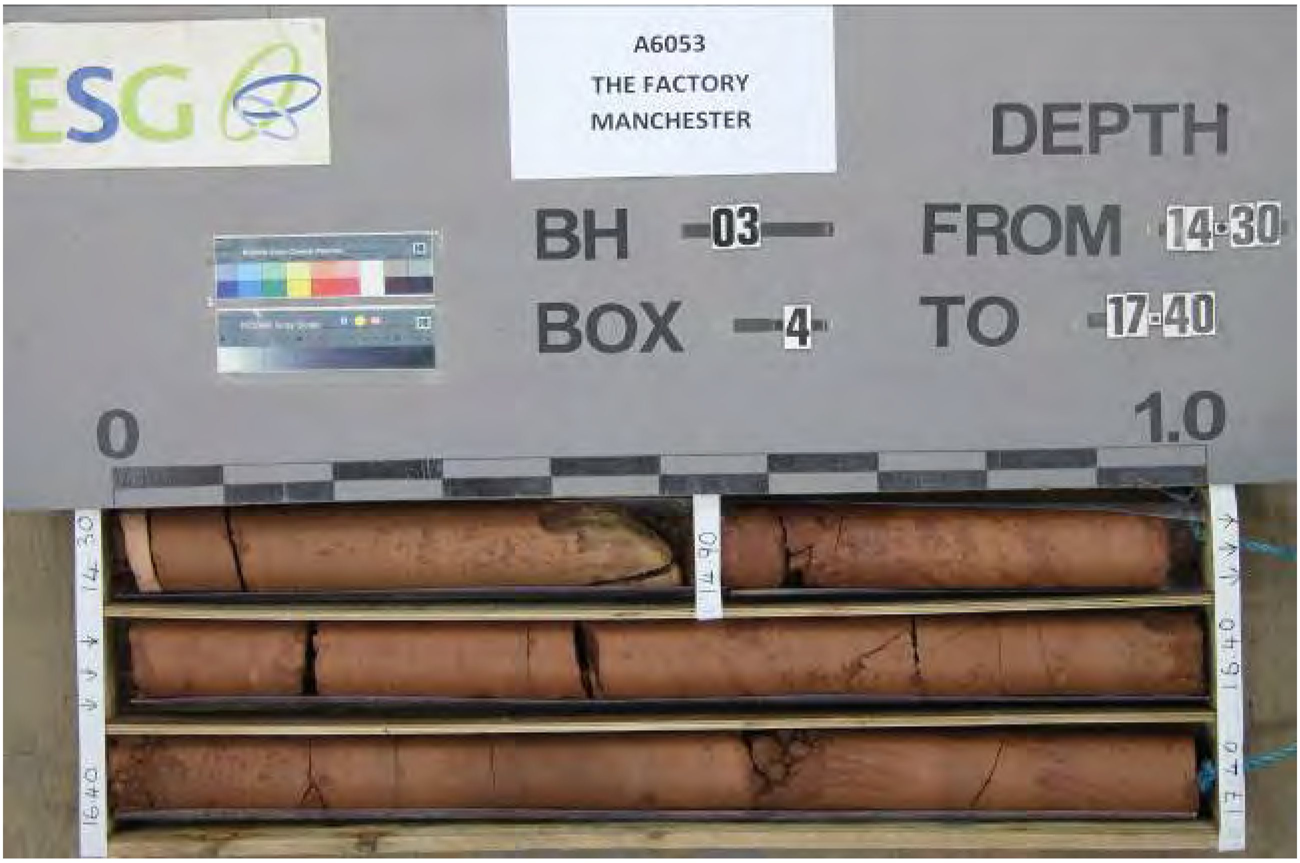

ESG
A6053
THE FACTORY
MANCHESTER
DEPTH
BH 03
FROM 4.20
BOX 1
TO 8.30
0
1.0
4.20
5.20
5.70
7.40
8.30


ESG
A6053
THE FACTORY
MANCHESTER
DEPTH
BH 03
FROM 8.30
BOX 2
TO 11.40
0
1.0
8.3
8.9
10.40
11.40

Notes:	Project	THE FACTORY, MANCHESTER	**Plate**
	Project No.	A6053-16	9
	Carried out for	Buro Happold Limited	

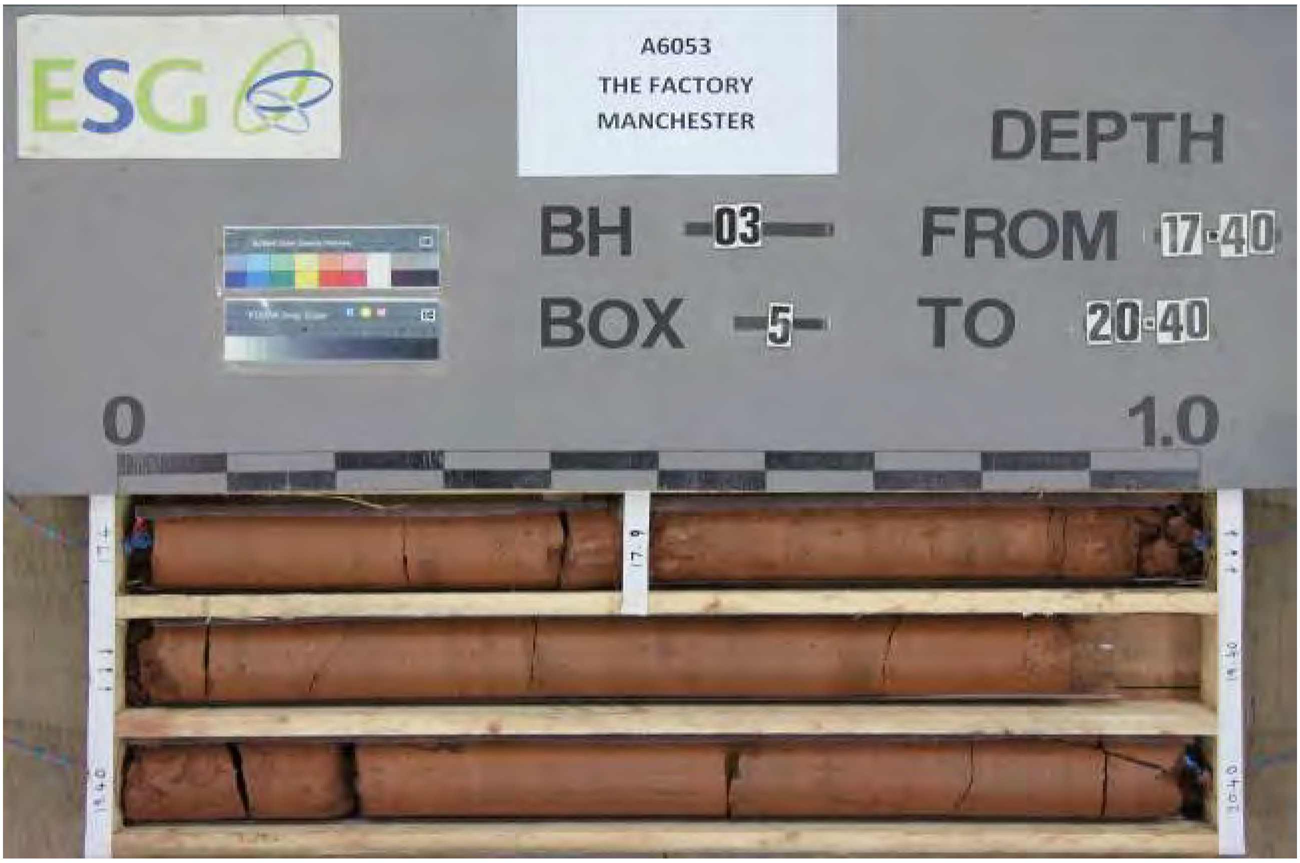
Core Photographs


ESG
A6053
THE FACTORY
MANCHESTER
DEPTH
BH 03
FROM 11.40
BOX 3
TO 14.30
0
1.0
11.40
11.90
13.40
14.30

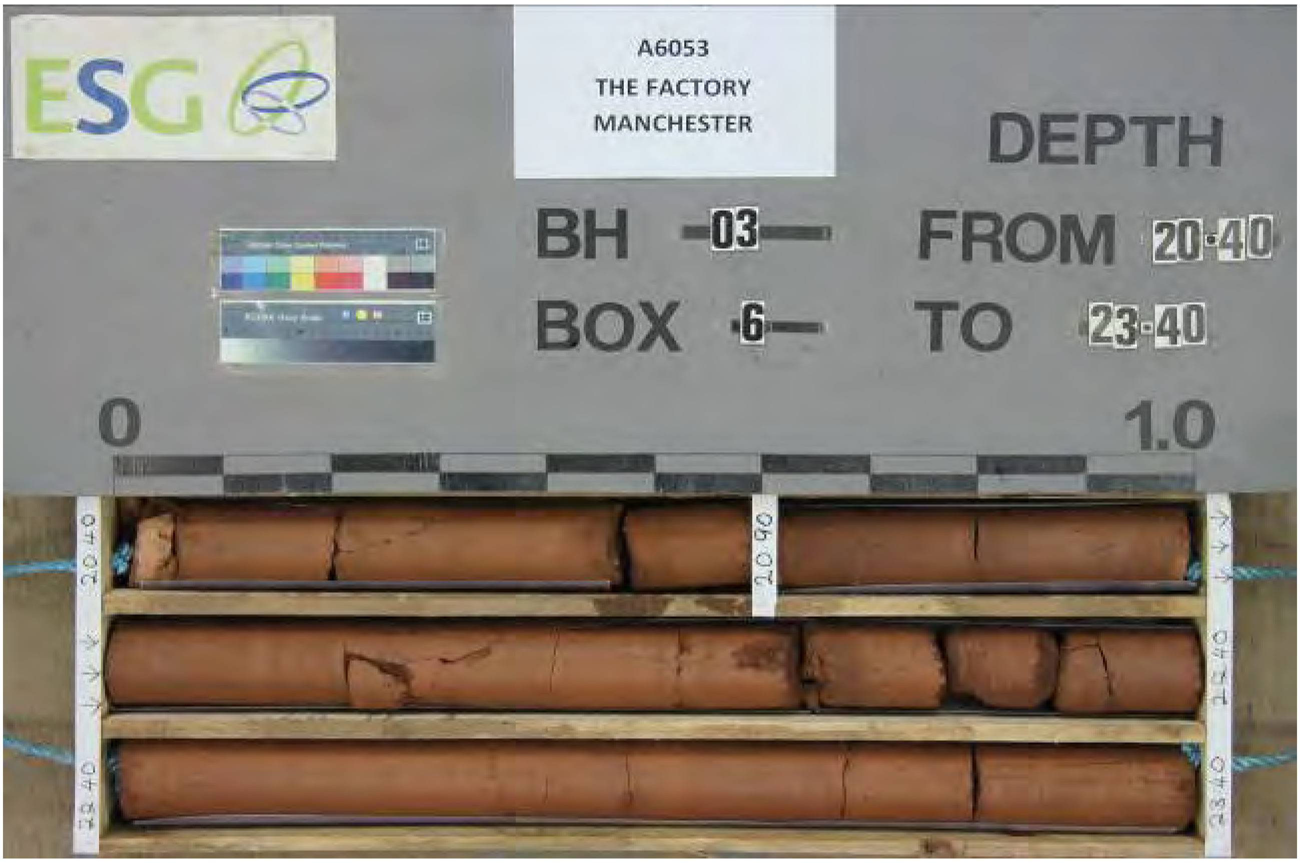

ESG
A6053
THE FACTORY
MANCHESTER
DEPTH
BH 03
FROM 14.30
BOX 4
TO 17.40
0
1.0
14.30
14.90
15.40
16.40
17.40

Notes:	Project	THE FACTORY, MANCHESTER	**Plate**	**10**
	Project No.	A6053-16		
	Carried out for	Buro Happold Limited		

Core Photographs



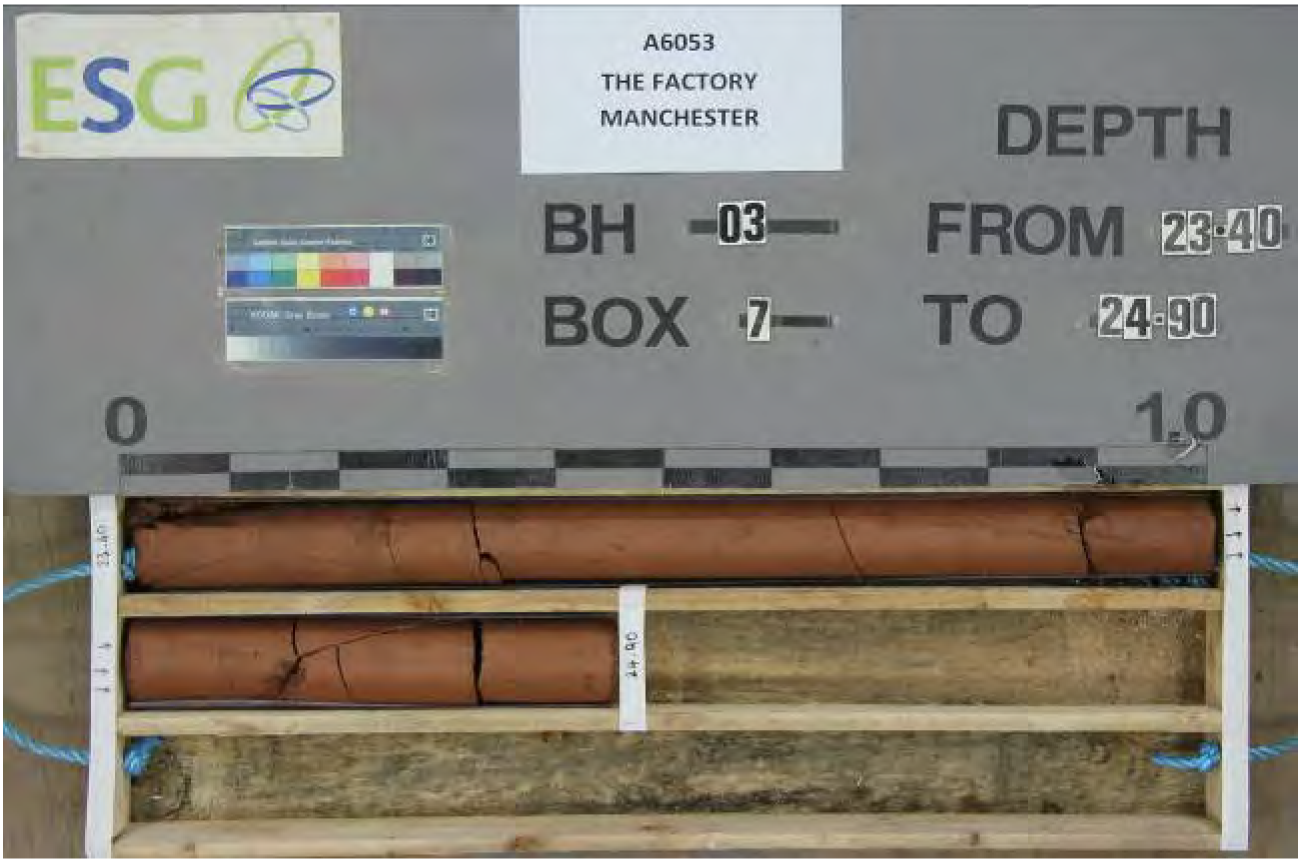
ESG
A6053
THE FACTORY
MANCHESTER
DEPTH
BH 03
BOX 5
FROM 17.40
TO 20.40
0
1.0
17.4
17.9
18.40
19.40
20.40



ESG
A6053
THE FACTORY
MANCHESTER
DEPTH
BH 03
BOX 6
FROM 20.40
TO 23.40
0
1.0
20.40
20.90
21.40
22.40
23.40

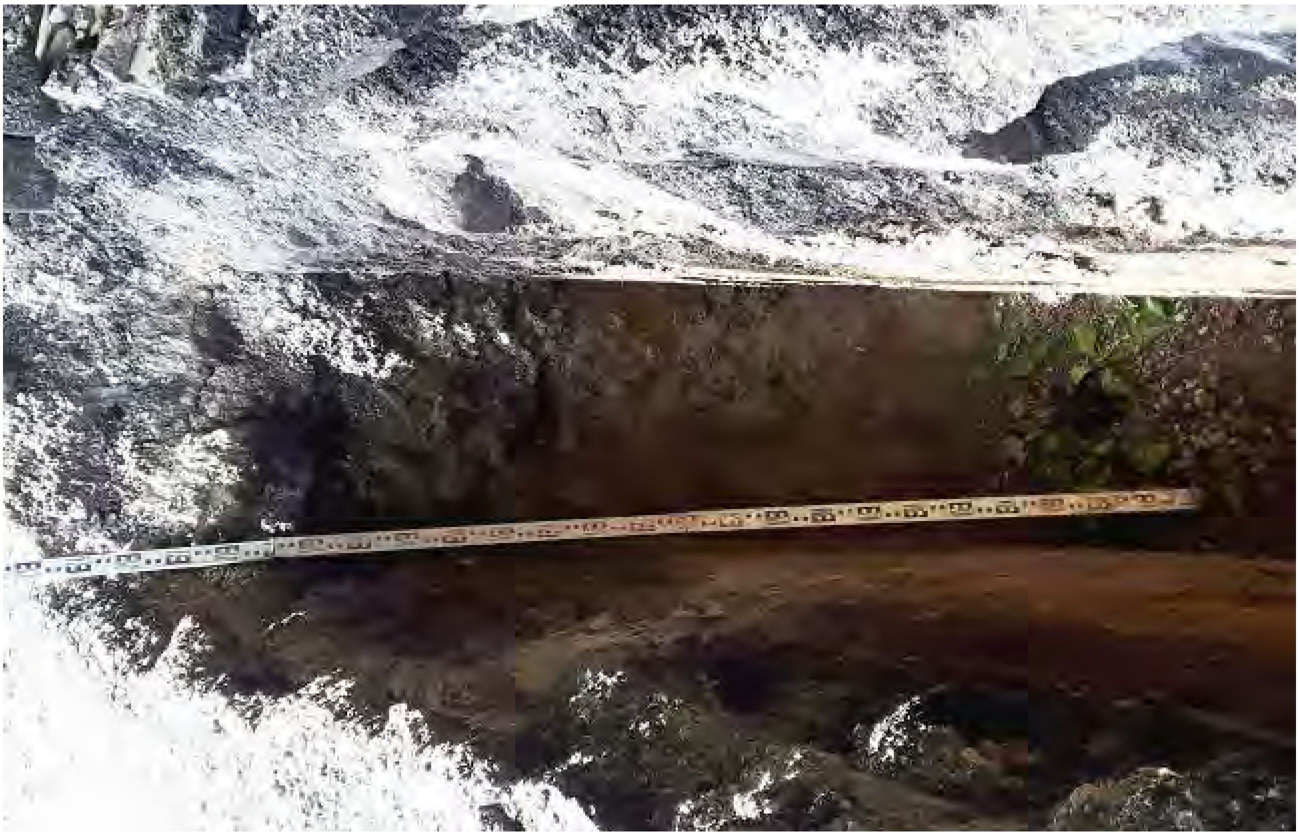
Notes:	Project	THE FACTORY, MANCHESTER	Plate
	Project No.	A6053-16	11
	Carried out for	Buro Happold Limited	

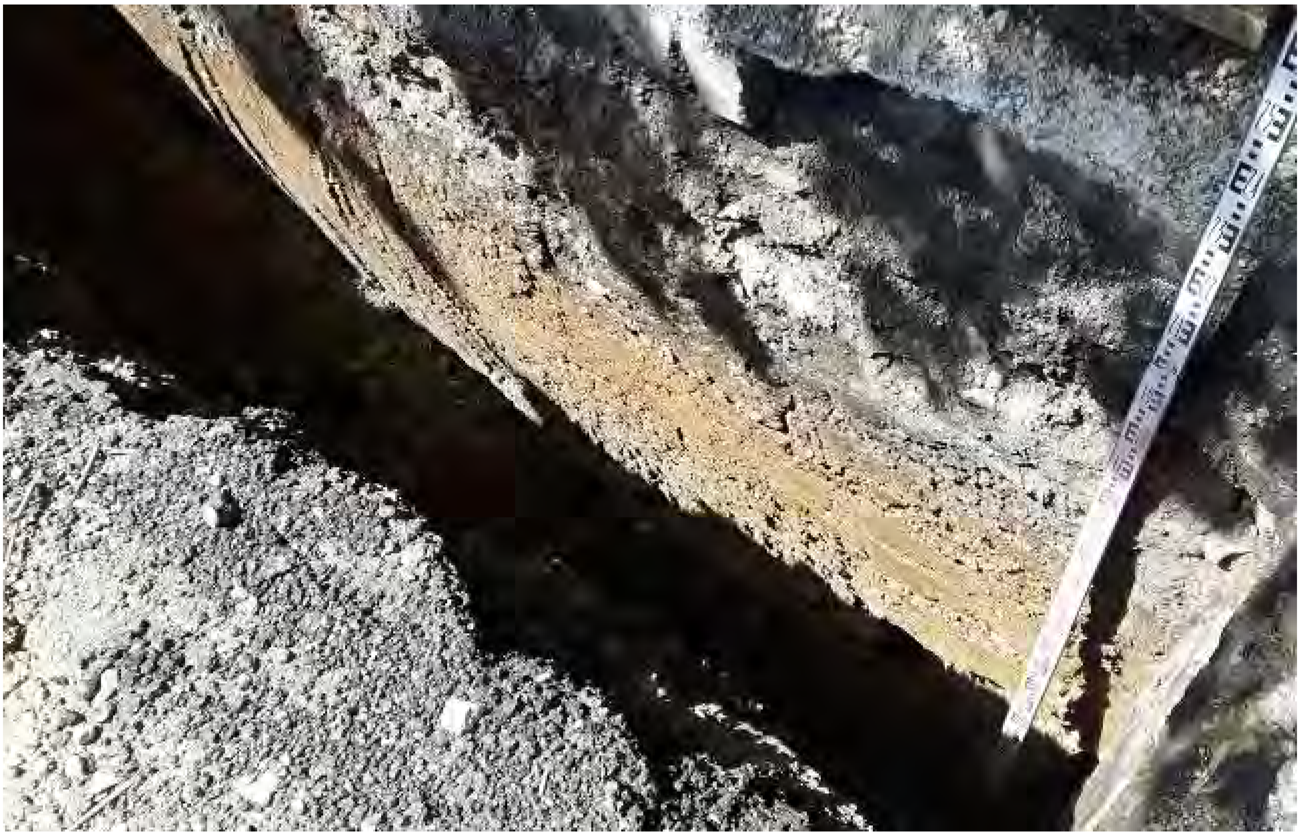
Core Photographs


A6053
THE FACTORY
MANCHESTER
DEPTH
BH 03
FROM 23.40
BOX 7
TO 24.90
0
1.0
23.40
24.90

Notes:	Project	THE FACTORY, MANCHESTER	**Plate**
	Project No.	A6053-16	12
	Carried out for	Buro Happold Limited	

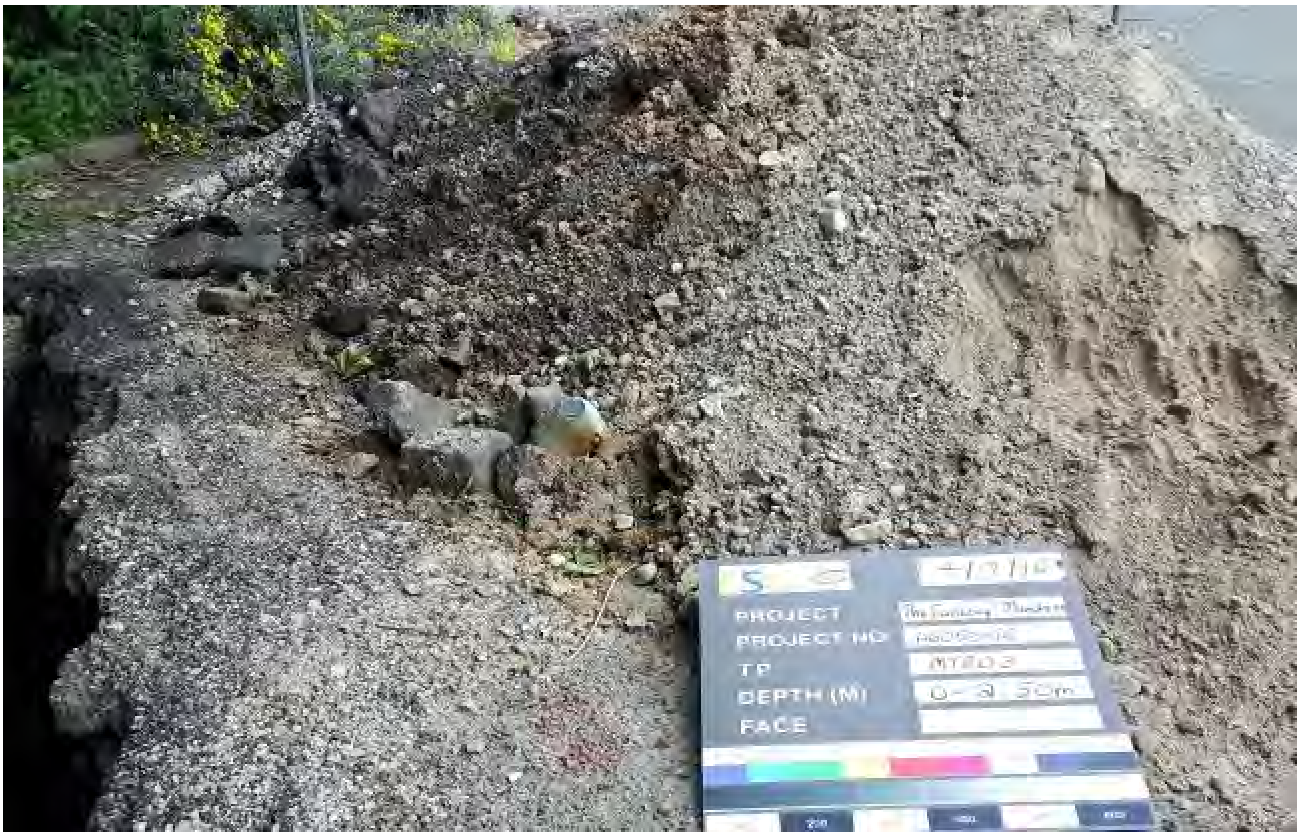
Photographs


MTP03


MTP03

Notes:	Project	THE FACTORY, MANCHESTER	**Plate**
	Project No.	A6053-16	1
	Carried out for	Buro Happold	

Photographs

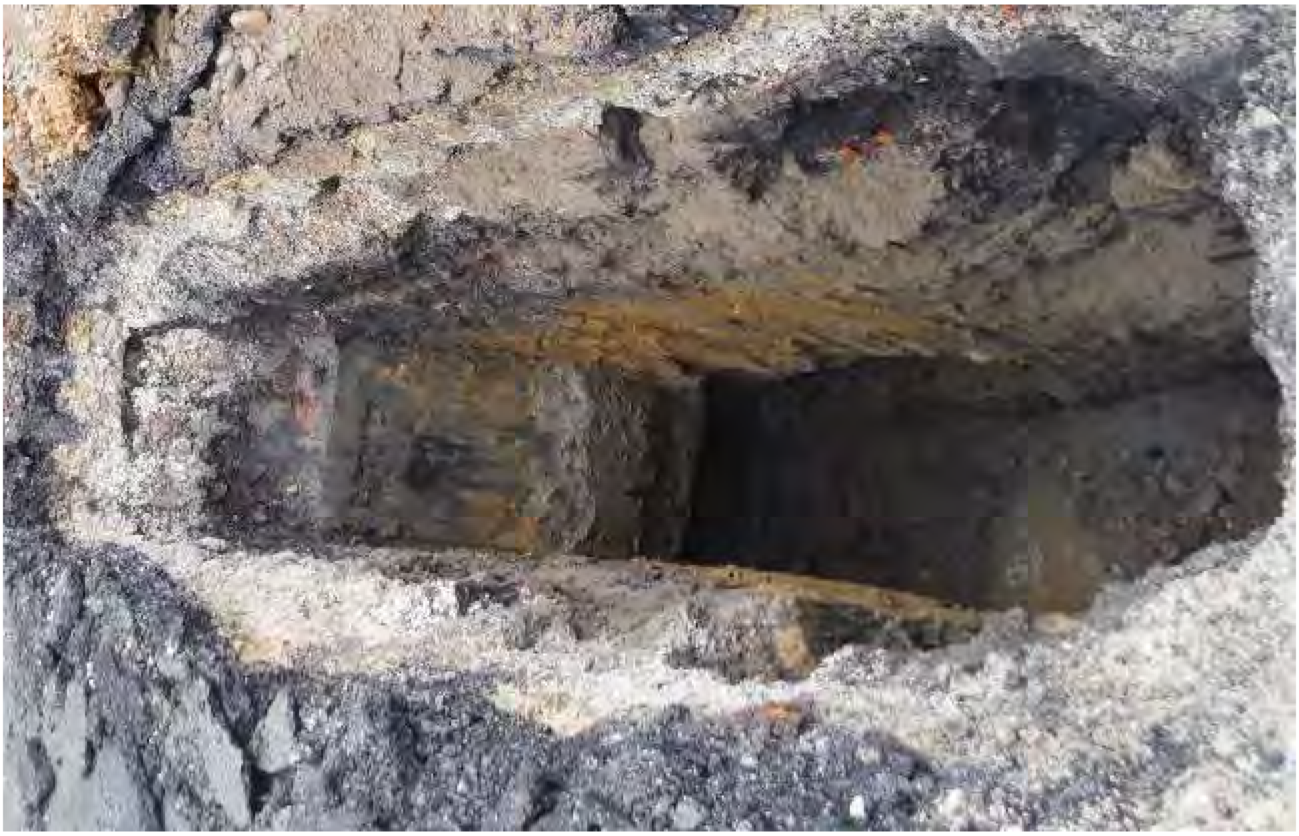

4/7/16
PROJECT
The Factory Manchester
PROJECT NO
A6053-16
TP
MTP03
DEPTH (M)
0-2.50m
FACE

MTP03 Spoil

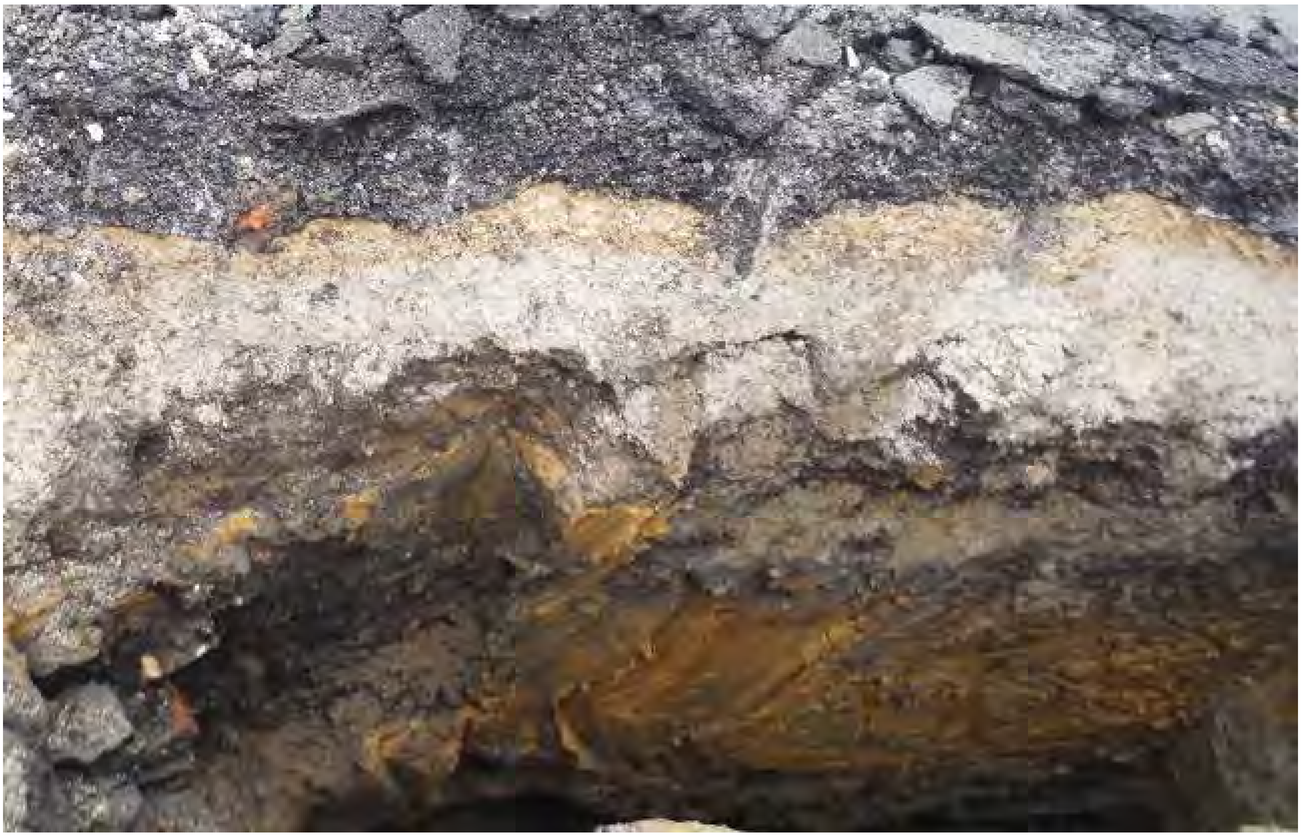
There are no photographic records for MTP03A

Notes:	Project	THE FACTORY, MANCHESTER	Plate
	Project No.	A6053-16	2
	Carried out for	Buro Happold	

Photographs



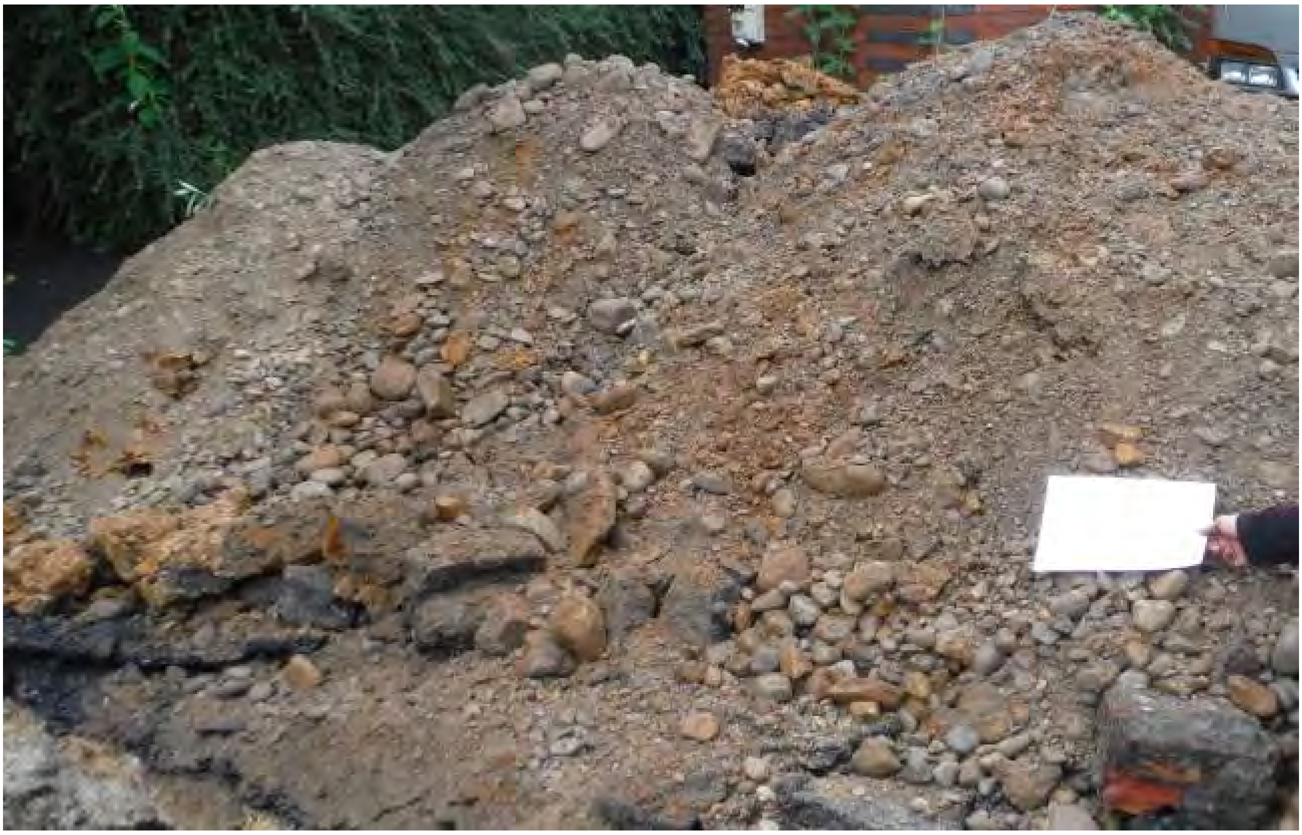
MTP04



MTP04

Notes:	Project	THE FACTORY, MANCHESTER	Plate
	Project No.	A6053-16	3
	Carried out for	Buro Happold	

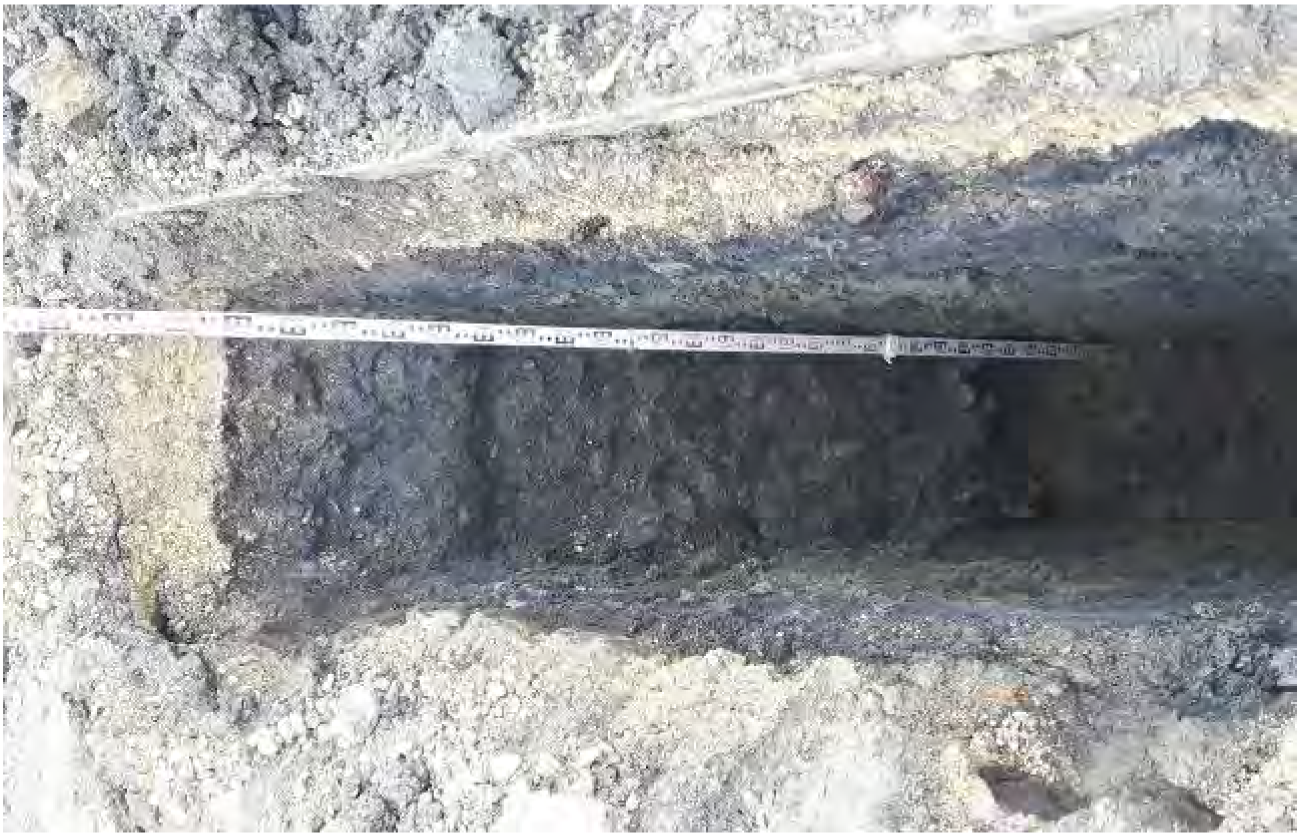
Photographs



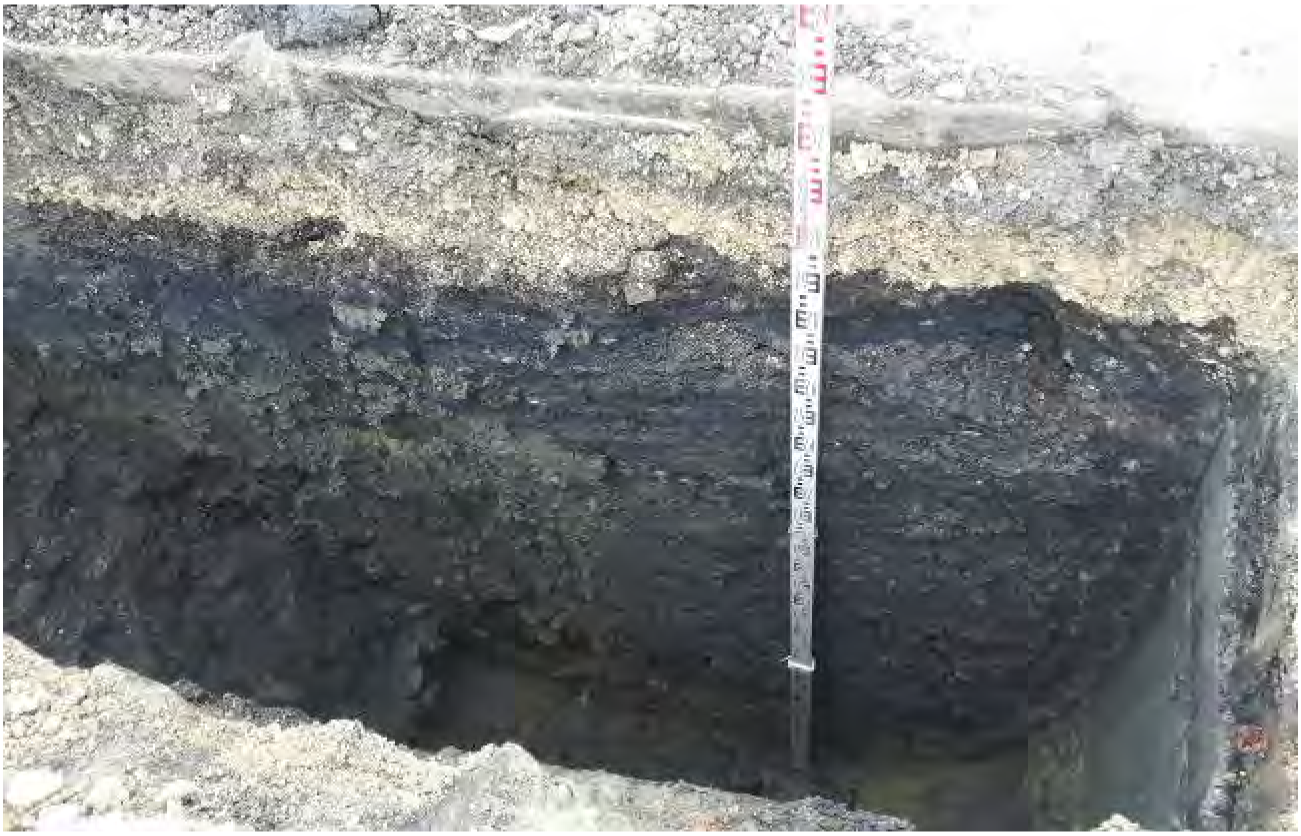
MTP04 Spoil

Notes:	**Project**	**THE FACTORY, MANCHESTER**	**Plate**
	Project No.	**A6053-16**	**4**
	Carried out for	**Buro Happold**	

Photographs



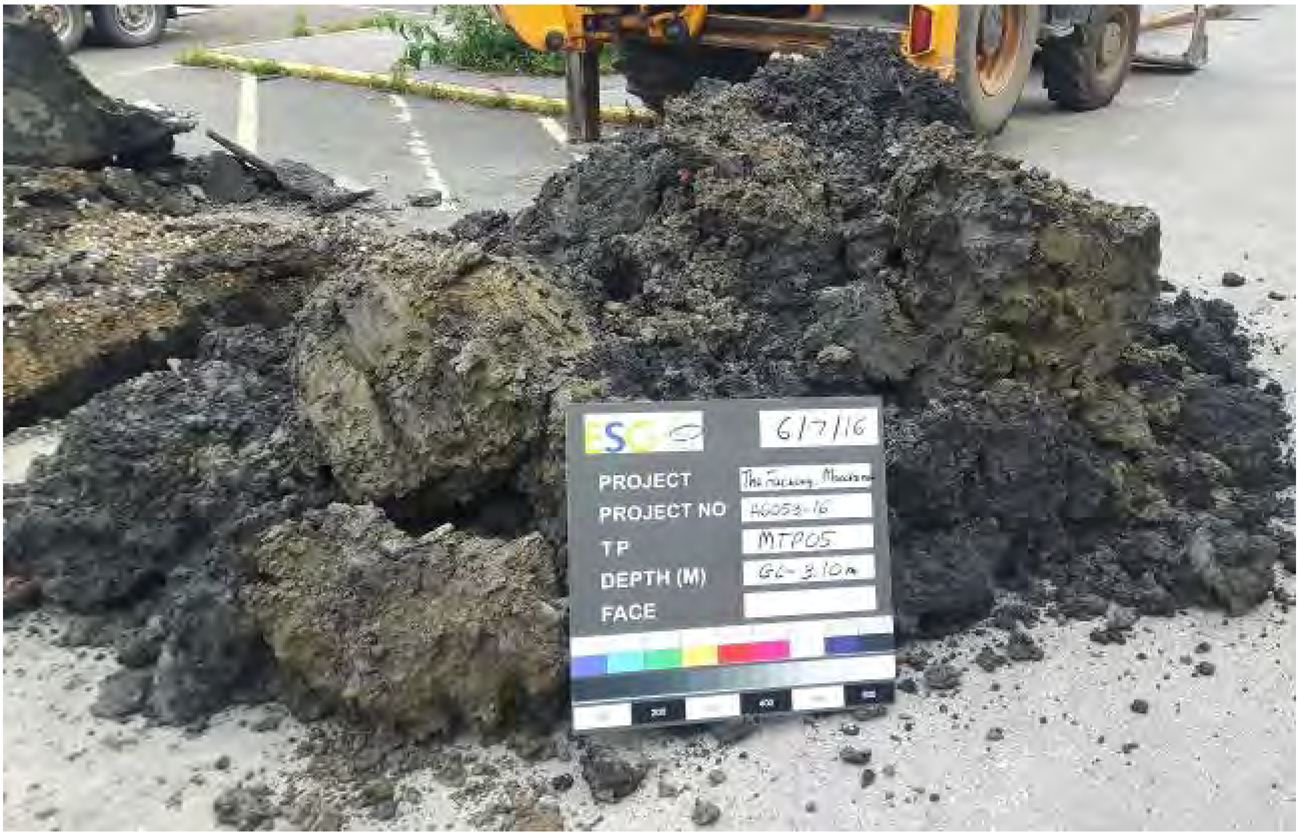
MTP05



MTP05

Notes:	**Project**	**THE FACTORY, MANCHESTER**	**Plate**
	Project No.	**A6053-16**	**5**
	Carried out for	**Buro Happold**	

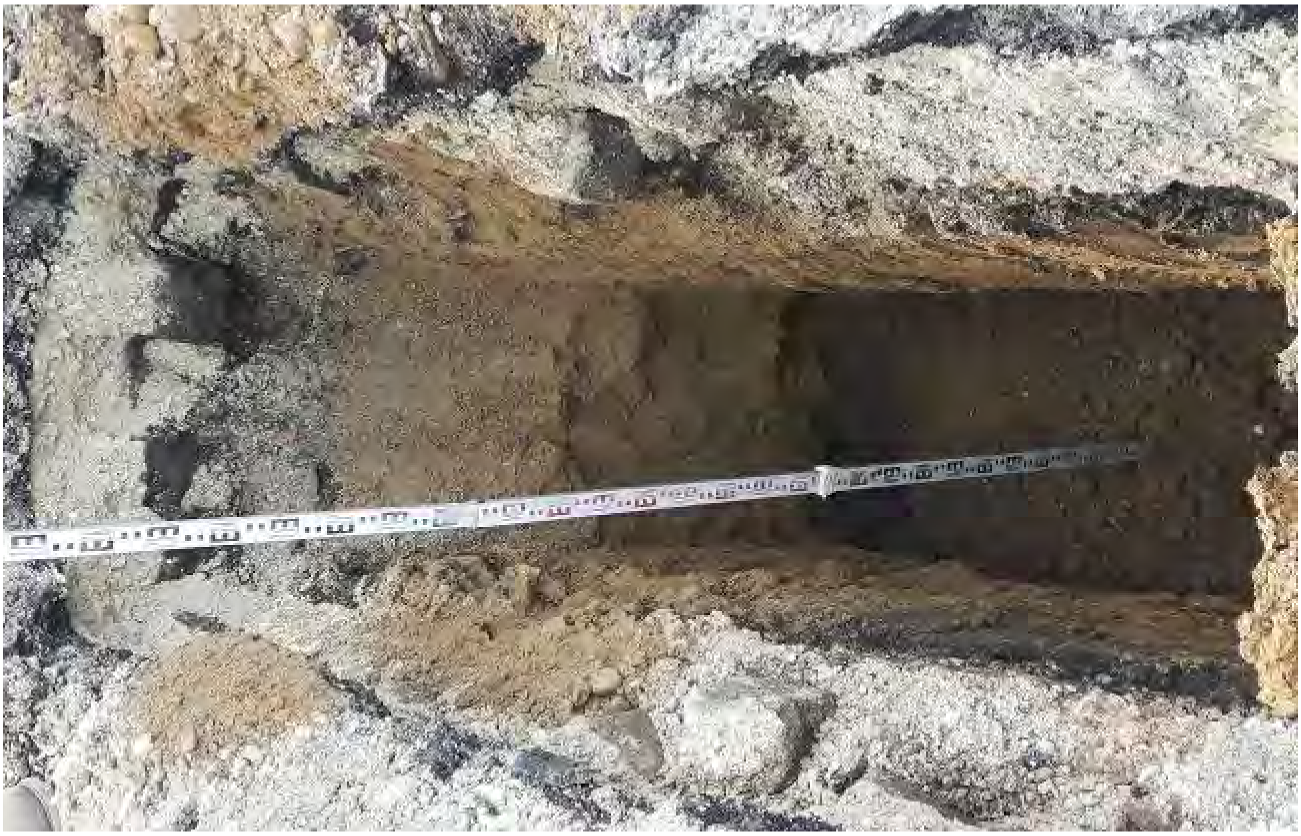
Photographs


6/7/16
PROJECT
The Factory, Manchester
PROJECT NO
A6053-16
TP
MTP05
DEPTH (M)
GL-3.10m
FACE

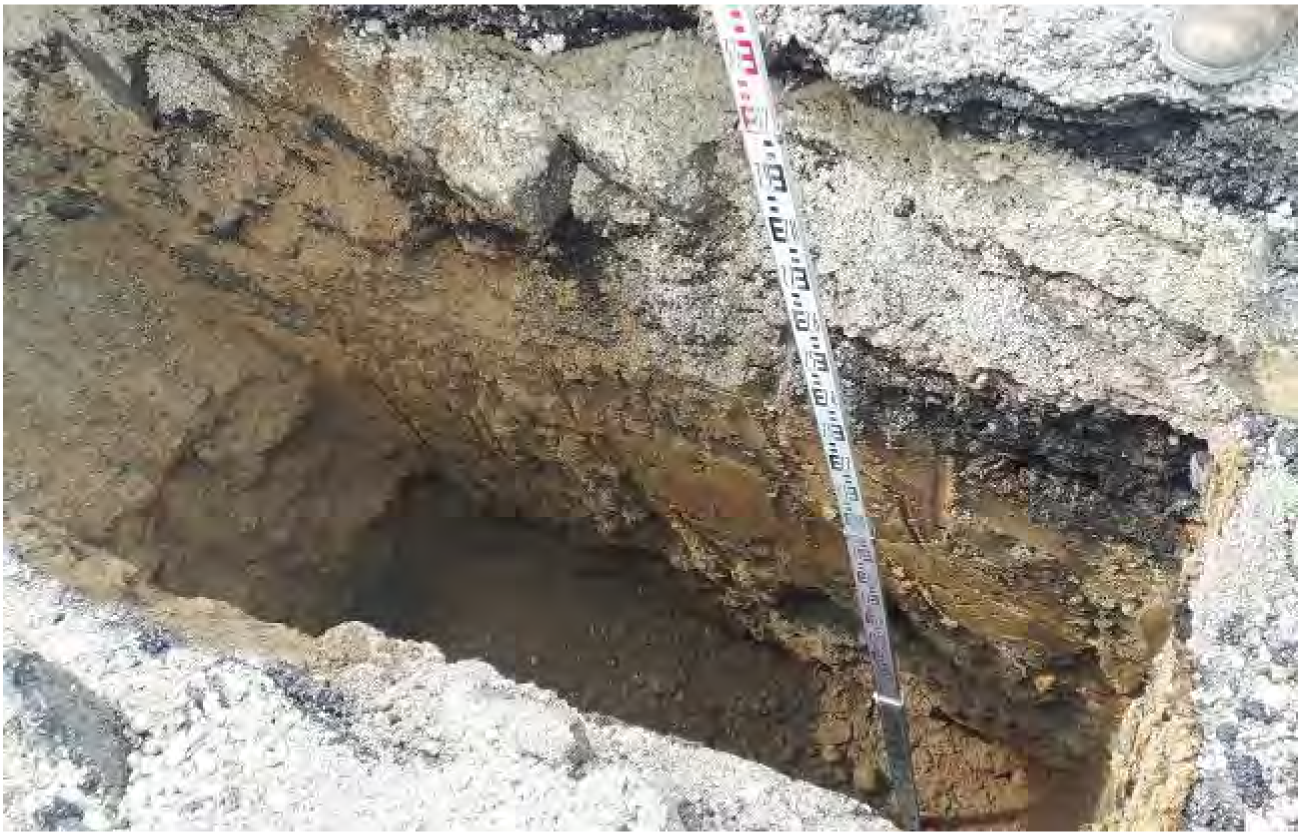
MTP05 Spoil

Notes:	**Project**	**THE FACTORY, MANCHESTER**	**Plate**
	Project No.	**A6053-16**	**6**
	Carried out for	**Buro Happold**	

Photographs



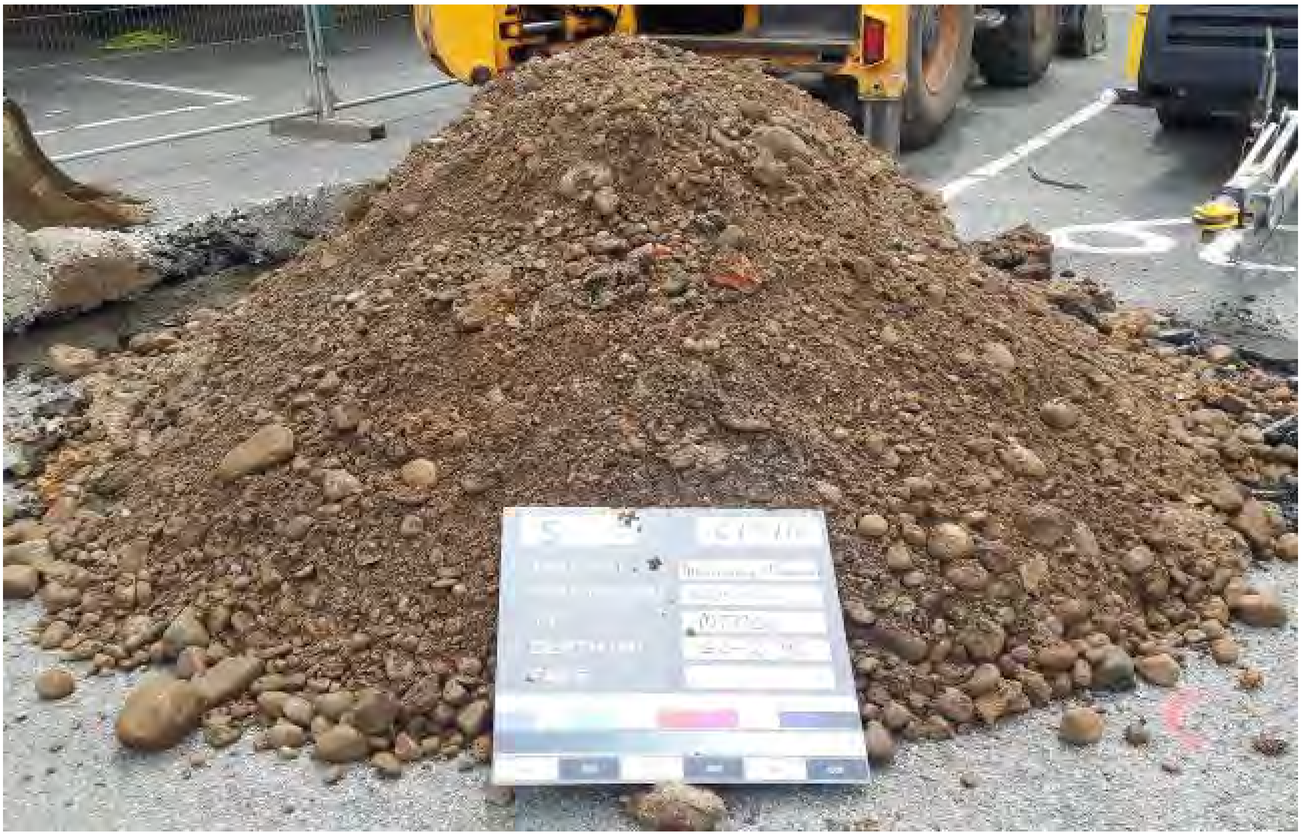
MTP06



MTP06

Notes:	Project	THE FACTORY, MANCHESTER	**Plate**
	Project No.	A6053-16	7
	Carried out for	Buro Happold	

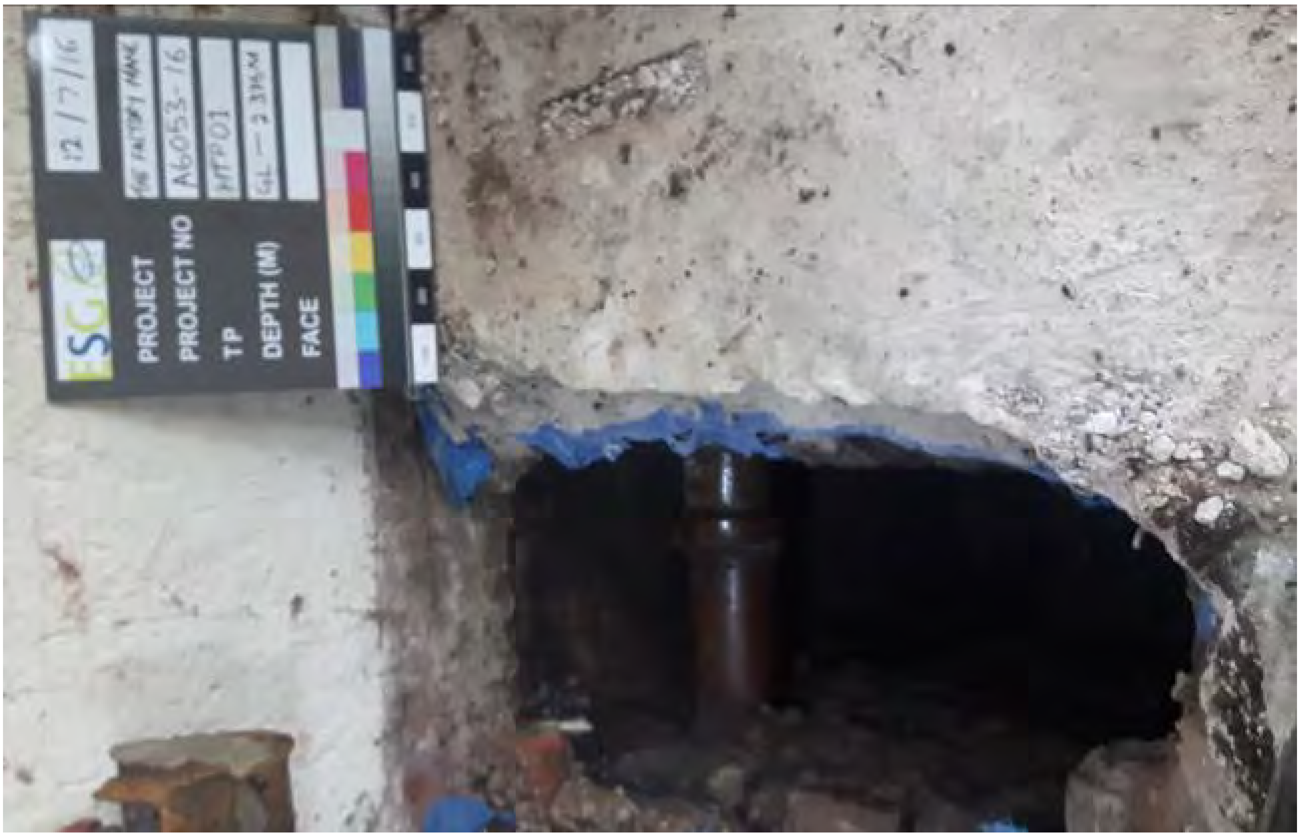
Photographs



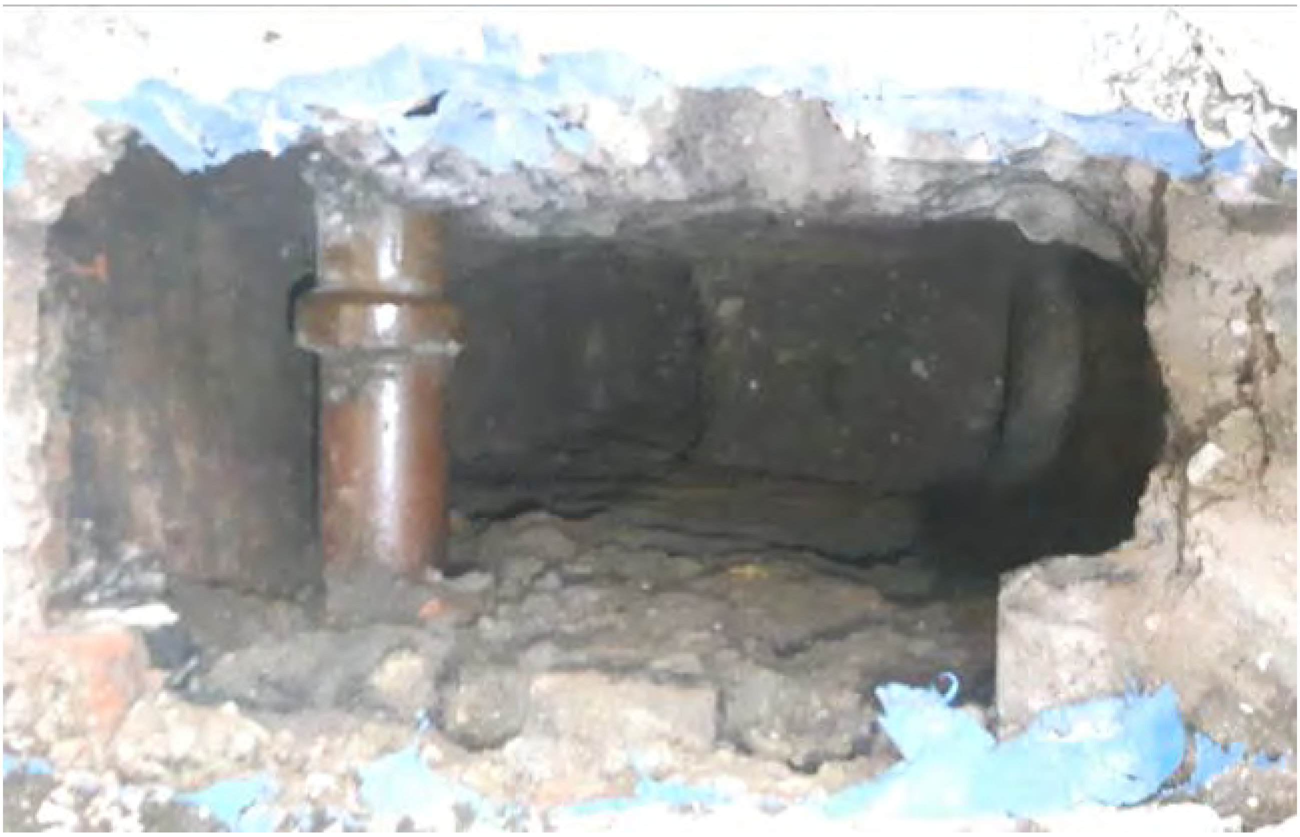
MTP06 Spoil

Notes:	Project	THE FACTORY, MANCHESTER	Plate
	Project No.	A6053-16	8
	Carried out for	Buro Happold	

Hand Dug Trial Pit Photographs


12/7/16
ESG
PROJECT
PROJECT NO
A6053-16
TP
HTP01
DEPTH (M)
FACE

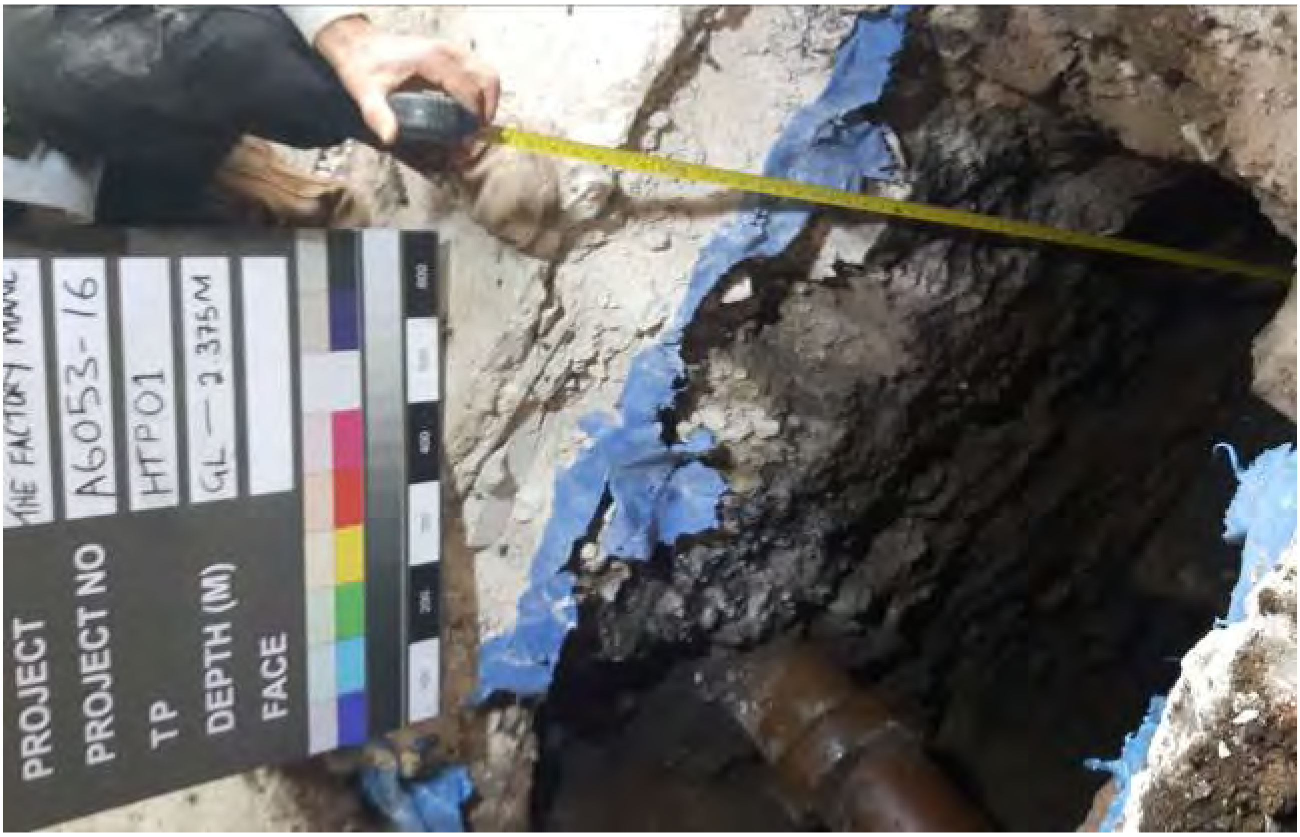
HTP01



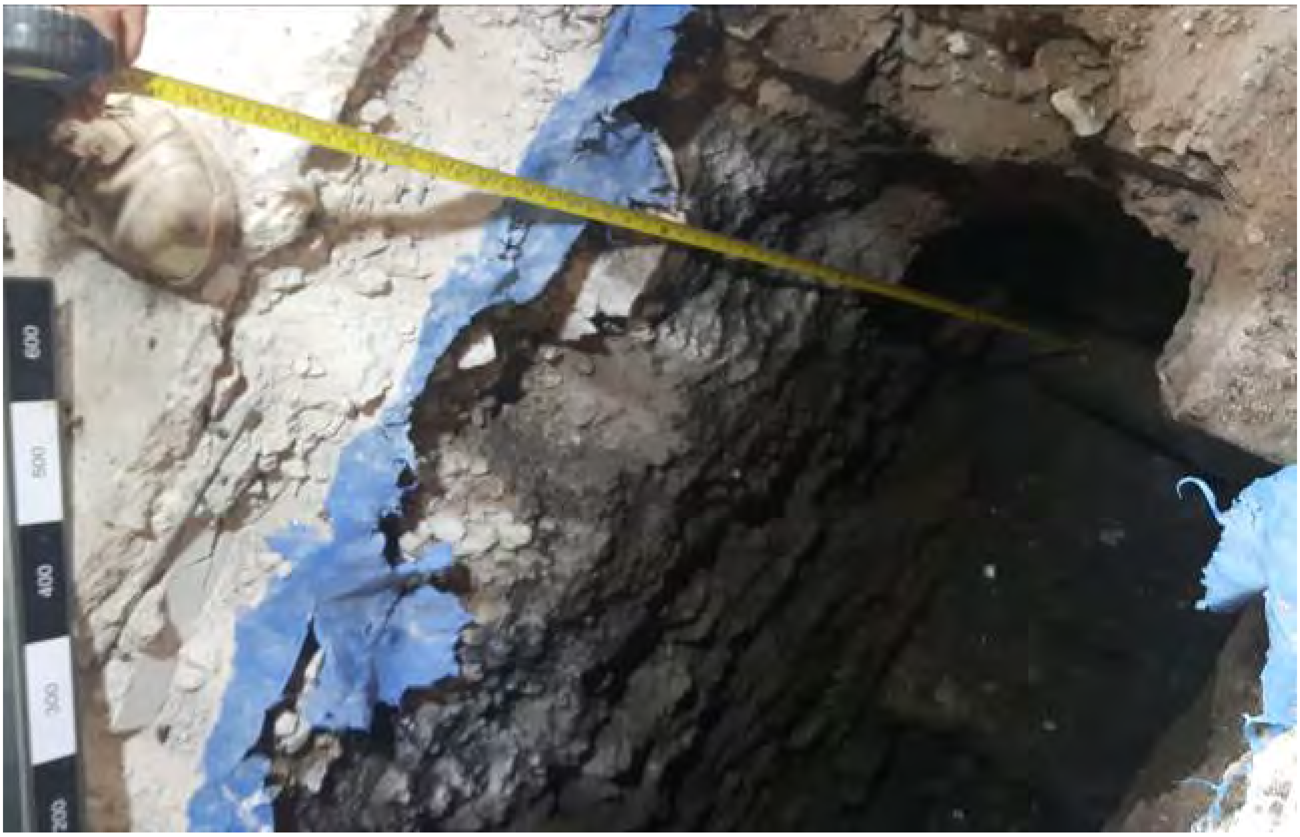
HTP01

Notes:	**Project**	**THE FACTORY, MANCHESTER**	**Plate**
	Project No.	**A6053-16**	**1**
	Carried out for	**Buro Happold**	

Hand Dug Trial Pit Photographs

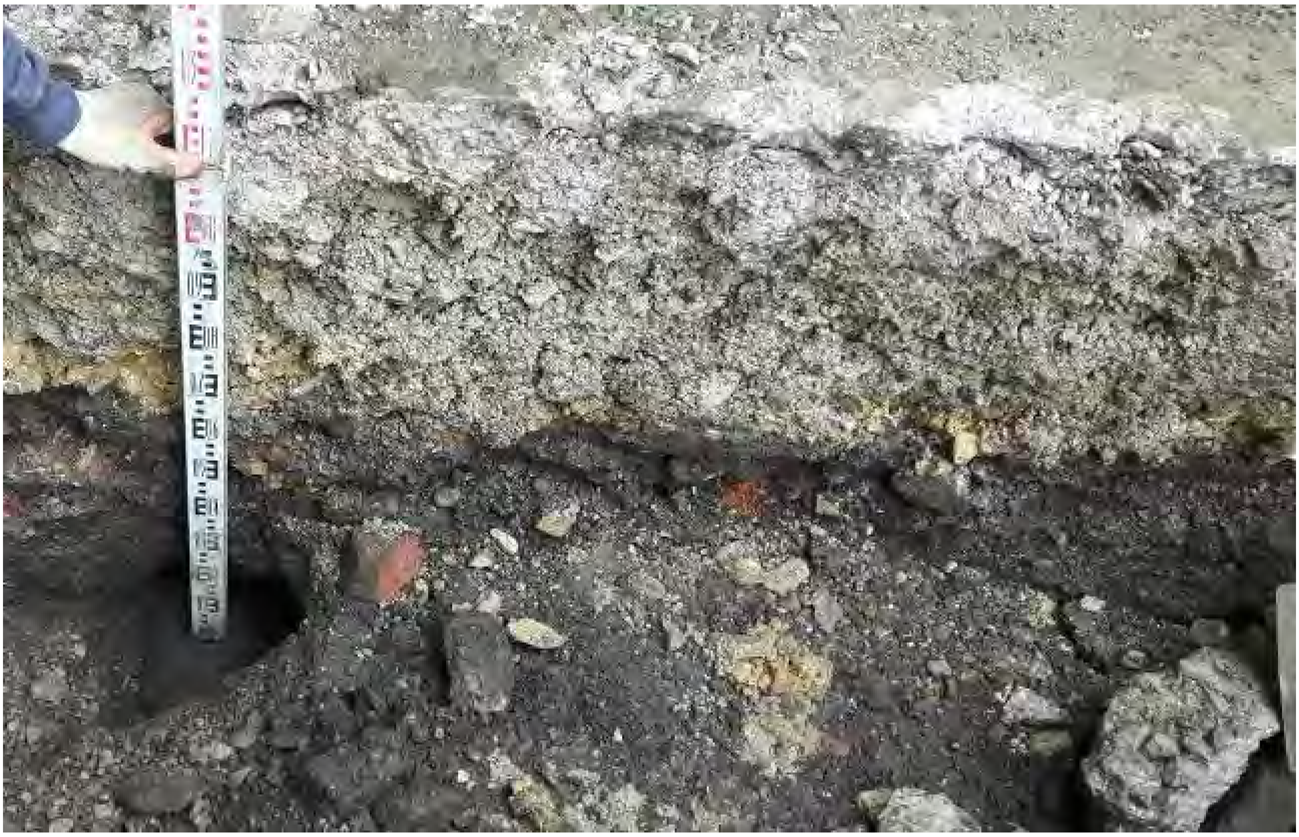

PROJECT
THE FACTORY MANC
PROJECT NO
A6053-16
TP
HTP01
DEPTH (M)
GL — 2.375M
FACE

HTP01

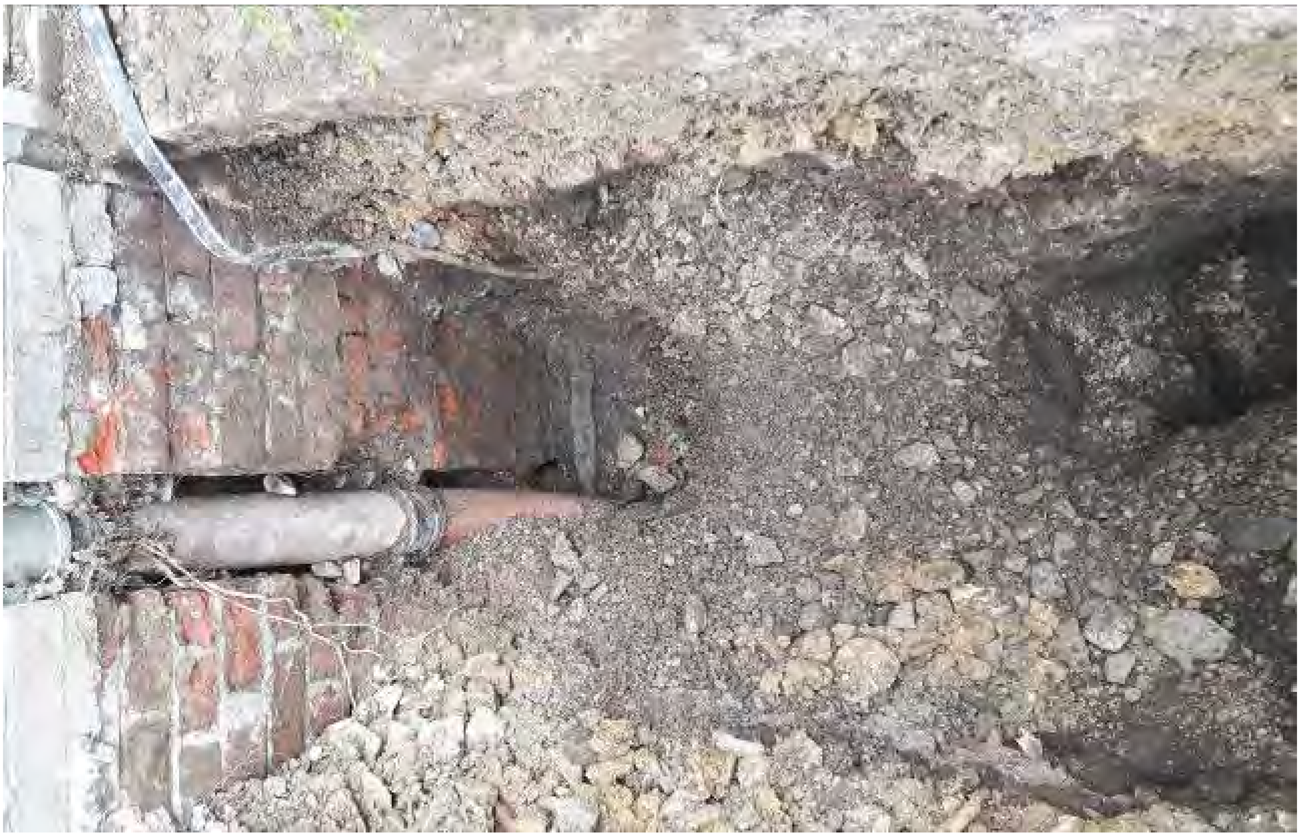


Notes:	Project	THE FACTORY, MANCHESTER	Plate
	Project No.	A6053-16	2
	Carried out for	Buro Happold	

Hand Dug Trial Pit Photographs



HTP02

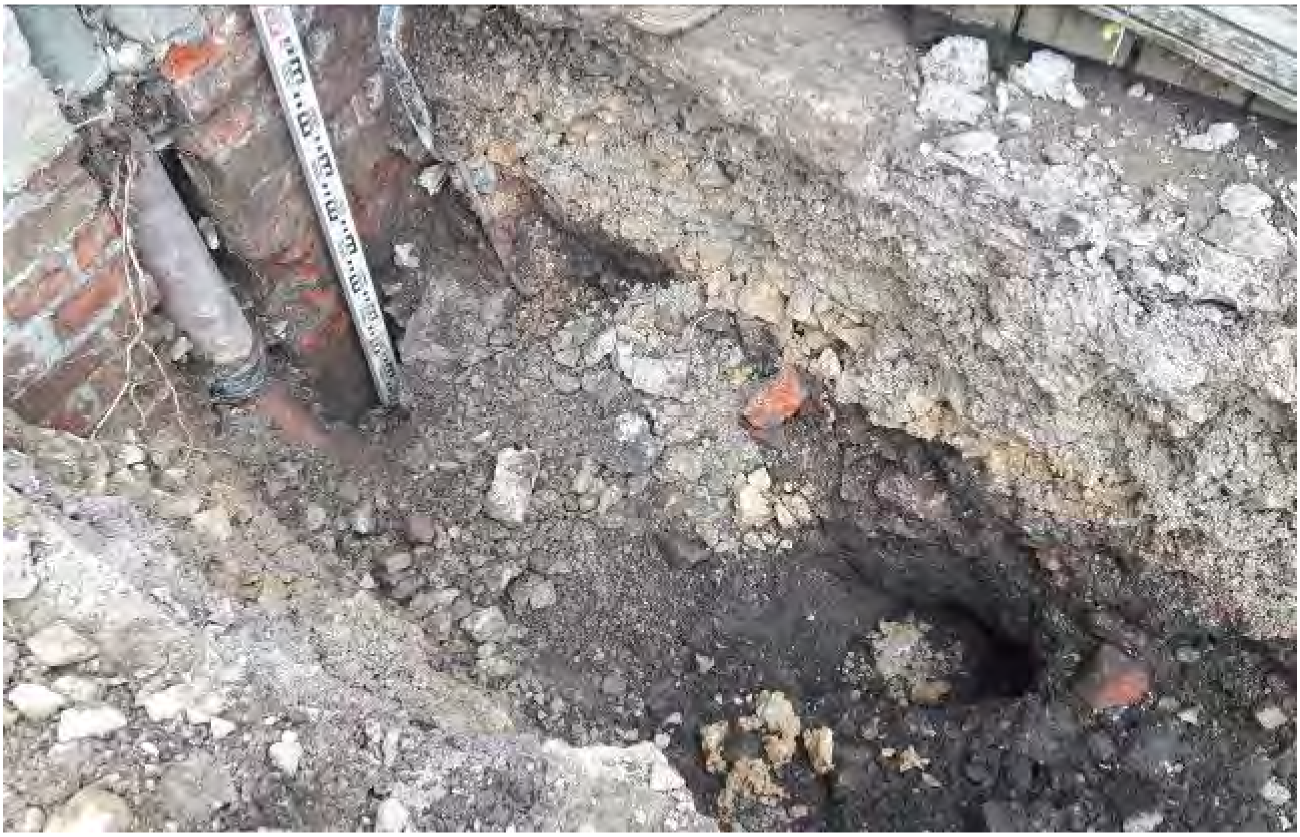


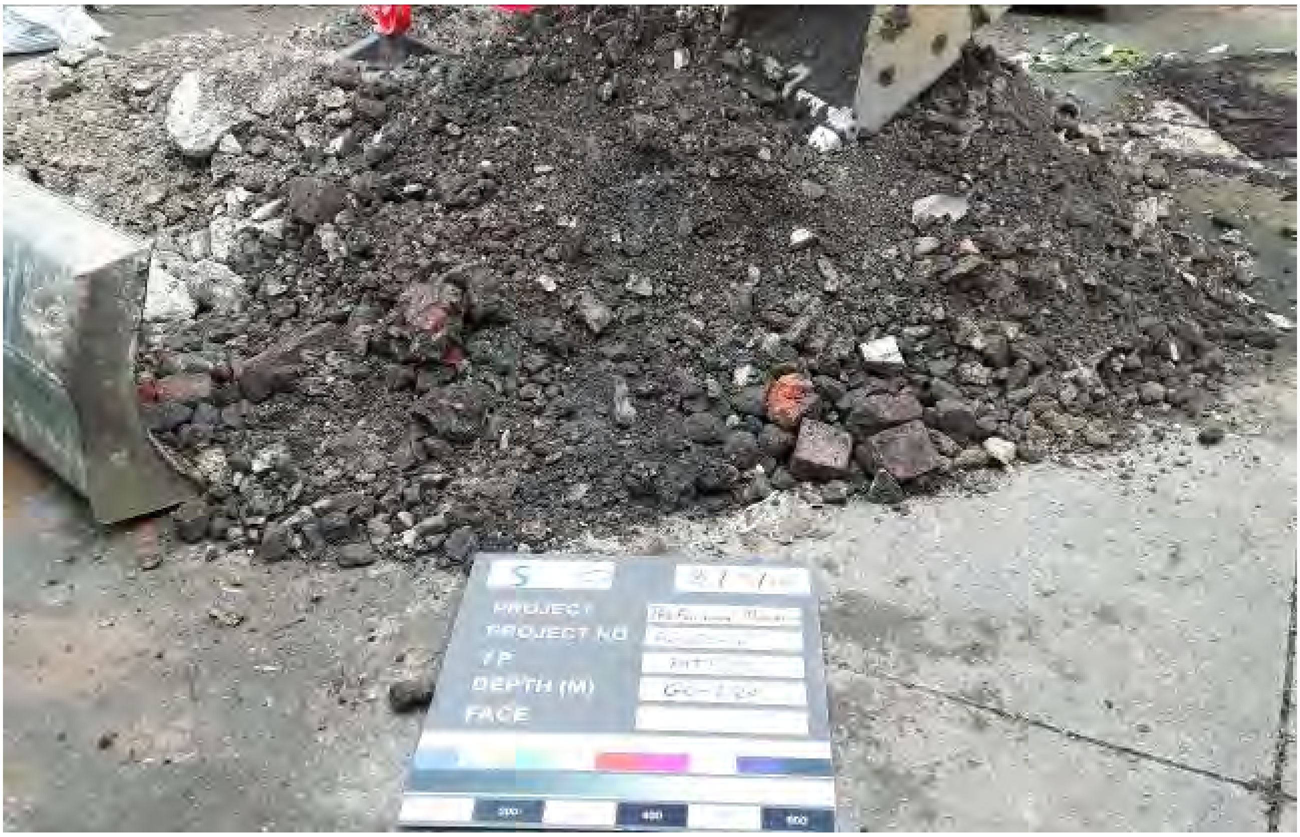
HTP02

Notes:

Project	**THE FACTORY, MANCHESTER**	**Plate**	**3**
Project No.	**A6053-16**		
Carried out for	**Buro Happold**		

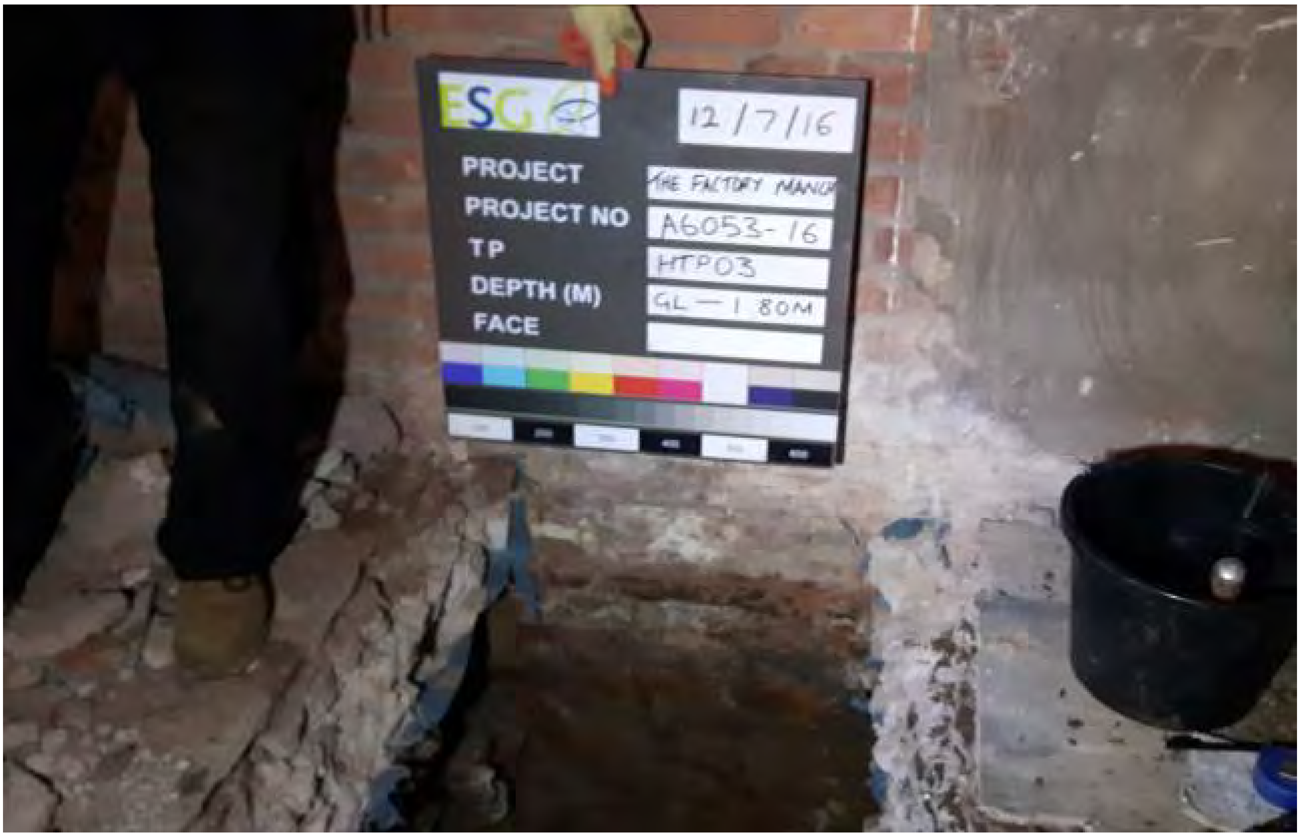
Hand Dug Trial Pit Photographs


HTP02

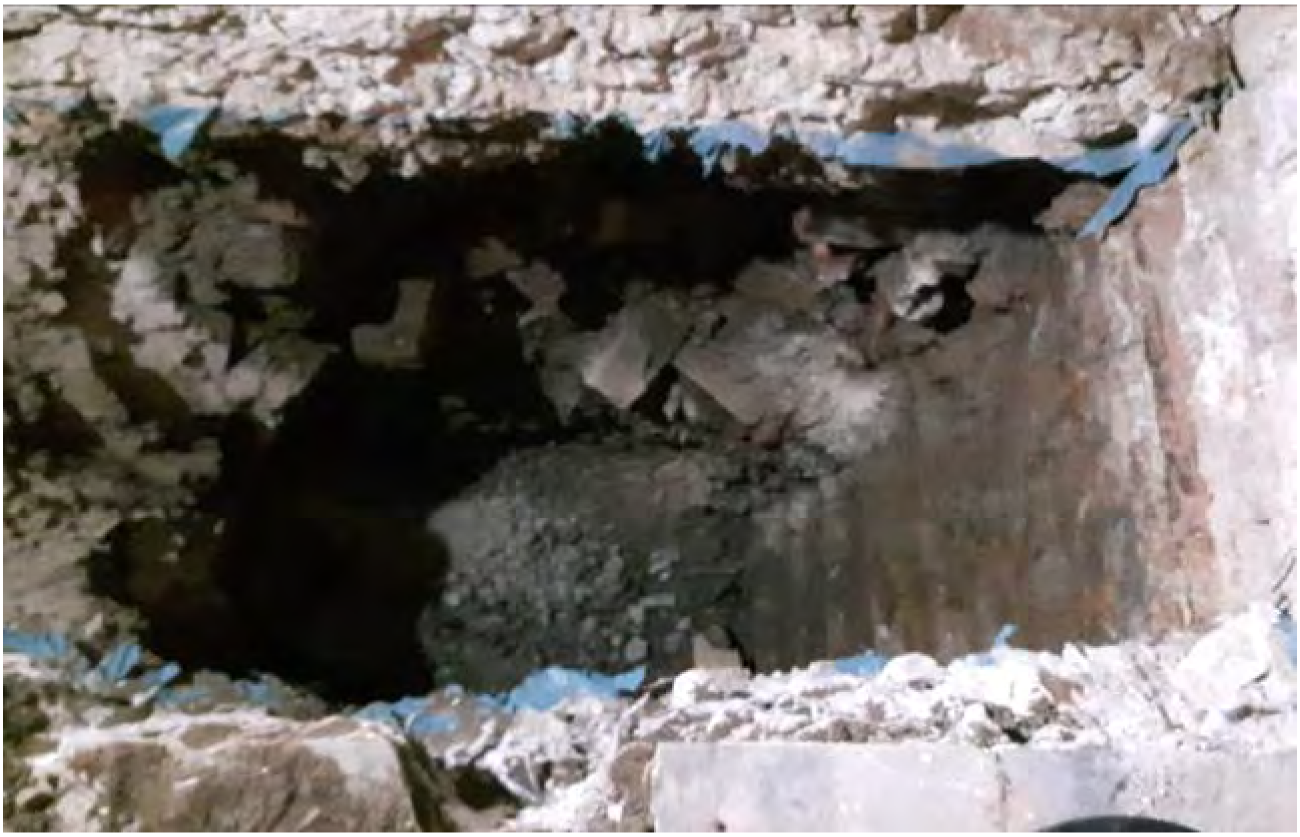

HTP02

Notes:	Project	THE FACTORY, MANCHESTER	**Plate**
	Project No.	A6053-16	4
	Carried out for	Buro Happold	

Hand Dug Trial Pit Photographs


ESG
12/7/16
PROJECT
THE FACTORY MANCH
PROJECT NO
A6053-16
TP
HTP03
DEPTH (M)
GL – 1.80M
FACE

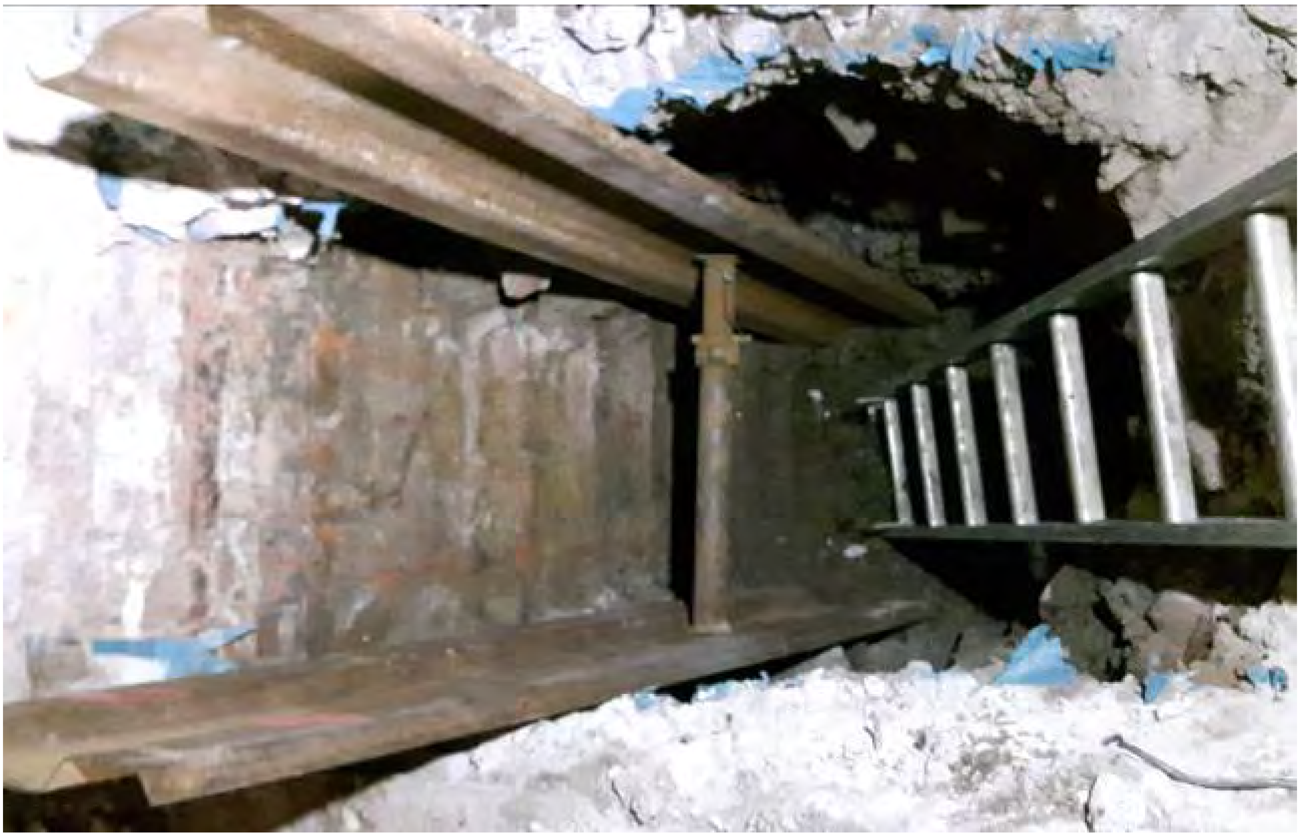
HTP03



HTP03

Notes:	**Project**	**THE FACTORY, MANCHESTER**	**Plate**
	Project No.	**A6053-16**	**5**
	Carried out for	**Buro Happold**	

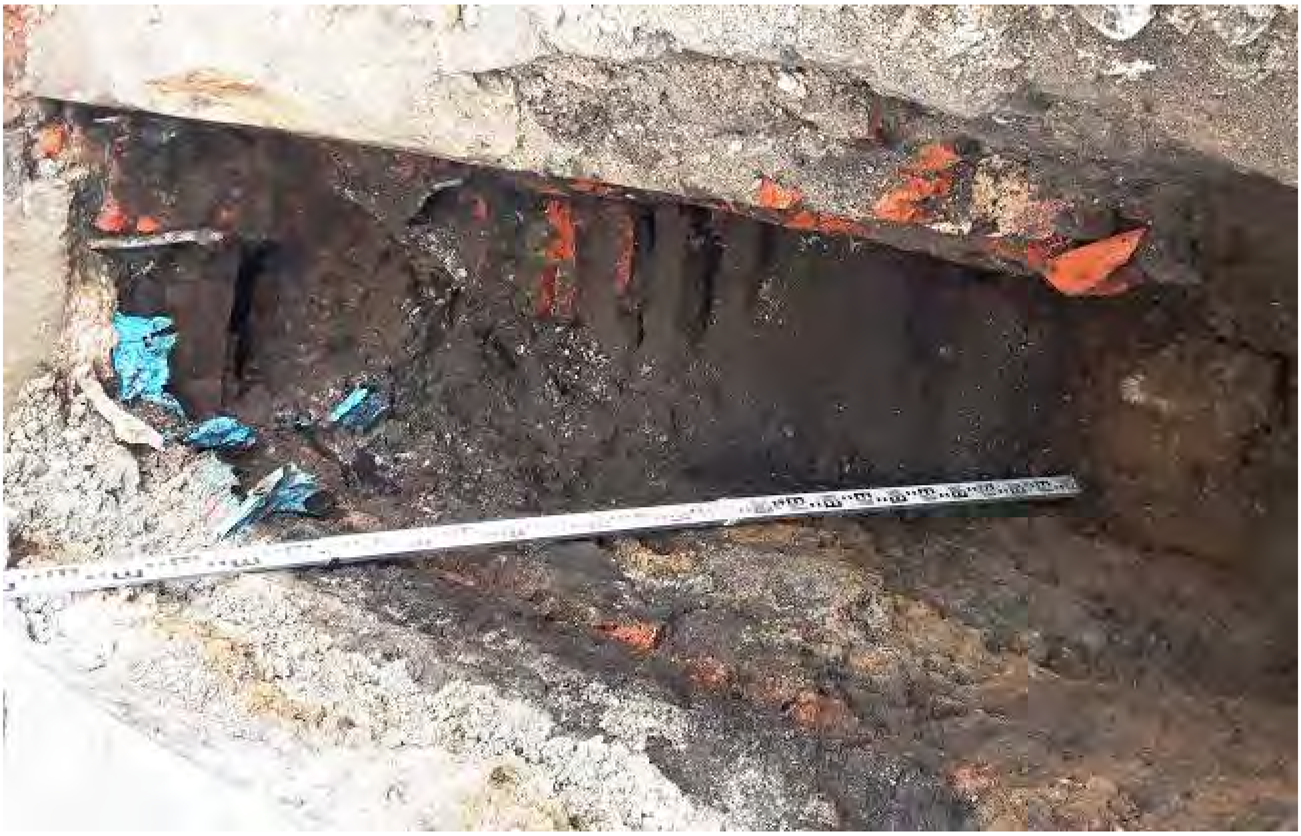
Hand Dug Trial Pit Photographs



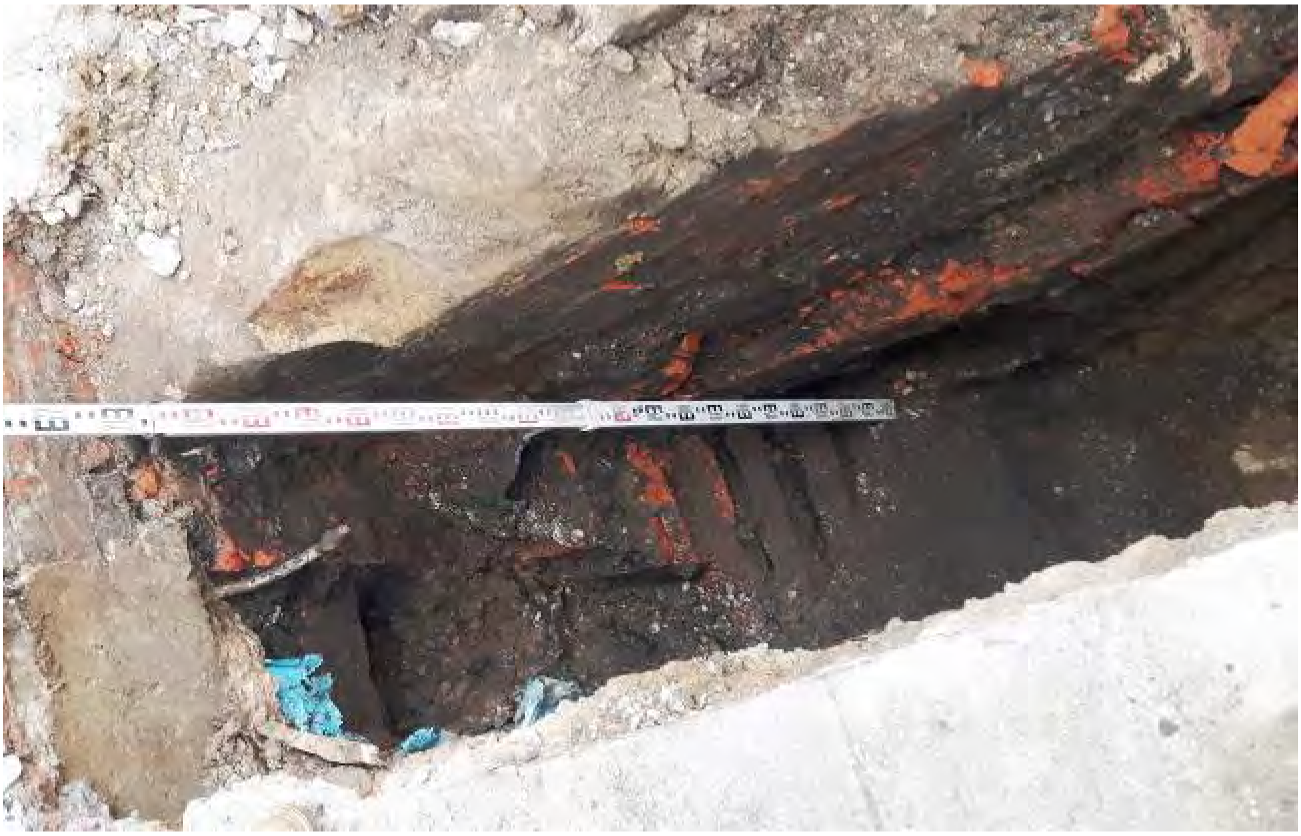
HTP03

Notes:	**Project**	**THE FACTORY, MANCHESTER**	**Plate**
	Project No.	**A6053-16**	**6**
	Carried out for	**Buro Happold**	

Hand Dug Trial Pit Photographs



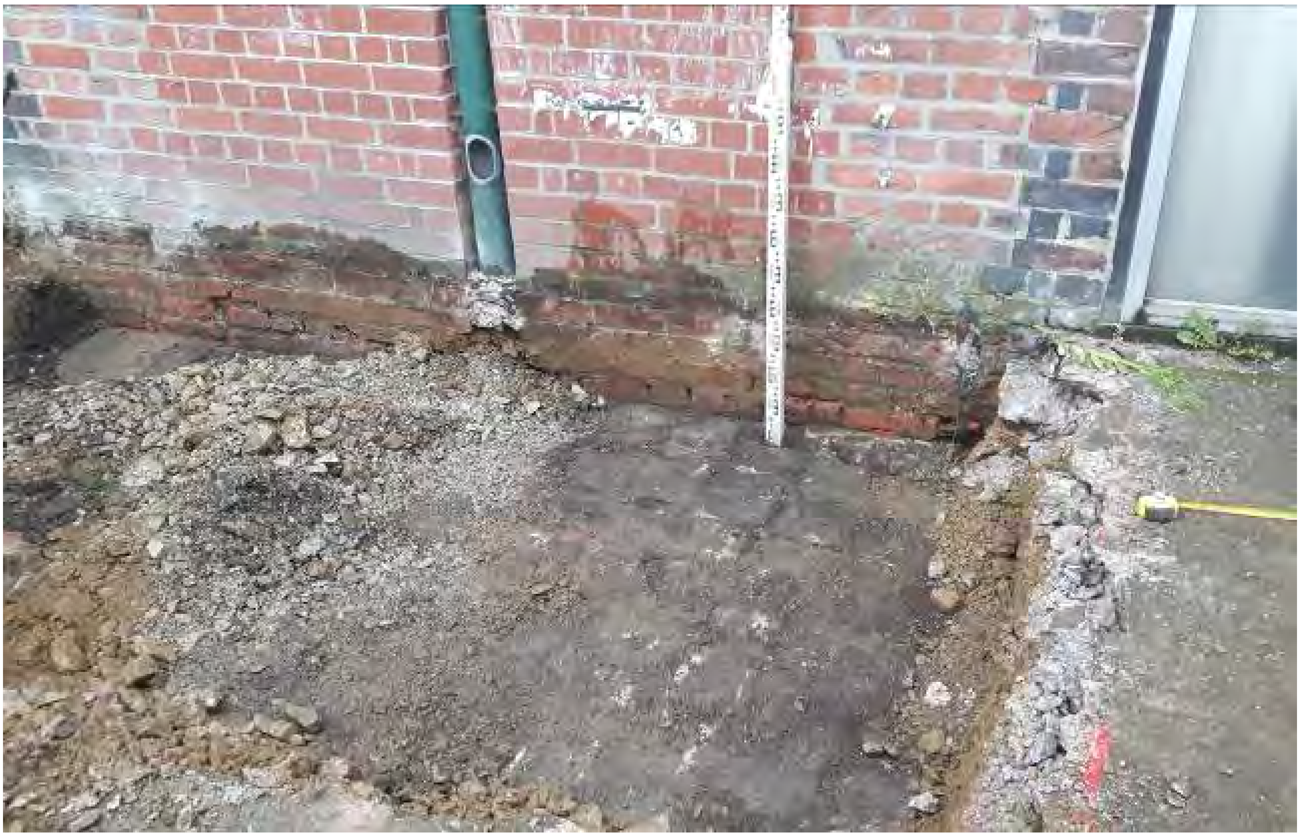
HTP04



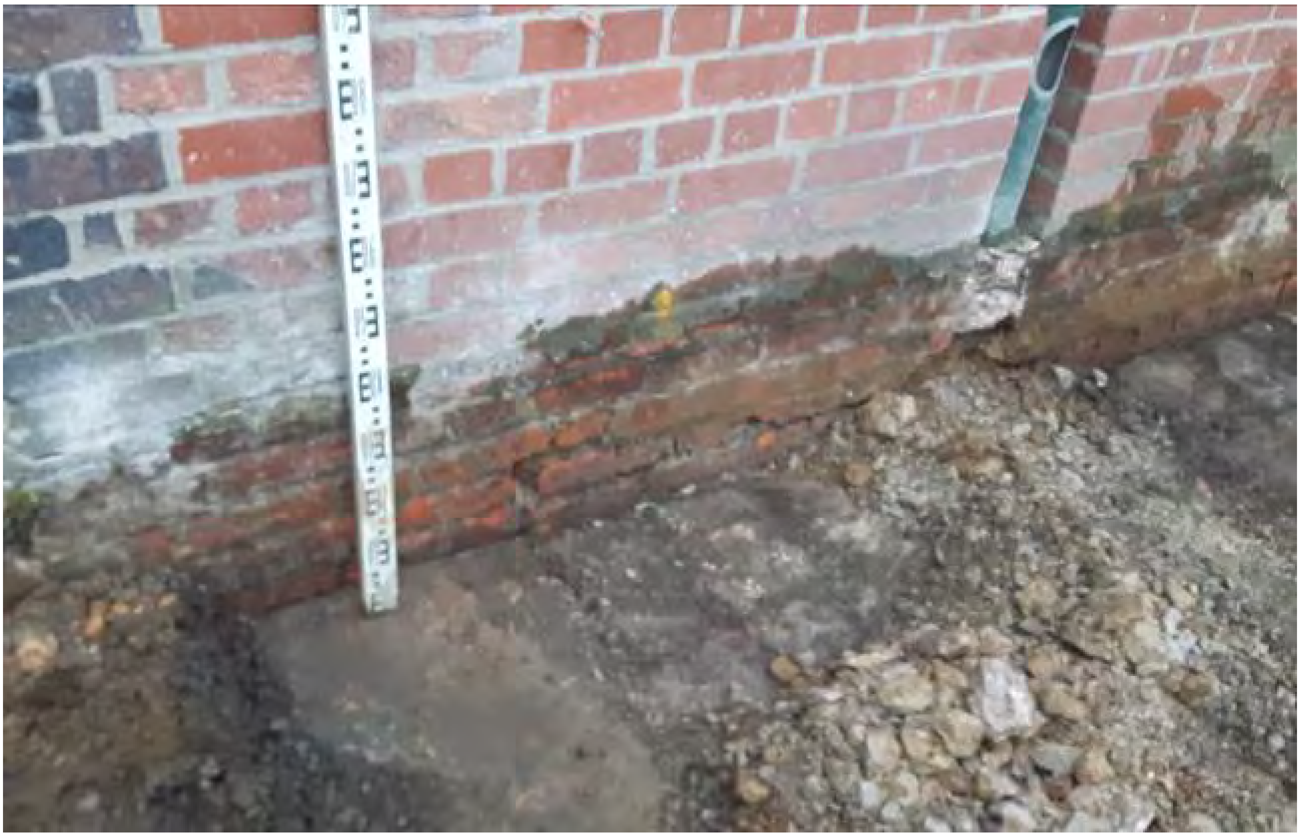
HTP04

Notes:	**Project** **Project No.** **Carried out for**	**THE FACTORY, MANCHESTER** **A6053-16** **Buro Happold**	**Plate** **7**

Hand Dug Trial Pit Photographs



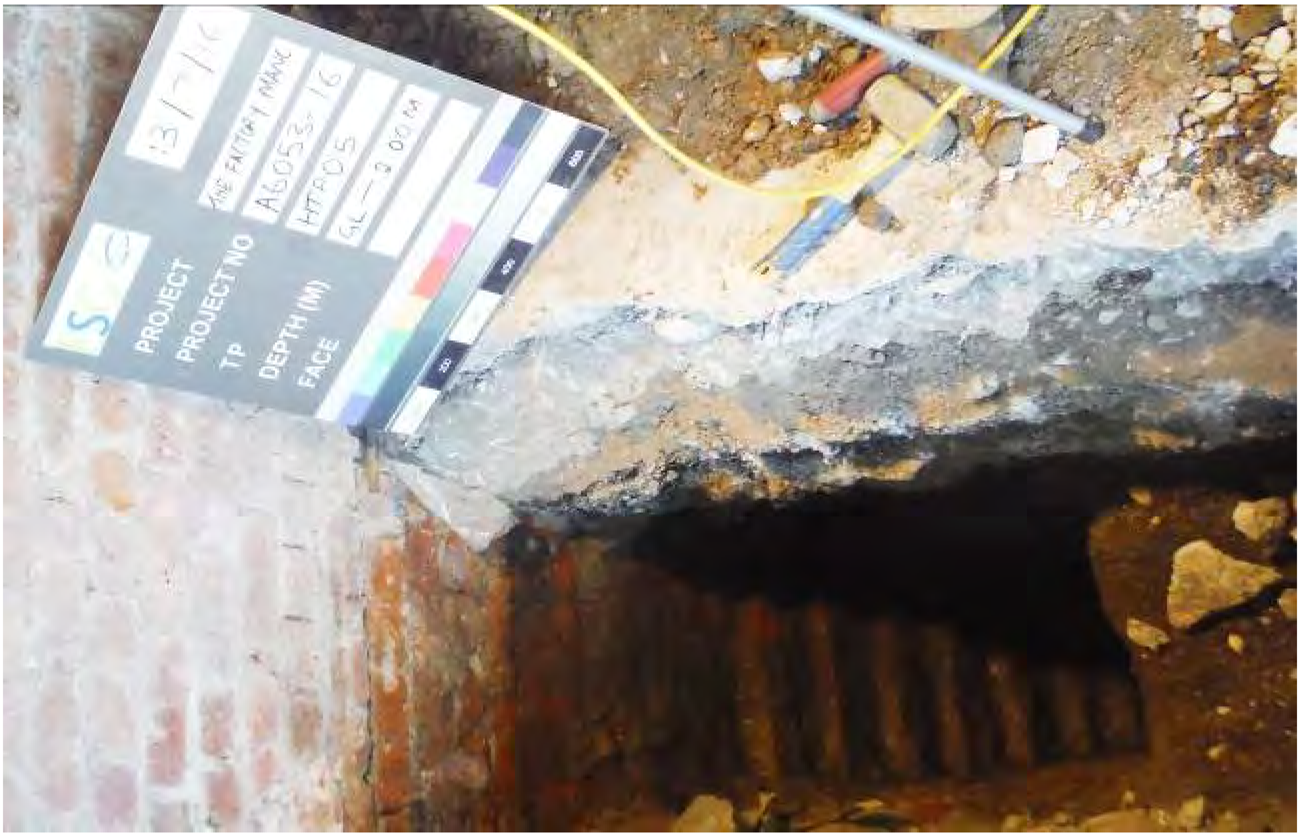
HTP04 Buttress extent



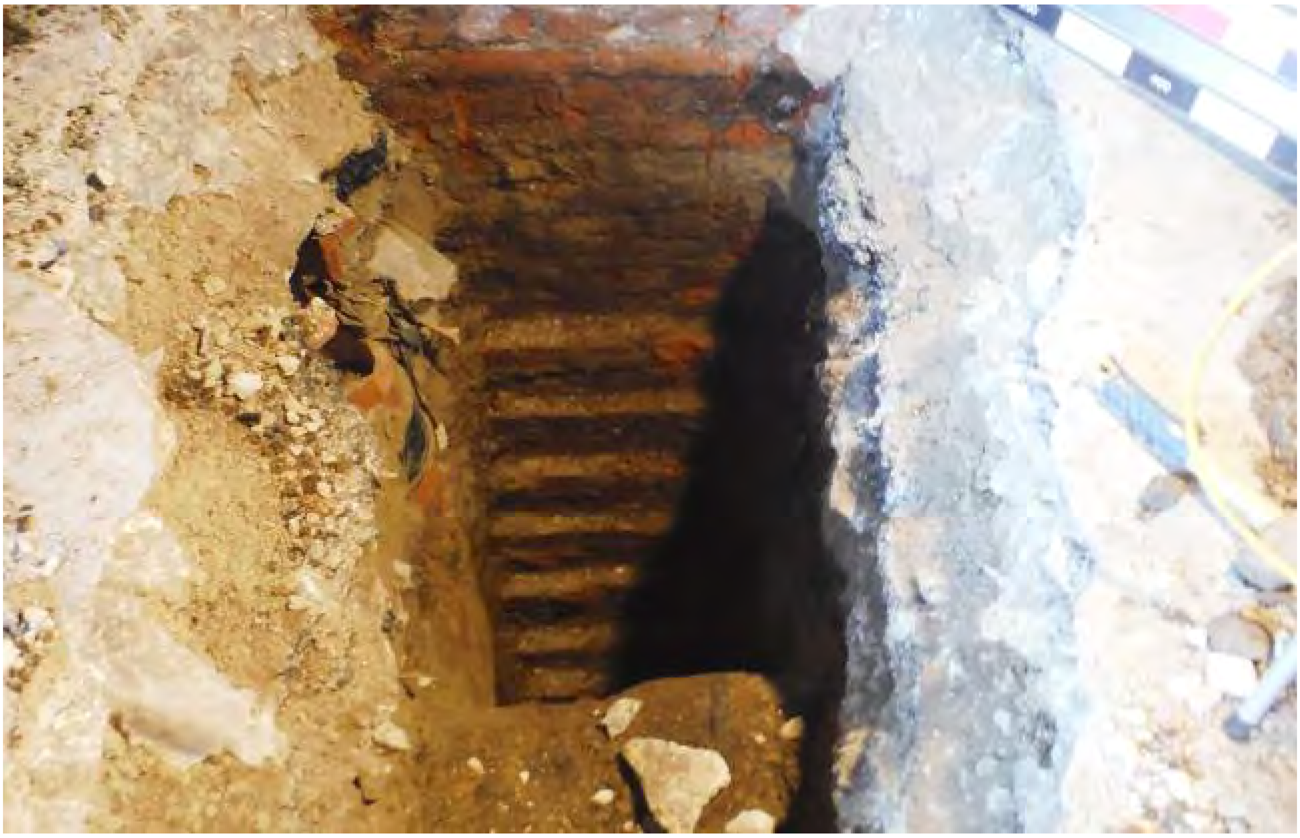
HTP04 Buttress extent

Notes:	Project	THE FACTORY, MANCHESTER	Plate
	Project No.	A6053-16	8
	Carried out for	Buro Happold	

Hand Dug Trial Pit Photographs


PROJECT
PROJECT NO
TP
DEPTH (M)
FACE
THE FACTORY MANC
A6053-16
HTP05
GL – 3.00 m

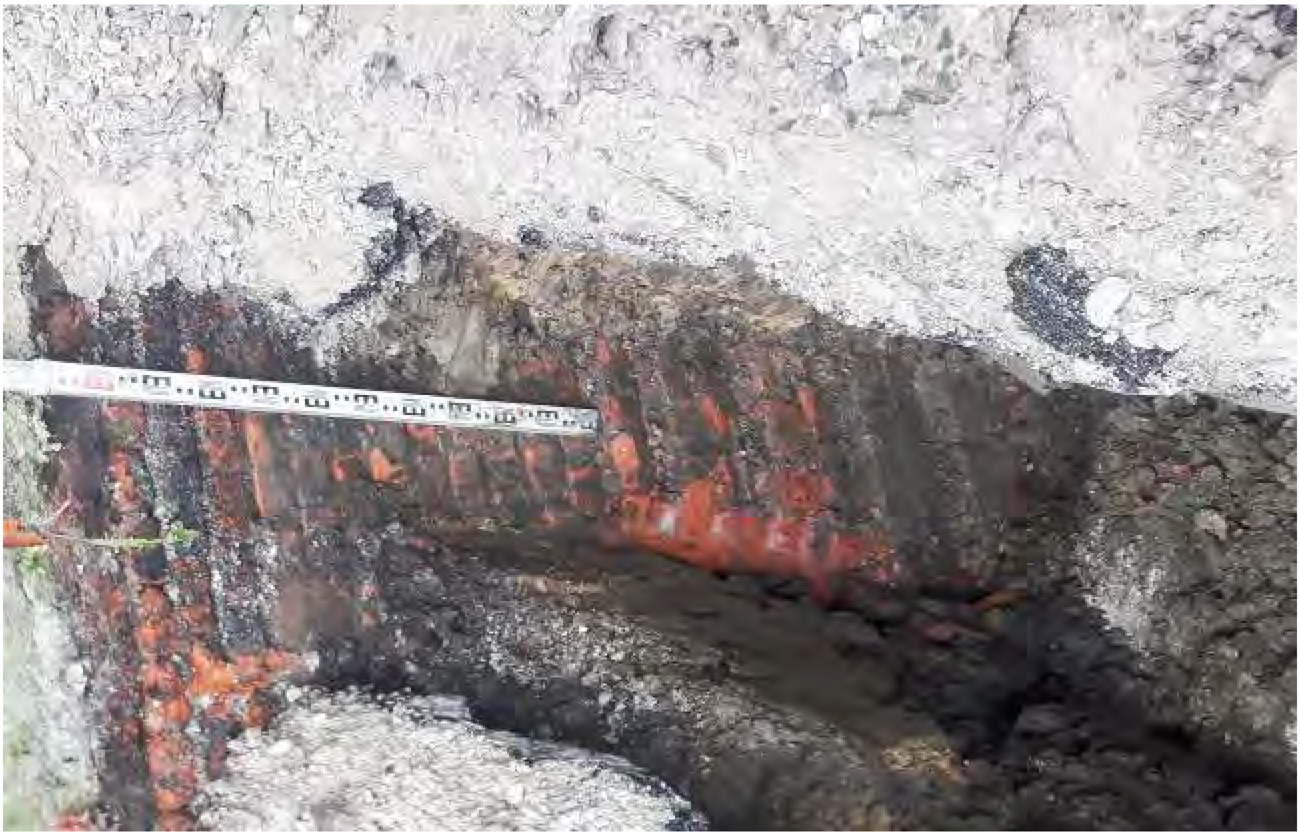
HTP05



HTP05

Notes:	**Project** **Project No.** **Carried out for**	**THE FACTORY, MANCHESTER** **A6053-16** **Buro Happold**	**Plate** **9**

Hand Dug Trial Pit Photographs

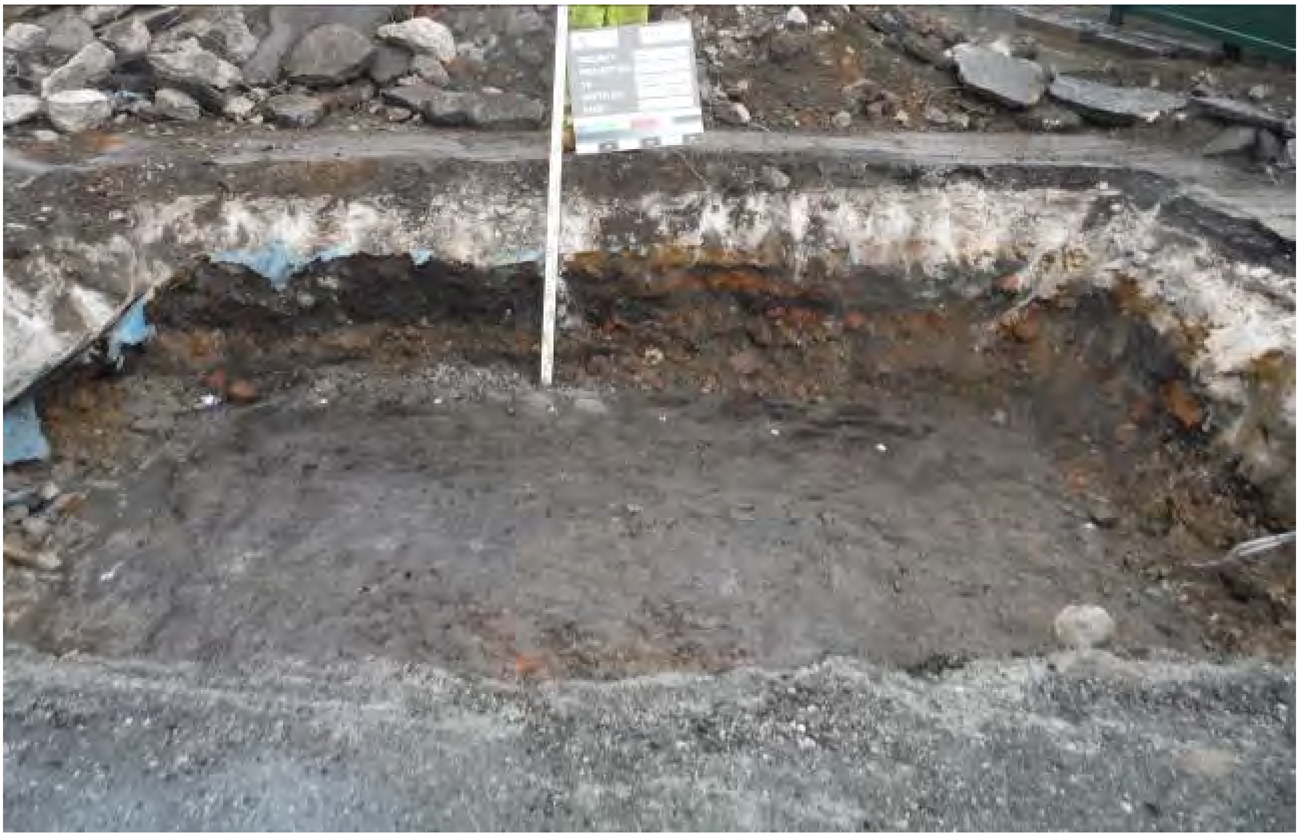


HTP06

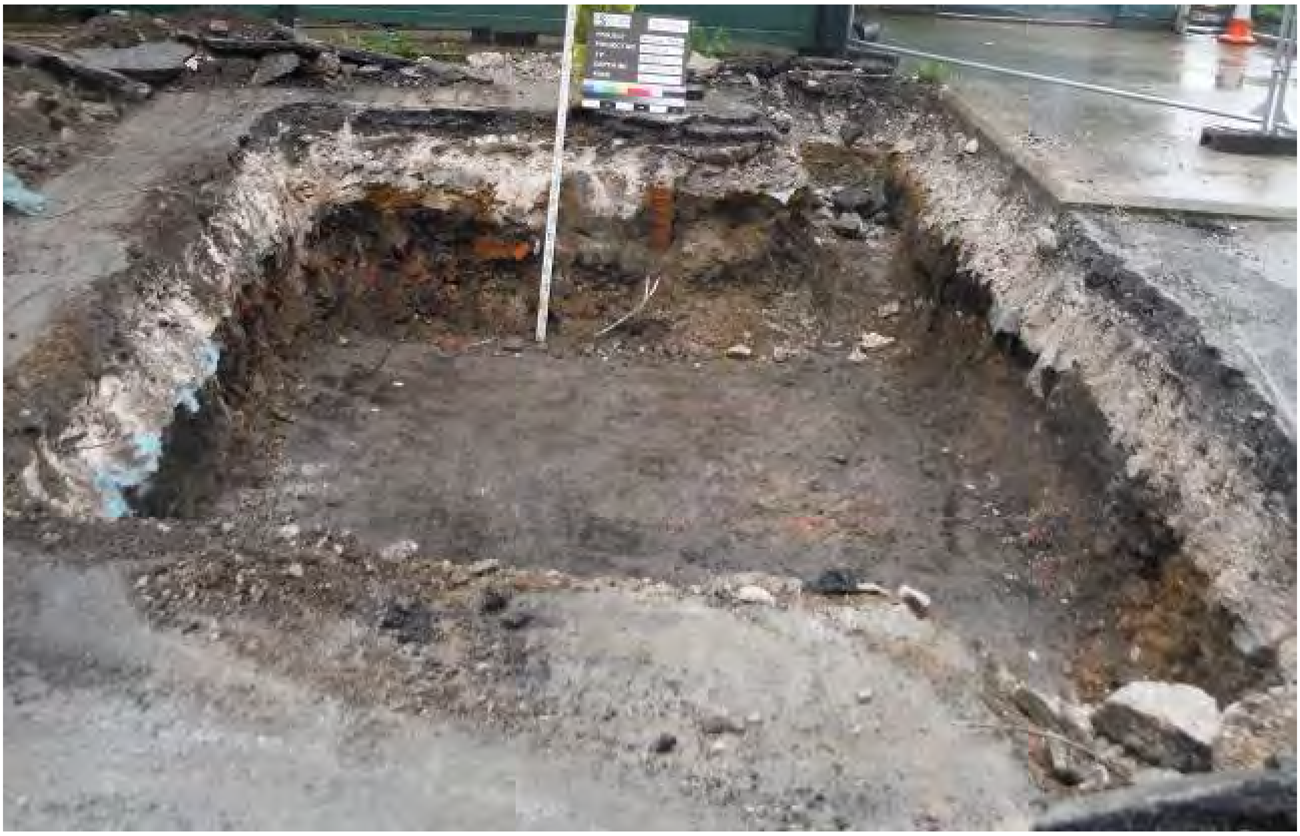
HTP06 Spoil

Notes:	**Project**	**THE FACTORY, MANCHESTER**	**Plate**
	Project No.	**A6053-16**	**10**
	Carried out for	**Buro Happold**	

Hand Dug Trial Pit Photographs



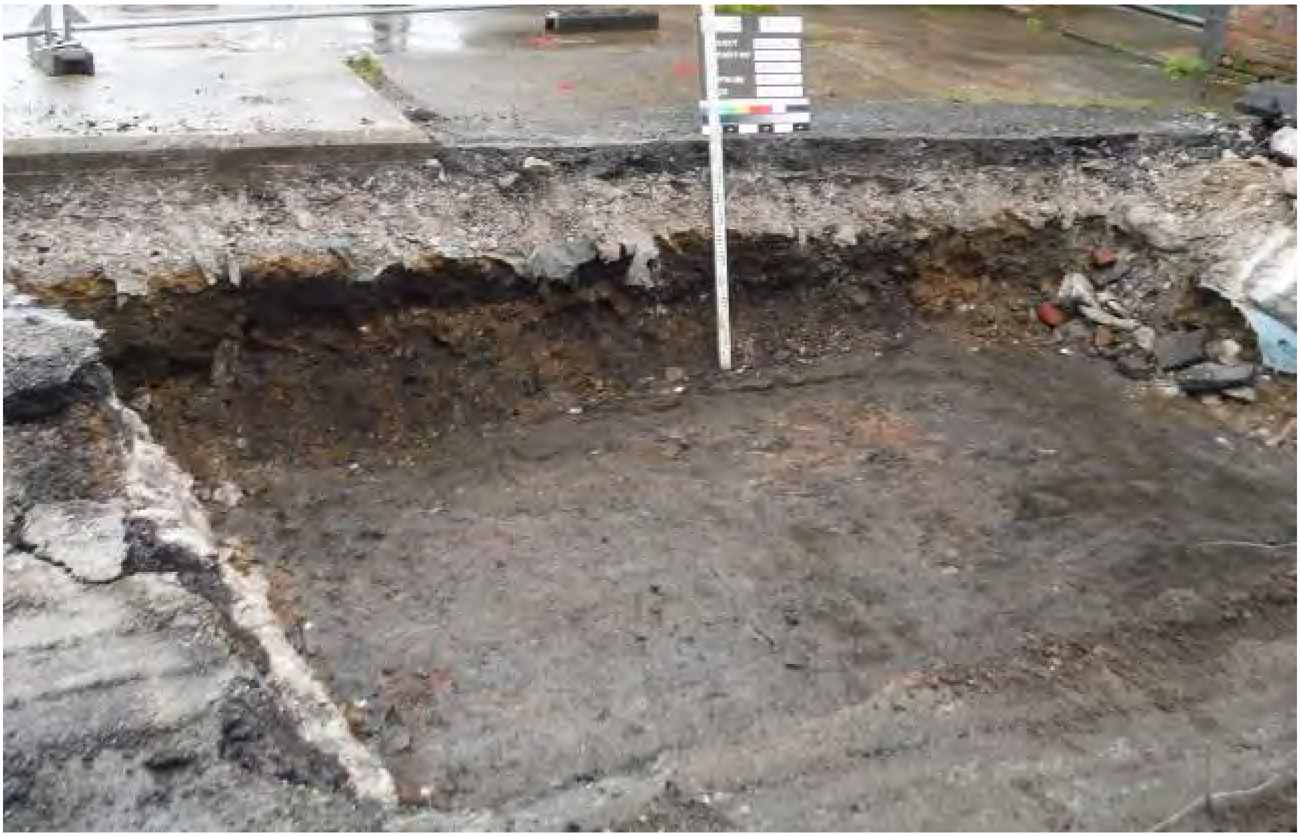
HTP07

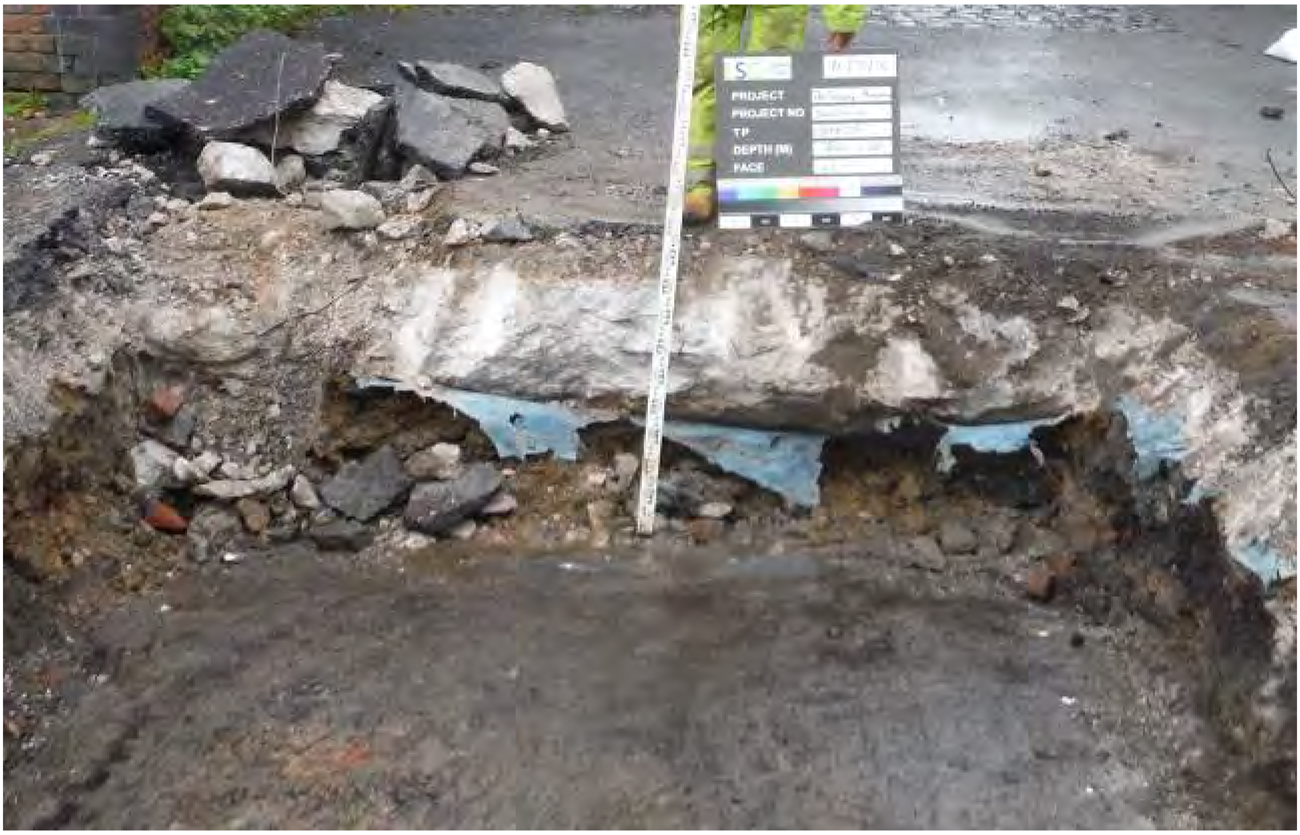


HTP07

Notes:	**Project**	**THE FACTORY, MANCHESTER**	**Plate**
	Project No.	**A6053-16**	**11**
	Carried out for	**Buro Happold**	

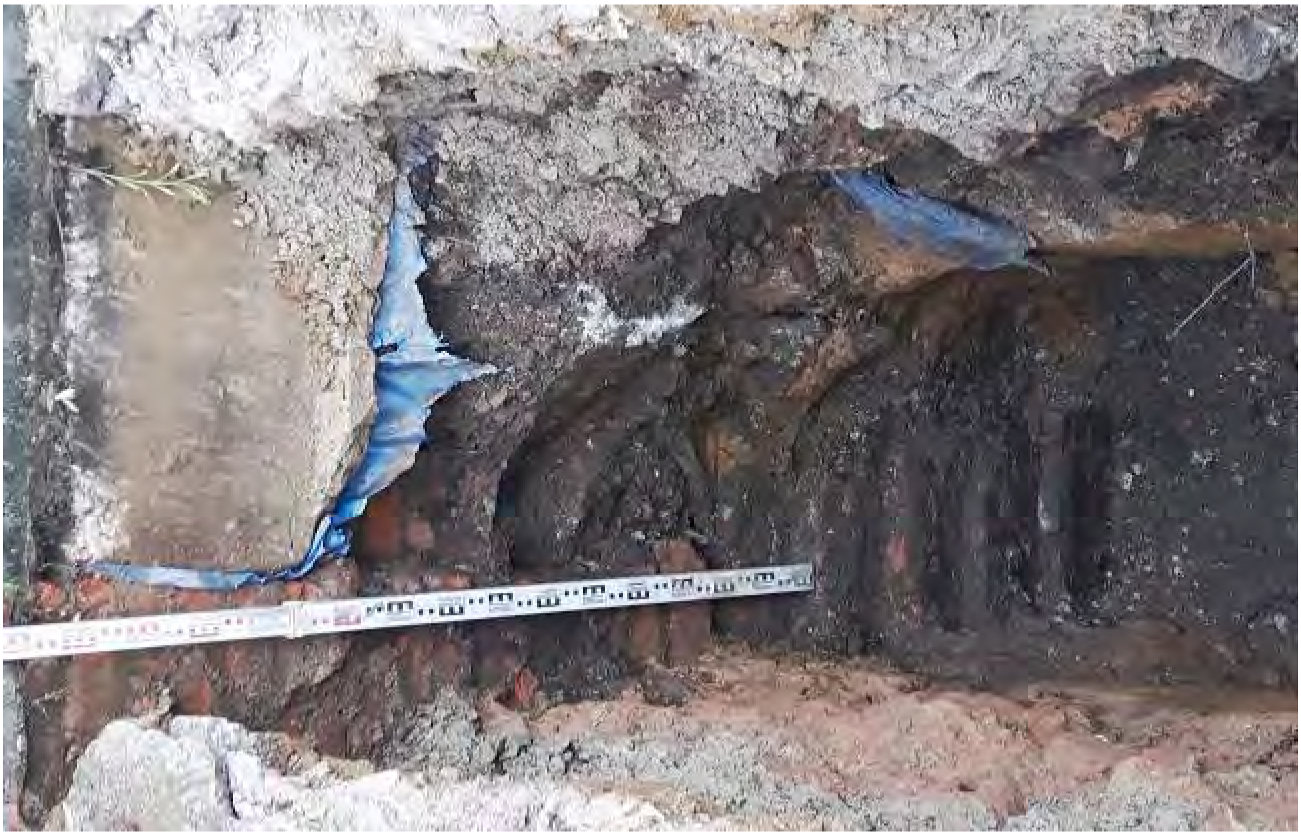
Hand Dug Trial Pit Photographs


HTP07

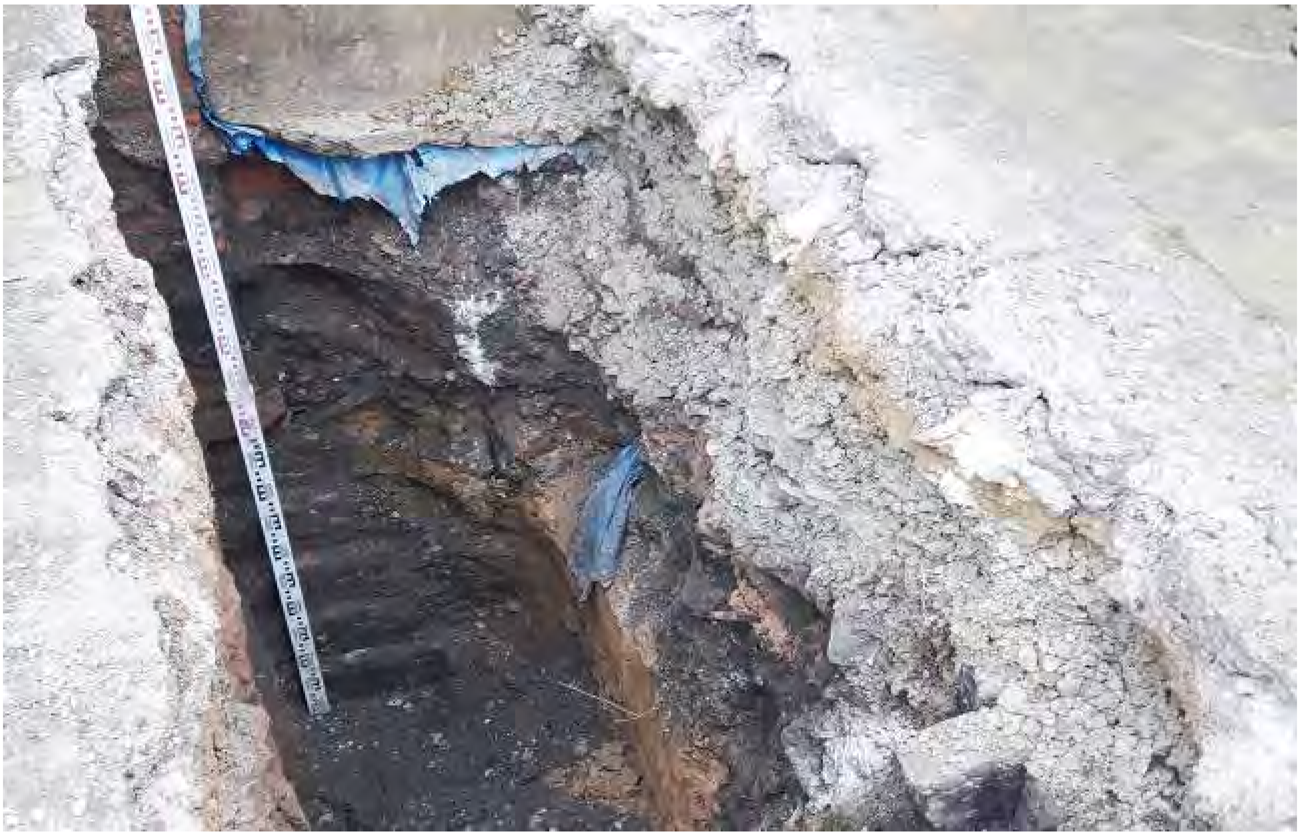

PROJECT
PROJECT NO
TP
DEPTH (M)
FACE
HTP07

Notes:	Project	THE FACTORY, MANCHESTER	Plate
	Project No.	A6053-16	12
	Carried out for	Buro Happold	

Hand Dug Trial Pit Photographs



HTP08



HTP08

Notes:	Project	THE FACTORY, MANCHESTER	Plate
	Project No.	A6053-16	13
	Carried out for	Buro Happold	

APPENDIX G
STRUCTURAL SURVEY

ESG Report Ref STR 751

Client: ESG
Site: The Factory, Manchester
Report Ref : STR 751
Issue date : 9th September 2016
Issue N^{o} : 002

UKAS TESTING
0001

Contents

Approval Sheet and Foreword

Distribution Sheet

1.0 Introduction

2.0 Sampling/Testing Methods & Equipment

3.0 Investigation Findings

Approval Sheet and Foreword

Report Status/Issue No: 002		Job No: STR 751
Client Name/Address: ESG Askern Road Carcroft, Doncaster DN6 8DG		
Approved by: Job Title:	Ben Dimbleby Project Supervisor	
Issued for and on behalf of ESG by the above signatory.	Unit 1, Littlefields Way Oldbury B69 2BT	Tel: 0121 552 0653 Email: ben.dimbleby@esg.co.uk

Foreword

This document has been prepared by ESG with all reasonable skill, care and diligence within the terms of the contract with the Client and within the limitations of the resources devoted to it by agreement with the Client.

This document is confidential to the Client and ESG accepts no responsibility whatsoever to third parties to whom this document, or any part thereof, is made known. Any such party relies upon the document at their own risk.

Unless specifically assigned or transferred within the terms of the agreement, ESG asserts and retains all Copyright, and other intellectual Property Rights in and over the Report and its contents.

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

Results reported herein relate solely to the samples or locations tested and are not necessarily representative of a larger sample population.

This test report or calibration certificate shall not be reproduced, except in full, without the written approval of the issuing laboratory.

Distribution

Date:	Name	Company	PDF	Hard copy	Issue No
09-09-16	Richard Hardwick	ESG	X		002
09-09-16	Tapiwa Basera	ESG	X		002
09-09-16	Tim Clifford	ESG	X		002

The latest version of this report supersedes any previous versions issued

Environmental Scientifics Group Ltd.
Registered in England No. 2880501.
Registered Office: ESG House, Bretby Business Park, Ashby Road, Burton on Trent DE15 0YZ

1.0 Introduction

Following written instructions from Richard Hardwick of ESG, ESG Limited visited the site on 1st of July 2016 in order to carry out the removal of masonry for laboratory testing and the drilling of core holes to establish construction thickness.

Test results are presented in section 3 of this report.

2.0 Sampling/Testing Methods & Equipment

Drilling of Cores – In-House Method IH.034 and BS EN 12504-1:2009*
Chemical Analysis of Mortar BS 4551: 2005
Compressive Strength of Bricks BS EB 771
** covered under ESG's current scope of UKAS accreditation.*

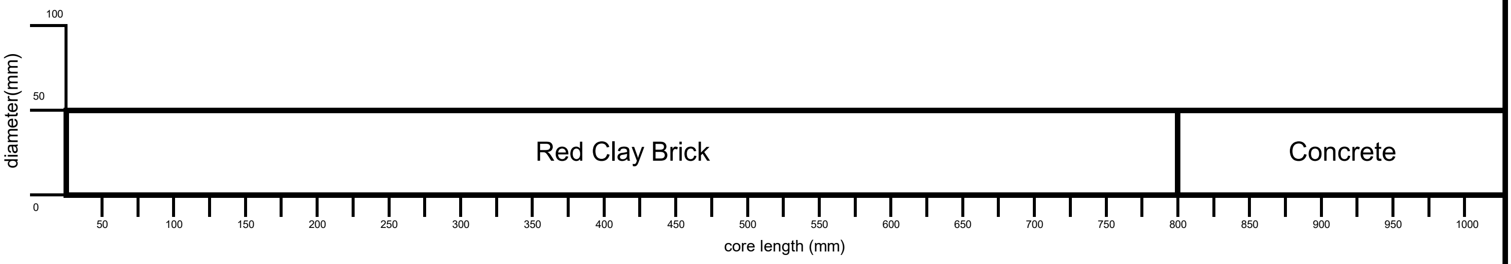
3.0 Investigation Findings

3.1 Core Logs
3.2 Compressive Strength of Bricks
3.3 Chemical Analysis of Mortar
3.4 Petrographic Analysis of Mortar
3.5 Location Drawing

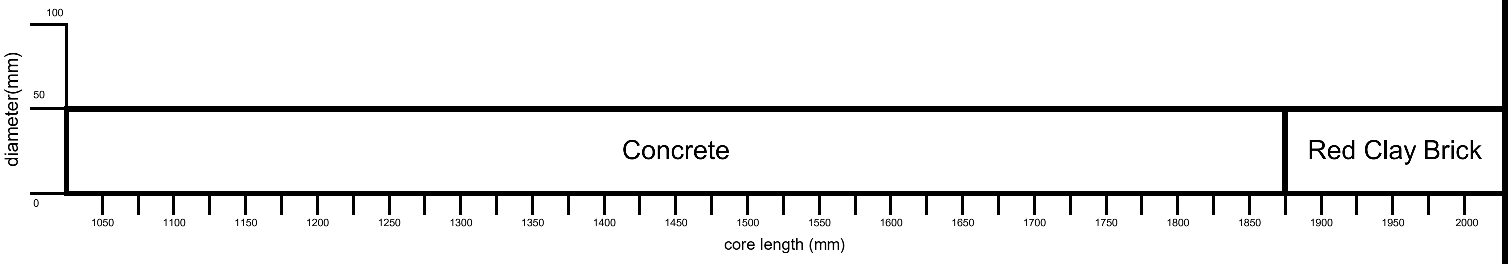
3.1 Core Logs

Core Log

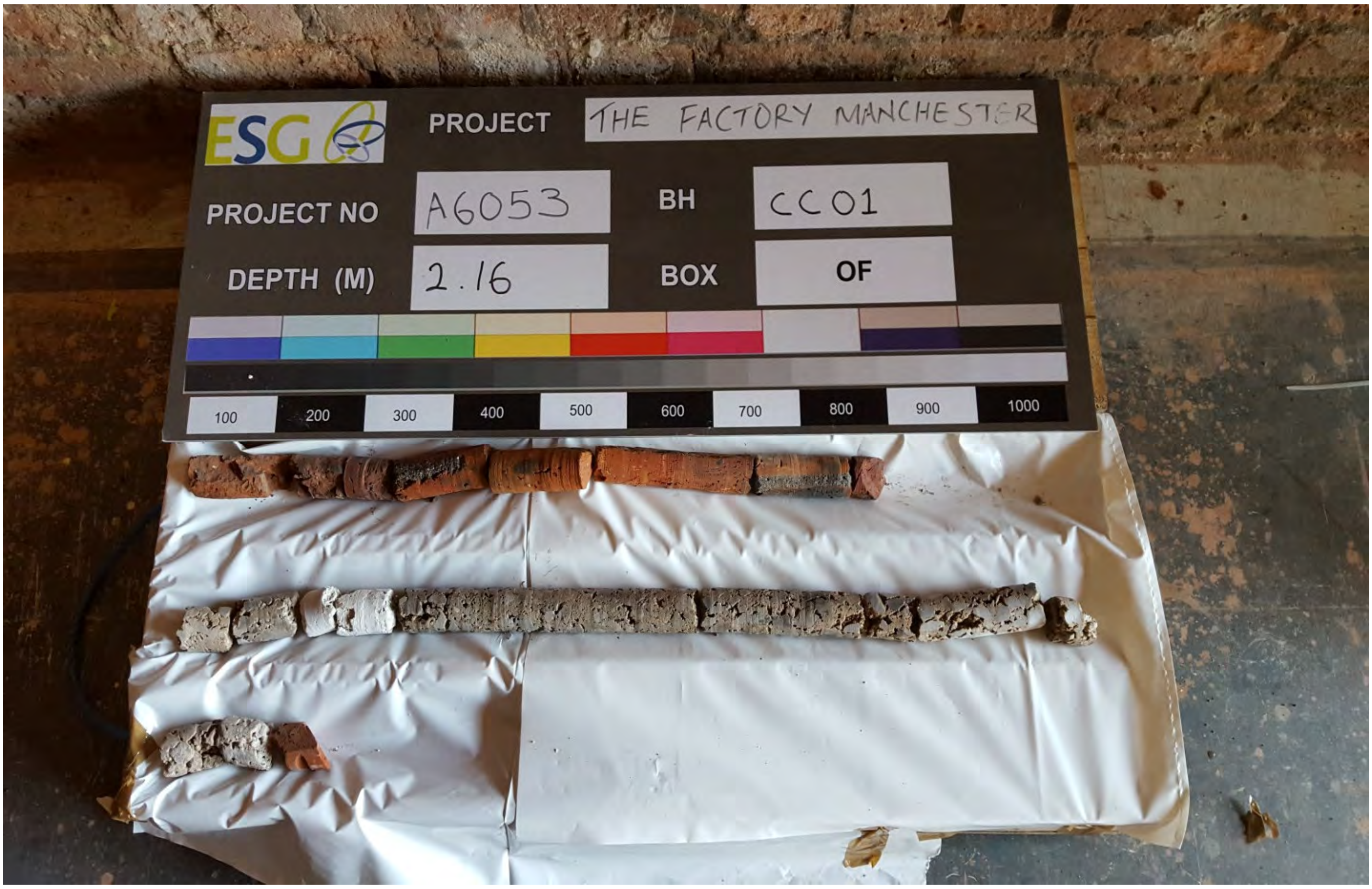
Client	ESG	Job Ref	STR 751	**Core**
Site	The Factory, Manchester	Logged by	BD.	CC01
Date cored	01/07/2016	Logged Date	08/07/2016	
Cored By	S.G	Checked By	B.D	



100
50
0
diameter(mm)
Red Clay Brick
Concrete
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
core length (mm)



100
50
0
diameter(mm)
Concrete
Red Clay Brick
1050
1100
1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800
1850
1900
1950
2000
core length (mm)



ESG
PROJECT
THE FACTORY MANCHESTER
PROJECT NO
A6053
BH
CC01
DEPTH (M)
2.16
BOX
OF
100
200
300
400
500
600
700
800
900
1000

Page 1 of 1

Comments

Coring Angle= Horizontal

Total depth drilled = 2100mm

Core position :

1.2m From arch walkway. 1.15m From ground level.

Vertical depth layer = N/A

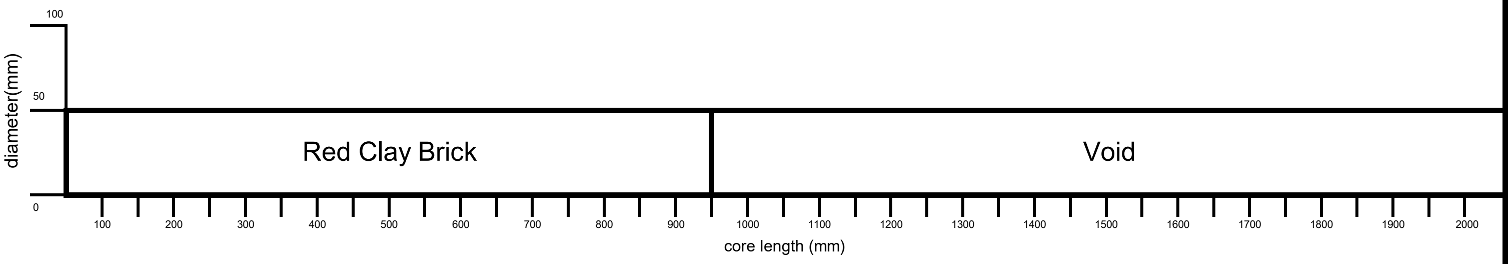
Vertical depth layer = N/A

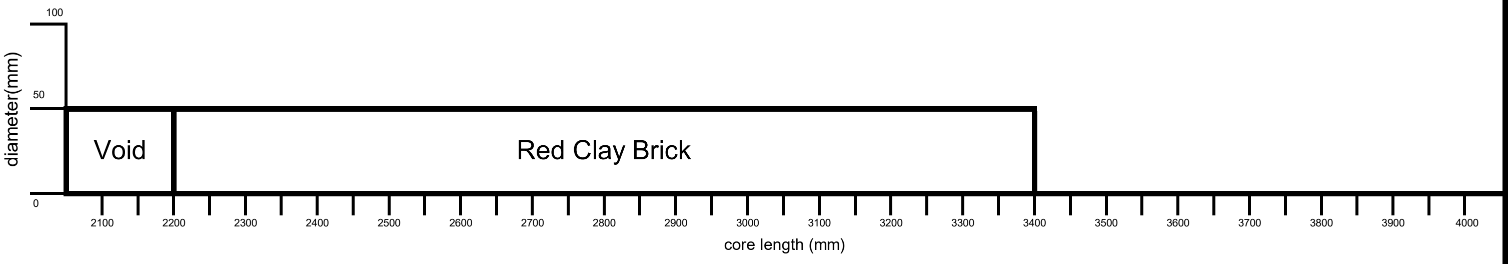
Vertical depth layer = N/A

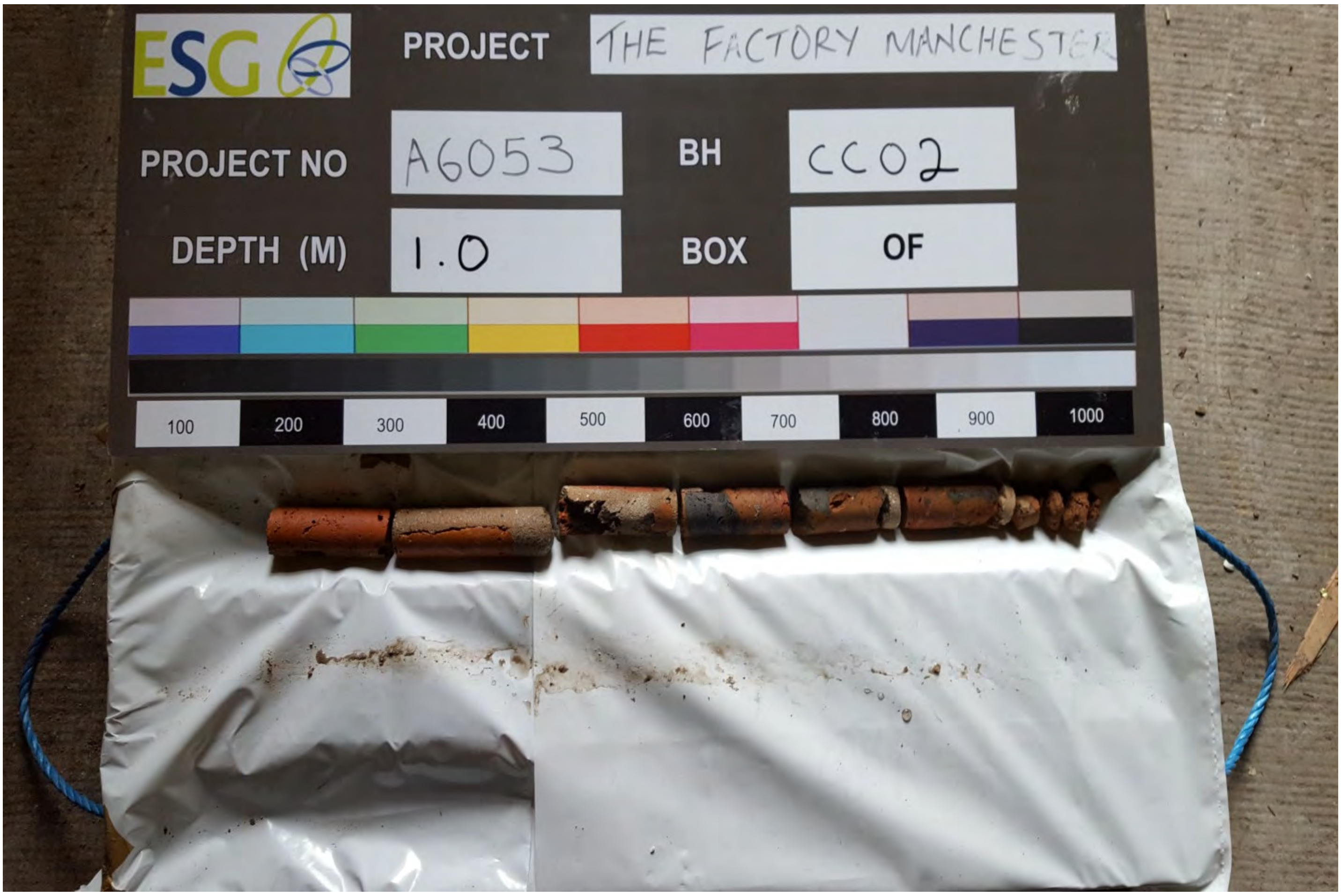
Total Depth Of Structure = 2370mm

Core Log

Client	ESG	Job Ref	STR 751	**Core**
Site	The Factory, Manchester	Logged by	BD.	CC02
Date cored	01/07/2016	Logged Date	08/07/2016	
Cored By	S.G	Checked By	B.D	


100
50
0
diameter(mm)
Red Clay Brick
Void
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
core length (mm)


100
50
0
diameter(mm)
Void
Red Clay Brick
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
3700
3800
3900
4000
core length (mm)


ESG
PROJECT
THE FACTORY MANCHESTER
PROJECT NO
A6053
BH
CC02
DEPTH (M)
1.0
BOX
OF
100
200
300
400
500
600
700
800
900
1000

Comments

Coring Angle= Horizontal

Total depth drilled = 800mm

Core position :

2.2m From window. 950mm From ground level.

Vertical depth layer = N/A

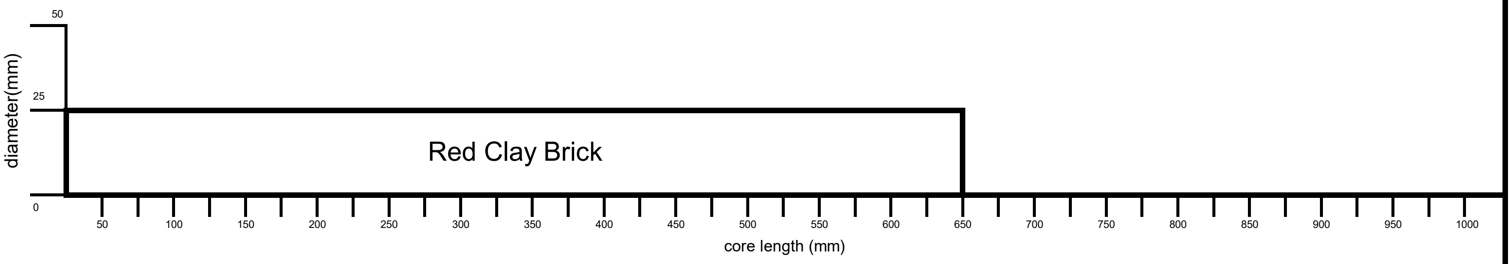
Vertical depth layer = N/A

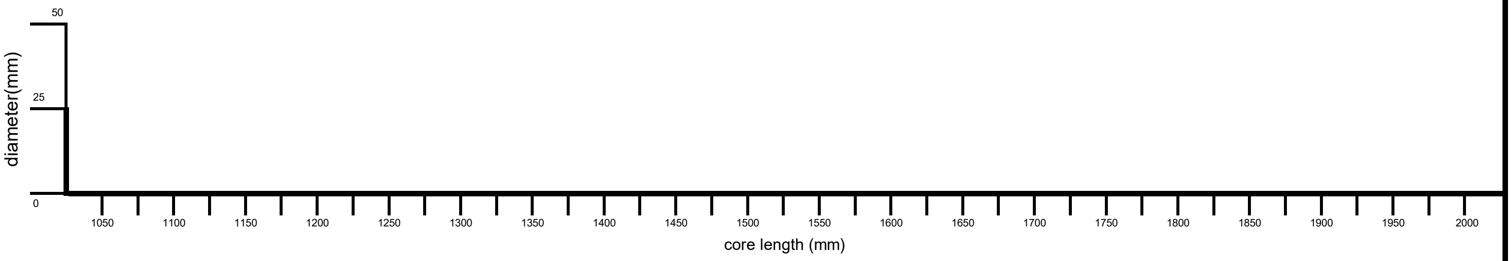
Vertical depth layer = N/A

Total Depth Of Structure = 3400mm

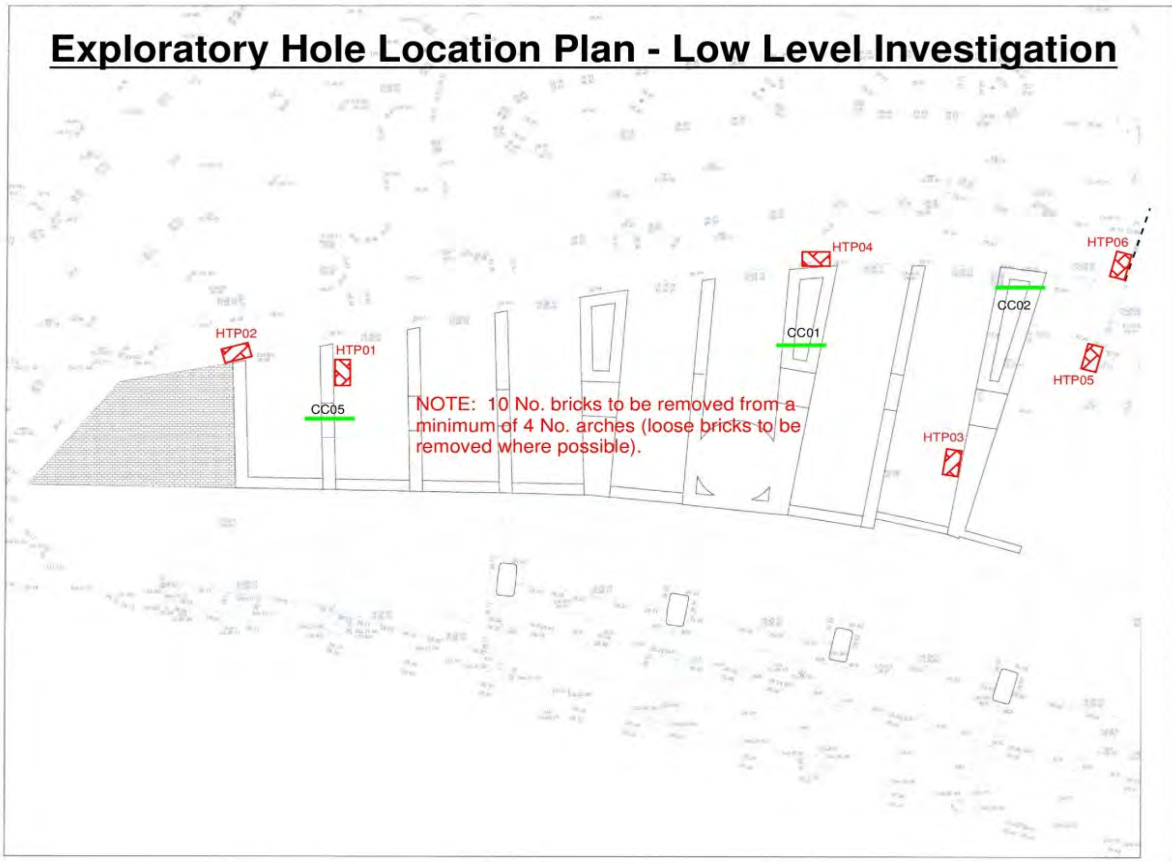
Core Log

Client	ESG	Job Ref	STR 751	**Core**
Site	The Factory, Manchester	Logged by	BD.	CC05 Pilot Hole
Date cored	01/07/2016	Logged Date	08/07/2016	
Cored By	S.G	Checked By	B.D	





Exploratory Hole Location Plan - Low Level Investigation



HTP02
HTP01
CC05
HTP04
CC01
HTP06
CC02
HTP05
HTP03
NOTE: 10 No. bricks to be removed from a minimum of 4 No. arches (loose bricks to be removed where possible).

KEY

🟥 Hand excavated Trial Pit (possible machine assist)

🟩 Concrete Core (NOTE: Pilot holes to be drilled in to establish if concrete core is required).

GENERAL NOTES

1. All exploratory hole and associated features to be fully surveyed and recorded in in 3D space.
2. UXO clearance required as per the UXO Report.
3. Also refer to 'Exploratory Hole Schedule' document.
4. All exploratory hole locations are subject to existing utilities and as such are marked as indicative.
5. All exploratory holes are subject to agreement with the Heritage Architect.
6. All works to be undertaken in accordance with the methodology agreed with MCC Heritage Team.

GI TENDER
REV 04
June 2016

Comments

Coring Angle= Horizontal
Total depth drilled = 650mm
Vertical depth layer = N/A
Vertical depth layer = N/A
Vertical depth layer = N/A

Core position : 1.2m From arch walkway. 1.15m From ground level.

Total Depth Of Structure = 650mm

3.2 Compressive Strength of Bricks

TEST REPORT

ESG
Environmental Scientifics Group

CERTIFICATE OF TEST

Authorised signatories:

P. Haddock-Operations Manager [✓]
P. Thomas- Section Manager [ ]

Compressive Strength of Bricks
BS EN 771

Page 1 of 1
Date 12/07/2016
Report Ref: STR751/16/01

Lab Ref No.	**STR751**	Date Received	**11/07/2016**
Scheme / Site	**The Factory, Manchester**	Date Started	**11/07/2016**
Date Sampled	**01/07/2016**	Date Finished	**12/07/2016**

TEST RESULTS

Mean Strength (N/mm^2)	**12.9**

Test No.	Reference	Dimensions mm	Compressive Strength N/mm^2	Comments
1	STR751.1	230X110X70	11.1	Red Clay Brick
2	STR751.2	235X110X65	13.8	Red Clay Brick
3	STR751.3	230X110X68	15.7	Red Clay Brick
4	STR751.4	230X110X65	21.4	Red Clay Brick
5	STR751.5	225X105X67	10.5	Red Clay Brick
6	STR751.6	239X110X67	7.6	Red Clay Brick
7	STR751.7	230X112X66	14.2	Red Clay Brick
8	STR751.8	230X110X70	11.6	Red Clay Brick
9	STR751.9	235X115X68	10.3	Red Clay Brick

Remarks:

Issuing laboratory:
Environmental Scientifics Group

Unit 29, Rufford Court
Hardwick Grange
Warrington
Cheshire, WA1 4RF
Tel: 01925 286220
Fax: 01925 838135

Client Name

ESG
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

FAO **Richard Hardwick**

Authorised By:

This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory
Environmental Scientifics Group Limited
Reg office: ESG House, Bretby Business Park, Ashby Road, Burton upon Trent, DE15 0YZ
Incorporated in England: 02880501

3.3 Chemical Analysis of Mortar

ESG
The River Laboratory Farmhouse
Church Lane
East Stoke
Wareham
Dorset
BH20 6BB

UKAS TESTING
0001

TEST REPORT

Chemical Analysis of Mortar

to BS4551: 2005

Client:	**ESG**	**Report No:**	**RS161451**
Address:	Unit 1 Littlefields Way	Report Date:	22 July 2016
	Oldbury	Contract No:	STR751
	West Midlands	Sample Number:	C162108
	B69 2BT		

Site: **The Factory, Manchester**

Sample Details:

Sample Location	1		
Client Reference	1	Sampled By:	ESG Oldbury
Date Sampled:	01 July 2016	Date Tested:	15 July 2016
Date Received:	12 July 2016		
Type of Sample:	Mortar lumps		
Method of Sampling:	Hardened mortars to Clause 5.3		
Sample Preparation:	Hardened mortars to Clause 7.4.5		

Assumptions made in calculations:

OPC - % SiO_2 content = 20.2 (19.5-21.0%)
OPC - % CaO content = 64.5 (62.0-66.0%)
Lime - % CaO content = 72.7 (65.6-75.6%)
OPC values based on typical values as given in BS4551:2005
The mortar is made with Ordinary Portland Cement only. OPC - % SiO2 content = 20.2 (19.5-21.0%)
SiO_2 content of fine aggregate = 0.2%

Uncertainty as a result of sampling error, analysts technique etc.

BS4551:2005 quotes reproducibility as follows:
Cement content, as a % by mass of dry mortar from SiO_2 R2, 3.3%
Cement content, as a % by mass of dry mortar from CaO, R2, 1.9%
Lime content, as a % by mass of dry mortar, R2, 3.0%
Fine aggregate volume proportions to one volume of cement, R2, 1.5%
Lime volume proportions to one volume of cement, R2, 1.0%
The difference between two test results obtained under reproducibility conditions should exceed R2 on only one in 20 occasions.

Methods (Detection limits where applicable)

Insoluble Residue to BS1881: Part 124: 1988 – Combustion at 925°C
Soluble Silica to BS4551: 2005 determination by ICP-OES (0.094%)
Calcium Oxide to BS4551: 2005 determination by ICP-OES (0.93%)
Sulphur Trioxide to BS4551: 2005 determination by ICP-OES (0.0098%)
Aluminium Oxide to BS4551: 2005 determination by ICP-OES (0.0015%)
Iron Oxide to BS4551: 2005 determination by ICP-OES (0.025%)
Magnesium Oxide to BS4551: 2005 determination by ICP-OES (0.0048%)
Chloride Ion to BS1881: Part 124: 1988 clause 10

Signed: ____________________

For and on behalf of **ESG**

☐ J. Booth - Principal Engineer
☑ T. Green - Technical Manager

V1.3

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Analysis Results (by mass)	**Mortar**	**Aggregate**
Sample Reference	C162108	No sample available
Insoluble Residue %	72.4	
Soluble SiO_2 %	2.05	
CaO %	11.74	
SO_3 % of total	0.27	
Al_2O_3 % of total	0.56	
MgO % of total	0.19	
Fe_2O_3 % of total	0.42	
Cl- Ion % of total	Not determined	

Composition of Mortar (by mass) Assuming Cement/Fine Aggregate Mix

Cement from CaO %	18.2
Cement from SiO_2 %	9.2
It is likely that the aggregate contains some Calcium or the mortar contains lime and the cement content is nearer that determined from the Soluble Silica. On this basis the following can be calculated:	
Fine aggregate content %	90.8
SO_3 as % of cement	0.02
Cl^- Ion % of cement	-
Traditional volume proportions	1 : 7 to 8
Traditional mortar designation	*iv*

Composition of Mortar (by mass) Assuming Cement/Lime/Fine Aggregate Mix

Cement from SiO_2 %	9.2
Hydrated Lime %	8.0
Fine aggregate content %	82.8
It is likley that the aggregate contains Calcium and the lime content reported is likely to be overestimated. On this basis the following can be calculated:	
Traditional volume proportions	1 : 2 : 8 to 9
Traditional mortar designation	*iv*

Remarks:

End of Report

ESG
The River Laboratory Farmhouse
Church Lane
East Stoke
Wareham
Dorset
BH20 6BB

UKAS TESTING
0001

TEST REPORT

Chemical Analysis of Mortar

to BS4551: 2005

Client:	**ESG**	**Report No:**	**RS161452**
Address:	Unit 1 Littlefields Way	Report Date:	22 July 2016
	Oldbury	Contract No:	STR751
	West Midlands	Sample Number:	C162109
	B69 2BT		

Site: **The Factory, Manchester**

Sample Details:

Sample Location	3		
Client Reference	3	Sampled By:	ESG Oldbury
Date Sampled:	01 July 2016	Date Tested:	15 July 2016
Date Received:	12 July 2016		
Type of Sample:	Mortar lumps		
Method of Sampling:	Hardened mortars to Clause 5.3		
Sample Preparation:	Hardened mortars to Clause 7.4.5		

Assumptions made in calculations:

OPC - % SiO_2 content = 20.2 (19.5-21.0%)
OPC - % CaO content = 64.5 (62.0-66.0%)
Lime - % CaO content = 72.7 (65.6-75.6%)
OPC values based on typical values as given in BS4551:2005
The mortar is made with Ordinary Portland Cement only. OPC - % SiO2 content = 20.2 (19.5-21.0%)
SiO_2 content of fine aggregate = 0.2%

Uncertainty as a result of sampling error, analysts technique etc.

BS4551:2005 quotes reproducibility as follows:
Cement content, as a % by mass of dry mortar from SiO_2 R2, 3.3%
Cement content, as a % by mass of dry mortar from CaO, R2, 1.9%
Lime content, as a % by mass of dry mortar, R2, 3.0%
Fine aggregate volume proportions to one volume of cement, R2, 1.5%
Lime volume proportions to one volume of cement, R2, 1.0%
The difference between two test results obtained under reproducibility conditions should exceed R2 on only one in 20 occasions.

Methods (Detection limits where applicable)

Insoluble Residue to BS1881: Part 124: 1988 – Combustion at 925°C
Soluble Silica to BS4551: 2005 determination by ICP-OES (0.094%)
Calcium Oxide to BS4551: 2005 determination by ICP-OES (0.93%)
Sulphur Trioxide to BS4551: 2005 determination by ICP-OES (0.0098%)
Aluminium Oxide to BS4551: 2005 determination by ICP-OES (0.0015%)
Iron Oxide to BS4551: 2005 determination by ICP-OES (0.025%)
Magnesium Oxide to BS4551: 2005 determination by ICP-OES (0.0048%)
Chloride Ion to BS1881: Part 124: 1988 clause 10

Signed: ______________________

For and on behalf of **ESG**

☐ J. Booth - Principal Engineer
☑ T. Green - Technical Manager

V1.3

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Analysis Results (by mass)	**Mortar**	**Aggregate**
Sample Reference	C162109	No sample available
Insoluble Residue %	36.1	
Soluble SiO_2 %	2.24	
CaO %	22.14	
SO_3 % of total	1.22	
Al_2O_3 % of total	0.62	
MgO % of total	0.43	
Fe_2O_3 % of total	0.51	
Cl- Ion % of total	Not determined	

Composition of Mortar (by mass) Assuming Cement/Fine Aggregate Mix

Cement from CaO %	34.3
Cement from SiO_2 %	10.2
It is likely that the aggregate contains some Calcium or the mortar contains lime and the cement content is nearer that determined from the Soluble Silica. On this basis the following can be calculated:	
Fine aggregate content %	89.8
SO_3 as % of cement	0.12
Cl^- Ion % of cement	-
Traditional volume proportions	1 : 7 to 8
Traditional mortar designation	*iv*

Composition of Mortar (by mass) Assuming Cement/Lime/Fine Aggregate Mix

Cement from SiO_2 %	10.2
Hydrated Lime %	21.4
Fine aggregate content %	68.4
It is likley that the aggregate contains Calcium and the lime content reported is likely to be overestimated. On this basis the following can be calculated:	
Traditional volume proportions	1 : 2 : 8 to 9
Traditional mortar designation	*iv*

Remarks:

End of Report

ESG
The River Laboratory Farmhouse
Church Lane
East Stoke
Wareham
Dorset
BH20 6BB

UKAS TESTING
0001

TEST REPORT

Chemical Analysis of Mortar

to BS4551: 2005

Client:	**ESG**	**Report No:**	**RS161453**
Address:	Unit 1 Littlefields Way	Report Date:	22 July 2016
	Oldbury	Contract No:	STR751
	West Midlands	Sample Number:	C162110
	B69 2BT		

Site: **The Factory, Manchester**

Sample Details:

Sample Location	4		
Client Reference	4	Sampled By:	ESG Oldbury
Date Sampled:	01 July 2016	Date Tested:	15 July 2016
Date Received:	12 July 2016		
Type of Sample:	Mortar lumps		
Method of Sampling:	Hardened mortars to Clause 5.3		
Sample Preparation:	Hardened mortars to Clause 7.4.5		

Assumptions made in calculations:

OPC - % SiO_2 content = 20.2 (19.5-21.0%)
OPC - % CaO content = 64.5 (62.0-66.0%)
Lime - % CaO content = 72.7 (65.6-75.6%)
OPC values based on typical values as given in BS4551:2005
The mortar is made with Ordinary Portland Cement only. OPC - % SiO2 content = 20.2 (19.5-21.0%)
SiO_2 content of fine aggregate = 0.2%

Uncertainty as a result of sampling error, analysts technique etc.

BS4551:2005 quotes reproducibility as follows:
Cement content, as a % by mass of dry mortar from SiO_2 R2, 3.3%
Cement content, as a % by mass of dry mortar from CaO, R2, 1.9%
Lime content, as a % by mass of dry mortar, R2, 3.0%
Fine aggregate volume proportions to one volume of cement, R2, 1.5%
Lime volume proportions to one volume of cement, R2, 1.0%
The difference between two test results obtained under reproducibility conditions should exceed R2 on only one in 20 occasions.

Methods (Detection limits where applicable)

Insoluble Residue to BS1881: Part 124: 1988 – Combustion at 925°C
Soluble Silica to BS4551: 2005 determination by ICP-OES (0.094%)
Calcium Oxide to BS4551: 2005 determination by ICP-OES (0.93%)
Sulphur Trioxide to BS4551: 2005 determination by ICP-OES (0.0098%)
Aluminium Oxide to BS4551: 2005 determination by ICP-OES (0.0015%)
Iron Oxide to BS4551: 2005 determination by ICP-OES (0.025%)
Magnesium Oxide to BS4551: 2005 determination by ICP-OES (0.0048%)
Chloride Ion to BS1881: Part 124: 1988 clause 10

Signed: ________________________

For and on behalf of **ESG**

☐ J. Booth - Principal Engineer
☑ T. Green - Technical Manager

V1.3

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Analysis Results (by mass)

	Mortar	Aggregate
Sample Reference	C162110	No sample available
Insoluble Residue %	33.3	
Soluble SiO_2 %	2.25	
CaO %	24.20	
SO_3 % of total	1.25	
Al_2O_3 % of total	0.66	
MgO % of total	0.48	
Fe_2O_3 % of total	0.50	
Cl- Ion % of total	Not determined	

Composition of Mortar (by mass) Assuming Cement/Fine Aggregate Mix

Cement from CaO %	37.5
Cement from SiO_2 %	10.3
It is likely that the aggregate contains some Calcium or the mortar contains lime and the cement content is nearer that determined from the Soluble Silica. On this basis the following can be calculated:	
Fine aggregate content %	89.7
SO_3 as % of cement	0.13
Cl^- Ion % of cement	-
Traditional volume proportions	1 : 7 to 8
Traditional mortar designation	*iv*

Composition of Mortar (by mass) Assuming Cement/Lime/Fine Aggregate Mix

Cement from SiO_2 %	10.3
Hydrated Lime %	24.2
Fine aggregate content %	65.5
It is likley that the aggregate contains Calcium and the lime content reported is likely to be overestimated. On this basis the following can be calculated:	
Traditional volume proportions	1 : 2 : 8 to 9
Traditional mortar designation	*iv*

Remarks:

End of Report

ESG
The River Laboratory Farmhouse
Church Lane
East Stoke
Wareham
Dorset
BH20 6BB

0001

TEST REPORT

Chemical Analysis of Mortar

to BS4551: 2005

Client:	**ESG**	**Report No:**	**RS161454**
Address:	Unit 1 Littlefields Way	Report Date:	22 July 2016
	Oldbury	Contract No:	STR751
	West Midlands	Sample Number:	C162111
	B69 2BT		

Site: **The Factory, Manchester**

Sample Details:

Sample Location	5		
Client Reference	5	Sampled By:	ESG Oldbury
Date Sampled:	01 July 2016	Date Tested:	15 July 2016
Date Received:	12 July 2016		
Type of Sample:	Mortar lumps		
Method of Sampling:	Hardened mortars to Clause 5.3		
Sample Preparation:	Hardened mortars to Clause 7.4.5		

Assumptions made in calculations:

OPC - % SiO_2 content = 20.2 (19.5-21.0%)
OPC - % CaO content = 64.5 (62.0-66.0%)
Lime - % CaO content = 72.7 (65.6-75.6%)
OPC values based on typical values as given in BS4551:2005
The mortar is made with Ordinary Portland Cement only. OPC - % SiO2 content = 20.2 (19.5-21.0%)
SiO_2 content of fine aggregate = 0.2%

Uncertainty as a result of sampling error, analysts technique etc.

BS4551:2005 quotes reproducibility as follows:
Cement content, as a % by mass of dry mortar from SiO_2 R2, 3.3%
Cement content, as a % by mass of dry mortar from CaO, R2, 1.9%
Lime content, as a % by mass of dry mortar, R2, 3.0%
Fine aggregate volume proportions to one volume of cement, R2, 1.5%
Lime volume proportions to one volume of cement, R2, 1.0%
The difference between two test results obtained under reproducibility conditions should exceed R2 on only one in 20 occasions.

Methods (Detection limits where applicable)

Insoluble Residue to BS1881: Part 124: 1988 – Combustion at 925°C
Soluble Silica to BS4551: 2005 determination by ICP-OES (0.094%)
Calcium Oxide to BS4551: 2005 determination by ICP-OES (0.93%)
Sulphur Trioxide to BS4551: 2005 determination by ICP-OES (0.0098%)
Aluminium Oxide to BS4551: 2005 determination by ICP-OES (0.0015%)
Iron Oxide to BS4551: 2005 determination by ICP-OES (0.025%)
Magnesium Oxide to BS4551: 2005 determination by ICP-OES (0.0048%)
Chloride Ion to BS1881: Part 124: 1988 clause 10

Signed: ______________________

For and on behalf of **ESG**

☐ J. Booth - Principal Engineer
☑ T. Green - Technical Manager

V1.3

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.
Environmental Scientifics Group Ltd. Registered in England No. 2880501. Registered Office: ESG House, Bretby Business Park, Ashby Road, Burton upon Trent, DE15 0YZ

Analysis Results (by mass)

	Mortar	Aggregate
Sample Reference	C162111	No sample available
Insoluble Residue %	38.9	
Soluble SiO_2 %	1.59	
CaO %	20.64	
SO_3 % of total	0.85	
Al_2O_3 % of total	0.51	
MgO % of total	0.40	
Fe_2O_3 % of total	0.44	
Cl- Ion % of total	Not determined	

Composition of Mortar (by mass) Assuming Cement/Fine Aggregate Mix

Cement from CaO %	32.0
Cement from SiO_2 %	6.9
It is likely that the aggregate contains some Calcium or the mortar contains lime and the cement content is nearer that determined from the Soluble Silica. On this basis the following can be calculated:	
Fine aggregate content %	93.1
SO_3 as % of cement	0.06
Cl^- Ion % of cement	-
Traditional volume proportions	1 : 8
Traditional mortar designation	v

Composition of Mortar (by mass) Assuming Cement/Lime/Fine Aggregate Mix

Cement from SiO_2 %	6.9
Hydrated Lime %	22.2
Fine aggregate content %	70.8
It is likley that the aggregate contains Calcium and the lime content reported is likely to be overestimated. On this basis the following can be calculated:	
Traditional volume proportions	1 : 3 : 10 to 12
Traditional mortar designation	v

Remarks:

End of Report

ESG
The River Laboratory Farmhouse
Church Lane
East Stoke
Wareham
Dorset
BH20 6BB

UKAS TESTING
0001

TEST REPORT

Chemical Analysis of Mortar

to BS4551: 2005

Client:	**ESG**	**Report No:**	**RS161455**
Address:	Unit 1 Littlefields Way	Report Date:	22 July 2016
	Oldbury	Contract No:	STR751
	West Midlands	Sample Number:	C162112
	B69 2BT		

Site: **The Factory, Manchester**

Sample Details:

Sample Location	7		
Client Reference	7	Sampled By:	ESG Oldbury
Date Sampled:	01 July 2016	Date Tested:	15 July 2016
Date Received:	12 July 2016		
Type of Sample:	Mortar lumps		
Method of Sampling:	Hardened mortars to Clause 5.3		
Sample Preparation:	Hardened mortars to Clause 7.4.5		

Assumptions made in calculations:

OPC - % SiO_2 content = 20.2 (19.5-21.0%)
OPC - % CaO content = 64.5 (62.0-66.0%)
Lime - % CaO content = 72.7 (65.6-75.6%)
OPC values based on typical values as given in BS4551:2005
The mortar is made with Ordinary Portland Cement only. OPC - % SiO2 content = 20.2 (19.5-21.0%)
SiO_2 content of fine aggregate = 0.2%

Uncertainty as a result of sampling error, analysts technique etc.

BS4551:2005 quotes reproducibility as follows:
Cement content, as a % by mass of dry mortar from SiO_2 R2, 3.3%
Cement content, as a % by mass of dry mortar from CaO, R2, 1.9%
Lime content, as a % by mass of dry mortar, R2, 3.0%
Fine aggregate volume proportions to one volume of cement, R2, 1.5%
Lime volume proportions to one volume of cement, R2, 1.0%
The difference between two test results obtained under reproducibility conditions should exceed R2 on only one in 20 occasions.

Methods (Detection limits where applicable)

Insoluble Residue to BS1881: Part 124: 1988 – Combustion at 925°C
Soluble Silica to BS4551: 2005 determination by ICP-OES (0.094%)
Calcium Oxide to BS4551: 2005 determination by ICP-OES (0.93%)
Sulphur Trioxide to BS4551: 2005 determination by ICP-OES (0.0098%)
Aluminium Oxide to BS4551: 2005 determination by ICP-OES (0.0015%)
Iron Oxide to BS4551: 2005 determination by ICP-OES (0.025%)
Magnesium Oxide to BS4551: 2005 determination by ICP-OES (0.0048%)
Chloride Ion to BS1881: Part 124: 1988 clause 10

Signed: ______________________

For and on behalf of **ESG**

☐ J. Booth - Principal Engineer
☑ T. Green - Technical Manager

V1.3

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Analysis Results (by mass)

	Mortar	Aggregate
Sample Reference	C162112	No sample available
Insoluble Residue %	33.1	
Soluble SiO_2 %	1.52	
CaO %	23.89	
SO_3 % of total	0.60	
Al_2O_3 % of total	0.47	
MgO % of total	0.44	
Fe_2O_3 % of total	0.38	
Cl- Ion % of total	Not determined	

Composition of Mortar (by mass) Assuming Cement/Fine Aggregate Mix

Cement from CaO %	37.0
Cement from SiO_2 %	6.6
It is likely that the aggregate contains some Calcium or the mortar contains lime and the cement content is nearer that determined from the Soluble Silica. On this basis the following can be calculated:	
Fine aggregate content %	93.4
SO_3 as % of cement	0.04
Cl^- Ion % of cement	-
Traditional volume proportions	1 : 8
Traditional mortar designation	*v*

Composition of Mortar (by mass) Assuming Cement/Lime/Fine Aggregate Mix

Cement from SiO_2 %	6.6
Hydrated Lime %	27.0
Fine aggregate content %	66.4
It is likley that the aggregate contains Calcium and the lime content reported is likely to be overestimated. On this basis the following can be calculated:	
Traditional volume proportions	1 : 3 : 10 to 12
Traditional mortar designation	*v*

Remarks:

End of Report

ESG
The River Laboratory Farmhouse
Church Lane
East Stoke
Wareham
Dorset
BH20 6BB

UKAS TESTING
0001

TEST REPORT

Chemical Analysis of Mortar

to BS4551: 2005

Client: **ESG**
Address: Unit 1 Littlefields Way
Oldbury
West Midlands
B69 2BT

Report No: **RS161456**
Report Date: 22 July 2016
Contract No: STR751
Sample Number: C162113

Site: **The Factory, Manchester**

Sample Details:

Sample Location	8		
Client Reference	8	Sampled By:	ESG Oldbury
Date Sampled:	01 July 2016	Date Tested:	15 July 2016
Date Received:	12 July 2016		
Type of Sample:	Mortar lumps		
Method of Sampling:	Hardened mortars to Clause 5.3		
Sample Preparation:	Hardened mortars to Clause 7.4.5		

Assumptions made in calculations:

OPC - % SiO_2 content = 20.2 (19.5-21.0%)
OPC - % CaO content = 64.5 (62.0-66.0%)
Lime - % CaO content = 72.7 (65.6-75.6%)
OPC values based on typical values as given in BS4551:2005
The mortar is made with Ordinary Portland Cement only. OPC - % SiO2 content = 20.2 (19.5-21.0%)
SiO_2 content of fine aggregate = 0.2%

Uncertainty as a result of sampling error, analysts technique etc.

BS4551:2005 quotes reproducibility as follows:
Cement content, as a % by mass of dry mortar from SiO_2 R2, 3.3%
Cement content, as a % by mass of dry mortar from CaO, R2, 1.9%
Lime content, as a % by mass of dry mortar, R2, 3.0%
Fine aggregate volume proportions to one volume of cement, R2, 1.5%
Lime volume proportions to one volume of cement, R2, 1.0%
The difference between two test results obtained under reproducibility conditions should exceed R2 on only one in 20 occasions.

Methods (Detection limits where applicable)

Insoluble Residue to BS1881: Part 124: 1988 – Combustion at 925°C
Soluble Silica to BS4551: 2005 determination by ICP-OES (0.094%)
Calcium Oxide to BS4551: 2005 determination by ICP-OES (0.93%)
Sulphur Trioxide to BS4551: 2005 determination by ICP-OES (0.0098%)
Aluminium Oxide to BS4551: 2005 determination by ICP-OES (0.0015%)
Iron Oxide to BS4551: 2005 determination by ICP-OES (0.025%)
Magnesium Oxide to BS4551: 2005 determination by ICP-OES (0.0048%)
Chloride Ion to BS1881: Part 124: 1988 clause 10

Signed: ______________________________

For and on behalf of **ESG**

☐ J. Booth - Principal Engineer
☑ T. Green - Technical Manager

V1.3

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.
Environmental Scientifics Group Ltd. Registered in England No. 2880501. Registered Office: ESG House, Bretby Business Park, Ashby Road, Burton upon Trent, DE15 0YZ

Analysis Results (by mass)	Mortar	Aggregate
Sample Reference	C162113	No sample available
Insoluble Residue %	44.2	
Soluble SiO_2 %	1.52	
CaO %	22.08	
SO_3 % of total	0.27	
Al_2O_3 % of total	0.47	
MgO % of total	0.18	
Fe_2O_3 % of total	0.47	
Cl- Ion % of total	Not determined	

Composition of Mortar (by mass) Assuming Cement/Fine Aggregate Mix

Cement from CaO %	34.2
Cement from SiO_2 %	6.6
It is likely that the aggregate contains some Calcium or the mortar contains lime and the cement content is nearer that determined from the Soluble Silica. On this basis the following can be calculated:	
Fine aggregate content %	93.4
SO_3 as % of cement	0.02
Cl^- Ion % of cement	-
Traditional volume proportions	1 : 8
Traditional mortar designation	v

Composition of Mortar (by mass) Assuming Cement/Lime/Fine Aggregate Mix

Cement from SiO_2 %	6.6
Hydrated Lime %	24.5
Fine aggregate content %	68.9
It is likley that the aggregate contains Calcium and the lime content reported is likely to be overestimated. On this basis the following can be calculated:	
Traditional volume proportions	1 : 3 : 10 to 12
Traditional mortar designation	v

Remarks:

End of Report

ESG
The River Laboratory Farmhouse
Church Lane
East Stoke
Wareham
Dorset
BH20 6BB

UKAS TESTING
0001

TEST REPORT

Chemical Analysis of Mortar

to BS4551: 2005

Client:	**ESG**	**Report No:**	**RS161457**
Address:	Unit 1 Littlefields Way	Report Date:	22 July 2016
	Oldbury	Contract No:	STR751
	West Midlands	Sample Number:	C162114
	B69 2BT		

Site: **The Factory, Manchester**

Sample Details:

Sample Location	9		
Client Reference	9	Sampled By:	ESG Oldbury
Date Sampled:	01 July 2016	Date Tested:	15 July 2016
Date Received:	12 July 2016		
Type of Sample:	Mortar lumps		
Method of Sampling:	Hardened mortars to Clause 5.3		
Sample Preparation:	Hardened mortars to Clause 7.4.5		

Assumptions made in calculations:

OPC - % SiO_2 content = 20.2 (19.5-21.0%)
OPC - % CaO content = 64.5 (62.0-66.0%)
Lime - % CaO content = 72.7 (65.6-75.6%)
OPC values based on typical values as given in BS4551:2005
The mortar is made with Ordinary Portland Cement only. OPC - % SiO2 content = 20.2 (19.5-21.0%)
SiO_2 content of fine aggregate = 0.2%

Uncertainty as a result of sampling error, analysts technique etc.

BS4551:2005 quotes reproducibility as follows:
Cement content, as a % by mass of dry mortar from SiO_2 R2, 3.3%
Cement content, as a % by mass of dry mortar from CaO, R2, 1.9%
Lime content, as a % by mass of dry mortar, R2, 3.0%
Fine aggregate volume proportions to one volume of cement, R2, 1.5%
Lime volume proportions to one volume of cement, R2, 1.0%
The difference between two test results obtained under reproducibility conditions should exceed R2 on only one in 20 occasions.

Methods (Detection limits where applicable)

Insoluble Residue to BS1881: Part 124: 1988 – Combustion at 925°C
Soluble Silica to BS4551: 2005 determination by ICP-OES (0.094%)
Calcium Oxide to BS4551: 2005 determination by ICP-OES (0.93%)
Sulphur Trioxide to BS4551: 2005 determination by ICP-OES (0.0098%)
Aluminium Oxide to BS4551: 2005 determination by ICP-OES (0.0015%)
Iron Oxide to BS4551: 2005 determination by ICP-OES (0.025%)
Magnesium Oxide to BS4551: 2005 determination by ICP-OES (0.0048%)
Chloride Ion to BS1881: Part 124: 1988 clause 10

Signed: ____________________

For and on behalf of **ESG**

☐ J. Booth - Principal Engineer
☑ T. Green - Technical Manager

V1.3

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
This test report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Analysis Results (by mass)	Mortar	Aggregate
Sample Reference	C162114	No sample available
Insoluble Residue %	37.8	
Soluble SiO_2 %	1.48	
CaO %	23.93	
SO_3 % of total	0.25	
Al_2O_3 % of total	0.49	
MgO % of total	0.17	
Fe_2O_3 % of total	0.44	
Cl- Ion % of total	Not determined	

Composition of Mortar (by mass) Assuming Cement/Fine Aggregate Mix

Cement from CaO %	37.1
Cement from SiO_2 %	6.4
It is likely that the aggregate contains some Calcium or the mortar contains lime and the cement content is nearer that determined from the Soluble Silica. On this basis the following can be calculated:	
Fine aggregate content %	93.6
SO_3 as % of cement	0.02
Cl^- Ion % of cement	-
Traditional volume proportions	1 : 8
Traditional mortar designation	v

Composition of Mortar (by mass) Assuming Cement/Lime/Fine Aggregate Mix

Cement from SiO_2 %	6.4
Hydrated Lime %	27.3
Fine aggregate content %	66.4
It is likley that the aggregate contains Calcium and the lime content reported is likely to be overestimated. On this basis the following can be calculated:	
Traditional volume proportions	1 : 3 : 10 to 12
Traditional mortar designation	v

Remarks:

End of Report

3.4 Petrographic Analysis of Mortar

SANDBERG
CONSULTING ENGINEERS
INVESTIGATION INSPECTION
MATERIALS TESTING

Sandberg LLP
5 Carpenters Place
London SW4 7TD

Tel: 020 7565 7000
Fax: 020 7565 7101
email: eden@sandberg.co.uk
web: www.sandberg.co.uk

Report - 57653/K-2

REPORT ON THE PETROGRAPHIC EXAMINATION OF TWO MORTAR SAMPLES
(Job STR 751, “The Factory” Mortar Samples 2 and 6)

57653/K | K12882/2

57653/K | K12882/3

Environmental Scientifics Group Limited
139 Summerlee Street
Queenslie Industrial Estate
Glasgow
Scotland
G33 4DB

This report comprises
6 pages of text
Appendix A – 4 pages
Appendix B – 4 pages / photographs
Appendix C – 4 pages / photomicrographs

For the attention of Dave Partridge

7 September 2016

Partners: N C D Sandberg S C Clarke D J Ellis P Tate A A Willmott R A Rogerson
M A Eden J D French C Morgan G S Mayers G C S Moor Dr R M Harris J Fagan R H Gostomski J H Dell
Senior Associates: R D Easthope I M Hudson S R P Morris M I Ingle M Faliva
Associates: D Hunt R A Lucas A L Pitman D A Kinnersley M C Gould A Kitson J Carmichael Y N P Guellil A T Hollyman J Glen

Sandberg established in 1860 is a member firm of the Association for Consultancy and Engineering
Sandberg LLP (Reg No OC304229) is registered in England and Wales Registered Office 40 Grosvenor Gardens London SW1W 0EB

SANDBERG
CONSULTING ENGINEERS
INVESTIGATION INSPECTION
MATERIALS TESTING

Sandberg LLP
5 Carpenters Place
London SW4 7TD

Tel: 020 7565 7000
Fax: 020 7565 7101
email: eden@sandberg.co.uk
web: www.sandberg.co.uk

Report - 57653/K-2

REPORT ON THE PETROGRAPHIC EXAMINATION OF TWO MORTAR SAMPLES
(Job STR 751, "The Factory" Mortar Samples 2 and 6)

1 INTRODUCTION

Two mortar samples were provided on 29 July 2016. It was requested that the samples be examined petrographically. Instructions to proceed with the analysis were submitted under Purchase Order No. STR 751.

2 SAMPLES

Laboratory reference	Client / site reference	Weight
K12882/2	Mortar Sample 2	123.81g
K12882/3	Mortar Sample 6	93.21g

3 TEST METHODS

The petrographic testing was carried out in accordance with APG SR2 (2010)[1] and ASTM C856-14[2]. In brief, the following work was carried out.

(i) The samples were examined as received and photographed.

(ii) A fluorescent resin impregnated thin section was prepared from each sample. The thin sections measured about 67x45mm and included several representative fragments of each sample.

(iii) The thin sections were examined with a Zeiss petrological photomicroscope and the distribution of porosity and microcracking was assessed from an examination of the thin section in fluorescent light using the petrological microscope.

4 PETROGRAPHIC EXAMINATION RESULTS

4.1 Visual description of the samples

Visual descriptions of the samples as received are given in Table A1 in Appendix A and photographs illustrating the samples as received are given in Appendix B.

4.2 Petrographic description of the aggregate

A petrographic description of the aggregate in each sample is given in Table A2 in Appendix A.

4.3 Petrographic description of the matrix

A petrographic description of the matrix in each sample is given in Table A3 in Appendix A. Photomicrographs illustrating the typical appearance of the matrix in the thin sections are given in Appendix C.

4.4 Volume proportions

The volume proportions of aggregate, matrix and void have been determined by point counting of the thin sections using the petrological microscope and the results are given in Table A4 in Appendix A.

---

[1] Applied Petrography Group. A code of practice for the petrographic examination of concrete (Author M A Eden), SR2, The Geological Society of London, London, 2010 (Available for download from http://www.appliedpetrographygroup.com/4).

[2] ASTM C856-14 – Standard Practice for Petrographic Examination of Hardened Concrete.

5 DISCUSSION

5.1 Aggregate characteristics

(i) Aggregate type

The aggregate in both samples consists of a mixture of crushed particles of bottom ash and quartz sand. The volume proportions of the ash and sand have been measured by point counting of the thin sections and converted to approximate weight proportions using an assumed density for the sand of 2620 kg/m^3 and an assumed density for the bottom ash of 1400 kg/m^3. The results are as follows:

Laboratory reference	Client sample reference	Bottom ash, Wt. % Note 1	Sand, Wt. % Note 1
K12882/2	Mortar Sample 2	27%	73%
K12882/3	Mortar Sample 6	25%	75%

Note 1: It should be note that in order convert these weight percentages to equivalent volume proportions it would be necessary to know the bulk density of the bottom ash as well as the sand. Whilst it is possible to estimate the bulk density of the sand with reasonable certainty the bulk density of the bottom ash cannot be reliably estimated.

(ii) Potential aggregate properties

The bottom ash particles are dominated by particles of carbonaceous ash with smaller amounts of glassy ash and part-burnt coal. Part-burnt coal particles are more abundant in Sample 2 than in Sample 6. The bottom ash aggregate would be expected to have a high shrinkage potential. Some potential for sulphate attack might also be expected on account of the possible presence of sulphide minerals such as pyrite within the coal particles.

The ash particles would be expected to be moderately weak on account of their high void contents. The ash aggregate would be expected to contribute to a high water demand for the mortar on account of its high voidage, angular particles shape and the abundance of carbonaceous ash dust.

The quartz sand is composed of dense and robust lithologies that would be expected to have a very low water absorption and very high compressive strength. The surfaces of the sand particles in Sample 2 are sometimes coated with brown clayey deposits and similar material occurs in the matrix of this sample.

(iii) Aggregate deterioration

The majority of the aggregate particles show little evidence to suggest that they have undergone alteration since their incorporation into the mortar. There is however occasional patches of iron and possibly organic staining around some of the part-burnt coal particles probably related to pyrite decomposition within the part-burnt coal and the migration of organic matter from the coal particles into the surrounding matrix.

The extent of staining of the matrix around the surfaces of the bottom ash particles is much greater in Sample 2 than in Sample 6 and the differing extents of staining of the lime matrix with organic and iron compounds between the two samples is largely responsible for the differences in colour of the matrix in the two samples.

The part-burnt coal particles have commonly undergone shrinkage within the mortar. No evidence has been found however to suggest expansion of the coal particles within the mortar.

5.2 Matrix characteristics

(i) Binder type

The binder in both samples is lime-based. No evidence has been found to suggest the presence of Portland cement in these samples. Traces of calcium silicate particles can occasionally be found in both samples in keeping with the binder being a feebly hydraulic lime binder.

(ii) Method of mixing of the lime

Sample 6 has abundant rounded lime lumps and lime lumps in this sample account for some 8% by volume of the mortar. The lime lumps are rare in Sample 2.

It is possible that the lime lumps in these samples reflect the presence of deformed fragments of lime-putty that have not been fully mixed with the sand. The lime lumps in this sample are much finer than those typically seen in mortar with "hot-mixed" lime. The abundance of lime lumps in Sample 6 is in keeping with the lime binder being poorly mixed with the sand.

(iii) Microporosity

The lime matrix in both samples has a uniformly very high microporosity and the very high microporosity of the lime matrix in these samples is regarded as being typical of that seen in lime mortar.

(iv) Moisture ingress and matrix alteration

Neither sample show evidence for weakening or deterioration as a result of moisture ingress. The staining of the matrix in Sample 2 is indicative of moisture ingress into the mortar. The occasional presence of traces of gypsum within some of the voids in Sample 6 is indicative of the minor ingress of moisture containing sulphates.

(v) Cracking

The abundant shrinkage cracks in the matrix of Sample 6 are indicative of the mortar undergoing rapid drying soon after its placement. Shrinkage cracking is much less abundant in Sample 2 than in the Sample 6.

5.3 Estimated composition of the mortar

The measured volume proportions of matrix, bottom ash and sand have been used to calculate the approximate weight percentages of lime binder in each sample. The results are given in Table A4 in Appendix A. The results are summarised as follows:

Laboratory reference	**Client sample reference**	**Lime binder, % by weight of dry mortar**
K12882/2	Mortar Sample 2	16%
K12882/3	Mortar Sample 6	38%

6 CONCLUSIONS

6.1 Both samples have an aggregate that is composed of a mixture if siliceous sand with smaller amounts of bottom ash.

6.2 The bottom ash includes particles of part-burn coal that have undergone shrinkage within the mortar. Part-burnt coal particles are generally more abundant in Sample 2 than in Sample 6.

6.3 The binder in both samples is based on feebly hydraulic lime. No evidence has been seen for the presence of Portland cement in these samples. The measured volumes of lime matrix are consistent with lime contents of about 16% by weight of dry mortar in Sample 2 and 38% by weight of dry mortar in Sample 6.

6.4 The matrix of Sample 6 contains abundant lime lumps and lime lumps are much more abundant in Sample 6 than in Sample 2. The abundance of lime lumps in Sample 6 is indicative of poor mixing of the lime binder with the sand in this sample.

6.5 The lime matrix in Sample 6 has abundant shrinkage cracks that are indicative of the lime matrix drying out soon after placement.

6.6 Sample 2 has an overall brownish grey colour and Sample 6 has a medium grey colour. The following factors have influenced the appearance of the mortar.

- The grey colour of both samples is related to the abundance of black carbonaceous ash dust in the matrix.
- The lighter colour of Sample 6 compared to Sample 2 is related to the abundance of white lime lumps.
- The much higher lime binder content of Sample 6 compared to Sample 2 is likely to have contributed to the lighter colour of the matrix in Sample 6 compared to Sample 2.
- The brownish colour of Sample 2 is partly related to the staining of the lime matrix with brown organic matter and iron compounds from the coal particles many of which appear to have altered within the lime matrix of Sample 2. The extent of alteration of the bottom ash particles is much lower in Sample 6 than in Sample 2.
- The traces of brown clayey dust around the surfaces of the sand particles and in the matrix of Sample 2 have contributed to the brownish colour of the matrix in this sample.

7 REMARKS

The above concludes the requested programme of testing. Please do not hesitate to contact us if we can be of any further assistance in this matter.

Environmental Scientifics Group Limited
139 Summerlee Street
Queenslie Industrial Estate
Glasgow
Scotland
G33 4DB

for GEOMATERIALS RESEARCH SERVICES
(part of Sandberg LLP)

M. A. Eden, BSc., MSc., FGS., C.Geol
Partner

For the attention of Dave Partridge

7 September 2016

Samples can only be retained for a period of one month from the date of issue of the report unless we are instructed otherwise.
Samples can be returned or retained for a further charge.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

APPENDIX A – PETROGRAPHIC DESCRIPTION OF THE SAMPLES

PETROGRAPHIC EXAMINATION OF HARDENED CONCRETE
ASTM C856-14 AND APG-SR2 (2010)

TABLE A1 OF 4: VISUAL DESCRIPTION

Laboratory reference	**K12882/2**	**K12882/3**
Client sample reference	**Mortar Sample 2**	**Mortar Sample 6**
Description of outer surface	Rough surfaces	Rough surfaces. Some of the surfaces are coated with paint.
Lime lumps	None seen	Abundant
Matrix colour	Medium to dark greyish brown	Medium grey
Aggregate observations	Typically fine. Occasional coarse brick fragments up to about 15mm in maximum dimension.	Typically fine. Occasional coarse coal fragments up to about 12mm in maximum dimension.
Strength characteristics	Weak – can be readily broken by hand. Moderately friable.	Moderately weak – can be broken by hand. Marginally stronger than Sample 2.
Voids:	Few voids visible in the sample as received	Few voids visible in the sample as received

PETROGRAPHIC EXAMINATION OF HARDENED CONCRETE
ASTM C856-14 AND APG-SR2 (2010)

TABLE A2 OF 4: PETROGRAPHIC DESCRIPTION OF THE AGGREGATE

Laboratory reference	**K12882/2**	**K12882/3**
Client sample reference	**Mortar Sample 2**	**Mortar Sample 6**
Grading (estimated BS 882 grading classification)	Medium	Medium
Maximum size (mm)	2.5mm	2.0mm
Typical shape	The ash particles are angular the sand particles are typically subrounded	The ash particles are angular the sand particles are typically subrounded
Aggregate materials, vol. %		
Carbonaceous ash	31.7	30.0
Glassy ash	8.8	8.0
Siliceous sand including feldspar and ironstone	59.5	62.0
Aggregate alteration	Minor staining of the paste surrounding some of the ash particles	Minor staining of the paste surrounding some of the ash particles

PETROGRAPHIC EXAMINATION OF HARDENED CONCRETE
ASTM C856-14 AND APG-SR2 (2010)

TABLE A3 OF 4: PETROGRAPHIC DESCRIPTION OF THE MATRIX

Laboratory reference	**K12882/2**	**K12882/3**
Client sample reference	**Mortar Sample 2**	**Mortar Sample 6**
Binder type	Feebly hydraulic lime	Feebly hydraulic lime
Dust	Abundant carbonaceous ash dust	Abundant carbonaceous ash dust
Cement grains	No Portland cement grains seen. Occasional calcium silicate particles seen that contain crystals of belite and calcium-alumino-ferrite.	No Portland cement grains seen. Occasional calcium silicate particles seen that contain crystals of belite and calcium-alumino-ferrite.
Lime lumps	Trace	Abundant (the measured volume % of lime lumps is 7.8% by volume of the sample)
Hard burnt lime	None seen	Traces of hard burnt lime particles seen
Carbonation	Fully carbonated	Fully carbonated
Portlandite	None seen	None seen
Porosity	Very high	Very high
Microcracking	Moderate	Very high – the matrix contains abundant shrinkage cracks
Crack fillings	None seen	None seen
Void fillings	None seen	Traces of gypsum
Surface alteration	None seen	Traces of gypsum sometimes seen in voids close to the surfaces

PETROGRAPHIC EXAMINATION OF HARDENED CONCRETE
ASTM C856-14 AND APG-SR2 (2010)

TABLE A4 OF 4: VOLUME PROPORTIONS AND CALCULATION OF THE COMPOSITION

Laboratory reference	**K12882/2**	**K12882/3**
Client sample reference	**Mortar Sample 2**	**Mortar Sample 6**
VOLUME PROPORTIONS:		
Matrix	28.2	34.5
Lime lump	0.0	7.8
Hard burnt lime	0.0	1.2
Ash	19.1	14.0
Glassy ash	5.3	3.7
Quartz	36.0	28.9
Void	11.4	9.9
Normalised volume proportions		
Matrix	31.8	48.3
Bottom ash	27.6	19.7
Sand	40.6	32.1
Approximate weight proportions Note 1		
Bottom ash	386	275
Sand	1063	840
Lime binder	271	690
Lime Binder, % by weight of dry mortar	16%	38%

Note 1: Based on the following assumptions:

- The sand particle density is 2620 kg/m^3
- The mean bottom ash particle density of 1400 kg/m^3
- The lime density is 2100 kg/m^3
- The water/binder ratio is 0.7

APPENDIX B – PHOTOGRAPHS ILLUSTRATING THE SAMPLES AS RECEIVED

Figure B1

Sample K12882/2 – Sample 2

The sample as received, View 1:

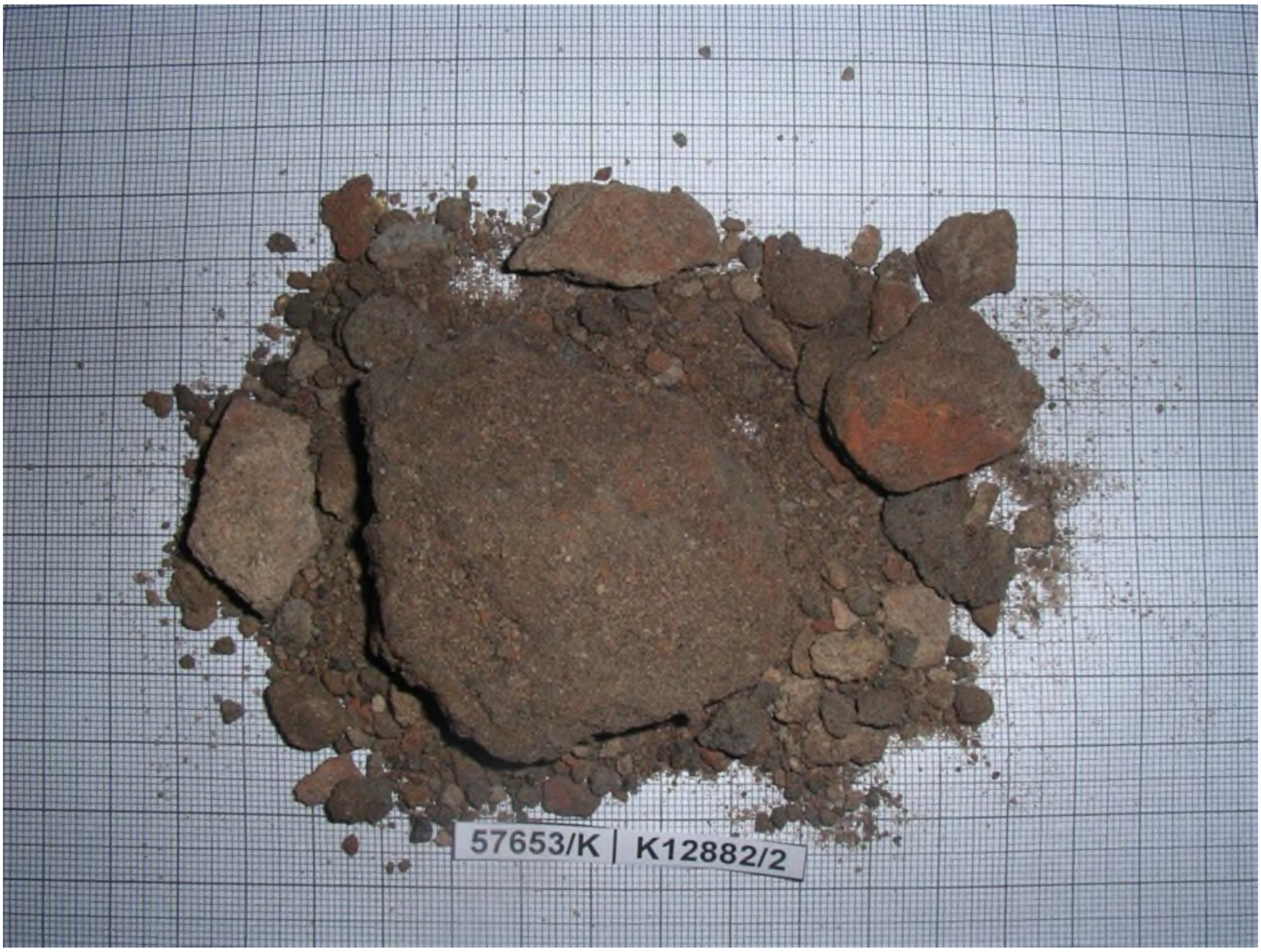


Figure B2

Sample K12882/2 – Sample 2

The sample as received, View 2:

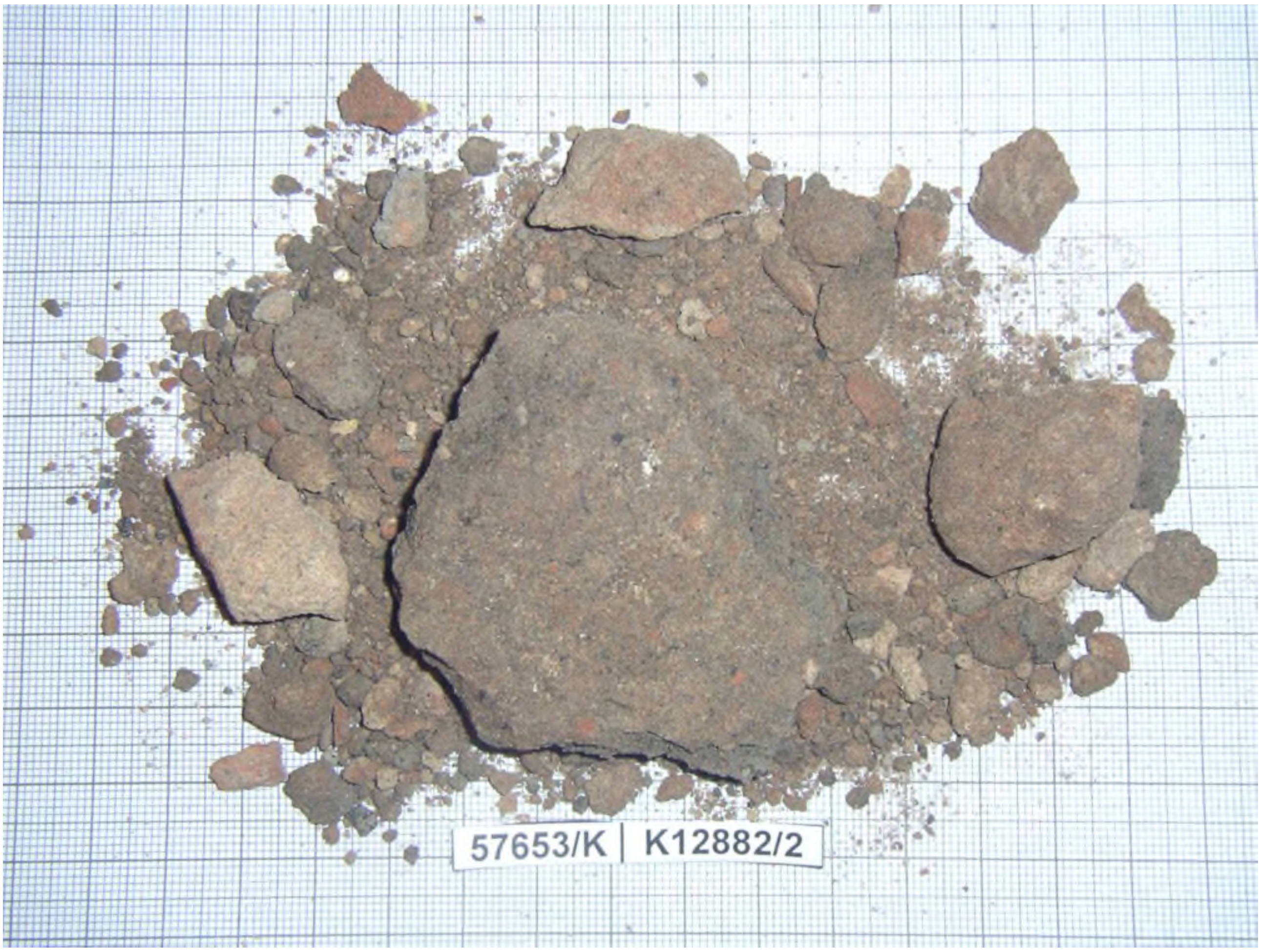

57653/K
K12882/2

Figure B3

Sample K12882/3 – Sample 6

The sample as received, View 1:

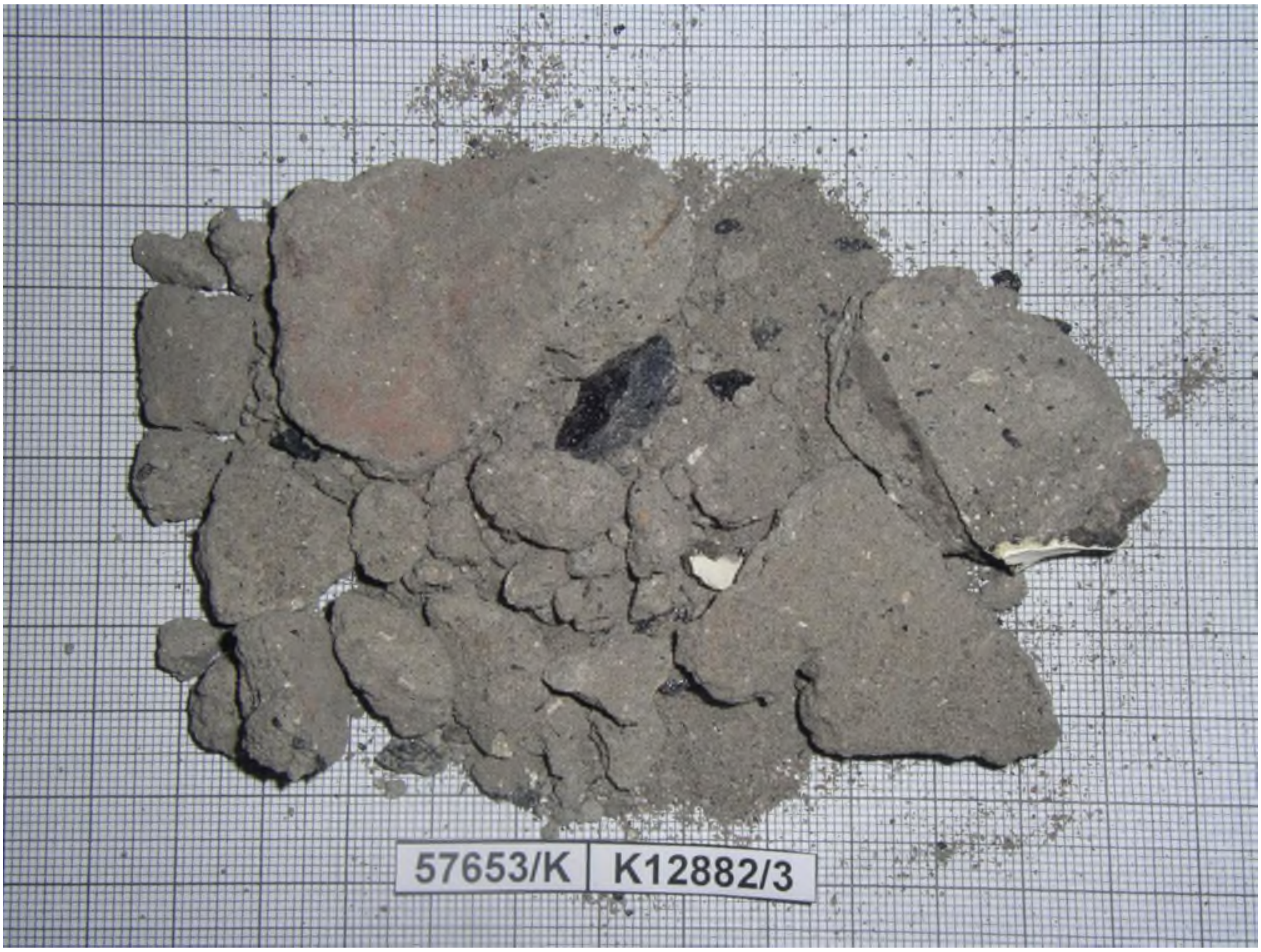
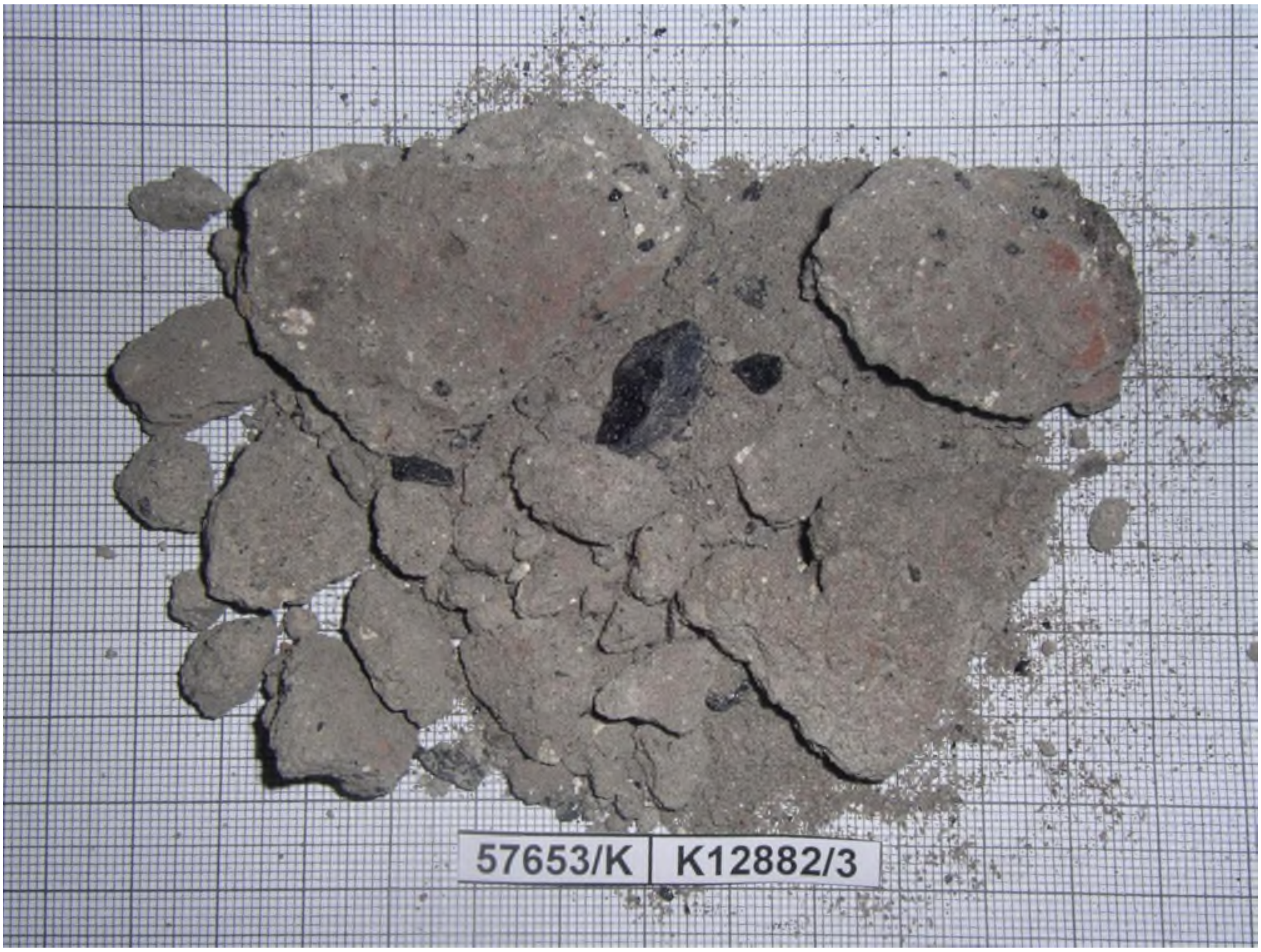

57653/K
K12882/3

Figure B4

Sample K12882/3 – Sample 6

The sample as received, View 2:


57653/K
K12882/3

APPENDIX C – PHOTOMICROGRAPHS ILLUSTRATING THE THIN SECTIONS

Figure C1

Sample K12882/2 – Sample 2

Thin section, oblique polars: A coal particle occurs at the bottom of the field of view in H3/4. A glassy ash particle occurs in B2. Quartz sand particles occur in B6 and E6. Carbonated lime matrix surrounds the aggregate particles and is visible for example in C1.

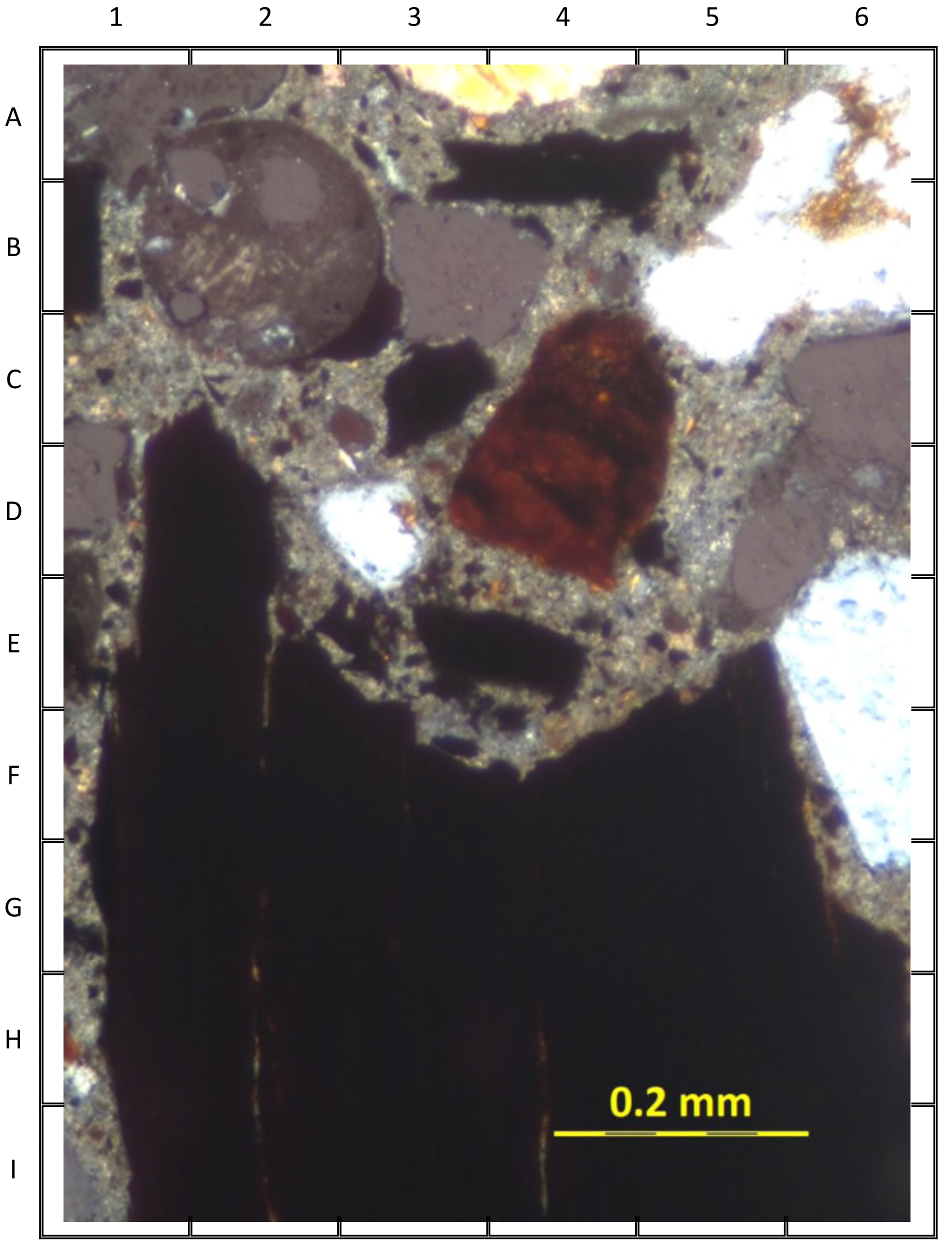


Figure C2

Sample K12882/2 – Sample 2

Thin section, oblique polars: The field of view is dominated by porous carbonated lime matrix. Brown clayey deposits coat the surfaces of the sand particles for example in B6 and similar material is dispersed through the lime matrix for example in G3/4. Quartz particles occur in B4 and C/D1.

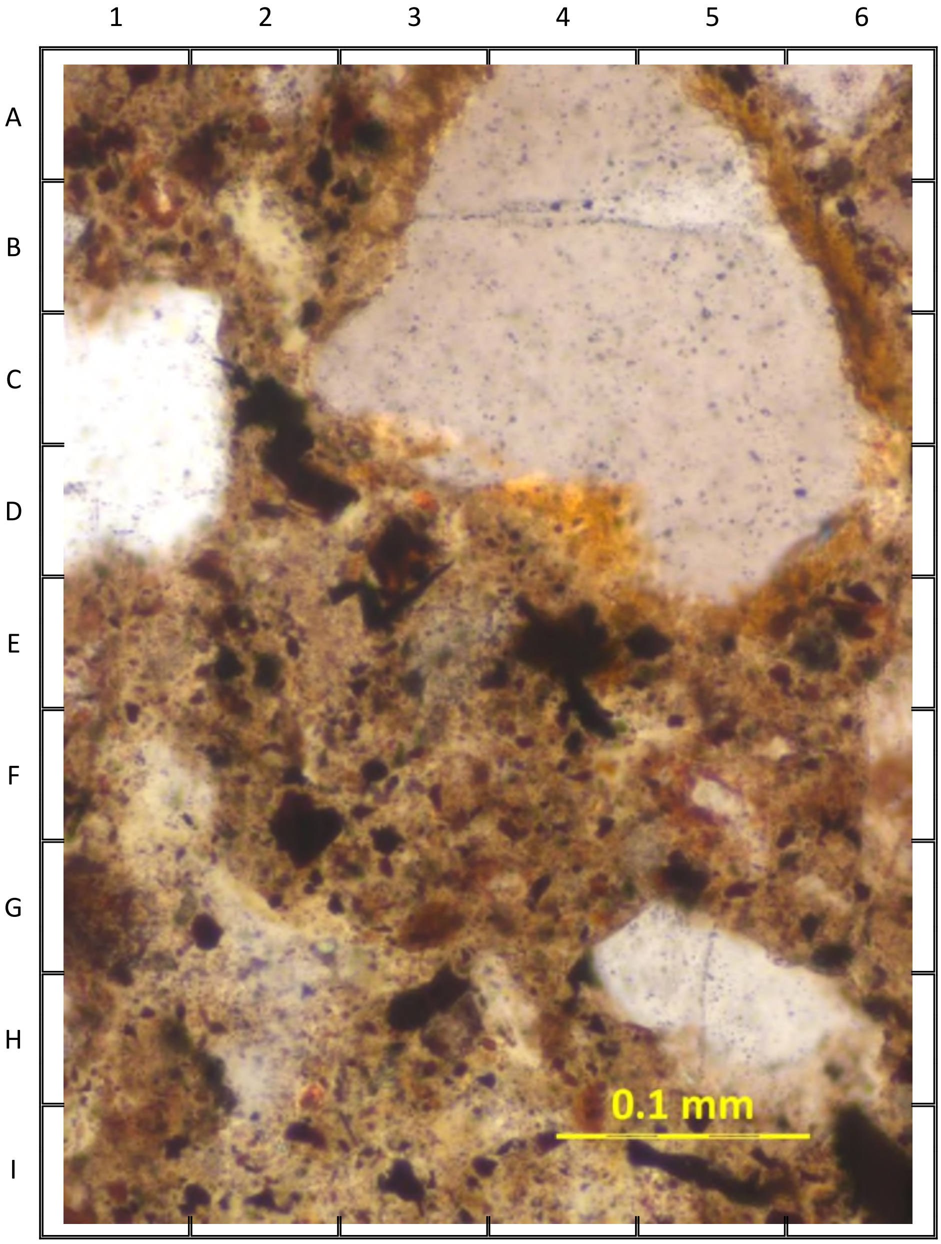


Figure C3

Sample K12882/3 – Sample 6

Thin section, oblique polars: A lime lump occurs in G5/6. Much of the upper half of the field of view is occupied by porous carbonated lime matrix (visible for example in D1) surrounding quartz sand particles that appear various shades of grey for example in C1 and A/B4. Black carbonaceous ash particles occur in E/F1 and B3.

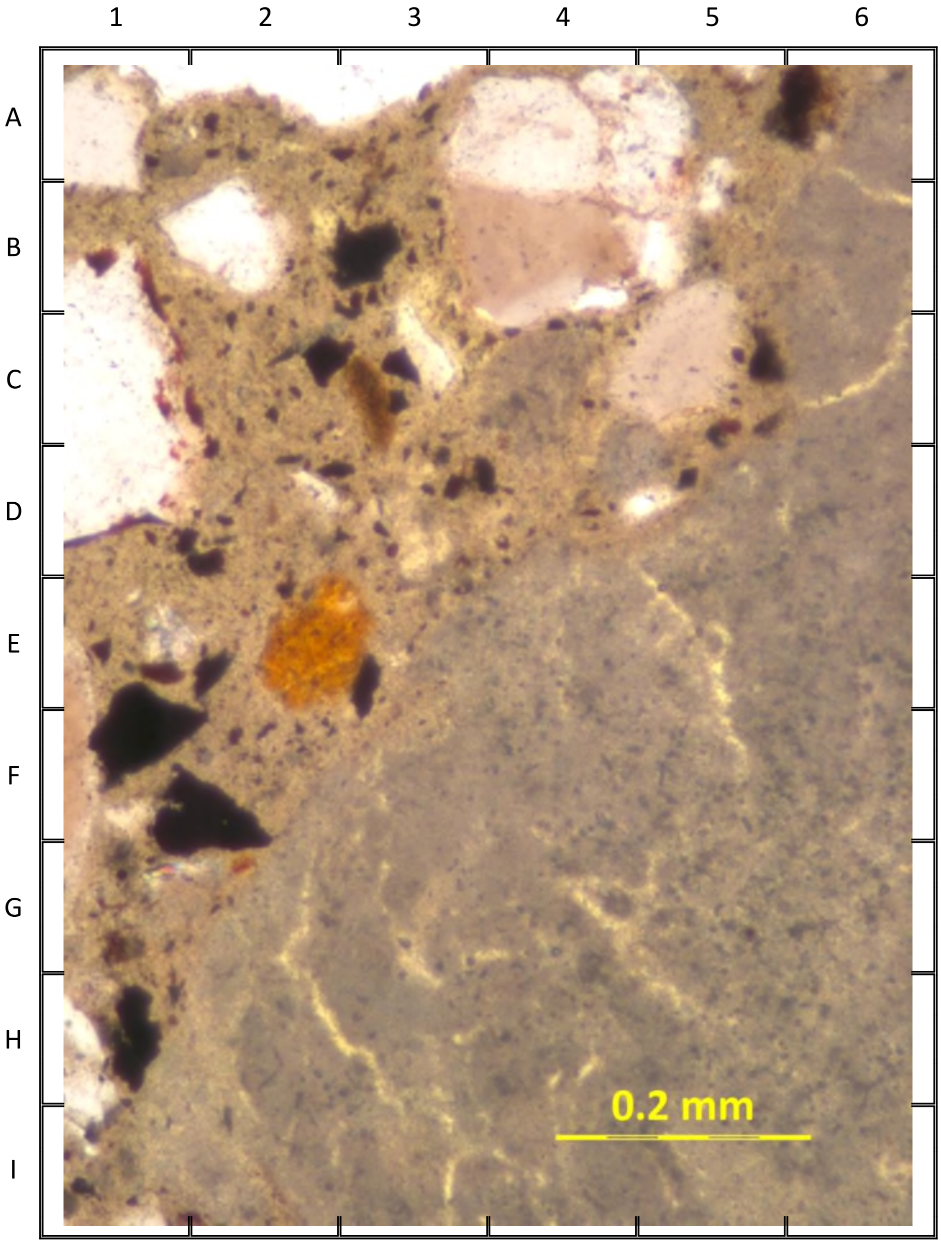
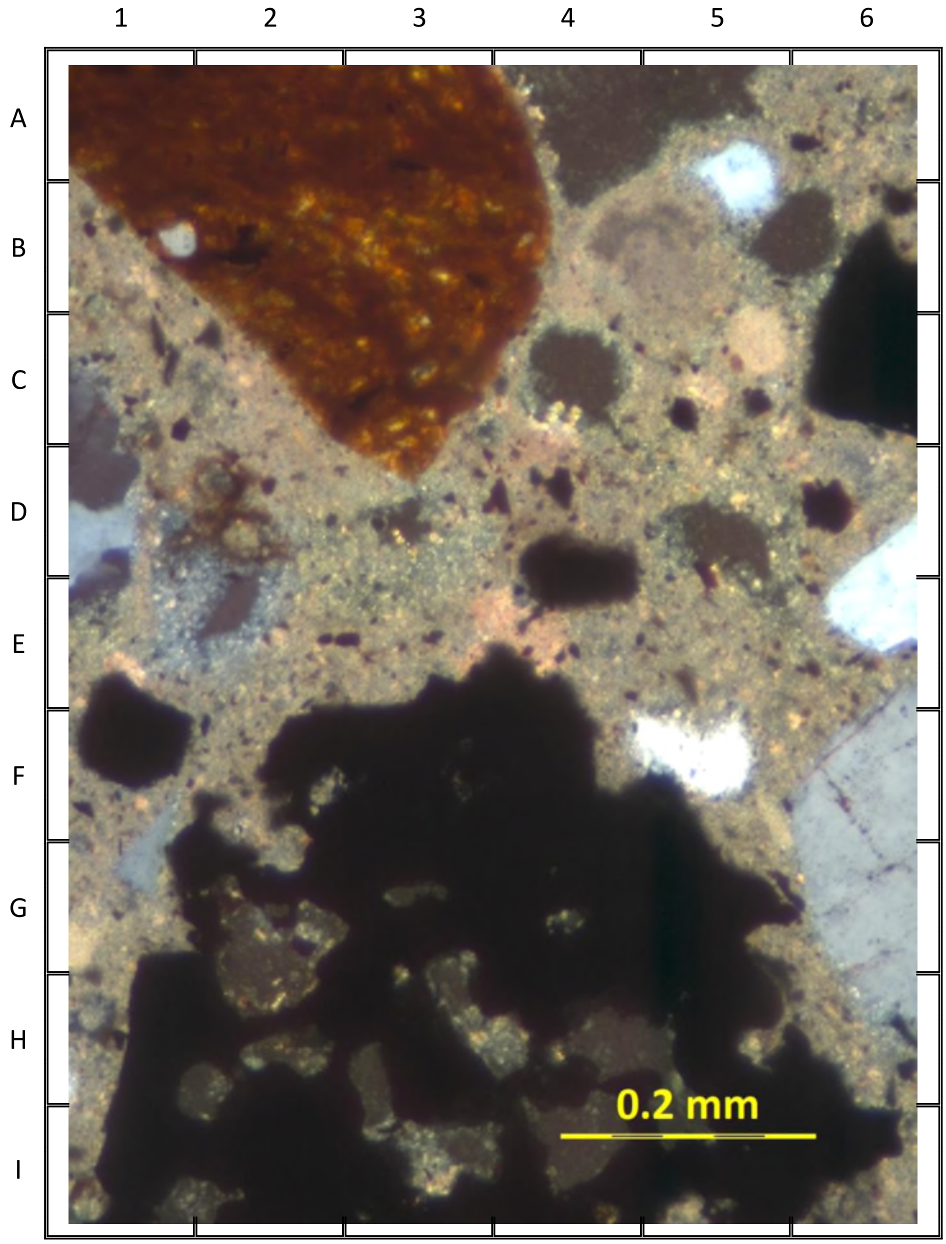


Figure C4

Sample K12882/3 – Sample 6

Thin section, oblique polars: A carbonaceous ash particle occurs in G3. An ironstone particle occurs in A2. Carbonated lime matrix containing black carbonaceous ash dust can be seen for example in D4.



This report is personal to the client, confidential, non-assignable and written with no admission of liability to any third party.

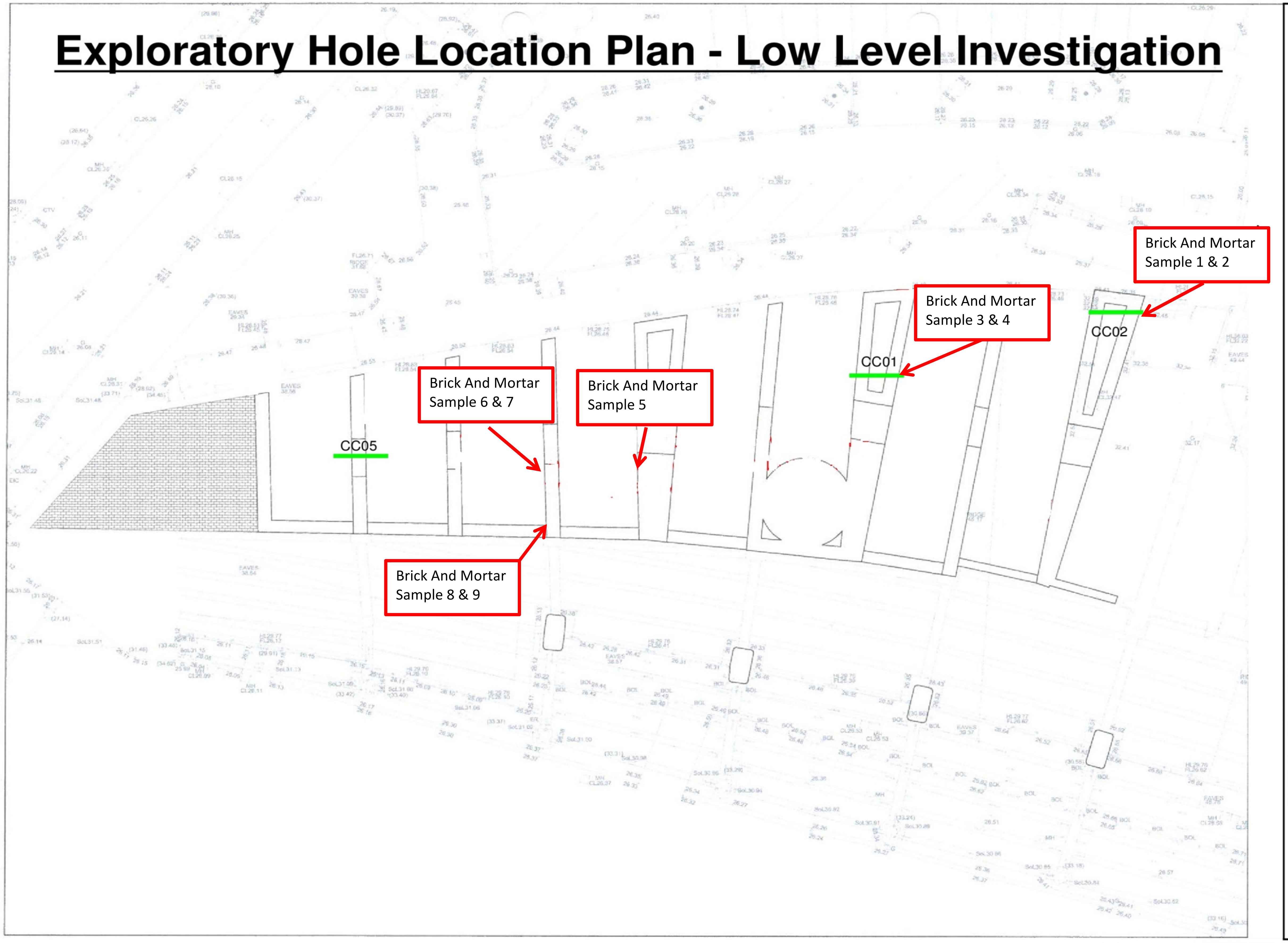
This report shall not be reproduced, except in full, without the written approval of Sandberg LLP.

Where our involvement consists exclusively of testing samples, the results and our conclusions relate only to the samples tested.

3.5 Location Drawing

ESG	Client: ESG	
	Site: The Factory, Manchester	Tested by: BD
		Report Ref:STR 751

Exploratory Hole Location Plan - Low Level Investigation


Brick And Mortar Sample 1 & 2
Brick And Mortar Sample 3 & 4
CC02
CC01
Brick And Mortar Sample 6 & 7
Brick And Mortar Sample 5
CC05
Brick And Mortar Sample 8 & 9

KEY

🟩 Concrete Core (NOTE: Pilot holes to be drilled in to establish if concrete core is required).

GENERAL NOTES

1. All exploratory hole and associated features to be fully surveyed and recorded in in 3D space.
2. UXO clearance required as per the UXO Report.
3. Also refer to 'Exploratory Hole Schedule' document.
4. All exploratory hole locations are subject to existing utilities and as such are marked as indicative.
5. All exploratory holes are subject to agreement with the Heritage Architect.
6. All works to be undertaken in accordance with the methodology agreed with MCC Heritage Team.

GI TENDER
REV 04
June 2016

APPENDIX H
GPR SURVEY

ESG Letter Report Ref L6060-16

ESG
18/19 Drome Road
Deeside Industrial Park
Deeside
Flintshire
CH5 2NY

Tel: 01244 288200

surveys-geophysics@esg.co.uk

Your Ref:
Our Ref: L6060 - 16

3 August 2016

ESG
4 Hexthorpe Rd,
Doncaster,
DN4 0AE

For the Attention of Richard Hardwick

Dear Sirs

GPR SURVEY, THE FACTORY, MANCHESTER.

We are pleased to set out below the results of the processing and interpretation for fieldworks undertaken for the above project.

INTRODUCTION

In June 2016, ESG (surveys and geophysics) were commissioned to perform a GPR survey to determine the thickness of existing brick railway arches at The Factory, Manchester.

THE SITE

The survey area was centred on National Grid Reference (SJ 83112 98011)

FIELDWORK.

On 11 July 2016 a one man survey team was mobbed to site to conduct the GPR survey.

A GSSI SIR 3000 GPR system with a 400MHz antenna set to record at a rate of 100 times per metre was used to collect data in a grid system of 0.5m spacing over the investigation area. The equipment technical specifications can be found in Enclosure B

During the fieldworks, data quality was monitored in real time on screen by the on-site geophysicist to ensure that the records being obtained were of suitable quality.

PROCESSING

The GPR data logged by the SIR systems were imported into GPR-SLICE$_{(c)}$ Ground Penetrating Radar Imaging Software for processing. The data were subject to the following processing to enhance the records:

- DC removal
- Zero time adjustment
- Background noise removal
- Finite Impulse Response (FIR) Filter
- Amplitude correction – automatic gain control and trace equalisation

Each Radargram was then inspected by an experienced geophysicist to identify the brick arch and establish the thickness of the brickwork.

Form the data collected the brickwork in the arch appears to have a thickness of 20cm ($^{+}/_{-}$ 2cm).

An example of a section of processed radar record is presented in Figure F1 – Enclosure A.

If any further processing is required by ESG or any further information or clarification is needed please contact the writer.

Yours faithfully
For ESG

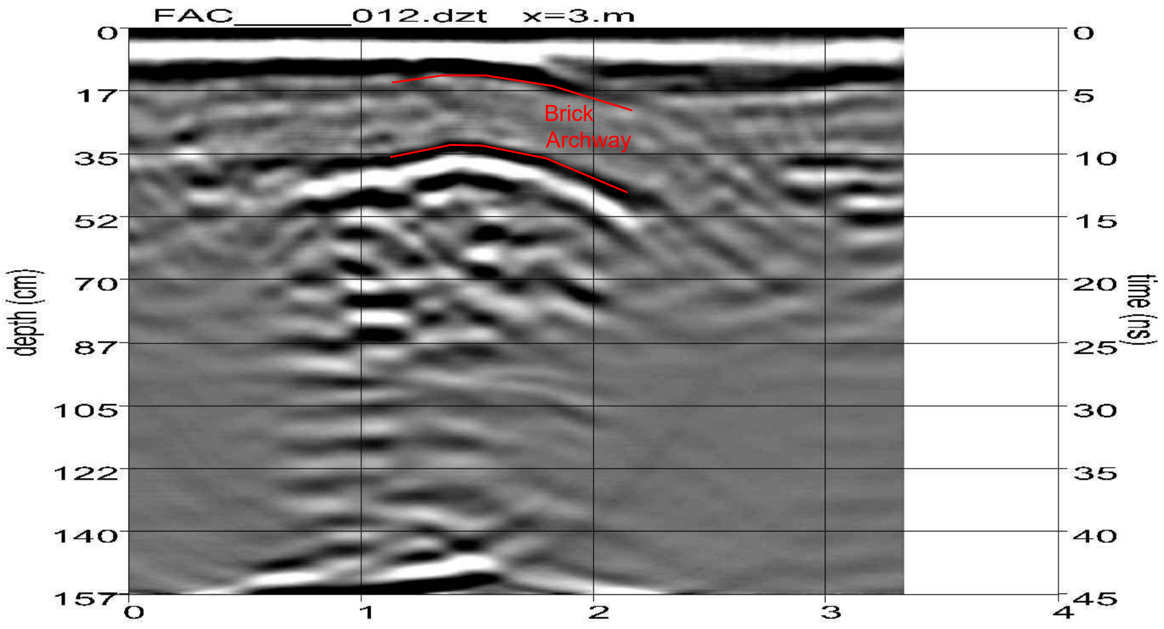
Tom smith (BSc)
Geophysicist
tom.smith@esg.co.uk

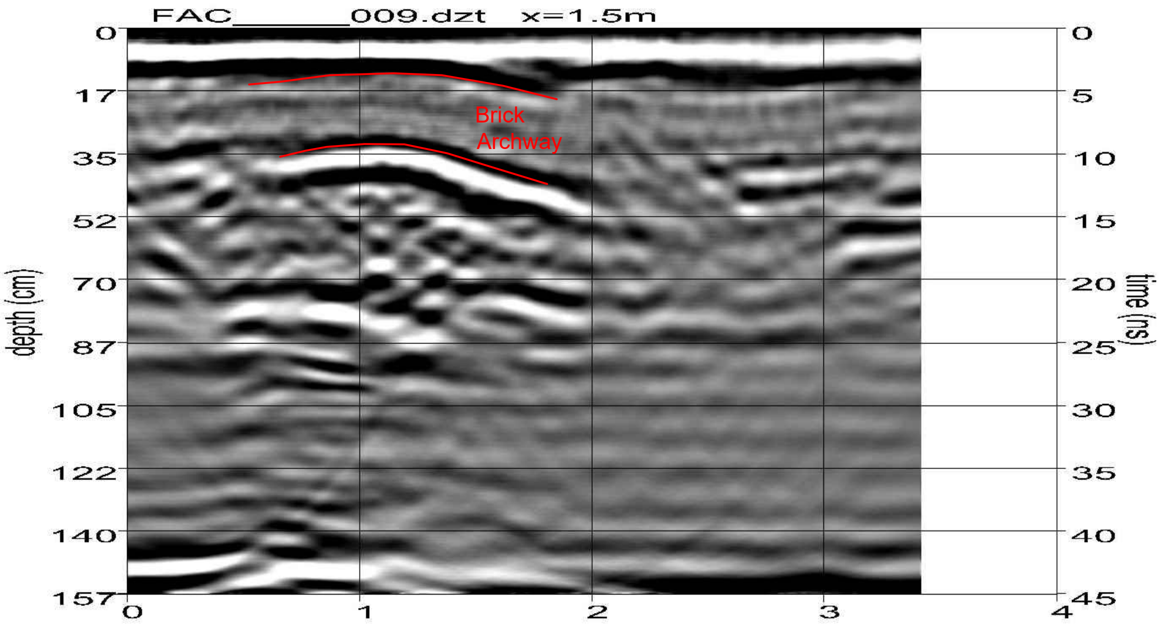
APPENDIX A

EXAMPLE RADARGRAMS

Title	**Figure**
Example radargrams with arches highlighted	F1

GPR Radargram Examples - The Factory - Manchester





Notes:	Project	The Factory - Manchester	Figure
	Project No.	L6060 - 16	F1
	Carried out for		

APPENDIX B

TECHNICAL INFORMATION

SIR 3000 GPR System

Technical Information

GSSI SIR-3000 Ground Penetrating Radar System

TerraSIRch
SIR-3000

The Geophysical Survey Systems Inc. SIR 3000 is a rugged, high performance, single channel ground penetrating radar (GPR) system which provides unrivaled scan rates with low noise.

The system features a rugged light weight hand held PC tablet which controls the GPR system. The equipment has full digital timing control and digital data acquisition throughout making it ideal for high precision surveys for engineering geophysics, archaeology, concrete and road pavement surveys. There are a series of lightweight, interchangeable, bistatic antenna which enables the selection of appropriate radar frequency. Digital processing includes: AGC, SEC & USER gain, FFT filtering, temporal and spatial filtering, modeling & migration and topographic compensation.

Mechanical:

Dimensions:	31.5(L) x 22(W) x 10.5(H) cm
Weight:	4.1Kg (9lbs) including battery
Environmental:	Water Resistant

Operating:

Operating Temperature:	-10C to 40C ambient
Charging Power:	15V DC, 4 amps
Battery:	10.8V DC, internal
Transmit Rate:	Up to 100kHz

System:

Antennas:	Compatible with all GSSI antennas
Number of Channels:	1
Data Storage:	Internal Memory 1GB Flash memory card
Compact Flash Port:	accepts industry standard CF memory up to 2GB (user provided)
Display:	Enhanced 8.4" TFT, 800 x 600 resolution
Display Mode:	Line Scan, O-Scope

Data Acquisition:

Data Format:	RADAN (*.dzt)
Scan Rate Examples:	220 scans/ sec at 256 samples /scan 120 scans / sec at 512 samples / scan
Sample Size:	8-bit or 16-bit, user selectable
Scan Interval:	User Selectable
No. of Samples /Scan:	256, 512, 1024, 2048, 4096, 8192
Operating Modes:	Free Run, Survey Wheel, Point Mode
Time Range:	0 – 8000 nanoseconds full scale, user selectable
Gain:	Manual or Automatic, 1-5 gain points (-20 to +80dB)
Filters	Vertical: Low Pass and High Pass IIR and FIR Horizontal: Stacking, Background Removal

THE FACTORY SITE, MANCHESTER

FACTUAL REPORT ON ADDITIONAL GROUND INVESTIGATION

Report No A6131-16

May 2017

Carried out for:
Manchester City Council
Town Hall
Albert Square
Manchester
M60 2LA

Engineer:
Buro Happold Ltd
2 Brewery Place
Brewery Wharf
Leeds
LS10 1NE

ESG
Askern Road, Carcroft
Doncaster, South Yorkshire, DN6 8DG
Tel: +44 (0) 1302 723 456
email: geo.doncaster@esg.co.uk

Report No A6131-16

May 2017

Issue No Date	Status	Prepared by	Checked by	Approved by
1 Feb 2017	Draft report	NAME and QUALIFICATIONS C Thew BSc FGS	NAME and QUALIFICATIONS T Clifford BEng	NAME and QUALIFICATIONS T Clifford BEng
		SIGNATURE	SIGNATURE	SIGNATURE
2 Mar 2017	Final report	NAME and QUALIFICATIONS T Clifford BEng	NAME and QUALIFICATIONS T Clifford BEng	NAME and QUALIFICATIONS P Hepton BSc PhD
		SIGNATURE	SIGNATURE	SIGNATURE
3 May 2017	Updated Final report	NAME and QUALIFICATIONS T Clifford BEng	NAME and QUALIFICATIONS T Clifford BEng	NAME and QUALIFICATIONS P Hepton BSc PhD
		SIGNATURE	SIGNATURE	SIGNATURE

This Report has been prepared by ESG Limited (“ESGL”) with all reasonable skill and care, within the terms and conditions of the contract between ESGL and the Client (“Contract”) and within the limitations of the resources devoted to it by agreement with the Client. Any reliance upon the Report is subject to the Contract terms and conditions.

This Report is confidential between the Client and ESGL. ESGL accepts no responsibility whatsoever to third parties to whom this document, or any part thereof, is made known. Any such party relies upon the Report at their own risk. The Contracts (Rights of Third Parties) Act 1999 does not apply to this Report nor the Contract and the provisions of the said Act are hereby excluded.

This Report shall not be used for engineering or contractual purposes unless signed above by the author, checker and the approver for and on behalf of ESGL and unless the Report status is ‘Final’.

Unless specifically assigned or transferred within the terms and conditions of the Contract, ESGL asserts and retains all Copyright and other Intellectual Property Rights in and over the Report and its contents. The Report may not be copied or reproduced, in whole or in part, without the written authorisation from ESGL. ESGL shall not be liable for any use of the Report for any purpose other than that for which it was originally prepared.

Whilst every effort has been made to ensure the accuracy of the data supplied and any analysis interpretation derived from it, the possibility exists of variations in the ground and groundwater conditions around and between the exploratory positions. No liability can be accepted for any such variations in these conditions. Furthermore, any recommendations are specific to the development as detailed in this Report and no liability will be accepted should they be used for the design of alternative schemes without prior consultant with ESGL

CONTENTS

Page

1 INTRODUCTION 1

2 SITE SETTING 2

- 2.1 Location and Description 2
- 2.2 Published Geology 2

3 FIELDWORK 3

- 3.1 General 3
- 3.2 Exploratory Holes 3
- 3.3 Groundwater and Gas Monitoring 4

4 LABORATORY TESTING 5

- 4.1 Geotechnical Testing 5
- 4.2 Geoenvironmental Testing 5

REFERENCES 6

APPENDIX A FIGURES AND DRAWINGS

APPENDIX B EXPLORATORY HOLE RECORDS

APPENDIX C INSTRUMENTATION AND MONITORING

APPENDIX D GEOTECHNICAL LABORATORY TEST RESULTS

APPENDIX E GEOENVIRONMENTAL LABORATORY TEST RESULTS

APPENDIX F PHOTOGRAPHS

1 INTRODUCTION

In April 2016 ESG was commissioned by Buro Happold Limited, on behalf of Manchester City Council, to carry out a ground investigation in the centre of Manchester, at a site referred to as The Factory. The investigation was required to obtain geotechnical and geoenvironmental information for proposed development of the site.

Due to access restrictions to part of the site, the works were undertaken in two phases. The first phase, which covered the majority of the site, was reported in October 2017, the report reference is A6053-16.

The works reported herein were carried out as the second phase. The scope of the investigation was specified by Buro Happold Limited and comprised dynamic (window) sampling boreholes extended by rotary drilling, trial pits, in situ testing, laboratory testing and monitoring. The investigation was performed in accordance with the contract specification, and the general requirements of BS 5930 (2015), BS EN 1997-2 (2007), BS EN ISO 22475-1 (2006) and other relevant related standards identified below. The fieldwork took place between 9 and 23 January 2017.

This report presents the factual records of the fieldwork and laboratory testing. The information is also presented as digital data as defined in AGS (2010).

2 SITE SETTING

2.1 Location and Description

The site is located in Manchester city centre, approximately 550 m northwest of Deansgate Railway Station, see Site Location Plan in Appendix A, at National Grid reference SJ 829 980. It covers an area of approximately 0.7 hectares, comprising areas of hardstanding either side of Water Street and railway arches underlying the Starlight Theatre shed building.

The area investigated during this Phase of the works is to the west of Water Street. It is roughly rectangular, approximately 100 m by 45 m, orientated south west to north east and comprises rough hard standing. The area is bounded to the west by the River Irwell and to the east by Water Street. The area investigated during Phase 1 of the works is to the east of Water Street.

2.2 Published Geology

The published geological map for the area, BGS Sheet 85 (2011), and the BGS Geology of Britain Viewer (2016) show the site located on superficial deposits comprising Alluvium and Glacial Till, overlying bedrock of the Chester Pebble Beds Formation, part of the Sherwood Sandstone Group.

Made ground associated with previous development is understood to be present.

3 FIELDWORK

3.1 General

The fieldwork was carried out in general accordance with BS 5930 (2015), BS EN 1997-2 (2007) and BS EN ISO 22475-1 (2006).

The exploratory hole locations were selected by Buro Happold Limited and set out from local features. The co-ordinates and ground levels were surveyed by ESG to National Grid and Ordnance Datum. The exploratory hole locations are shown on the Site Plan in Appendix A.

3.2 Exploratory Holes

Two boreholes, designated BH04 and BH05, were put down by a combination of dynamic sampling and rotary core drilling to depths of 22.2 m and 17.9 m respectively.

One trial pit, designated TP01, was dug by an hydraulic backhoe excavator to a depth of 1.7 m.

The exploratory hole logs are presented in Appendix B. These provide information including the equipment and methods used, samples taken, tests carried out, water observations and descriptions of the strata encountered. Explanation of the terms and abbreviations used on the logs is given in the Key to Exploratory Hole Records in Appendix B, together with other explanatory information. The logging of soil and rock materials is in accordance with BS EN ISO 14688-1+A1 (2013) for soils and BS EN ISO 14689-1 (2003) for rocks, as amplified by BS 5930 (2015).

Standard penetration tests (SPT) in the boreholes were carried out in accordance with BS EN ISO 22476-3+A1 (2011) and the SPT hammer energy ratio certificate is included in Appendix B. The SPT results are presented on the logs as uncorrected N values.

Photographs of the rotary drilled cores are presented in Appendix F.

On completion of the fieldwork geotechnical samples were transported to the Carcroft laboratory of ESG for testing and temporary retention. Geoenvironmental samples were transported from site directly to the laboratory at Bretby, Burton-on-Trent.

3.3 Groundwater and Gas Monitoring

Instrumentation installed in the exploratory holes for groundwater and gas monitoring are shown on the logs and summarised in Appendix C. Records of monitoring carried out by ESG during and after the fieldwork period are presented in Appendix C.

4 LABORATORY TESTING

4.1 Geotechnical Testing

Geotechnical laboratory testing was scheduled by Buro Happold Limited and was carried out in accordance with BS 1377 (1990), BS EN ISO 17892 (2014) Part 1 and 2 and ISRM (2007) unless otherwise stated. The testing is summarised below and the results are presented in Appendix D.

TYPE	REMARKS
Atterberg Limit Determination	1 No
Particle Size Distribution Analysis	5 No
Dry Density / Moisture Content Relationship	1 No (4.5 kg heavy compaction)
Point Load Index Testing	25 No
Uniaxial Compressive Strength of Rock	1 No
pH and Water Soluble Sulphate Content	10 No (soils samples) and 9 No (rock core samples)

4.2 Geoenvironmental Testing

Geoenvironmental laboratory testing was scheduled by Buro Happold Limited on selected soil samples recovered during the fieldwork, and a water samples recovered by ESG from the installation in BH05. The testing was carried out by the ESG laboratory at Burton-on-Trent. The results are presented in Appendix E.

REFERENCES

AGS : 2010 : Electronic transfer of geotechnical and geoenvironmental data (Edition 4 including Addendum 3. October 2011). Association of Geotechnical and Geoenvironmental Specialists.

BGS England and Wales Sheet 85 : 2011 : Manchester. 1:50000 geological map (Bedrock and Superficial). British Geological Survey.

BGS Geology of Britain Viewer : 2017. www.bgs.ac.uk. British Geological Survey.

BS 1377 : 1990 : Methods of test for soils for civil engineering purposes. British Standards Institution.

BS 5930 : 2015 : Code of practice for ground investigations. British Standards Institution.

BS EN 1997-2 : 2007 : Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. British Standards Institution.

BS EN ISO 14688-1:2002+A1 : 2013 : Geotechnical investigation and testing - Identification and classification of soil - Part 1 Identification and description. British Standards Institution.

BS EN ISO 14688-2:2004+A1 : 2013 : Geotechnical investigation and testing - Identification and classification of soil - Part 2 Principles for a classification. British Standards Institution.

BS EN ISO 14689-1 : 2003 : Geotechnical investigation and testing - Identification and classification of rock - Part 1 Identification and description. British Standards Institution.

BS EN ISO 22475-1 : 2006 : Geotechnical investigation and testing – Sampling methods and groundwater measurements - Part 1 Technical principles for execution. British Standards Institution.

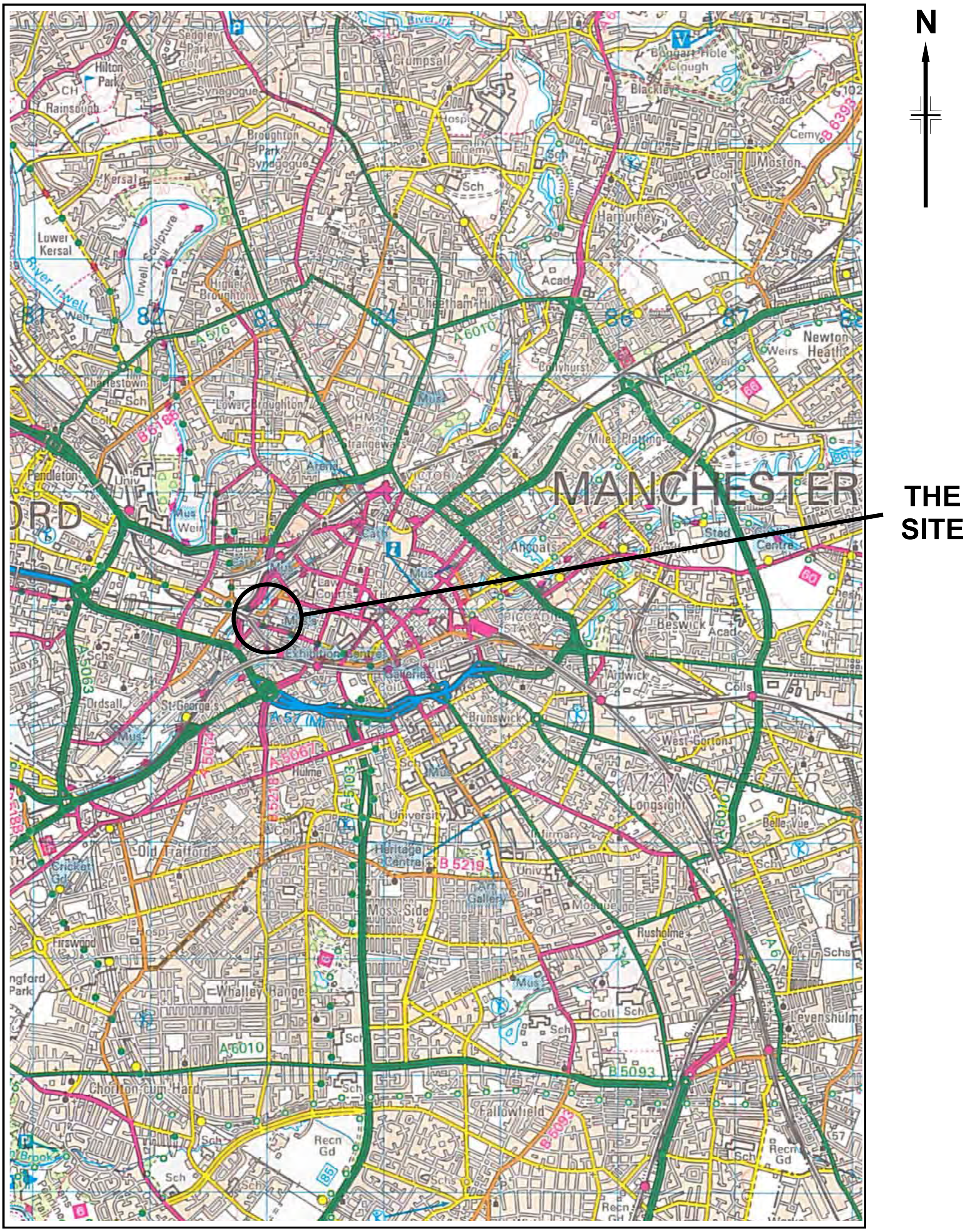
BS EN ISO 22476-3:2005+A1 : 2011 : Geotechnical investigation and testing - Field testing - Part 3 Standard penetration test. British Standards Institution.

ISRM : 2007 : The Complete ISRM Suggested Methods for Rock Characterisation, Testing and Monitoring (1974-2006). Commission on Testing Methods, International Society for Rock Mechanics (Editors Ulusay R & Hudson JA).

APPENDIX A
FIGURES AND DRAWINGS

Site Location Plan A1
Site Plan A2

Site Location Plan



Reproduced from the 2013 Ordnance Survey 1:50 000 scale Landranger map No 109 by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright, Environmental Services Group Limited. All rights reserved. Licence Number 100006060

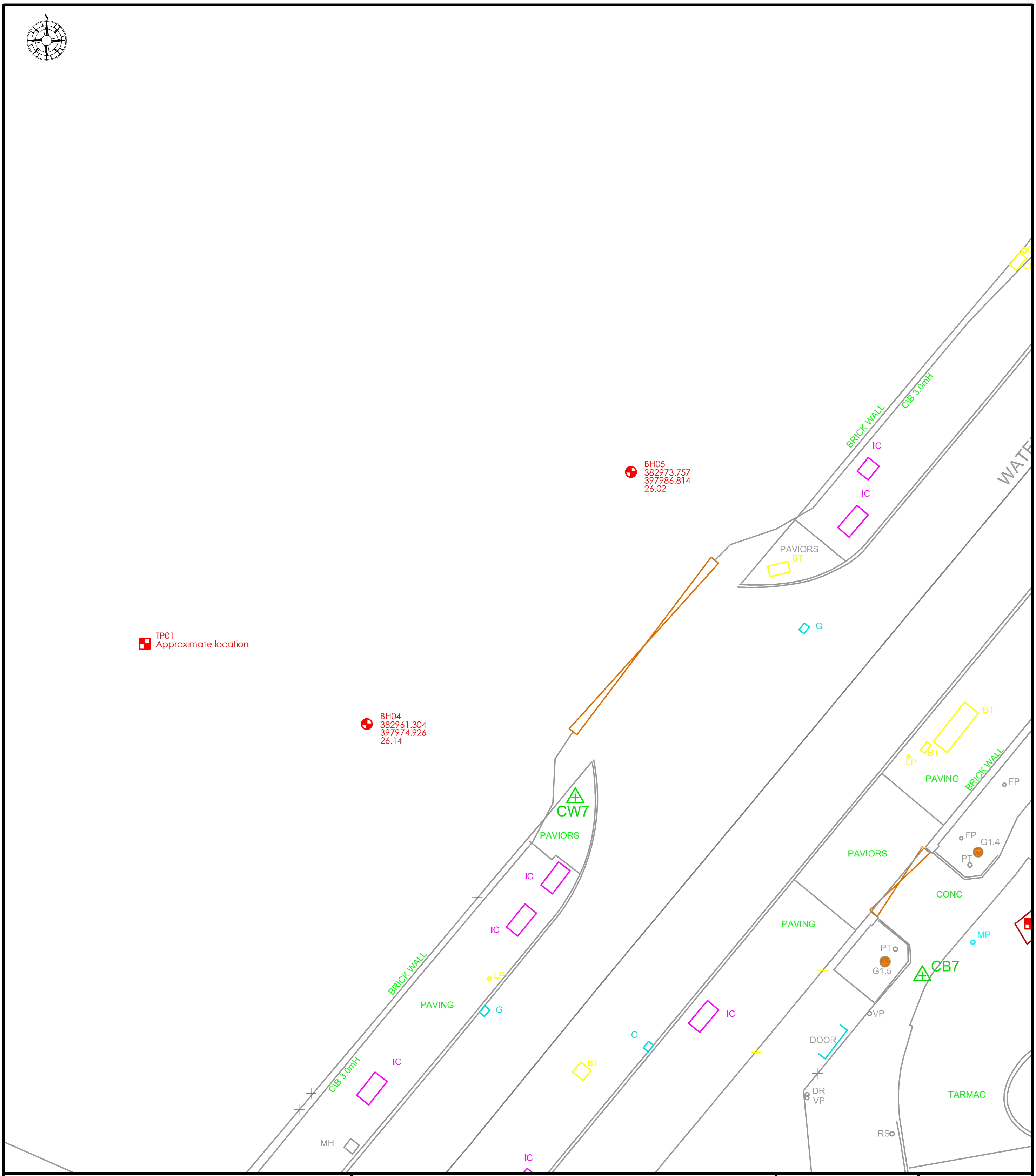
Notes:
Scale 1:50 000

Project	**THE FACTORY, MANCHESTER - ADDITIONAL BOREHOLES**
Project No.	**A6131-16**
Carried out for	**Buro Happold Limited**

Figure

A1

Sheet 1 of 1


N
BH05
382973.757
397986.814
26.02
TP01
Approximate location
BH04
382961.304
397974.926
26.14
BRICK WALL
CIB 3.0mH
IC
IC
WATE
PAVIORS
BT
G
BT
BT
LP
PAVING
BRICK WALL
FP
FP
G1.4
PT
CW7
PAVIORS
IC
IC
LP
BRICK WALL
PAVING
G
CIB 3.0mH
IC
MH
PAVIORS
CONC
PAVING
PT
G1.5
MP
CB7
VP
IC
G
BT
DOOR
DR
VP
TARMAC
RS
IC

LEGEND TO SYMBOLS

⊕ Borehole Location

Scale: 1:250

0 12.5m 25 37.5 50 62.5

Title
SITE PLAN

Project
THE FACTORY ADDITIONAL GI

Client
Buro Happold Limited

Date 15/03/17	Drawn By AW
Scale 1:250	Approv. By TC
Sheet Size A4	Project No A6136-17
Figure No A2	Rev 0

ESG

APPENDIX B

EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records	Key
SPT Hammer Energy Ratio Report	SPT Hammer Reference ADS5
Borehole Logs	BH04 and BH05
Trial Pit Logs	TP01

Key to Exploratory Hole Records

SAMPLES

Undisturbed

U	Driven tube sample	nominally 100 mm diameter and full recovery unless otherwise stated
UT	Driven thin wall tube sample	
TW	Pushed thin wall tube sample	
P	Pushed piston sample	
L	Liner sample (from Windowless or similar sampler), full recovery unless otherwise stated	
CBR	CBR mould sample	
BLK	Block sample	
CS	Core sample (from rotary core) taken for laboratory testing	
AMAL	Amalgamated sample	

Disturbed

D	Small sample
B	Bulk sample

Other

W	Water sample
G	Gas sample
	Environmental chemistry samples (in more than one container where appropriate)
ES	Soil sample
EW	Water sample

Comments Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that attempt was made to take a tube sample, however, there was no recovery.

Monitoring samples taken after completion of hole construction are not shown on the exploratory hole logs.

TESTS

SPT S or SPT C Standard Penetration Test, open shoe (S) or solid cone (C)

The Standard Penetration Test is defined in BS EN ISO 22476-3:2005+A1:2011. The incremental blow counts are given in the Field Records column; each increment is 75 mm unless stated otherwise and any penetration under self weight in mm (SW) is noted. Where the full 300 mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach 50 the total blow count beyond the seating drive is given (without the N = prefix).

IV	*in situ* Vane shear strength, peak (p) and remoulded (r)
HV	Hand vane shear strength, peak (p) and remoulded (r)
PP	Pocket penetrometer test, converted to shear strength
KFH, KRH, KPI	Permeability tests (KFH = falling head, KRH = rising head; KPI = packer inflow); results provided in Field Records column (one value per stage for packer tests)

DRILLING RECORDS

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930:2015

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
If	Fracture spacing, mm. Minimum, typical and maximum spacings are presented. The term non-intact (NI) is used where the core is fragmented.

Flush returns, estimated percentage with colour where relevant, are given in the Records column

CRF	Core recovered (length in m) in the following run
AZCL	Assessed zone of core loss
NR	Not recovered

GROUNDWATER

▼	Groundwater strike
▽	Groundwater level after standing period

Notes:
See report text for full references of standards

Key to Exploratory Hole Records

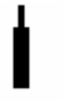
INSTALLATION

Standpipe/ piezometer

Details of standpipe/piezometer installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill.

The type of instrument installed is indicated by a code in the Legend column at the depth of the response zone:

SP	Standpipe
SPIE	Standpipe piezometer
PPIE	Pneumatic piezometer
EPIE	Electronic piezometer

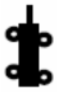


Inclinometer or Slip Indicator

The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend column.

The type of instrument installed is indicated by a code in the Legend column at the base of the tubing:

ICE	Biaxial inclinometer
ICM	Inclinometer tubing for use with probe
SLIP	Slip indicator

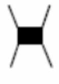


Settlement Points or Pressure Cells

The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the Legend column.

The type of instrument installed is indicated by a code in the Legend column:

ESET	Electronic settlement cell/gauge
ETM	Magnetic extensometer settlement point
EPCE	Electronic embedment pressure cell
PPCE	Electronic push in pressure cell



INSTALLATION LEGENDS

A legend describing the installation is shown in the rightmost column. Legends used to describe the backfill materials as indicated below.

Arisings	Concrete	Grout	Bentonite	Sand	Gravel	Macadam
▒	░	▧	▨	░	○	▲

NOTES

1 Soils and rocks are described in accordance with BS EN ISO 14688-1:2002+A1:2013 and 14689-1:2003 respectively as amplified by BS 5930:2015.

2 For fine soils, consistency determined during description is reported for those strata where undisturbed samples are available. Where the logger considers that the sample may not be representative of the condition in situ, for whatever reason, the reported consistency is given in brackets. The reliability of the sample is indicated by Probably or Possibly as appropriate. Hence (Probably firm) indicates the logger is reasonably confident of the assessment, but (Possibly firm) means less certainty. Where the samples available are too disturbed to allow a reasonable assessment of the in situ condition, no consistency is given.

3 Evidence of the occurrence of very coarse particles (cobbles and boulders) is presented on the logs, however, because of their size in relation to the exploratory hole these records may not be fully representative of their size and frequency in the ground mass.

4 The declination of bedding and joints is given with respect to the normal to the core axis. Thus in a vertical borehole this will be the dip.

5 The assessment of SCR, RQD and Fracture Spacing excludes artificial fractures

6 Water level observations of discernible entries during the advancing of the exploratory hole are given at the foot of the log and in the Legend column. The term "none observed" is used where no discrete entries are identified although this does not necessarily indicate that the hole has not been advanced below groundwater level. Under certain conditions groundwater cannot be observed, for instance, drilling with water flush or overwater, or boring at a rate much faster than water can make its way into the borehole In addition, where appropriate, water levels in the hole at the time of recovering individual samples or carrying out in situ tests and at shift changes are given in the Records column.

7 The borehole logs present the results of Standard Penetration Tests recorded in the field without correction or interpretation. However, in certain ground conditions (eg high hydraulic head or where very coarse particles are present) some judgement may be necessary in considering whether the results are representative of in situ mass conditions.

Notes:
See report text for full references of standards

Project	**THE FACTORY SITE, MANCHESTER, ADDITIONAL GI**
Project No.	**A6131-16**
Carried out for	**Buro Happold**

Key

Sheet 2 of 2

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX59JP

SPT Hammer Ref:	ACE2
Test Date:	17/10/2016
Report Date:	17/10/2016
File Name:	ACE2.spt
Test Operator:	SH

Instrumented Rod Data

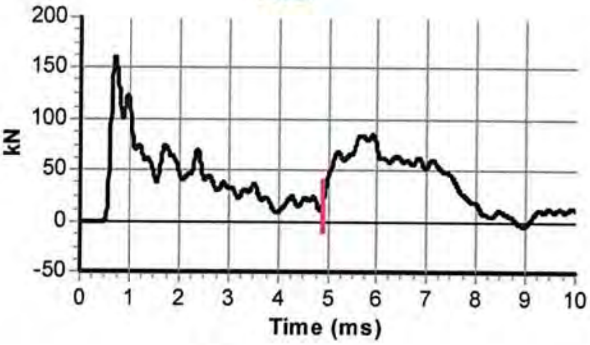
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.1
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	7080
Accelerometer No.2:	7079

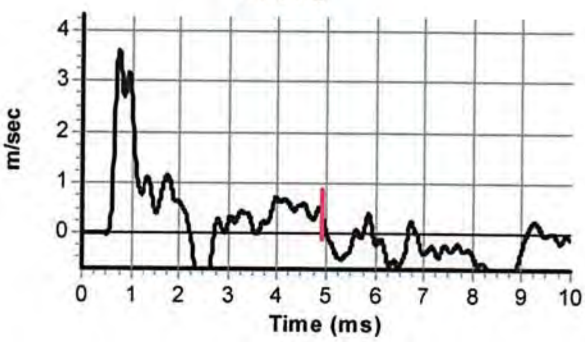
SPT Hammer Information

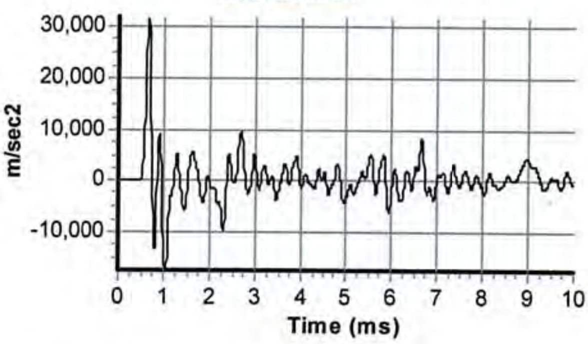
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	10.0

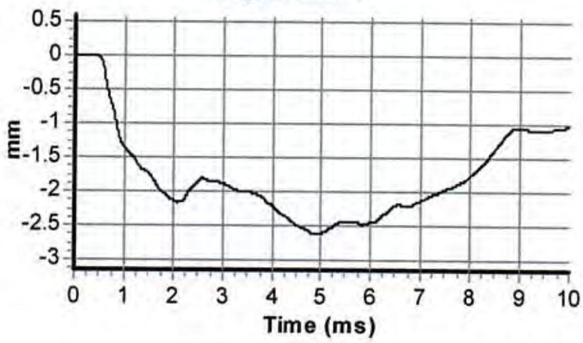
Comments / Location

CALIBRATION


Force


Velocity


Acceleration


Displacement

Calculations

Area of Rod A (mm2):	918
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	272

Energy Ratio E_r (%): **58**

Signed: M.GARDNER
Title: FITTER

The recommended calibration interval is 12 months

Borehole Log

Drilled TW	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	26.14 mOD
Logged DK	12/01/2017	Beretta T41. Dynamic sampling to 4.80m, followed by rotary core drilling (PWF size) to 22.20m, using water/mud flush. SPT Hammer ID: ACE2, Rod type: NWY.	1.20 4.80	4.80 22.20	87 121	4.80 5.80	**Coordinates (m)**	E 382961.30
Checked TC	**End**						**National Grid**	N 397974.90
Approved TC	14/01/2017							

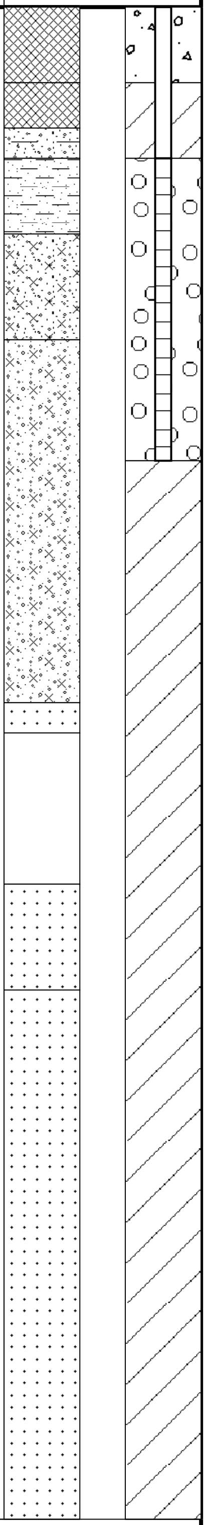
Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
			0.00-1.20 Hand excavated inspection pit.		
0.20	ES 1				
0.20	B 2				
0.50	ES 3				
0.50	B 4				
1.00	ES 5				
1.00	B 6				
1.20 - 1.65	SPTS		N=10 (1,1/2,2,3,3)		
1.20 - 1.70	B 7				
1.70 - 2.20	B 8				
2.20 - 2.65	SPTS		N=23 (4,5/5,5,7,6)		
2.20 - 3.20	B 9				
3.20 - 3.65	SPTS		N=23 (3,8/8,4,6,5)		
3.20 - 4.20	B 10				
4.20 - 4.65	SPTS		N=8 (2,2/1,2,2,3)	12/01/17	1800
4.20 - 4.80	B 11			4.20	3.02
				13/01/17 4.20	0700 2.36
4.80 - 5.80	0 0 0	- NA -	Flush: 4.80 - 5.80 Water with liquid polymer 20%		
5.80			CS 12		
5.80 - 6.50	93 79 14	NI 40 100			
6.85 - 7.05			CS 13		
6.50 - 7.30	100 100 100				
7.30			CS 14		
7.30 - 8.80	100 100 85	80 190 390			
8.30 - 8.50			CS 15		
8.80			CS 16		
9.10			CS 17		
8.80 - 10.30	100 100 100				

Strata Description

Main	Detail	Depth	Level	(Thickness)
Dark grey sandy angular to subangular fine to coarse GRAVEL of mudstone, brick, sandstone and granite with low cobble content. Cobbles are angular of brick. (MADE GROUND)		0.50	+25.64	(0.50)
Dark brown and dark grey sandy slightly clayey angular to subangular fine to coarse GRAVEL of brick, granite and sandstone. (MADE GROUND)		0.80	+25.34	(0.30)
Orangish brown, mottled dark brownish grey slightly gravelly clayey fine SAND. Gravel is angular fine to coarse of sandstone.		1.00	+25.14	(0.20)
Soft to firm orangish brown, mottled brownish grey, sandy CLAY with rare rootlets (up to 2mm diameter).		1.50	+24.64	(0.50)
Grey, mottled orangish brown, slightly gravelly very silty SAND. Gravel is rounded of quartzite.		2.20	+23.94	(0.70)
Medium dense dark grey and yellowish brown very sandy silty angular to rounded fine to coarse GRAVEL of sandstone and quartzite.		4.60	+21.54	(2.40)
Extremely weak reddish brown fine to coarse grained SANDSTONE.		4.80	+21.34	(0.20)
NO RECOVERY.		5.80	+20.34	(1.00)
Extremely weak to very weak reddish brown fine and medium grained SANDSTONE. Fractures are: 1) Subhorizontal, very closely and closely spaced, planar and undulating, smooth and rough with sandy smearing on surface and local clay smearing (up to 3mm). 2) Subvertical, planar, smooth with sand infill and local clay smearing (up to 2mm).		6.50	+19.64	(0.70)
Very weak and weak reddish brown fine and medium grained SANDSTONE. Fractures are subhorizontal, closely and medium spaced, planar and undulating, smooth and rough with sand infill (up to 3mm) and local clay smearing (up to 3mm). Loss of strength adjacent to fractures (5-30mm).				

Legend | Backfill



Groundwater Entries			
No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks	
Depths (m)	Remarks

Chiselling Details		
Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
15/03/2017 16:17:10

AGS

Project	**THE FACTORY ADDITIONAL GI**
Project No.	**A6131-16**
Carried out for	**Buro Happold**

Borehole

BH04

Borehole Log

Drilled	TW	**Start**	
Logged	DK	12/01/2017	
Checked	TC	**End**	
Approved	TC	14/01/2017	

Equipment, Methods and Remarks

Beretta T41.
Dynamic sampling to 4.80m, followed by rotary core drilling (PWF size) to 22.20m, using water/mud flush.
SPT Hammer ID: ACE2, Rod type: NWY.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	4.80	87	4.80
4.80	22.20	121	5.80

Ground Level	26.14 mOD
Coordinates (m)	E 382961.30
National Grid	N 397974.90

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.00			CS 18	13/01/17 5.80	1800 2.36
				14/01/17 5.80	0730 2.36
11.00			CS 19		
10.30 - 11.80	100 100 94				
11.80					
12.00			CS 20 CS 21		
11.80 - 13.30	53 36 19				
13.30					
13.30 - 13.80	100 100 28		CS 22		
14.00 - 14.25			Flush: 5.80 - 22.20 Water with liquid polymer 100% CS 23		
13.80 - 14.80	100 100 85				
14.90		NI 120 260	CS 24		
15.00			CS 25		
14.80 - 16.30	100 100 100				
16.00			CS 26		
17.00 - 17.20			CS 27		
16.30 - 17.80	100 93 41				
18.00			CS 28		
17.80 - 19.30	80 73 55				
19.00			CS 29		
19.30 - 20.70					

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Very weak and weak reddish brown fine and medium grained SANDSTONE. Fractures are subhorizontal, closely and medium spaced, planar and undulating, smooth and rough with sand infill (up to 3mm) and local clay smearing (up to 3mm). Loss of strength adjacent to fractures (5-30mm).	11.00 extremely weak 11.80-12.50 AZCL 13.05-13.10 recovered as sand 13.18-13.25 recovered as sand 13.30 extremely weak 14.80-14.88 subvertical planar smooth fracture with sand infill 17.00-17.65 subvertical planar and rough fracture with sand infill and clay smearing 17.80-18.15 AZCL	(15.70)		

Groundwater Entries			
No.	**Depth Strike**	**Remarks**	**Depth Sealed**

Depth Related Remarks	
Depths (m)	**Remarks**

Chiselling Details		
Depths (m)	**Duration (mins)**	**Tools used**

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
15/03/2017 16:17:10

AGS

Project	THE FACTORY ADDITIONAL GI
Project No.	A6131-16
Carried out for	Buro Happold

Borehole

BH04

Borehole Log

Drilled	TW	**Start**	
Logged	DK	12/01/2017	
Checked	TC	**End**	
Approved	TC	14/01/2017	

Equipment, Methods and Remarks

Beretta T41.
Dynamic sampling to 4.80m, followed by rotary core drilling (PWF size) to 22.20m, using water/mud flush.
SPT Hammer ID: ACE2, Rod type: NWY.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	4.80	87	4.80
4.80	22.20	121	5.80

Ground Level	26.14 mOD
Coordinates (m)	E 382961.30
National Grid	N 397974.90

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
20.00	100 93 75		CS 30		
21.00		NI 140 250	CS 31		
20.70 - 22.20	100 97 49				
22.10			CS 32	14/01/17 5.80	1800 2.36

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Very weak and weak reddish brown fine and medium grained SANDSTONE. Fractures are subhorizontal, closely and medium spaced, planar and undulating, smooth and rough with sand infill (up to 3mm) and local clay smearing (up to 3mm). Loss of strength adjacent to fractures (5-30mm).	20.60-20.70 drilling disturbed. Recovered as sandy angular fine to coarse gravel	22.20 +3.94		
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
15/03/2017 16:17:10

Project	**THE FACTORY ADDITIONAL GI**
Project No.	**A6131-16**
Carried out for	**Buro Happold**

Borehole

BH04

Sheet 3 of 3

Borehole Log

Drilled	TW	**Start**	
Logged	MS/ RTM	15/01/2017	
Checked	TC	**End**	
Approved	TC	16/01/2017	

Equipment, Methods and Remarks

Beretta T41.
Dynamic sampling to 4.40m, followed by rotary core drilling (PWF size) to 17.90m using water/mud flush.
SPT Hammer ID: ACE2, Rod type: NWY.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	17.90	121	4.30

Ground Level	26.02 mOD
Coordinates (m)	E 382973.80
National Grid	N 397986.80

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
0.20	ES 1		0.00-1.20 Hand excavated inspection pit.		
0.20 - 0.30	B 3				
0.50	ES 2				
0.50 - 0.60	B 6				
1.00	ES 4				
1.00 - 1.10	B 9				
1.20 - 1.65	SPTS		N=7 (2,2/3,2,1,1)		
1.20 - 2.10	B 11				
1.20 - 1.65	D 10				
2.20 - 2.65	SPTS		N=9 (2,2/2,2,2,3)		
2.20	ES 5				
2.20 - 3.20	B 13				
2.20 - 2.65	D 12				
3.00	ES 7				
3.20 - 3.65	SPTS		N=10 (1,1/1,2,3,4)		
3.20 - 3.45	D 14				
3.45 - 3.75	D 15				
3.50	ES 8				
3.75 - 4.00	D 16				
			Flush: 4.00 - 4.40 Water with liquid polymer 30%		
4.40 - 4.60			N/A NA N/A		
4.40 - 5.00	67 67 67	40 40 40	CS 17		
			N/A NA N/A		
5.40 - 5.60			CS 18		
5.00 - 5.90	89 89 89	80 80 80			
6.20 - 6.30			CS 19		
			Flush: 4.40 - 8.10 Water with liquid polymer 100%		
6.50			CS 20		
5.90 - 7.40	97 80 47	NI 200 410			
				15/01/17 4.30	1800 1.21
7.50			CS 21	16/01/17 4.30	0700 2.63
7.40 - 8.10	43 14 14	NI 60 100			
8.00			CS 22		
8.10 - 8.90	79 42 31	NI 70 150	CS 23		
8.50					
9.50			CS 24		
8.90 - 10.40	97 93 87	NI 150 300			

Strata Description

Main	Detail	Depth	Level	(Thickness)
Light grey slightly sandy angular to subangular fine to coarse GRAVEL of limestone and sandstone with medium cobble content. Cobbles are subangular to angular of limestone. (MADE GROUND)		0.90	+25.12	(0.90)
Soft brown, locally yellowish brown slightly sandy gravelly CLAY. with low cobble content. Gravel is subangular to rounded fine to coarse of flint, brick, sandstone and limestone. (MADE GROUND)		2.20	+23.82	(1.30)
Loose brown very sandy clayey subangular to subrounded fine to coarse GRAVEL of flint, brick and sandstone. (MADE GROUND)		3.20	+22.82	(1.00)
Loose to medium dense brown and grey slightly sandy subangular to rounded fine to coarse GRAVEL of various lithologies including brick, flint and sandstone. (MADE GROUND)	3.45-3.75 becoming very sandy	3.75	+22.27	(0.55)
Reddish brown fine to coarse SAND. (Completely weathered SANDSTONE)	4.00-4.40 no recovery	4.40	+21.62	(0.65)
Extremely weak to very weak, reddish brown medium grained SANDSTONE. Discontinuities are subhorizontal and occasional subvertical, closely spaced, rough, planar with greenish grey staining.	4.40-4.60 AZCL 5.00-5.10 AZCL	5.90	+20.12	(1.50)
Extremely weak to very weak reddish brown speckled greenish grey and red medium grained SANDSTONE. Discontinuities are subhorizontal, widely spaced, rough, planar with greenish grey staining.	5.90-6.75 2mm diameter quartz fragments/gravel embedded in sandstone 6.93-7.40 fractures are subvertical smooth planar with greenish grey staining 7.40-7.80 AZCL	8.10	+17.92	(2.20)
Very weak, locally extremely weak, greenish grey and red medium grained SANDSTONE. Discontinuities are subhorizontal, closely to medium spaced, rough, planar, clean.	8.10-8.27 AZCL	8.90	+17.12	(0.80)
Extremely weak to very weak reddish brown fine to medium grained SANDSTONE. Discontinuities are subhorizontal, closely to medium spaced, planar, rough, clean.				(2.10)

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

(c) ESG www.esg.co.uk
15/03/2017 16:17:11

AGS

Project	THE FACTORY ADDITIONAL GI
Project No.	A6131-16
Carried out for	Buro Happold

Borehole

BH05

Borehole Log

Drilled	TW	**Start**	15/01/2017	
Logged	MS/ RTM			
Checked	TC	**End**	16/01/2017	
Approved	TC			

Equipment, Methods and Remarks

Beretta T41.
Dynamic sampling to 4.40m, followed by rotary core drilling (PWF size) to 17.90m using water/mud flush.
SPT Hammer ID: ACE2, Rod type: NWY.

Depth from (m)	to (m)	Diameter (mm)	Casing Depth (m)
1.20	17.90	121	4.30

Ground Level	26.02 mOD
Coordinates (m)	E 382973.80
National Grid	N 397986.80

Samples and Tests

Depth	TCR SCR RQD	If	Records/Samples	Date Casing	Time Water
10.50			CS 25		
10.60			CS 26		
			Flush: 8.10 - 13.40 Water with liquid polymer 90%		
10.40 - 11.90	90 59 13				
11.90			CS 27		
11.90 - 13.40	80 37 20				
		NI 110 360			
13.80			CS 28		
13.40 - 14.90	87 59 37		Flush: 13.40 - 14.90 Water with liquid polymer 70%		
14.50			CS 29		
15.50 - 15.70			CS 30		
14.90 - 16.40	100 80 13				
		NI 80 390	Flush: 14.90 - 17.90 Water with liquid polymer 90%		
16.70			CS 31		
16.40 - 17.90	87 60 36				
17.40 - 17.55			CS 32		
				16/01/17 4.30	1245

Strata Description

Main	Detail	Depth, Level (Thickness)	Legend	Backfill
Extremely weak to very weak reddish brown fine to medium grained SANDSTONE. Discontinuities are subhorizontal, closely to medium spaced, planar, rough, clean.	10.40-10.55 AZCL	11.00 +15.02		
Extremely weak to very weak reddish brown medium grained SANDSTONE. Discontinuities are subhorizontal, medium to widely spaced, rough, planar with yellowish brown staining.	11.20-11.90 fractures are subvertical smooth planar with yellowish staining 11.90-12.20 AZCL 13.00-13.40 yellowish brown staining penetrating up to 3mm adjacent to fracture 13.40-13.60 AZCL	(3.90) 14.90 +11.12		
Very weak to weak reddish brown medium grained SANDSTONE. Discontinuities are: 1) Subhorizontal, closely to medium spaced, planar, smooth with sand smearing on surface. 2) Subvertical, planar, smooth with yellowish brown and grey staining.	16.40-16.60 AZCL 16.60-17.90 occasional 4mm diameter quartz clasts within sandstone	(3.00) 17.90 +8.12		
END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike	Remarks	Depth Sealed

Depth Related Remarks

Depths (m)	Remarks

Chiselling Details

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

AGS

(c) ESG www.esg.co.uk
15/03/2017 16:17:11

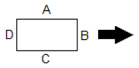
Project	**THE FACTORY ADDITIONAL GI**
Project No.	**A6131-16**
Carried out for	**Buro Happold**

Borehole

BH05

Trial Pit Log

Logged DK **Checked** TC **Approved** TC	**Start** 23/01/2017 **End** 23/01/2017	**Equipment, Methods and Remarks** JCB 3CX. Machine excavated trial pit.	**Dimension and Orientation** Width 9.00 m Length 9.00 m 30 (Deg)	**Ground Level** **Coordinates (m)** **National Grid**



Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.00 - 0.50 0.00 - 0.50	ES2 B1		Dark grey and brownish grey sandy slightly clayey angular to subangular fine to coarse GRAVEL of brick and granite with low cobble content. Cobbles are angular of brick and granite. (MADE GROUND)		(0.60) 0.60	▨	▒
			Dark grey and brownish grey sandy slightly clayey angular to subangular GRAVEL and COBBLES of brick and granite. (MADE GROUND)	0.60 terram sheet	(0.20) 0.80	▨	▒
0.80 - 1.70 0.80 - 1.70	ES4 B3	23/01/17 dry	Soft to firm orangish brown, mottled brownish grey, sandy CLAY with frequent pockets (up to 5mm) of dark brown clay.		(0.90) 1.70	┄	▒
			END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depth (m)	Remarks
0.00 - 1.70	No groundwater encountered during excavation.

Stability Stable
Shoring None
Weather Overcast

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:25

(c) ESG www.esg.co.uk
15/03/2017 17:28:38

AGS

Project **THE FACTORY ADDITIONAL GI**
Project No. **A6131-16**
Carried out for **Buro Happold**

Trial Pit
TP01
Sheet 1 of 1

APPENDIX C

INSTRUMENTATION AND MONITORING

Installation Details	Table C1
Groundwater Monitoring	Table C2
Gas Monitoring	Table C3

Installation Details

Instrument Reference	Instrument Type (See Notes)	Installation Date, dd/mm/yyyy	Pipe Diameter, mm	Instrument Base, mbgl	Response Zone Range, mbgl	Pipe Top Details	Headworks	Remarks
BH04 (1)	SP	14/01/2017	50	3.00	1.00 to 3.00	Gas Tap	Flush cover	
BH05 (1)	SP	16/01/2017	50	10.00	4.00 to 10.00	Gas Tap	Flush cover	

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well

Project	**THE FACTORY ADDITIONAL GI**
Project No.	**A6131-16**
Carried out for	**Buro Happold**

Table

C1

Groundwater Monitoring

Instrument Reference	Instrument Type	Instrument Base, mbgl	Date Time dd/mm/yyyy hh:mm:ss	Depth to groundwater, mbgl	Comments
BH04 (1)	SP	3.00	18/01/2017 14:30:00	2.59	
			02/02/2017 00:00:00	-	Borehole inaccessible.
			08/03/2017 17:30:00	2.73	Installation damaged, new gas bung installed during visit.
			14/03/2017 18:04:00	2.87	
			22/03/2017 12:08:00	2.62	
			30/03/2017 10:15:00	2.72	
			13/04/2017 13:00:00	Dry	
BH05 (1)	SP	10.00	18/01/2017 14:50:00	3.14	
			19/01/2017 13:30:00	3.06	
			02/02/2017 13:59:00	3.15	
			08/03/2017 17:20:00	2.96	
			14/03/2017 17:57:00	3.08	
			22/03/2017 12:03:00	2.92	
			30/03/2017 10:05:00	3.04	
			13/04/2017 00:00:00	-	Borehole inaccessible.

Notes: Type: SP - Standpipe, SPIE - Standpipe Piezometer, HPIE - Hydraulic Piezometer, PPIE - Pneumatic Piezometer, EPIE - Vibrating Wire Piezometer, PWEL - Pumping Well

Project **THE FACTORY ADDITIONAL GI**

Project No. **A6131-16**

Carried out for **Buro Happold**

Table

C2

Gas Monitoring

Instrument Reference	Instrument Base, mbgl	Date Time dd/mm/yyyy hh:mm:ss	Air Temperature, oC	Barometric Pressure, mbar	Gas Differential Pressure, Pa	Gas Flow Rate, l/hr	Gas Concentrations Carbon Dioxide, %vol	Carbon Monoxide, ppm	Hydrogen Sulphide, ppm	Methane, %LEL	Methane, %vol	Nitrogen, %vol	Oxygen, %vol
BH04 (1)	3.00	02/02/2017 00:00:00	Borehole inaccessible										
		08/03/2017 17:30:00	13.0	1011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.8	21.1
		14/03/2017 18:04:00	-	1030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.5	21.4
		22/03/2017 12:08:00	7.0	1004	0.0	0.0	3.7	0.0	0.0	0.0	0.0	90.1	6.1
		30/03/2017 10:15:00	13.0	1014	0.0	0.0	0.1	0.0	0.0	0.0	0.0	80.3	19.0
		13/04/2017 13:00:00	13.0	1016	0.0	0.0	0.4	0.0	0.0	0.0	0.0	79.0	20.5
BH05 (1)	10.00	02/02/2017 13:59:00	11.0	985	0.0	0.1	0.0	0.0	0.0	0.0	0.0	78.5	21.4
		08/03/2017 17:20:00	13.0	1011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.8	21.1
		14/03/2017 17:57:00	-	1030	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.6	21.3
		22/03/2017 12:03:00	7.0	1004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.3	21.6
		30/03/2017 10:05:00	13.0	1014	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.7	21.2
		13/04/2017 00:00:00	Borehole inaccessible										

Notes: ND - not detected

Project **THE FACTORY ADDITIONAL GI**

Project No. **A6131-16**

Carried out for **Buro Happold**

Table

C3

APPENDIX D

GEOTECHNICAL LABORATORY TEST RESULTS

Index Properties – Summary of Results	INDX
Particle Size Distribution Analyses	PSD 1 to 5
Dry Density / Moisture Content Relationship	COMPH
Point Load Index Testing	PLT 1 and 2
Uniaxial Compressive Strength of Rock	RUCS
pH and Water Soluble Sulphate Content of Soils	EFS/171806 EFS/171807 EFS/172947

INDEX PROPERTIES - SUMMARY OF RESULTS

Hole No.	Sample				Soil Description	p	p_d	w	< 425 µm sieve	W_L	W_P	I_P	p_s	Remarks
	No.	Depth (m)		type										
		from	to			Mg/m^3		%	%	%	%		Mg/m^3	
BH04	7	1.20		B	Brown slightly gravelly CLAY.				98	53 a	26	27		

General notes: All above tests carried out to BS1377 : 1990 unless annotated otherwise. See individual test reports for further details.

Key :

p bulk density, linear

p_d dry density

w moisture content

* test carried out to BS EN ISO 17892-1 2014

W_L Liquid limit

a 4 point cone test

b 1 point cone test

W_P Plastic limit

NP non - plastic

I_P Plasticity Index

<425um preparation

n from natural soil

s sieved specimen

p_s particle density

-g = gas jar

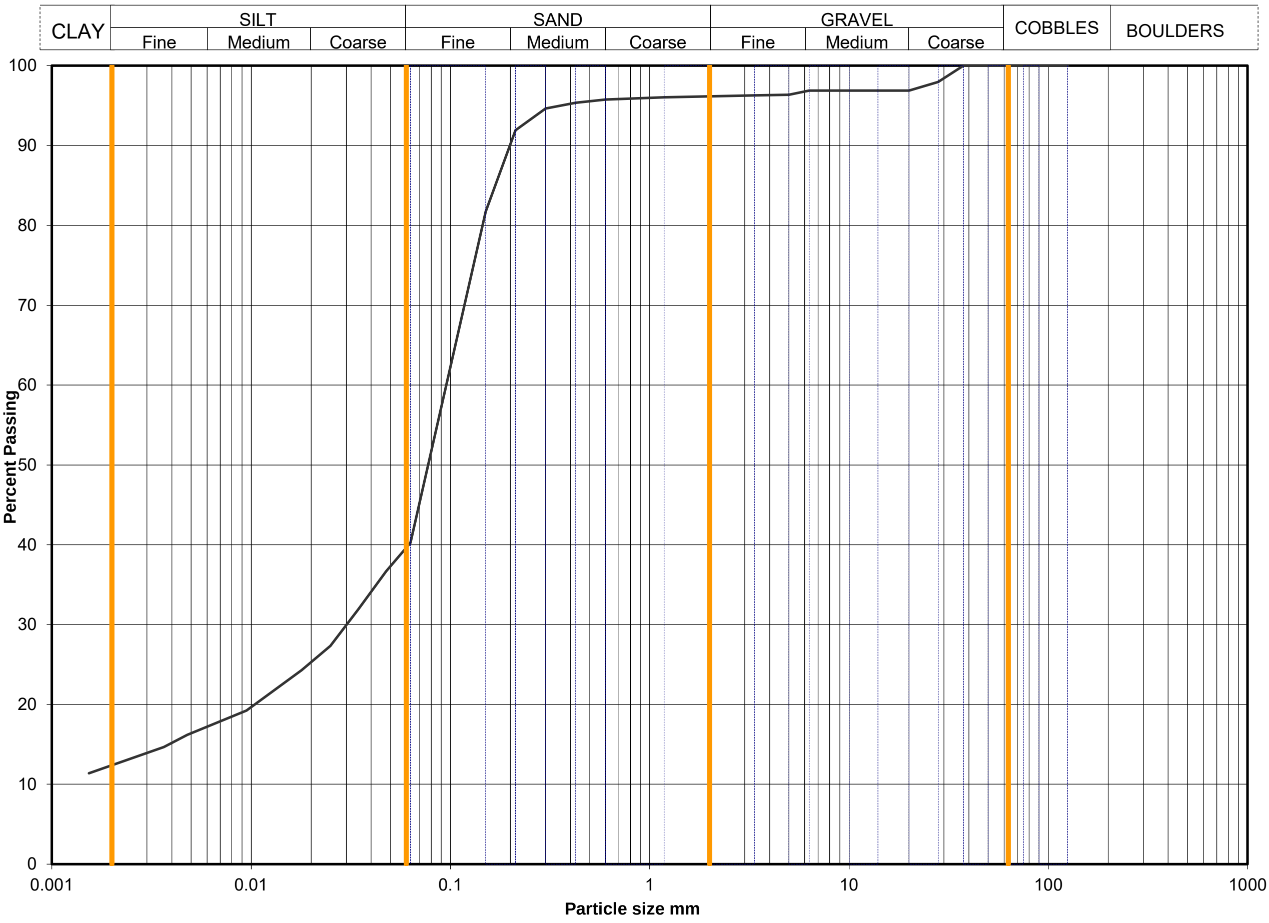
-p = small pyknometer

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

QA Ref SLR 1 Rev 2.91 Sep 16	Project No A6131-16 Project Name THE FACTORY ADDITIONAL GI	Printed:23/02/2017 15:04	**Table** **INDX**

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH04
	A6131-1620170124041239	Sample Depth (m BGL)	1.7
		Sample Type and No	B8
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	40
90	100	0.0476	37
75	100	0.0345	32
63	100	0.0250	27
50	100	0.0179	24
37.5	100	0.0095	19
28	98	0.0048	16
20	97	0.0036	15
14	97	0.0015	11
10	97		
6.3	97		
5.0	96		
3.35	96		
2.00	96		
1.18	96		
0.600	96		
0.425	95	2.65	assumed
0.300	95	Dry mass of sample, kg	
0.212	92		
0.150	82	4.0	
0.063	40		

Soil description	Grey slightly gravelly sandy clayey SILT.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	4	4
	Sand	56	56
*<60mm values to aid description only	Silt	28	28
	Clay	12	12

Uniformity Coefficient	**D60 / D10**	Not applicable

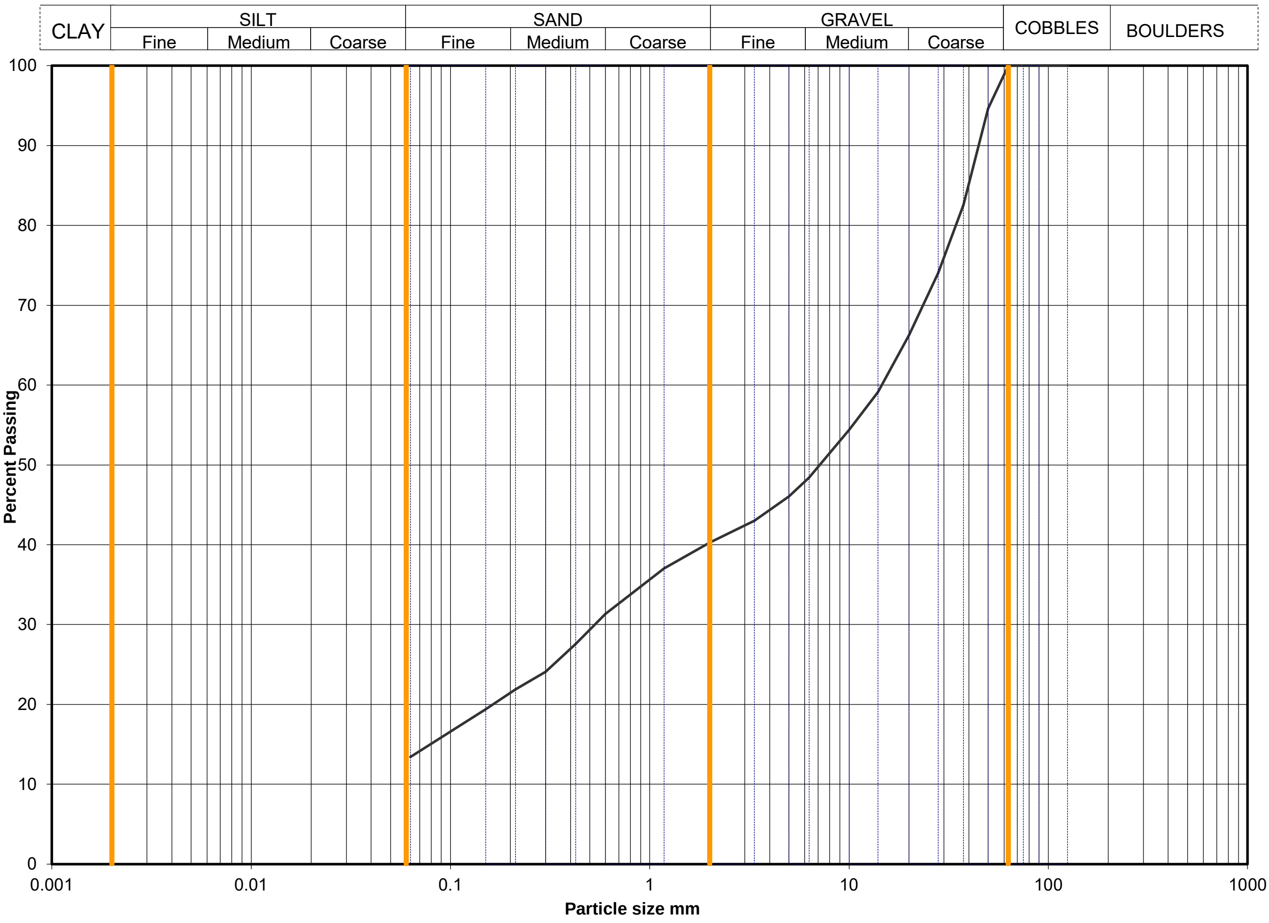
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

QA Ref SLR 2,9 Rev 2.10 Oct 16	UKAS TESTING 1157	Project No A6131-16 Project Name THE FACTORY ADDITIONAL GI	Printed: 26/01/2016 13:38	**Figure** **PSD**

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH04
		Sample Depth (m BGL)	2.2
	A6131-1620170124041312	Sample Type and No	B9
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	95		
37.5	83		
28	74		
20	66		
14	59		
10	54		
6.3	48		
5.0	46		
3.35	43		
2.00	40		
1.18	37		
0.600	31		
0.425	28		
0.300	24	Dry mass of sample, kg	
0.212	22		
0.150	19	5.2	
0.063	13		

Soil description	Dark brown very sandy clayey silty GRAVEL.		
Preparation / Pretreatment	Sieve: natural material		
Remarks			
Sample Proportions		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	60	60
	Sand	27	27
*<60mm values to aid description only	Silt	silt+clay =	
	Clay	13	13

Uniformity Coefficient	**D60 / D10**	Not applicable

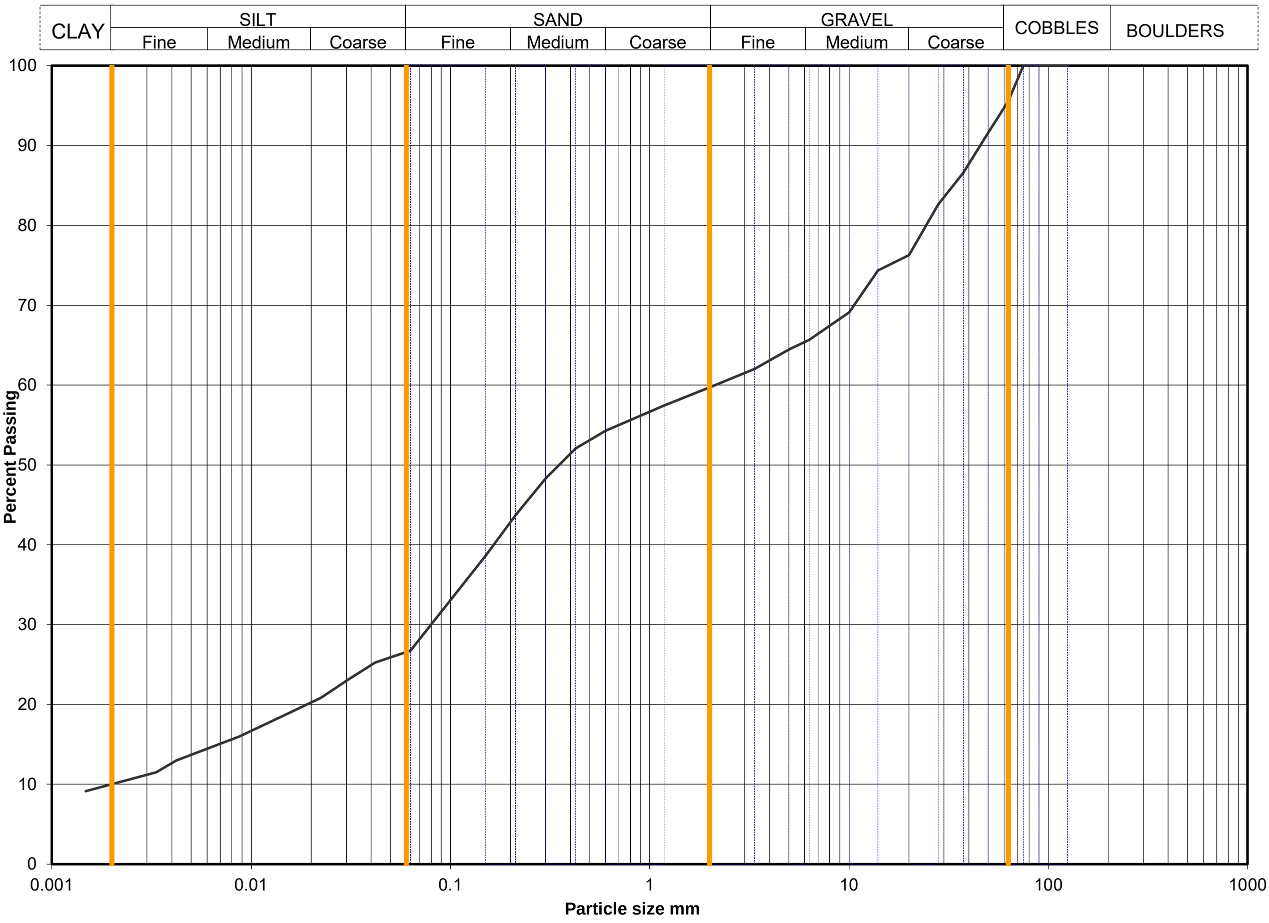
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

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

QA Ref SLR 2,9 Rev 2.10 Oct 16	UKAS TESTING 1157	Project No A6131-16 Project Name THE FACTORY ADDITIONAL GI	Printed: 26/01/2016 13:38	**Figure** **PSD**

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID: A6131-1620170124092316	Hole No	BH05
		Sample Depth (m BGL)	1
		Sample Type and No	B9
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	27
90	100	0.0420	25
75	100	0.0307	23
63	96	0.0224	21
50	92	0.0162	19
37.5	87	0.0087	16
28	83	0.0042	13
20	76	0.0033	11
14	74	0.0015	9
10	69		
6.3	66		
5.0	64		
3.35	62		
2.00	60		
1.18	57	2.65 assumed	
0.600	54		
0.425	52		
0.300	48	Dry mass of sample, kg 9.7	
0.212	44		
0.150	39		
0.063	27		

Soil description	Brown slightly sandy gravelly CLAY with one cobble.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	4	0
	Gravel	36	38
	Sand	33	34
	Silt	17	18
	Clay	10	10

Uniformity Coefficient	**D60 / D10**	1215

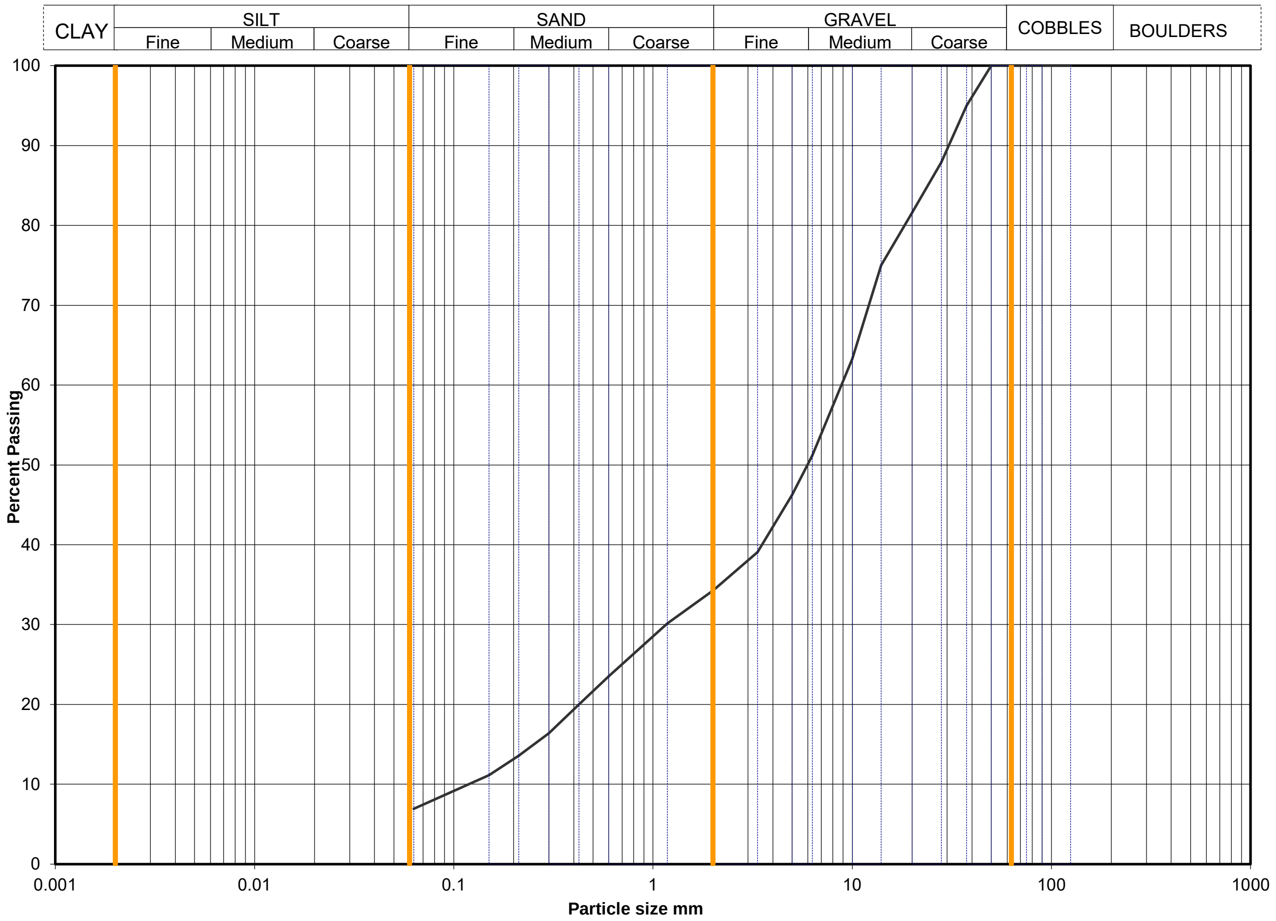
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

QA Ref SLR 2,9 Rev 2.10 Oct 16 1157	Project No A6131-16 Project Name THE FACTORY ADDITIONAL GI	Printed: 26/01/2016 13:38	**Figure** **PSD**

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID: A6131-1620170124092336	Hole No	BH05
		Sample Depth (m BGL)	2.2
		Sample Type and No	B13
		Specimen Ref	



Sieving		**Sedimentation**	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	95		
28	88		
20	82		
14	75		
10	63		
6.3	51		
5.0	46		
3.35	39		
2.00	34		
1.18	30		
0.600	24		
0.425	20		
0.300	16	Dry mass of sample, kg 1.6	
0.212	14		
0.150	11		
0.063	7		

Soil description	Dark brown very sandy clayey GRAVEL.
Preparation / Pretreatment	Sieve: natural material
Remarks	

Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	66	66
	Sand	27	27
	Silt	silt+clay =	
	Clay	7	7

Uniformity Coefficient	**D60 / D10**	75

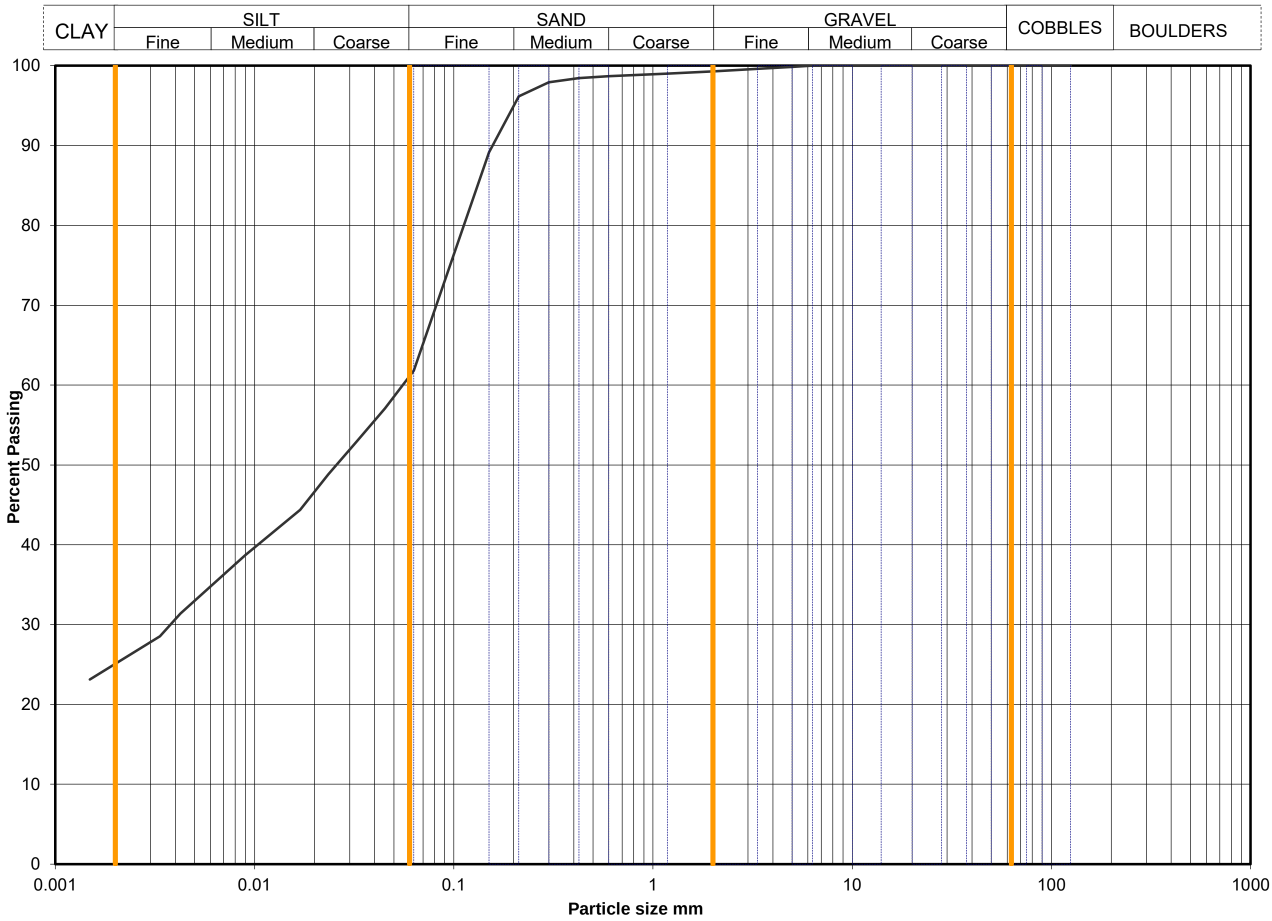
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	none

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

QA Ref SLR 2,9 Rev 2.10 Oct 16	UKAS TESTING 1157	Project No A6131-16 Project Name THE FACTORY ADDITIONAL GI	Printed: 26/01/2016 13:38	**Figure** **PSD**

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	TP01
	A6131-1620170124114345	Sample Depth (m BGL)	0.8
		Sample Type and No	B3
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	62
90	100	0.0452	57
75	100	0.0326	53
63	100	0.0235	49
50	100	0.0169	44
37.5	100	0.0090	39
28	100	0.0042	31
20	100	0.0034	29
14	100	0.0015	23
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	99		
1.18	99		
0.600	99		
0.425	98	2.65	assumed
0.300	98	Dry mass of sample, kg	
0.212	96		
0.150	89	6.1	
0.063	62		

Soil description	Orangish brown slightly gravelly sandy silty CLAY.		
Preparation / Pretreatment	Sieve: natural material Hydro: as BS1377		
Remarks			
Sample Proportions *<60mm values to aid description only		Whole	*<60mm
	Cobbles / boulders	0	0
	Gravel	1	1
	Sand	37	37
	Silt	37	37
	Clay	25	25

Uniformity Coefficient	**D60 / D10**	Not applicable

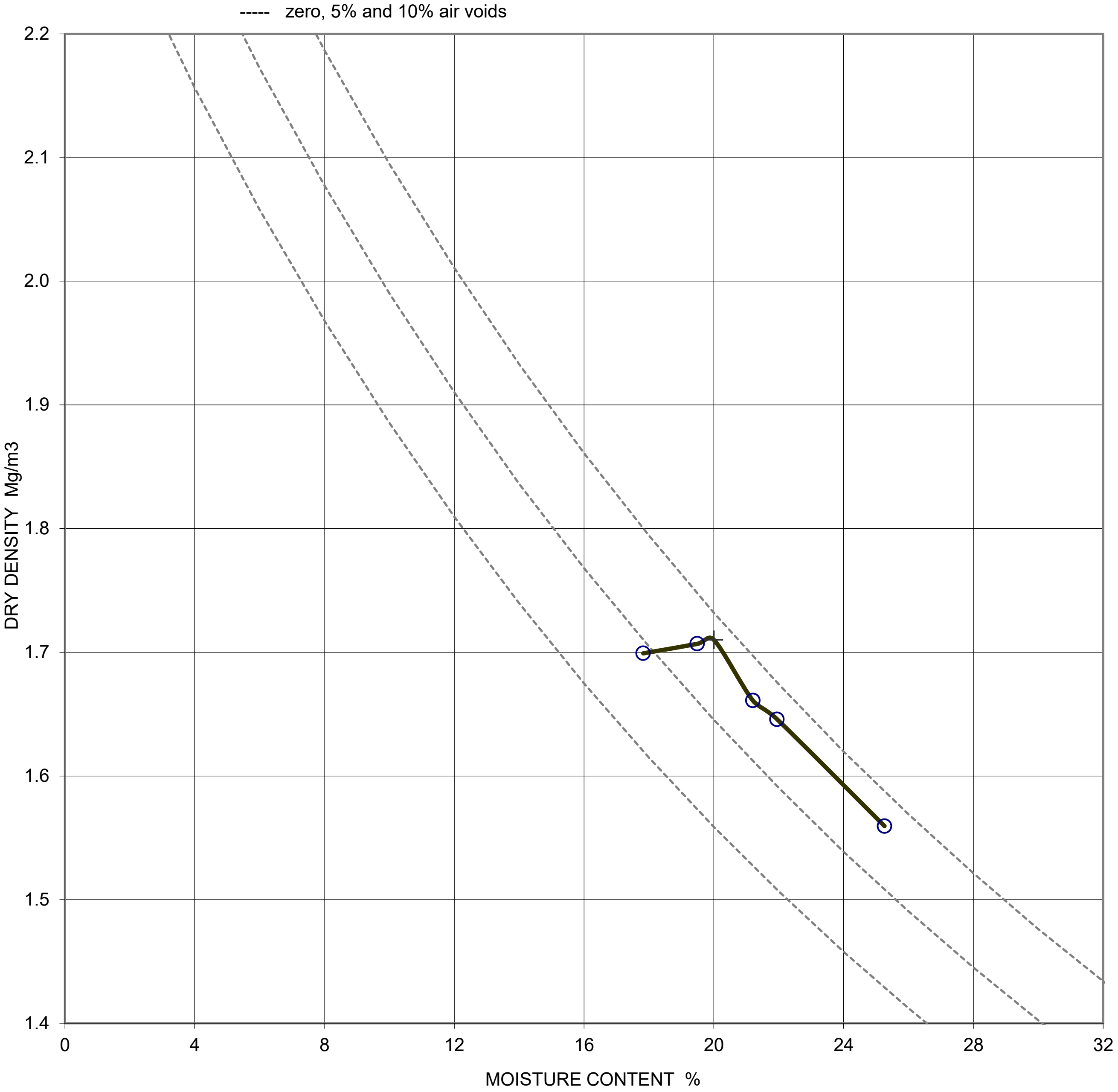
Test Method	BS 1377 : Part 2 : 1990	
	Sieving	9.2 wet sieve
	Sedimentation	9.5 hydrometer

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

QA Ref SLR 2,9 Rev 2.10 Oct 16 UKAS TESTING 1157	Project No A6131-16 Project Name THE FACTORY ADDITIONAL GI	Printed: 26/01/2016 13:38	**Figure** **PSD**

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP
BS1377 : PART 4 : 1990 : HEAVY COMPACTION, 4.5 kg rammer

Sample Details:	SAMPLE ID:	Hole No	BH04
	A6131-1620170118032937	Sample Depth (m BGL)	1.00
		Sample Type and No	B6
		Specimen Ref	



Soil description	Brown slightly gravelly silty CLAY.		
Test method	BS 1377:part 4:1990: clause 3.5, 4.5 kg rammer in a 1 litre mould		
Preparation	Original material was natural, composite specimens tested		
Material > 37.5mm	0	%	
Material < 37.5mm > 20mm	5	%	
Particle density	2.65	assumed	
Remarks			

Derived Parameters +

Maximum dry density, Mg/m3
1.71

Optimum moisture content, %
20

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

QA Ref
SLD 4, 3.5/6
Rev 2.6
Jan 17

1157

Project No	A6131-16
Project Name	THE FACTORY ADDITIONAL GI

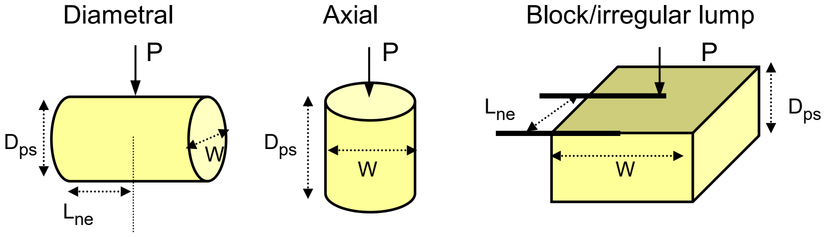
Printed:
23/02/2017
15:19

Figure
COMPH

Point Load Index Test
ISRM:1985

All specimens tested at as received water content unless shown otherwise

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction (U = unknown or random)
L - parallel to planes of weakness
P - perpendicular to planes of weakness
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions				LOAD P kN	De equivalent diameter, mm	Point Load Index MPa F = (De/50)0.45		Remarks
							Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm			Is	Is(50)	
BH04	6.85	13	CS			SANDSTONE	A	U	Y		86.6	72.0	70.0	0.70	87.85	0.09	0.12	
BH04	8.30	15	CS	1		SANDSTONE	D	U	Y	52.0	86.8	87.0	86.0	0.90	86.40	0.12	0.15	
BH04	8.30	15	CS	2		SANDSTONE	A	U	Y		86.8	53.0	52.0	0.50	75.81	0.09	0.10	
BH04	9.10	17	CS			SANDSTONE	A	P	Y		84.5	57.0	5.0	0.90	23.19	1.67	1.18	
BH04	10.00	18	CS			SANDSTONE	A	U	Y		85.8	64.0	62.0	0.60	82.30	0.09	0.11	
BH04	11.00	19	CS			SANDSTONE	A	U	Y		86.4	59.0	57.0	0.40	79.19	0.06	0.08	
BH04	12.00	21	CS			SANDSTONE	A	U	Y		83.9	52.0	51.0	0.80	73.81	0.15	0.17	
BH04	13.30	22	CS			SANDSTONE	A	U	N		80.9	72.0	71.0	0.30	85.52	0.04	0.05	
BH04	14.90	24	CS			SANDSTONE	A	U	N		87.0	4.0	59.0	2.30	80.84	0.35	0.44	
BH04	16.00	26	CS			SANDSTONE	A	U	Y		87.6	57.0	54.0	0.50	77.61	0.08	0.10	
BH04	17.00	27	CS	1		SANDSTONE	D	U	Y	52.0	85.9	84.0	82.0	0.60	83.93	0.09	0.11	
BH04	17.00	27	CS	2		SANDSTONE	A	U	Y		85.9	58.0	57.0	0.40	78.96	0.06	0.08	
BH04	18.00	28	CS			SANDSTONE	A	U	Y		85.2	72.0	70.0	0.80	87.14	0.11	0.14	
BH04	19.00	29	CS			SANDSTONE	A	U	Y		85.8	61.0	59.0	1.40	80.28	0.22	0.27	
BH04	20.00	30	CS			SANDSTONE	A	U	Y		86.0	63.0	60.0	1.40	81.06	0.21	0.26	
BH04	21.00	31	CS			SANDSTONE	A	U	Y		83.3	58.0	57.0	0.70	77.75	0.12	0.14	
BH04	22.10	32	CS			SANDSTONE	A	U	Y		85.7	59.0	58.0	0.80	79.55	0.13	0.16	
BH05	5.40	18	CS			SANDSTONE	A	U	N		86.5	71.0	67.0	0.20	85.90	0.03	0.03	
BH05	6.20	19	CS			SANDSTONE	A	U	Y		86.7	61.0	60.0	0.10	81.38	0.02	0.02	
BH05	8.00	22	CS			SANDSTONE	I	U	Y	41.0	81.0	57.0	56.0	0.10	76.00	0.02	0.02	

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

QA Ref
ISRM 85
Rev 2.5
Jan 17

1157

Project No A6131-16

Project Name THE FACTORY ADDITIONAL GI

Printed:14/03/2017
16:20

Figure

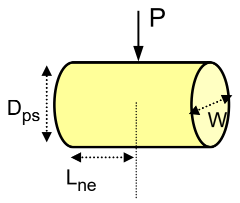
PLT

Point Load Index Test
ISRM:1985

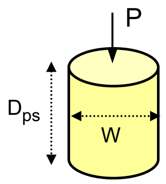
All specimens tested at as received water content unless shown otherwise

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction (U = unknown or random)
L - parallel to planes of weakness
P - perpendicular to planes of weakness
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P

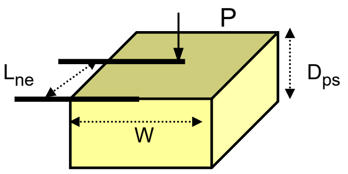
Diametral



Axial



Block/irregular lump



Borehole	Depth, m	Sample Ref	Sample Type	Specimen Ref	Specimen Depth	Rock type	Test Type see ISRM Fig 5 and 8		Failure Valid (Y/N)	Dimensions				LOAD P	De equivalent diameter, mm	Point Load Index MPa F = (De/50)0.45		Remarks
							Type (D, A, I, B)	Direction (L, P or U)		Lne mm	W mm	Dps mm	Dps' mm	kN		Is	Is(50)	
BH05	8.50	23	CS			SANDSTONE	A	U	Y		85.6	55.0	54.0	0.10	76.72	0.02	0.02	
BH05	9.50	24	CS			SANDSTONE	A	U	Y		86.5	52.0	51.0	0.30	74.95	0.05	0.06	
BH05	10.50	25	CS			SANDSTONE	A	U	Y		81.5	59.0	58.0	0.10	77.58	0.02	0.02	
BH05	11.90	27	CS			SANDSTONE	A	U	Y		83.8	39.0	38.0	0.10	63.67	0.02	0.03	
BH05	13.80	28	CS			SANDSTONE	A	U	Y		84.4	60.0	59.0	0.10	79.63	0.02	0.02	
BH05	14.50	29	CS			SANDSTONE	A	U	Y		84.9	72.0	70.0	0.80	86.99	0.11	0.14	
BH05	15.50	30	CS			SANDSTONE	A	U	Y		85.6	59.0	58.0	0.60	79.51	0.09	0.12	
BH05	16.70	31	CS			SANDSTONE	A	U	Y		84.8	75.0	73.0	0.50	88.78	0.06	0.08	
BH05	17.40	32	CS			SANDSTONE	A	U	Y		84.9	54.0	51.0	0.90	74.25	0.16	0.20	

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

QA Ref
ISRM 85
Rev 2.5
Jan 17

1157

Project No	A6131-16	Printed:14/03/2017 16:20
Project Name	THE FACTORY ADDITIONAL GI	

Figure

PLT

Uniaxial Compressive Strength Of Rock - Summary of Results

Hole No.	Sample				Rock Type	Specimen Dimensions[2]			Bulk Density[2]	Water Content[1]	Uniaxial Compression[3]				Remarks
	No.	Depth (m)		type		Dia.	Height	H/D			Load Rate	Time to failure	Mode of failure	UCS	
		from	to			mm	mm		Mg/m^3	%	kN/min	secs		MPa	
BH04	23	14.00		CS	MUDSTONE	85.5	176.6	2.1	2.24	12.4	5	441	shear	7.41	Outside ISRM Specification

Notes :

Test Specification : International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007

1 ISRM p87 test 1, water content at 105 ± 3 °C, specimen as received at the laboratory

2 ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density

3 ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

above notes apply unless annotated otherwise in the remarks

Mode of failure :

S - Single shear	MS - multiple shear
AC - Axial cleavage	F - Fragmented

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

QA Ref
RLR 2
Rev 2.16
Apr 15

Project No A6131-16

Project Name THE FACTORY ADDITIONAL GI

Printed:23/02/2017 15:20

Table
RUCS

TEST REPORT

UKAS
TESTING
1252

Report No. EFS/172947 (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: A6131-16 The Factory Manchester

The 10 samples described in this report were registered for analysis by ESG on 15-Mar-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 17-Mar-2017

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Page 2)
Analytical and Deviating Sample Overview (Page 3)
Table of Method Descriptions (Page 4)
Table of Report Notes (Page 5)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Barnes

Operations Director
Energy & Waste Services

Date of Issue: 17-Mar-2017

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.
ESG accepts no responsibility for any sampling not carried out by our personnel.

		Units :	mg/l	pH Units
		Method Codes :	ICPWSS	WSLM50
		Method Reporting Limits :	10	
		UKAS Accredited :	Yes	No
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**SO4-- (H2O sol) mg/l**	**pH (BS1377)**
1751806	BH04 B 2 0.20		105 §	8.5
1751807	BH04 B 6 1.00		57	8.0
1751808	BH04 B 7 1.20		182	7.4
1751809	BH04 B 11 4.20		12 §	8.8
1751810	BH05 B 3 0.20		23 §	8.6
1751811	BH05 D 10 1.20		76	8.3
1751812	BH05 D 12 2.20		16	8.4
1751813	BH05 D 15 3.45		10	8.6
1751814	TP01 B 1 0.00		139 §	9.9
1751815	TP01 B 3 0.80		82	8.4

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

Sample Analysis

A6131-16 The Factory Manchester

Date Printed	**17-Mar-2017**
Report Number	**EFS/172947**
Table Number	**1**

Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer	**ESG Limited Doncaster**	Consignment No	S63569
Site	**A6131-16 The Factory Manchester**	Date Logged	15-Mar-2017
Report No	**S172947**	Report Due	17-Mar-2017

ID Number	Description	MethodID Sampled	CustServ 72hr T/R	ICPWSS SO4-- (H2O sol) mg/l	WSLM50 pH (BS1377)
				✓	
CL/1751806	BH04 0.20	D	D	D	D
CL/1751807	BH04 1.00	D	D	D	D
CL/1751808	BH04 1.20	D	D	D	D
CL/1751809	BH04 4.20	D	D	D	D
CL/1751810	BH05 0.20	D	D	D	D
CL/1751811	BH05 1.20	D	D	D	D
CL/1751812	BH05 2.20	D	D	D	D
CL/1751813	BH05 3.45	D	D	D	D
CL/1751814	TP01 0.00	D	D	D	D
CL/1751815	TP01 0.80	D	D	D	D

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	WSLM50	Oven Dried @ < 35°C	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis
Unless stated otherwise results are expressed as mg/l
Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
TR Denotes Tremolite
AC Denotes Actinolite
AN Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined
N.Det Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Doncaster

Site : A6131-16 The Factory Manchester

Report Number : S17_2947

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1751806	BH04 B 2 0.20	STONE
CL/1751807	BH04 B 6 1.00	CLAY
CL/1751808	BH04 B 7 1.20	CLAY
CL/1751809	BH04 B 11 4.20	STONE
CL/1751810	BH05 B 3 0.20	STONE
CL/1751811	BH05 D 10 1.20	MADE GROUND
CL/1751812	BH05 D 12 2.20	SILT
CL/1751813	BH05 D 15 3.45	MADE GROUND
CL/1751814	TP01 B 1 0.00	STONE
CL/1751815	TP01 B 3 0.80	SILT

TEST REPORT

1252

Report No. EFS/171806 (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: A6131-16 The Factory Manchester

The 5 samples described in this report were registered for analysis by ESG on 08-Feb-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 15-Feb-2017

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Page 2)
Analytical and Deviating Sample Overview (Page 3)
Table of Method Descriptions (Page 4)
Table of Report Notes (Page 5)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

T Barnes

Operations Director
Energy & Waste Services

Date of Issue: 15-Feb-2017

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. ESG accepts no responsibility for any sampling not carried out by our personnel.

		Units :	mg/l	pH Units
		Method Codes :	ICPWSS	WSLM50
		Method Reporting Limits :	10	
		UKAS Accredited :	Yes	No
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**SO4-- (H2O sol) mg/l**	**pH (BS1377)**
1747141	BH04 CS 12 5.80	**06-Feb-17**	11	8.8
1747142	BH04 CS 14 7.30	**06-Feb-17**	<10	8.9
1747143	BH04 CS 16 8.80	**06-Feb-17**	<10	8.8
1747144	BH04 CS 20 11.80	**06-Feb-17**	14	8.8
1747145	BH04 CS 25 15.00	**06-Feb-17**	18	8.3

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

Sample Analysis

A6131-16 The Factory Manchester

Date Printed	**15-Feb-2017**
Report Number	**EFS/171806**
Table Number	**1**

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S171806

Customer	**ESG Limited Doncaster**
Site	**A6131-16 The Factory Manchester**
Report No	**S171806**

Consignment No S62918

Date Logged 08-Feb-2017

Report Due 15-Feb-2017

		MethodID	CustServ	ICPWSS	WSLM50
ID Number	**Description**	**Sampled**	**REPORT A**	**SO4-- (H2O sol) mg/l**	**pH (BS1377)**
				✓	
CL/1747141	BH04 5.80	06/02/17	🟩	🟩	🟩
CL/1747142	BH04 7.30	06/02/17	🟩	🟩	🟩
CL/1747143	BH04 8.80	06/02/17	🟩	🟩	🟩
CL/1747144	BH04 11.80	06/02/17	🟩	🟩	🟩
CL/1747145	BH04 15.00	06/02/17	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
☐	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	WSLM50	Oven Dried @ < 35°C	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile	**TR** Denotes Tremolite
CR Denotes Crocidolite	**AC** Denotes Actinolite
AM Denotes Amosite	**AN** Denotes Anthophylite

NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Doncaster

Site : A6131-16 The Factory Manchester

Report Number : S17_1806

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1747141	BH04 CS 12 5.80	SAND
CL/1747142	BH04 CS 14 7.30	SAND
CL/1747143	BH04 CS 16 8.80	SAND
CL/1747144	BH04 CS 20 11.80	SAND
CL/1747145	BH04 CS 25 15.00	SAND

TEST REPORT

1252

Report No. EFS/171807 (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: A6131-16 The Factory Manchester

The 4 samples described in this report were registered for analysis by ESG on 08-Feb-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 15-Feb-2017

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Page 2)
Analytical and Deviating Sample Overview (Page 3)
Table of Method Descriptions (Page 4)
Table of Report Notes (Page 5)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

Barnes

Operations Director
Energy & Waste Services

Date of Issue: 15-Feb-2017

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

		Units :	mg/l	pH Units
		Method Codes :	ICPWSS	WSLM50
		Method Reporting Limits :	10	
		UKAS Accredited :	Yes	No
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**SO4-- (H2O sol) mg/l**	**pH (BS1377)**
1747146	BH05 CS 17 4.40	06-Feb-17	<10	8.5
1747147	BH05 CS 20 6.50	06-Feb-17	<10	8.5
1747148	BH05 CS 21 7.50	06-Feb-17	<10	8.6
1747149	BH05 CS 26 10.60	06-Feb-17	<10	8.6

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

Sample Analysis

A6131-16 The Factory Manchester

Date Printed	**15-Feb-2017**
Report Number	**EFS/171807**
Table Number	**1**

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S171807

Customer	**ESG Limited Doncaster**
Site	**A6131-16 The Factory Manchester**
Report No	**S171807**

Consignment No S62918
Date Logged 08-Feb-2017

Report Due 15-Feb-2017

		MethodID	CustServ	ICPWSS	WSLM50
ID Number	**Description**	**Sampled**	**REPORT A**	**SO4-- (H2O sol) mg/l**	**pH (BS1377)**
				✓	
CL/1747146	BH05 4.40-4.60	06/02/17	🟩	🟩	🟩
CL/1747147	BH05 6.50	06/02/17	🟩	🟩	🟩
CL/1747148	BH05 7.50	06/02/17	🟩	🟩	🟩
CL/1747149	BH05 10.60	06/02/17	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	WSLM50	Oven Dried @ < 35°C	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis
Unless stated otherwise results are expressed as mg/l
Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile	**TR** Denotes Tremolite
CR Denotes Crocidolite	**AC** Denotes Actinolite
AM Denotes Amosite	**AN** Denotes Anthophylite

NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Doncaster

Site : A6131-16 The Factory Manchester

Report Number : S17_1807

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1747146	BH05 CS 17 4.40	SAND
CL/1747147	BH05 CS 20 6.50	SAND
CL/1747148	BH05 CS 21 7.50	SAND
CL/1747149	BH05 CS 26 10.60	SAND

APPENDIX E

GEOENVIRONMENTAL LABORATORY TEST RESULTS

Soil Sample Analysis Test Reports	EFS/171730
Water Sample Analysis Test Reports	EXR/235015

TEST REPORT

1252

Report No. EFS/171730M (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: A6131-16 The Factory Additional GI

The 6 samples described in this report were registered for analysis by ESG on 07-Feb-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 21-Feb-2017

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Pages 5 to 10)
Table of PCB Congener Results (Page 11)
Table of TPH Texas banding (std) (Page 12)
GC-FID Chromatograms (Pages 13 to 18)
Table of WAC Analysis Results (Pages 19 to 24)
Subcontracted Analysis Reports (Pages 25 to 26)
The accreditation status of subcontracted analysis is displayed on the appended subcontracted analysis reports.
Analytical and Deviating Sample Overview (Pages 27 to 28)
Table of Method Descriptions (Pages 29 to 30)
Table of Report Notes (Page 31)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

T Barnes

Operations Director
Energy & Waste Services

Date of Issue: 21-Feb-2017

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)
Tests marked '^' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.
All results are reported on a dry weight basis at 105^{o}C unless otherwise stated. (except QC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

LAB ID Number CL/	Client Sample Description	Sample Date	GRO (C5-C10)	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	SO4-- (H2O sol) mg/l	PCB-7 Congeners Analysis	pH units (AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
		Units :	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	pH Units	mg/kg	mg/kg
		Method Codes :	GROHSA	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPWSS	PCBECD	PHSOIL	SFAPI	SFAPI
		Method Reporting Limits :	0.2	0.5	0.3	0.2	1.2	1.6	0.7	0.5	2	0.5	16	10	5		0.5	0.5
		Accreditation Code:	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM	UM		UM	UM	UM
1746848	BH04 ES 1 0.20 (NVM)	24-Jan-17	<0.21§	<0.51§	3§	0.582§	7.96§	15§	187.59§	<0.51§	7.05§	<0.51§	42.38§	102§	Req §	8.8 §	<0.53§	<0.53§
1746849	BH04 ES 5 1.00	24-Jan-17	<0.2	<0.5	6.8	<0.21	16	16.9	39.7	<0.5	10.9	0.5	46.9	80	Req	8.4	<0.6	<0.6
1746850	BH05 ES 4 1.00	24-Jan-17	<0.3	<0.5	14.8	0.4	13.0	44	140.4	<0.52	17.5	0.6	72.4	35	Req	8.6	<0.6	<0.6
1746851	BH05 ES 7 3.00 (NVM)	24-Jan-17	<0.23§	<0.51§	4.72§	<0.205§	19.10§	15.81§	20§	<0.51§	19.10§	<0.51§	38.61§	60§	Req §	8.6 §	<0.57§	<0.57§
1746852	TP01 ES 2 0.00	24-Jan-17	<0.2	<0.5	4.3	0.54	12.6	26.1	40.4	<0.5	12.4	<0.5	43.8	236	Req	9.8	<0.5	<0.5
1746853	TP01 ES 4 0.80	24-Jan-17	<0.3	<0.5	11.6	0.25	16.3	18.1	17.3	<0.5	16.0	0.7	77.6	48	Req	8.8	<0.6	<0.6

ESG

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

Sample Analysis

A6131-16 The Factory Additional GI

Date Printed	**21-Feb-2017**
Report Number	**EFS/171730M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

LAB ID Number CL/	Client Sample Description	Sample Date	Phenol Index.(AR)	^Asbestos ID (Stage 1)	Tot.Moisture @ 105C	TPH by GCFID (AR)	TPH Carbon Banding.	S.O.M. % (Calc)	Chromium vi:	Stone Content %	Total Organic Carbon	Benzene	Toluene	Ethyl Benzene	MTBE	Xylenes	m/p Xylenes	o Xylene
Units :			mg/kg		%	mg/kg	mg/kg	% M/M	mg/kg	%	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Method Codes :			SFAPI	Sub020	TMSS	TPHFIDUS	TPHFIDUS	FOCS	KONECR	SSP3	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
Method Reporting Limits :			0.5		0.1	10	10	0.04	0.1	0.1	0.01	10	10	10	20	30	20	10
Accreditation Code:			U	U	U	UM		N	N	N	N	UM	UM	UM	U	UM	UM	UM
1746848	BH04 ES 1 0.20 (NVM)	24-Jan-17	<0.53§	NAIIS	5.6 §	576§	Req §	1.75	<0.1	80.6	1.01	<11§	<11§	<11§	<21§	<32§	<21§	<11§
1746849	BH04 ES 5 1.00	24-Jan-17	<0.6	NAIIS	19.0	20	Req	1.41	<0.1	< 0.1	0.82	<12	<12	<12	<25	<37	<25	<12
1746850	BH05 ES 4 1.00	24-Jan-17	<0.6	NAIIS	22.1	58	Req	5.41	<0.1	21.4	3.14	<13	<13	<13	<26	<39	<26	<13
1746851	BH05 ES 7 3.00 (NVM)	24-Jan-17	<0.57§	NAIIS	12.1 §	40§	Req §	0.64	<0.1	45.8	0.37	<11§	<11§	<11§	<23§	<34§	<23§	<11§
1746852	TP01 ES 2 0.00	24-Jan-17	<0.5	NAIIS	6.2	339	Req	2.20	<0.1	58.8	1.28	<11	<11	<11	<21	<32	<21	<11
1746853	TP01 ES 4 0.80	24-Jan-17	<0.6	NAIIS	22.0	17	Req	0.67	<0.1	< 0.1	0.39	<13	<13	<13	<26	<38	<26	<13

ESG

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

Sample Analysis

A6131-16 The Factory Additional GI

Date Printed	**21-Feb-2017**
Report Number	**EFS/171730M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

		Units :	mg/kg
		Method Codes :	PAHMSUS
		Method Reporting Limits :	
		Accreditation Code:	
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**PAH (16) by GCMS**
1746848	BH04 ES 1 0.20 (NVM)	24-Jan-17	Req §
1746849	BH04 ES 5 1.00	24-Jan-17	Req
1746850	BH05 ES 4 1.00	24-Jan-17	Req
1746851	BH05 ES 7 3.00 (NVM)	24-Jan-17	Req §
1746852	TP01 ES 2 0.00	24-Jan-17	Req
1746853	TP01 ES 4 0.80	24-Jan-17	Req

ESG

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

A6131-16 The Factory Additional GI

Sample Analysis

Date Printed	**21-Feb-2017**
Report Number	**EFS/171730M**
Table Number	**1**

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: A6131-16 The Factory Additional GI		
Sample Details:	BH04 ES 1 0.20 (NVM)	**Job Number:**	s17_1730M
LIMS ID Number:	CL1746848	**Date Booked in:**	07-Feb-17
QC Batch Number:	170150	**Date Extracted:**	09-Feb-17
Quantitation File:	Initial Calibration	**Date Analysed:**	13-Feb-17
Directory:	\021317MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.35	1.29	94	**N**
Acenaphthylene	208-96-8	-	< 0.08	-	N
Acenaphthene	83-32-9	4.52	1.37	96	N
Fluorene	86-73-7	4.91	1.21	95	N
Phenanthrene	85-01-8	5.75	7.87	99	N
Anthracene	120-12-7	5.80	2.55	99	N
Fluoranthene	206-44-0	7.09	8.39	94	N
Pyrene	129-00-0	7.37	7.87	96	N
Benzo[a]anthracene	56-55-3	9.05	3.67	97	N
Chrysene	218-01-9	9.10	4.05	99	N
Benzo[b]fluoranthene	205-99-2	10.57	4.06	92	N
Benzo[k]fluoranthene	207-08-9	10.60	1.61	90	N
Benzo[a]pyrene	50-32-8	10.99	3.65	96	N
Indeno[1,2,3-cd]pyrene	193-39-5	12.36	2.57	95	N
Dibenzo[a,h]anthracene	53-70-3	12.38	0.58	94	N
Benzo[g,h,i]perylene	191-24-2	12.66	2.20	90	N
Total (USEPA16) PAHs	-	-	< 53.05	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	114
Acenaphthene-d10	110
Phenanthrene-d10	112
Chrysene-d12	135
Perylene-d12	164

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	94
Terphenyl-d14	77

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: A6131-16 The Factory Additional GI		
Sample Details:	BH04 ES 5 1.00	**Job Number:**	s17_1730M
LIMS ID Number:	CL1746849	**Date Booked in:**	07-Feb-17
QC Batch Number:	170150	**Date Extracted:**	09-Feb-17
Quantitation File:	Initial Calibration	**Date Analysed:**	13-Feb-17
Directory:	\021317MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Total (USEPA16) PAHs	-	-	< 1.58	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	118
Acenaphthene-d10	112
Phenanthrene-d10	115
Chrysene-d12	121
Perylene-d12	126

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	99
Terphenyl-d14	78

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: A6131-16 The Factory Additional GI		
Sample Details:	BH05 ES 4 1.00	**Job Number:**	S17_1730M
LIMS ID Number:	CL1746850	**Date Booked in:**	07-Feb-17
QC Batch Number:	170150	**Date Extracted:**	09-Feb-17
Quantitation File:	Initial Calibration	**Date Analysed:**	13-Feb-17
Directory:	\021317MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	5.75	0.19	98	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	7.09	0.30	96	UM
Pyrene	129-00-0	7.37	0.28	98	UM
Benzo[a]anthracene	56-55-3	9.04	0.17	97	UM
Chrysene	218-01-9	9.09	0.18	96	UM
Benzo[b]fluoranthene	205-99-2	10.56	0.21	72	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	10.99	0.17	97	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.36	0.10	93	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	12.66	0.12	89	UM
Total (USEPA16) PAHs	-	-	< 2.41	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	110
Acenaphthene-d10	106
Phenanthrene-d10	107
Chrysene-d12	113
Perylene-d12	120

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	98
Terphenyl-d14	77

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: A6131-16 The Factory Additional GI		
Sample Details:	BH05 ES 7 3.00 (NVM)	**Job Number:**	s17_1730M
LIMS ID Number:	CL1746851	**Date Booked in:**	07-Feb-17
QC Batch Number:	170150	**Date Extracted:**	09-Feb-17
Quantitation File:	Initial Calibration	**Date Analysed:**	13-Feb-17
Directory:	\021317MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	**N**
Acenaphthylene	208-96-8	-	< 0.09	-	N
Acenaphthene	83-32-9	-	< 0.09	-	N
Fluorene	86-73-7	-	< 0.09	-	N
Phenanthrene	85-01-8	5.75	0.13	98	N
Anthracene	120-12-7	-	< 0.09	-	N
Fluoranthene	206-44-0	7.09	0.13	95	N
Pyrene	129-00-0	7.37	0.13	97	N
Benzo[a]anthracene	56-55-3	-	< 0.09	-	N
Chrysene	218-01-9	-	< 0.09	-	N
Benzo[b]fluoranthene	205-99-2	10.57	0.10	64	N
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	N
Benzo[a]pyrene	50-32-8	-	< 0.09	-	N
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	N
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	N
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	N
Total (USEPA16) PAHs	-	-	< 1.57	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	110
Acenaphthene-d10	105
Phenanthrene-d10	107
Chrysene-d12	112
Perylene-d12	118

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	100
Terphenyl-d14	78

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: A6131-16 The Factory Additional GI		
Sample Details:	TP01 ES 2 0.00	**Job Number:**	S17_1730M
LIMS ID Number:	CL1746852	**Date Booked in:**	07-Feb-17
QC Batch Number:	170150	**Date Extracted:**	09-Feb-17
Quantitation File:	Initial Calibration	**Date Analysed:**	13-Feb-17
Directory:	\021317MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.35	1.51	99	**UM**
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	4.52	1.34	94	UM
Fluorene	86-73-7	4.90	1.06	95	UM
Phenanthrene	85-01-8	5.75	7.47	99	UM
Anthracene	120-12-7	5.80	1.74	99	U
Fluoranthene	206-44-0	7.09	6.71	94	UM
Pyrene	129-00-0	7.38	6.20	96	UM
Benzo[a]anthracene	56-55-3	9.05	2.91	97	UM
Chrysene	218-01-9	9.10	3.25	98	UM
Benzo[b]fluoranthene	205-99-2	10.56	3.06	92	UM
Benzo[k]fluoranthene	207-08-9	10.60	1.11	90	UM
Benzo[a]pyrene	50-32-8	10.99	2.62	97	UM
Indeno[1,2,3-cd]pyrene	193-39-5	12.36	1.73	96	UM
Dibenzo[a,h]anthracene	53-70-3	12.38	0.41	90	UM
Benzo[g,h,i]perylene	191-24-2	12.65	1.57	90	UM
Total (USEPA16) PAHs	-	-	< 42.80	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	112
Acenaphthene-d10	105
Phenanthrene-d10	105
Chrysene-d12	119
Perylene-d12	140

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	98
Terphenyl-d14	76

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: A6131-16 The Factory Additional GI		
Sample Details:	TP01 ES 4 0.80	**Job Number:**	s17_1730M
LIMS ID Number:	CL1746853	**Date Booked in:**	07-Feb-17
QC Batch Number:	170150	**Date Extracted:**	09-Feb-17
Quantitation File:	Initial Calibration	**Date Analysed:**	13-Feb-17
Directory:	\021317MS14\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.10	-	**UM**
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	-	< 0.10	-	UM
Fluorene	86-73-7	-	< 0.10	-	UM
Phenanthrene	85-01-8	-	< 0.10	-	UM
Anthracene	120-12-7	-	< 0.10	-	U
Fluoranthene	206-44-0	-	< 0.10	-	UM
Pyrene	129-00-0	-	< 0.10	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.10	-	UM
Chrysene	218-01-9	-	< 0.10	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.10	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.10	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.10	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.10	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.10	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.10	-	UM
Total (USEPA16) PAHs	-	-	< 1.64	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	**% Area**
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	116
Acenaphthene-d10	112
Phenanthrene-d10	114
Chrysene-d12	118
Perylene-d12	124

Surrogates	**% Rec**
Nitrobenzene-d5	NA
2-Fluorobiphenyl	99
Terphenyl-d14	78

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polychlorinated Biphenyls (congeners)

Customer and Site Details:	ESG Limited Doncaster: A6131-16 The Factory Additional GI	**Matrix:**	Soil
Job Number:	S17_1730M	**Date Booked in:**	07-Feb-17
QC Batch Number:	170150	**Date Extracted:**	09-Feb-17
Directory:	020917PCB.GC70	**Date Analysed:**	09-Feb-17
Method:	Ultrasonic		
Accreditation code:	UM		

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
CL1746848	BH04 ES 1 0.20 (NVM)	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3
CL1746849	BH04 ES 5 1.00	<6.2	<6.2	<6.2	<6.2	<6.2	<6.2	<6.2
CL1746850	BH05 ES 4 1.00	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4
CL1746851	BH05 ES 7 3.00 (NVM)	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7	<5.7
CL1746852	TP01 ES 2 0.00	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3
CL1746853	TP01 ES 4 0.80	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4	<6.4

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

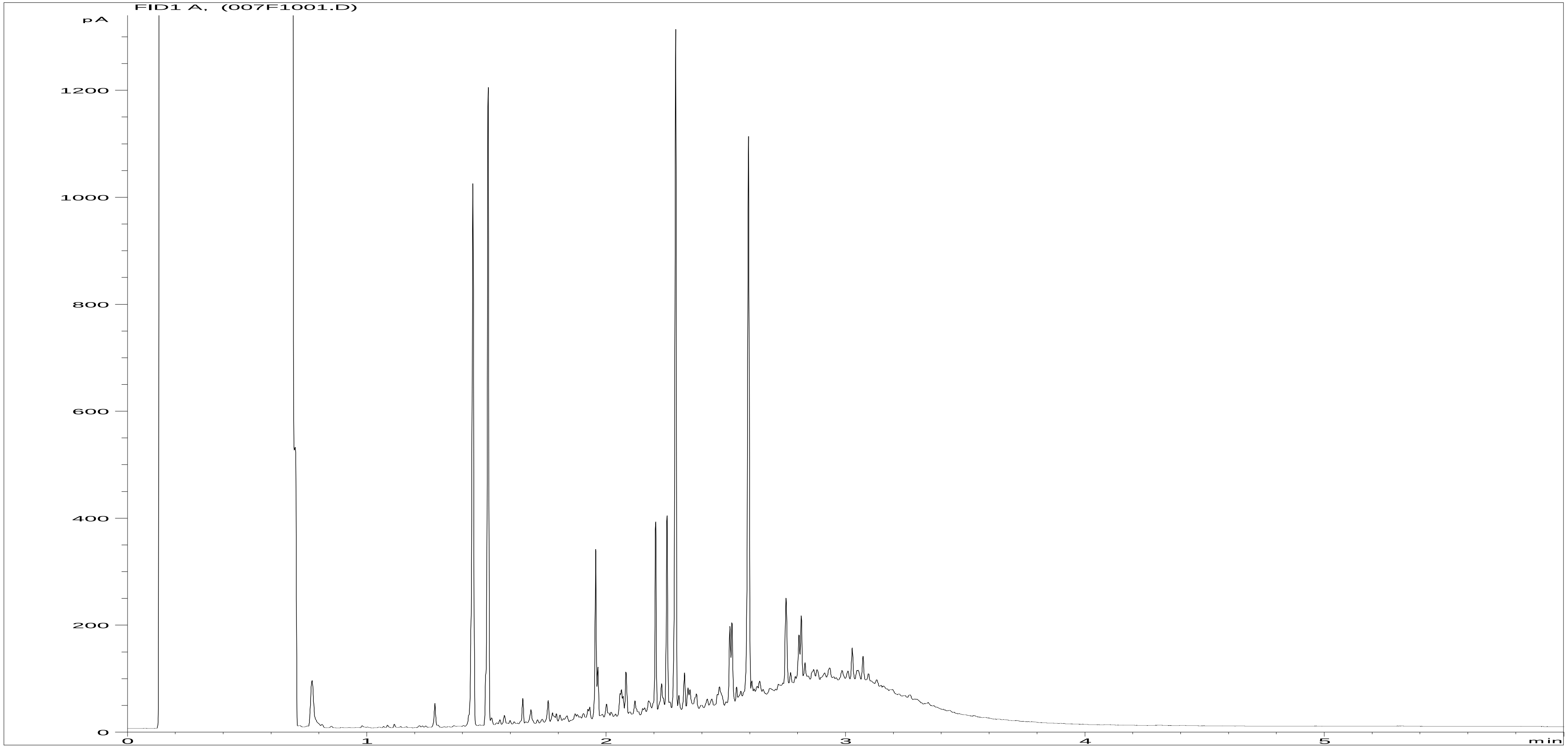
Total Petroleum Hydrocarbons (TPH) Carbon Ranges

Customer and Site Details:	ESG Limited Doncaster : A6131-16 The Factory Additional GI	**Matrix:**	Soil
Job Number:	S17_1730M	**Date Booked in:**	07-Feb-17
QC Batch Number:	170150	**Date Extracted:**	09-Feb-17
Directory:	D:\TES\DATA\Y2017\020917TPH_GC3\020917 2017-02-09 13-39-03\012F1501.D	**Date Analysed:**	09-Feb-17, 16:37:38
Method:	Ultra Sonic		
Accreditation code:	U		

		Concentration, (mg/kg) - as dry weight.				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
* CL1746848	BH04 ES 1 0.20 (NVM)	<2	3.13	21	77.1	396
CL1746849	BH04 ES 5 1.00	<2	<2	<2	2.49	14.6
CL1746850	BH05 ES 4 1.00	<3	<3	4.44	14	35.7
* CL1746851	BH05 ES 7 3.00 (NVM)	<2	<2	<2	5.42	30.4
CL1746852	TP01 ES 2 0.00	<2	3.25	17.5	66	232
CL1746853	TP01 ES 4 0.80	<3	<3	<3	<3	11.8

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

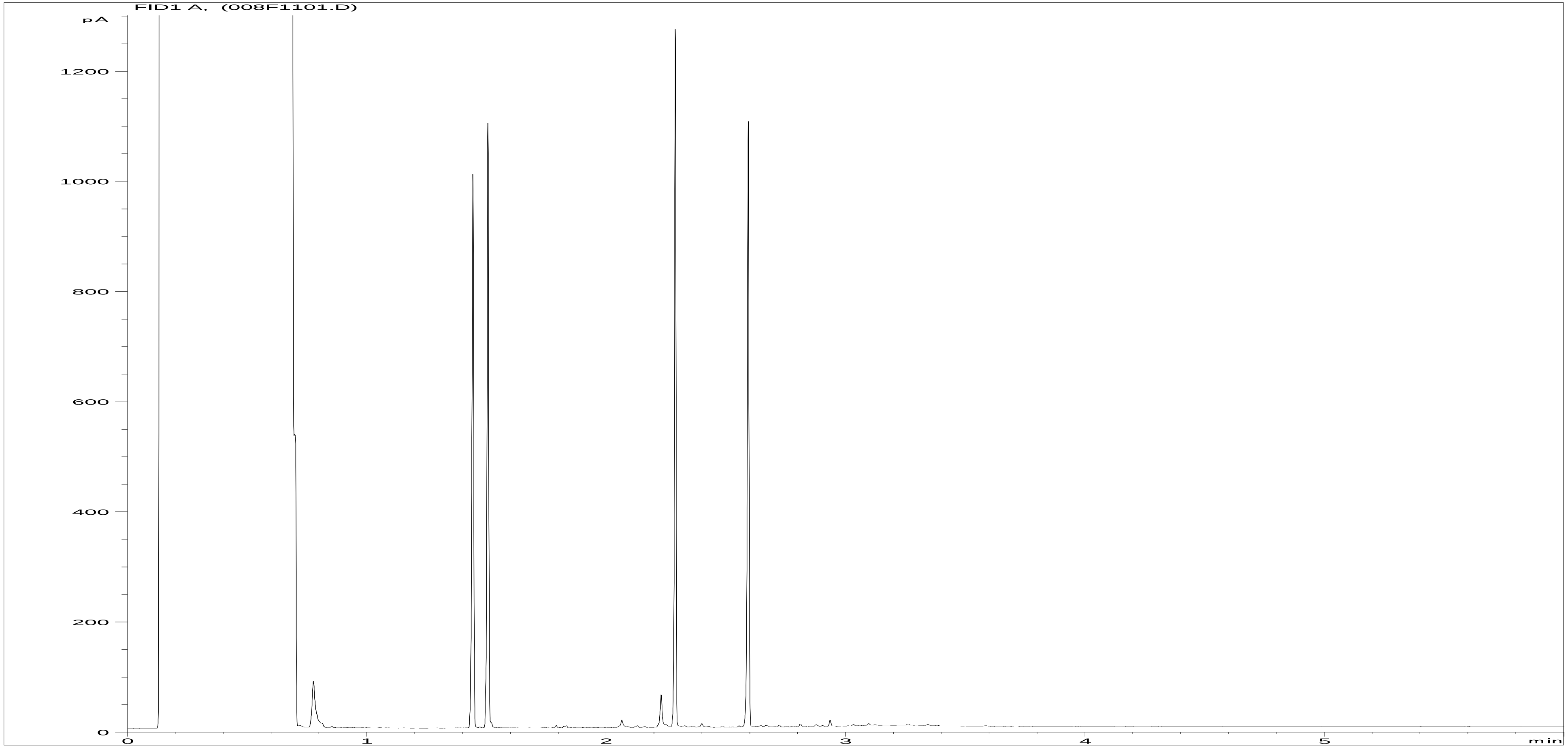


Sample ID: CL1746848
Multiplier: 8
Dilution: 1
Acquisition Method: 5UL_RUNF.M
Acquisition Date/Time: 09-Feb-17, 15:35:19
Datafile: D:\TES\DATA\Y2017\020917TPH_GC3\020917 2017-02-09 13-39-03\007F1001.D

Job Number: S17_1730M
Client: ESG Limited Doncaster
Site: A6131-16 The Factory Additional GI
Client Sample Ref: BH04 ES 1 0.20 (NVM)

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

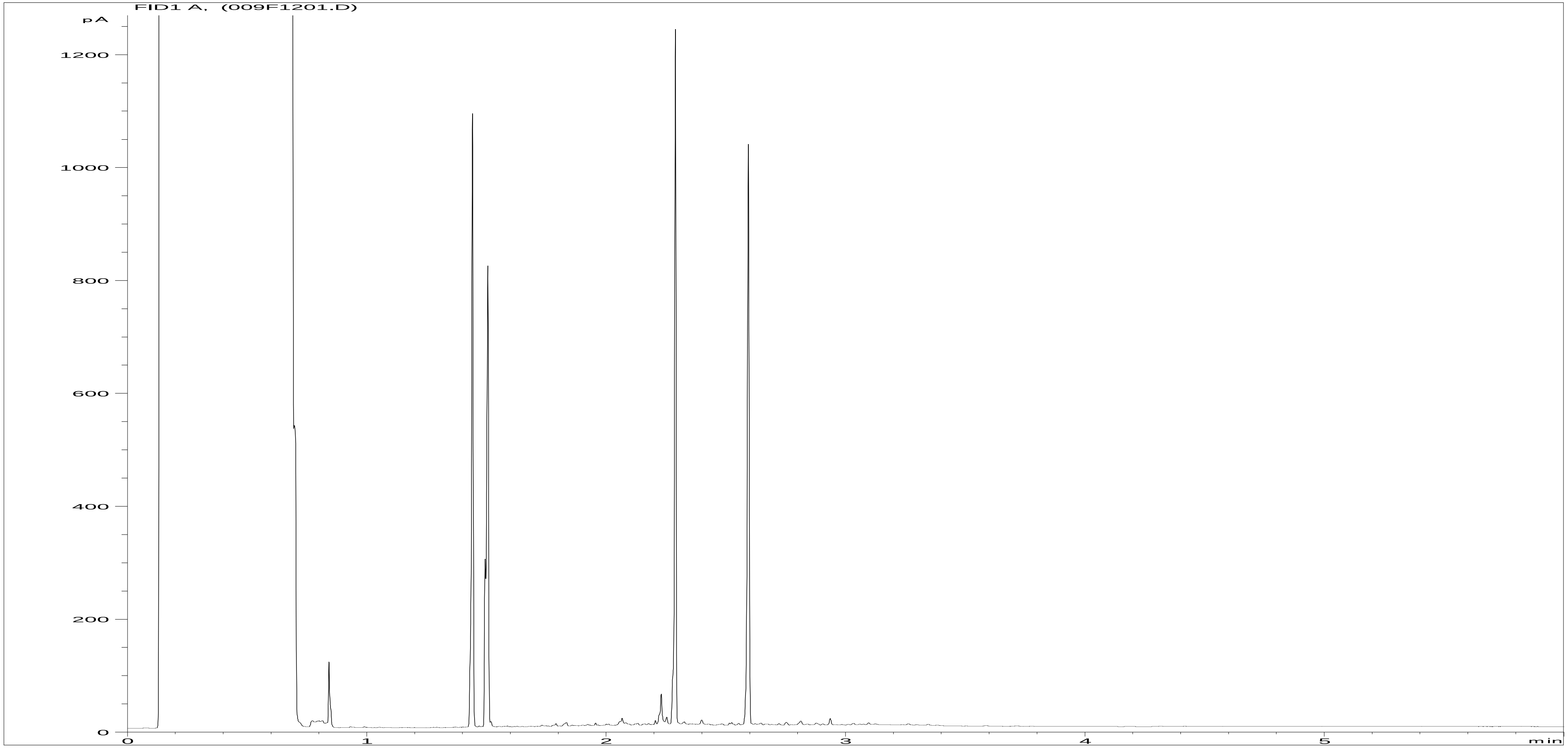
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1746849	**Job Number:**	S17_1730M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	A6131-16 The Factory Additional GI
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH04 ES 5 1.00
Acquisition Date/Time:	09-Feb-17, 15:47:44		
Datafile:	D:\TES\DATA\Y2017\020917TPH_GC3\020917 2017-02-09 13-39-03\008F1101.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

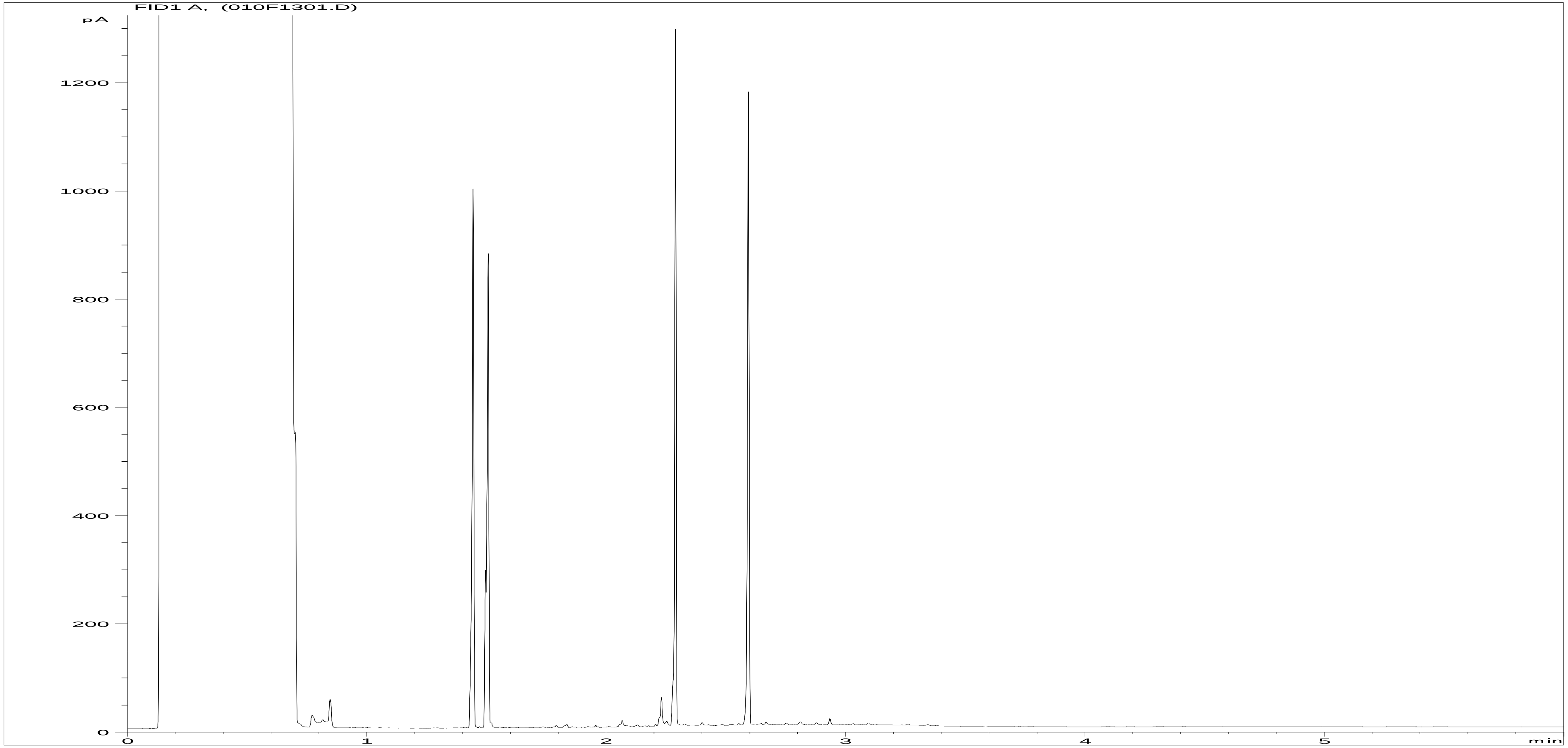
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1746850	**Job Number:**	S17_1730M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	A6131-16 The Factory Additional GI
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH05 ES 4 1.00
Acquisition Date/Time:	09-Feb-17, 16:00:13		
Datafile:	D:\TES\DATA\Y2017\020917TPH_GC3\020917 2017-02-09 13-39-03\009F1201.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID

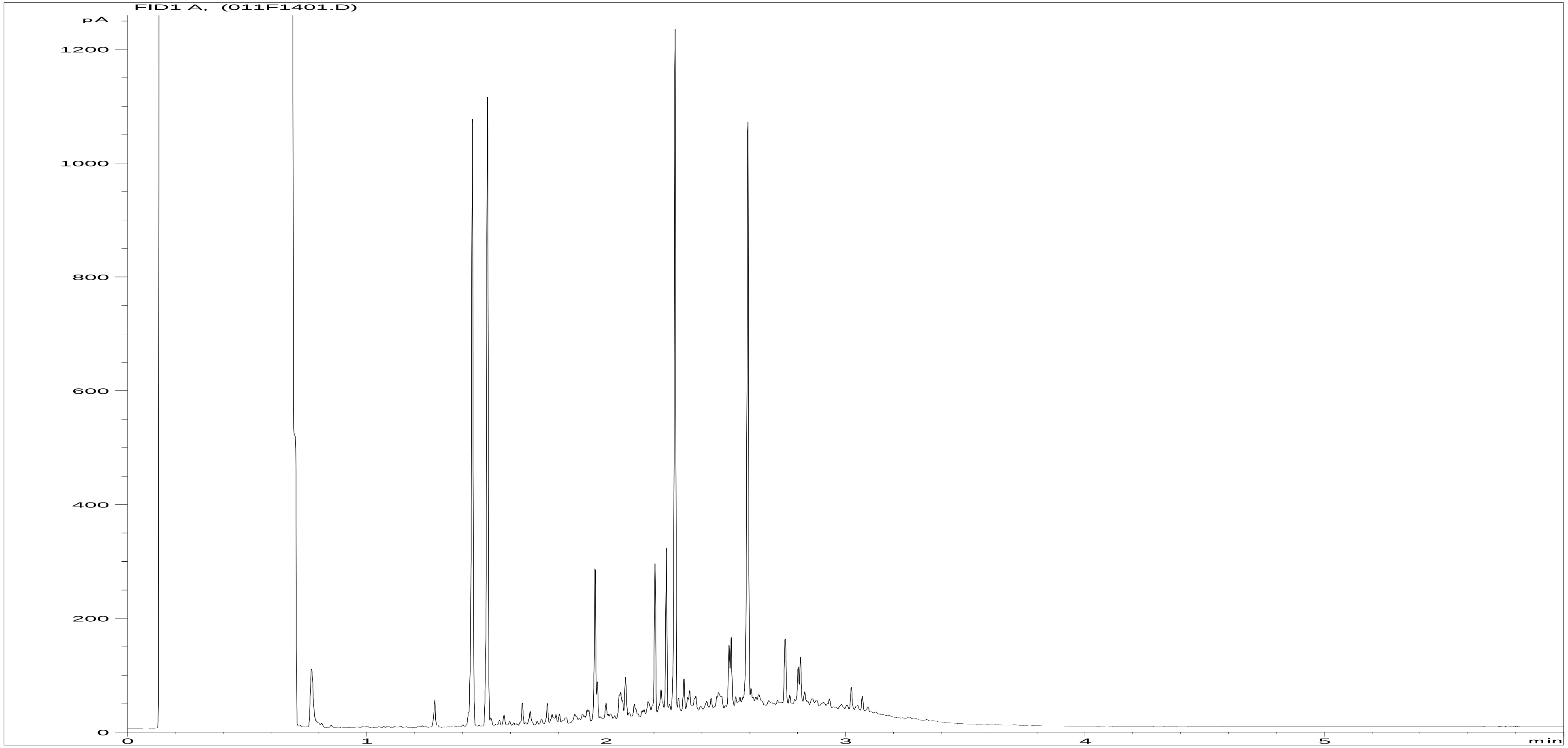


Sample ID: CL1746851
Multiplier: 8
Dilution: 1
Acquisition Method: 5UL_RUNF.M
Acquisition Date/Time: 09-Feb-17, 16:12:41
Datafile: D:\TES\DATA\Y2017\020917TPH_GC3\020917 2017-02-09 13-39-03\010F1301.D

Job Number: S17_1730M
Client: ESG Limited Doncaster
Site: A6131-16 The Factory Additional GI
Client Sample Ref: BH05 ES 7 3.00 (NVM)

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

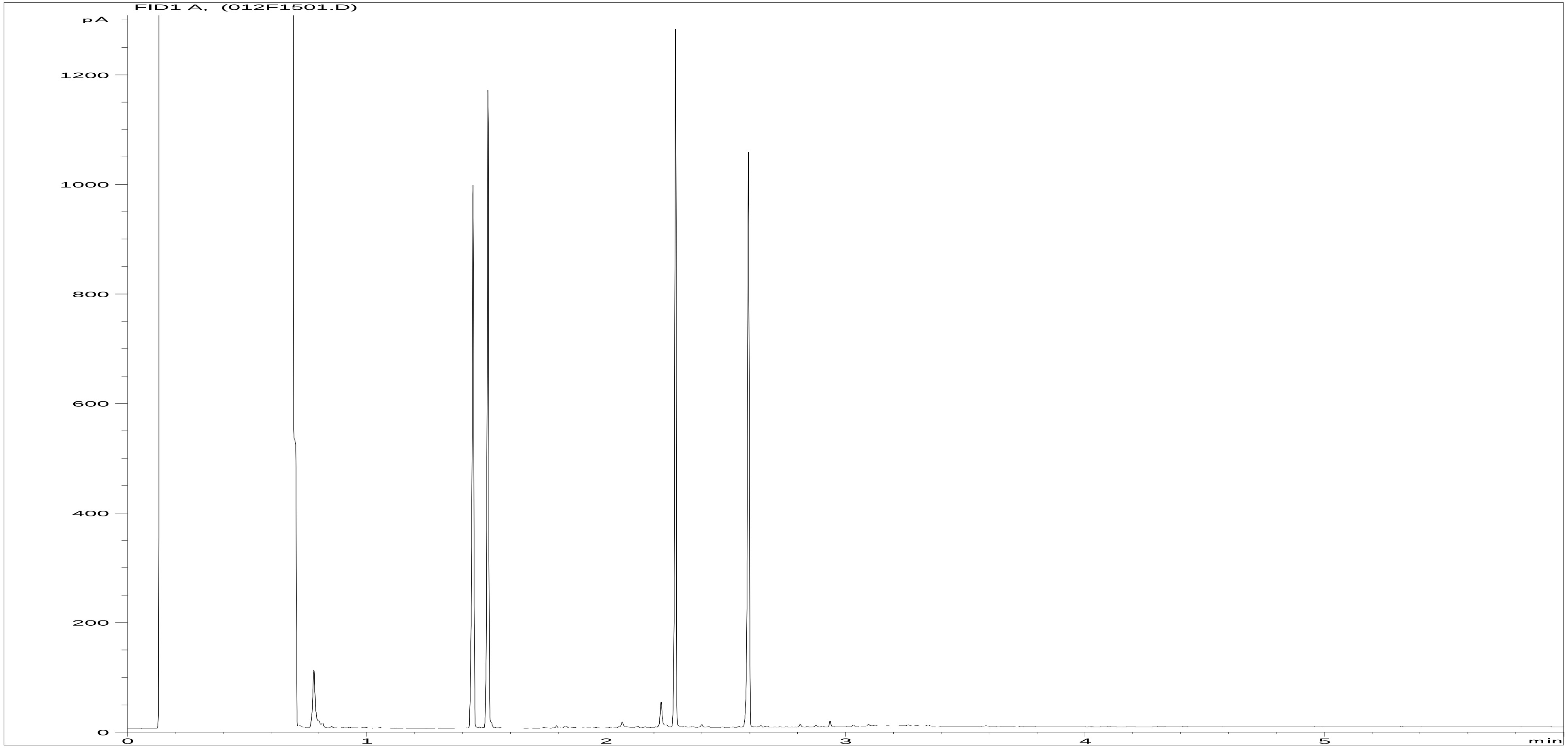
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1746852	**Job Number:**	S17_1730M
Multiplier:	8	**Client:**	ESG Limited Doncaster
Dilution:	1	**Site:**	A6131-16 The Factory Additional GI
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	TP01 ES 2 0.00
Acquisition Date/Time:	09-Feb-17, 16:25:11		
Datafile:	D:\TES\DATA\Y2017\020917TPH_GC3\020917 2017-02-09 13-39-03\011F1401.D		

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID: CL1746853
Multiplier: 8
Dilution: 1
Acquisition Method: 5UL_RUNF.M
Acquisition Date/Time: 09-Feb-17, 16:37:38
Datafile: D:\TES\DATA\Y2017\020917TPH_GC3\020917 2017-02-09 13-39-03\012F1501.D

Job Number: S17_1730M
Client: ESG Limited Doncaster
Site: A6131-16 The Factory Additional GI
Client Sample Ref: TP01 ES 4 0.80

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

				Leaching Data	
Client	ESG Limited Doncaster			Weight of sample (kg)	0.234
Contact	Richard Hardwick			Moisture content @ 105°C (% of Wet Weight)	5.6
				Equivalent Weight based on drying at 105°C (kg)	0.225
Site	A6131-16 The Factory Additional GI			Volume of water required to carry out 2:1 stage (litres)	0.441
				Fraction of sample above 4 mm %	44.400
Sample Description	**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
BH04 ES 1 0.20	s17_1730M	CL/1746848	21-Feb-17	Volume to undertake analysis (2:1 Stage) (litres)	0.300
				Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	**Method Code**	**Solid Waste Analysis (Dry Basis)**	**Concentration in Solid (Dry Weight Basis)**	**Landfill Waste Acceptance Criteria Limit Values**		
				Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
N	WSLM59	Total Organic Carbon (% M/M)	1.01	3	5	6
	LOI450	Loss on Ignition (%)				10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
	TPHFIDUS	Mineral Oil (mg/kg)		500		
	PAHMSUS	PAH Sum of 17 (mg/kg)		100		
N	PHSOIL	pH (pH units)	8.8 §		>6	
	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7			To be evaluated	To be evaluated

Accreditation	**Method Code**	**Leachate Analysis**	**2:1 Leachate**	**8:1 Leachate**	**Calculated amount leached @ 2:1**	**Calculated cumulative amount leached @ 10:1**	**Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1** **mg/kg (dry weight)**		
			mg/l except ºº		**mg/kg (dry weight)**				
U	WSLM3	pH (pH units) ºº	9.3	8.4	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	300	117					
U	ICPMSW	Arsenic	0.001	0.004	0.002	0.04	0.5	2	25
U	ICPWATVAR	Barium	0.05	0.09	0.1	0.8	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.006	0.002	0.012	0.03	0.5	10	70
U	ICPMSW	Copper	0.015	0.004	0.03	0.05	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.06	0.007	0.12	0.14	0.5	10	30
U	ICPMSW	Nickel	<0.001	0.001	<0.002	<0.01	0.4	10	40
U	ICPMSW	Lead	0.001	0.025	0.002	0.22	0.5	10	50
U	ICPMSW	Antimony	0.009	0.004	0.018	0.05	0.06	0.7	5
U	ICPMSW	Selenium	0.002	<0.001	0.004	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.004	0.02	0.008	0.18	4	50	200
U	KONENS	Chloride	14	<1	28	<27	800	15000	25000
U	ISEF	Fluoride	0.4	0.2	0.8	2	10	150	500
U	ICPWATVAR	Sulphate as SO4	62	10	124	169	1000	20000	50000
N	WSLM27	Total Dissolved Solids	200	91.2	400	1057	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	12	4.5	24	55	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	ESG Limited Doncaster		
Contact	Richard Hardwick		
Site	A6131-16 The Factory Additional GI		
Sample Description	**Report No**	**Sample No**	**Issue Date**
BH04 ES 5 1.00	s17_1730M	CL/1746849	21-Feb-17

Leaching Data	
Weight of sample (kg)	0.278
Moisture content @ 105°C (% of Wet Weight)	19.0
Equivalent Weight based on drying at 105°C (kg)	0.225
Volume of water required to carry out 2:1 stage (litres)	0.397
Fraction of sample above 4 mm %	0.000
Fraction of non-crushable material %	0.000
Volume to undertake analysis (2:1 Stage) (litres)	0.300
Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	0.82	3	5	6
	LOI450	Loss on Ignition (%)				10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.07	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
	TPHFIDUS	Mineral Oil (mg/kg)		500		
	PAHMSUS	PAH Sum of 17 (mg/kg)		100		
U	PHSOIL	pH (pH units)	8.4		>6	
	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	7.8	7.3	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	400	149					
U	ICPMSW	Arsenic	0.001	<0.001	0.002	<0.01	0.5	2	25
U	ICPWATVAR	Barium	0.07	0.08	0.14	0.8	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	<0.001	0.001	<0.002	<0.01	0.5	10	70
U	ICPMSW	Copper	0.005	0.007	0.01	0.07	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	<0.001	<0.001	<0.002	<0.01	0.5	10	30
U	ICPMSW	Nickel	<0.001	<0.001	<0.002	<0.01	0.4	10	40
U	ICPMSW	Lead	0.003	0.013	0.006	0.12	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.061	0.058	0.122	0.58	4	50	200
U	KONENS	Chloride	9	6	18	64	800	15000	25000
U	ISEF	Fluoride	<0.1	<0.1	<0.2	<1	10	150	500
U	ICPWATVAR	Sulphate as SO4	34	5	68	89	1000	20000	50000
N	WSLM27	Total Dissolved Solids	300	116	600	1405	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	20	13	40	139	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.
Results corrected to dry weight at 105°C where appropriate, in accordance with the MCERTS standard.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	ESG Limited Doncaster
Contact	Richard Hardwick
Site	A6131-16 The Factory Additional GI

Sample Description	Report No	Sample No	Issue Date
BH05 ES 4 1.00	s17_1730M	CL/1746850	21-Feb-17

Leaching Data	
Weight of sample (kg)	0.271
Moisture content @ 105°C (% of Wet Weight)	22.1
Equivalent Weight based on drying at 105°C (kg)	0.225
Volume of water required to carry out 2:1 stage (litres)	0.404
Fraction of sample above 4 mm %	53.300
Fraction of non-crushable material %	0.000
Volume to undertake analysis (2:1 Stage) (litres)	0.300
Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	3.14	3	5	6
	LOI450	Loss on Ignition (%)				10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.07	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
	TPHFIDUS	Mineral Oil (mg/kg)		500		
	PAHMSUS	PAH Sum of 17 (mg/kg)		100		
U	PHSOIL	pH (pH units)	8.6		>6	
	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	7.6	7.3	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	300	142					
U	ICPMSW	Arsenic	0.001	0.002	0.002	0.02	0.5	2	25
U	ICPWATVAR	Barium	0.07	0.09	0.14	0.9	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.001	0.001	0.002	0.01	0.5	10	70
U	ICPMSW	Copper	0.002	0.004	0.004	0.04	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.038	0.013	0.076	0.16	0.5	10	30
U	ICPMSW	Nickel	<0.001	0.001	<0.002	<0.01	0.4	10	40
U	ICPMSW	Lead	0.002	0.008	0.004	0.07	0.5	10	50
U	ICPMSW	Antimony	0.002	0.002	0.004	0.02	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.043	0.041	0.086	0.41	4	50	200
U	KONENS	Chloride	32	2	64	60	800	15000	25000
U	ISEF	Fluoride	0.7	0.5	1.4	5	10	150	500
U	ICPWATVAR	Sulphate as SO4	14	<3	28	<45	1000	20000	50000
N	WSLM27	Total Dissolved Solids	300	111	600	1362	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	4.9	3.9	9.8	40	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	ESG Limited Doncaster			
Contact	Richard Hardwick			
Site	A6131-16 The Factory Additional GI			
Sample Description	**Report No**	**Sample No**	**Issue Date**	
BH05 ES 7 3.00	s17_1730M	CL/1746851	21-Feb-17	

Leaching Data	
Weight of sample (kg)	0.259
Moisture content @ 105°C (% of Wet Weight)	12.1
Equivalent Weight based on drying at 105°C (kg)	0.225
Volume of water required to carry out 2:1 stage (litres)	0.416
Fraction of sample above 4 mm %	37.300
Fraction of non-crushable material %	0.000
Volume to undertake analysis (2:1 Stage) (litres)	0.300
Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values Inert Waste Landfill	 Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	 Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	0.37	3	5	6
	LOI450	Loss on Ignition (%)				10
N	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
	TPHFIDUS	Mineral Oil (mg/kg)		500		
	PAHMSUS	PAH Sum of 17 (mg/kg)		100		
N	PHSOIL	pH (pH units)	8.6 §		>6	
	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	7.6	7.3	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	300	126					
U	ICPMSW	Arsenic	<0.001	0.001	<0.002	<0.01	0.5	2	25
U	ICPWATVAR	Barium	0.06	0.08	0.12	0.8	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.001	<0.002	<0.01	0.5	10	70
U	ICPMSW	Copper	0.003	0.003	0.006	0.03	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.029	0.005	0.058	0.08	0.5	10	30
U	ICPMSW	Nickel	<0.001	0.001	<0.002	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	0.005	<0.002	<0.04	0.5	10	50
U	ICPMSW	Antimony	0.002	0.001	0.004	0.01	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.024	0.024	0.048	0.24	4	50	200
U	KONENS	Chloride	33	2	66	61	800	15000	25000
U	ISEF	Fluoride	0.7	0.3	1.4	4	10	150	500
U	ICPWATVAR	Sulphate as SO4	12	<3	24	<42	1000	20000	50000
N	WSLM27	Total Dissolved Solids	300	98.3	600	1252	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	4.8	3.4	9.6	36	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	ESG Limited Doncaster
Contact	Richard Hardwick
Site	A6131-16 The Factory Additional GI

Sample Description	Report No	Sample No	Issue Date
TP01 ES 2 0.00	s17_1730M	CL/1746852	21-Feb-17

Leaching Data	
Weight of sample (kg)	0.234
Moisture content @ 105°C (% of Wet Weight)	6.2
Equivalent Weight based on drying at 105°C (kg)	0.225
Volume of water required to carry out 2:1 stage (litres)	0.441
Fraction of sample above 4 mm %	71.800
Fraction of non-crushable material %	0.000
Volume to undertake analysis (2:1 Stage) (litres)	0.300
Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	1.28	3	5	6
	LOI450	Loss on Ignition (%)				10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
	TPHFIDUS	Mineral Oil (mg/kg)		500		
	PAHMSUS	PAH Sum of 17 (mg/kg)		100		
U	PHSOIL	pH (pH units)	9.8		>6	
	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	10.4	9.6	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	400	<100					
U	ICPMSW	Arsenic	<0.001	<0.001	<0.002	<0.01	0.5	2	25
U	ICPWATVAR	Barium	0.06	0.06	0.12	0.6	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.009	0.002	0.018	0.03	0.5	10	70
U	ICPMSW	Copper	0.008	0.002	0.016	0.03	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.065	0.008	0.13	0.16	0.5	10	30
U	ICPMSW	Nickel	0.002	<0.001	0.004	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.001	<0.002	<0.01	0.5	10	50
U	ICPMSW	Antimony	0.005	0.003	0.01	0.03	0.06	0.7	5
U	ICPMSW	Selenium	0.002	<0.001	0.004	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.009	0.017	0.018	0.16	4	50	200
U	KONENS	Chloride	40	3	80	79	800	15000	25000
U	ISEF	Fluoride	0.3	0.1	0.6	1	10	150	500
U	ICPWATVAR	Sulphate as SO4	67	12	134	193	1000	20000	50000
N	WSLM27	Total Dissolved Solids	300	71.7	600	1021	4000	60000	100000
U	SFAPI	Phenol Index	0.28	<0.05	0.56	<0.8	1		
N	WSLM13	Dissolved Organic Carbon	6.7	3.7	13.4	41	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	ESG Limited Doncaster
Contact	Richard Hardwick
Site	A6131-16 The Factory Additional GI

Sample Description	Report No	Sample No	Issue Date
TP01 ES 4 0.80	s17_1730M	CL/1746853	21-Feb-17

Leaching Data	
Weight of sample (kg)	0.292
Moisture content @ 105°C (% of Wet Weight)	22.0
Equivalent Weight based on drying at 105°C (kg)	0.225
Volume of water required to carry out 2:1 stage (litres)	0.383
Fraction of sample above 4 mm %	0.000
Fraction of non-crushable material %	0.000
Volume to undertake analysis (2:1 Stage) (litres)	0.300
Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	0.39	3	5	6
	LOI450	Loss on Ignition (%)				10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.07	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
	TPHFIDUS	Mineral Oil (mg/kg)		500		
	PAHMSUS	PAH Sum of 17 (mg/kg)		100		
U	PHSOIL	pH (pH units)	8.8		>6	
	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	7.9	7.7	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	300	158					
U	ICPMSW	Arsenic	<0.001	<0.001	<0.002	<0.01	0.5	2	25
U	ICPWATVAR	Barium	0.09	0.08	0.18	0.8	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.001	<0.002	<0.01	0.5	10	70
U	ICPMSW	Copper	0.002	0.002	0.004	0.02	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	<0.001	<0.001	<0.002	<0.01	0.5	10	30
U	ICPMSW	Nickel	0.005	<0.001	0.01	<0.02	0.4	10	40
U	ICPMSW	Lead	<0.001	0.001	<0.002	<0.01	0.5	10	50
U	ICPMSW	Antimony	0.001	<0.001	0.002	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	<0.001	0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.09	0.048	0.18	0.54	4	50	200
U	KONENS	Chloride	5	<1	10	<15	800	15000	25000
U	ISEF	Fluoride	<0.1	<0.1	<0.2	<1	10	150	500
U	ICPWATVAR	Sulphate as SO4	16	5	32	65	1000	20000	50000
N	WSLM27	Total Dissolved Solids	200	124	400	1341	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	6.4	4.1	12.8	44	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

CERTIFICATE OF ANALYSIS

ANALYSIS REQUESTED BY:
ESG Environmental Chemistry
PO Box 100
Burton upon Trent
Staffordshire
DE15 0XD

CONTRACT NO: 52083-7

PROJECT NO: 610

DATE OF ISSUE: 17.02.17

DATE SAMPLES RECEIVED: 08.02.17

DATE SAMPLES ANALYSED: 17.02.17

SAMPLE DESCRIPTION: Six soil/loose aggregate samples.

ANALYSIS REQUESTED: Qualitative analysis of samples for determination of presence/type of asbestos.

METHODS:

Our method involves initial examination of entire samples followed by detailed analysis of representative sub-samples. The sub samples are analysed qualitatively for asbestos by polarised light and dispersion staining as described by the Health and Safety Executive in HSG 248.

RESULTS:

Initial Screening

No asbestos was detected in any of the soil samples by stereo-binocular and polarised light microscopy.

A summary of the results is given in Table 1.

CONTRACT NO: 52083-7
PROJECT NO: 610
DATE OF ISSUE: 17.02.17

RESULTS: (cont.)

Table 1: Qualitative Results

ESG Job I.D: S171730

IOM sample number	Client sample number	ACM type detected	PLM result
S46026	S1746848 BH04 0.20	-	No Asbestos Detected
S46027	S1746849 BH04 1.00	-	No Asbestos Detected
S46028	S1746850 BH05 1.00	-	No Asbestos Detected
S46029	S1746851 BH05 3.00	-	No Asbestos Detected
S46030	S1746852 TP01 0.00	-	No Asbestos Detected
S46031	S1746853 TP01 0.80	-	No Asbestos Detected

Our detection limit for this method is 0.001%.

COMMENTS:

IOM Consulting cannot accept responsibility for samples that have been incorrectly collected or despatched by external clients.

Any opinions and interpretations expressed herein are outwith the scope of our UKAS accreditation.

Julie Simpson

AUTHORISED BY: ……………………….
J Simpson
Senior Scientific Technician

Sample Analysis

ESG Environmental Chemistry

S171730M

Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **A6131-16 The Factory Additional GI**
Report No **S171730M**

Consignment No S62527
Date Logged 07-Feb-2017

Report Due 13-Feb-2017

ID Number	Description	MethodID	BTEXHSA		CEN Leachate		CustServ	FOCS	GROHSA	ICPBOR	ICPMSS									ICPWSS	KONECR	MCertS	PAHMSUS	PCBECD	PHSOIL	SFAPI	
		Sampled	BTEX-HSA + MTBE analysis	MTBE (µg/kg)	CEN Leac(P)1	CEN Leac(P)2	REPORT A	S.O.M. % (Calc)	GRO (C5-C10)	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	SO4-- (H2O sol) mg/l	Chromium vi:	MCertS Analysis	PAH (16) by GCMS	PCB-7 Congeners Analysis	pH units (AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
			✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
CL/1746848	BH04 0.20	24/01/17	E	E	🟩	🟩	🟩	🟩	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	E	E
CL/1746849	BH04 1.00	24/01/17	E	E	🟩	🟩	🟩	🟩	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	E	E
CL/1746850	BH05 1.00	24/01/17	E	E	🟩	🟩	🟩	🟩	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	E	E
CL/1746851	BH05 3.00	24/01/17	E	E	🟩	🟩	🟩	🟩	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	E	E
CL/1746852	TP01 0.00	24/01/17	E	E	🟩	🟩	🟩	🟩	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	E	E
CL/1746853	TP01 0.80	24/01/17	E	E	🟩	🟩	🟩	🟩	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	E	E

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
☐	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Analytical and Deviating Sample Overview

Customer **ESG Limited Doncaster**
Site **A6131-16 The Factory Additional GI**
Report No **S171730M**

Consignment No S62527
Date Logged 07-Feb-2017

Report Due 13-Feb-2017

ID Number	Description	MethodID	SFAPI	SSP3	Sub020	TMSS	TPHFIDUS		WSLM59
		Sampled	Phenol Index.(AR)	Stone Content %	^Asbestos ID (Stage 1)	Tot.Moisture @ 105C	TPH by GCFID (AR)	TPH Carbon Banding.	Total Organic Carbon
			✓		✓	✓	✓	✓	
CL/1746848	BH04 0.20	24/01/17	E	🟩	🟩	🟩	🟩	🟩	🟩
CL/1746849	BH04 1.00	24/01/17	E	🟩	🟩	🟩	🟩	🟩	🟩
CL/1746850	BH05 1.00	24/01/17	E	🟩	🟩	🟩	🟩	🟩	🟩
CL/1746851	BH05 3.00	24/01/17	E	🟩	🟩	🟩	🟩	🟩	🟩
CL/1746852	TP01 0.00	24/01/17	E	🟩	🟩	🟩	🟩	🟩	🟩
CL/1746853	TP01 0.80	24/01/17	E	🟩	🟩	🟩	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	FOCS	Oven Dried @ < 35°C	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBECD	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SSP3	As Received	Determination of stones content by dry sieving at the required particle size
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
TR Denotes Tremolite
AC Denotes Actinolite
AN Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined
N.Det Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited Doncaster

Site : A6131-16 The Factory Additional GI

Report Number : S17_1730

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1746848	BH04 ES 1 0.20 (NVM)	Grey/Brown Silt STONE
CL/1746849	BH04 ES 5 1.00	Brown Clay SILT
CL/1746850	BH05 ES 4 1.00	Brown MADE GROUND
CL/1746851	BH05 ES 7 3.00 (NVM)	Brown Silt STONE
CL/1746852	TP01 ES 2 0.00	Brown Stone SILT
CL/1746853	TP01 ES 4 0.80	Brown Clay SILT

TEST REPORT

1252

Report No. EXR/235015 (Ver. 1)

ESG Limited Doncaster
ESG Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: A6131-16 The Factory Additional GI

The 1 sample described in this report were registered for analysis by ESG on 07-Feb-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 15-Feb-2017

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (10) Results (Page 5)
Table of PCB Congener Results (Page 6)
Table of TPH Interpretations (Page 7)
Table of TPH Texas banding (0.01) (Page 8)
GC-FID Chromatograms (Page 9)
Analytical and Deviating Sample Overview (Pages 10 to 11)
Table of Method Descriptions (Page 12)
Table of Report Notes (Page 13)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Tim Barnes

T Barnes

Operations Director
Energy & Waste Services

Date of Issue: 15-Feb-2017

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

		Units :	pH units	uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l	mg/l	mg/l	mg/l	mg/l
		Method Codes :	WSLM3	WSLM2	Calc_HD	KONENS	ISEF	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	PAHMSW	ICPMSW	ICPMSW	ICPMSW	ICPMSW
		Method Reporting Limits :		100	7	1	0.1	3	1	1	0.001	0.001	0.0001		0.001	0.001	0.002	0.001
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**pH units w**	**Conductivity uS/cm @ 25C w**	**Total Hardness as CaCO3**	**Chloride as Cl w**	**Fluoride as F a**	**Total Sulphur as SO4 (Dissolved) a**	**Calcium as Ca (Dissolved) a**	**Magnesium as Mg (Dissolved) a**	**Nickel as Ni (Dissolved)**	**Chromium as Cr (Dissolved)**	**Cadmium as Cd (Dissolved)**	**PAH GC-MS (16) o**	**Copper as Cu (Dissolved)**	**Lead as Pb (Dissolved)**	**Zinc as Zn (Dissolved)**	**Arsenic as As (Dissolved)**
1767885	BH05 W 33 3.15	02-Feb-17 15:00	7.4	500	109	42	0.4	56	32	7	0.012	0.009	<0.0001	Req	0.003	<0.001	0.003	0.001

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

A6131-16 The Factory Additional GI

Sample Analysis

Date Printed	**15-Feb-2017**
Report Number	**EXR/235015**
Table Number	**1**

Where individual results are flagged see report notes for status.

		Units :	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/l		µg/l	µg/l	µg/l	µg/l
		Method Codes :	ICPWATVAR	ICPMSW	ICPMSW	ICPMSW	SFAPI	SFAS	GROHSA	TPHFID	TPHFID	WSLM13	PCBCONEC	TPHFID	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
		Method Reporting Limits :	0.01	0.0001	0.001	0.001	0.02	0.02	0.1	0.01	0.01	0.2	0.05		5	5	5	10
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**Boron as B (Dissolved) a**	**Mercury as Hg (Dissolved)**	**Selenium as Se (Dissolved)**	**Antimony as Sb (Dissolved)**	**Cyanide (Total) as CN**	**Sulphide as S**	**GRO-HSA o**	**Carbon Banding**	**TPH GC**	**Dissolved Organic Carbon w**	**PCB - 7 Congeners o**	**Interpretation**	**Ethyl Benzene**	**Benzene**	**Toluene**	**MTBE**
1767885	BH05 W 33 3.15	**02-Feb-17 15:00**	0.02	0.0006	0.002	0.001	<0.02	<0.02	<0.1	Req	14	65	Req	Req	<5	<5	<5	<10

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**ESG Limited Doncaster**
Contact	Richard Hardwick

A6131-16 The Factory Additional GI

Sample Analysis

Date Printed	**15-Feb-2017**
Report Number	**EXR/235015**
Table Number	**1**

Where individual results are flagged see report notes for status.

		Units :	µg/l	µg/l	µg/l	mg/l	mg/l	mg/l	mg/l
		Method Codes :	BTEXHSA	BTEXHSA	BTEXHSA	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL	PHEHPLCVL
		Method Reporting Limits :	15	10	5	0.0005	0.0005	0.0005	0.0005
		UKAS Accredited :	Yes	Yes	Yes	No	No	No	No
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**Xylenes**	**m/p Xylenes**	**o Xylene**	**Phenol**	**Cresols**	**Dimethylphenols**	**Trimethylphenols**
1767885	BH05 W 33 3.15	02-Feb-17 15:00	<15	<10	<5	0.0009	<0.0005	<0.0005	<0.0005

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name **ESG Limited Doncaster**

Contact Richard Hardwick

Sample Analysis

A6131-16 The Factory Additional GI

Date Printed	**15-Feb-2017**
Report Number	**EXR/235015**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	ESG Limited Doncaster: A6131-16 The Factory Additional GI		
Sample Details:	BH05 W 33 3.15	**Job Number:**	w23_5015
LIMS ID Number:	EX1767885	**Date Booked in:**	07-Feb-17
QC Batch Number:	170075	**Date Extracted:**	09-Feb-17
Quantitation File:	Initial Calibration	**Date Analysed:**	10-Feb-17
Directory:	\020917MS10\	**Matrix:**	Water
Dilution:	20.0	**Ext Method:**	Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.400	-
Acenaphthylene	208-96-8	-	< 0.200	-
Acenaphthene	83-32-9	-	< 0.200	-
Fluorene	86-73-7	-	< 0.200	-
Phenanthrene	85-01-8	-	< 0.200	-
Anthracene	120-12-7	-	< 0.200	-
Fluoranthene	206-44-0	-	< 0.200	-
Pyrene	129-00-0	-	< 0.200	-
Benzo[a]anthracene	56-55-3	-	< 0.200	-
Chrysene	218-01-9	-	< 0.200	-
Benzo[b]fluoranthene	205-99-2	-	< 0.200	-
Benzo[k]fluoranthene	207-08-9	-	< 0.200	-
Benzo[a]pyrene	50-32-8	-	< 0.200	-
Indeno[1,2,3-cd]pyrene	193-39-5*	-	< 0.200	-
Dibenzo[a,h]anthracene	53-70-3*	-	< 0.200	-
Benzo[g,h,i]perylene	191-24-2*	-	< 0.200	-
Total (USEPA16) PAHs	-	-	< 3.400	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	106
Acenaphthene-d10	118
Phenanthrene-d10	88
Chrysene-d12	111
Perylene-d12	105

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	84
Terphenyl-d14	91

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Where individual results are flagged see report notes for status.

Polychlorinated Biphenyls (congeners)

Customer and Site Details: ESG Limited Doncaster: A6131-16 The Factory Additional GI
Job Number: W23_5015
QC Batch Number: 170011
Directory: 020817PCB.GC70
Method: Separating Funnel

Matrix: Water
Date Booked in: 07-Feb-17
Date Extracted: 08-Feb-17
Date Analysed: 08-Feb-17

*** This sample data is not UKAS accredited.**

		Concentration, (µg/l)						
Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
* EX1767885	BH05 W 33 3.15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Where individual results are flagged see report notes for status.

Interpretation of GC/FID Chromatographic Data

Client:	ESG Limited Doncaster
Site:	A6131 - 16 The Factory Additional GI
Report Number:	W235015
Date:	14/02/2017

Assessment Type	Standard Interpretation
Assessor:	CO
Analysis:	TPH by GC-FID (AR)

Sample ID	Client Description	Interpretation
EX1767885	BH05 W 33 3.15	Dual UCM in the range nC10-nC40+. Some possible similarities to degraded Diesel and degraded Kerosene. Suggest GC-MS for better I.D.

Where individual results are flagged see report notes for status.

Total Petroleum Hydrocarbons (TPH) Carbon Ranges

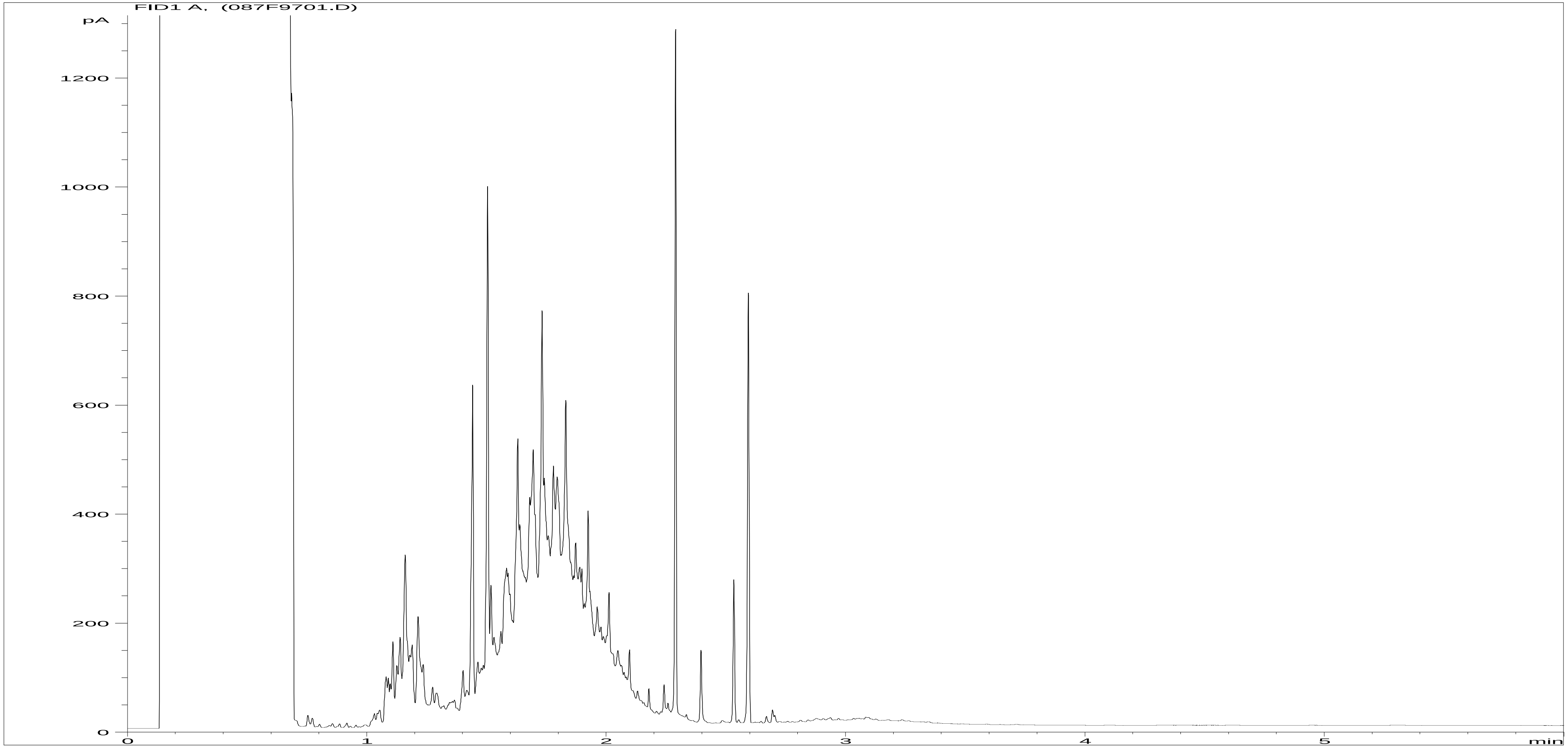
Customer and Site Details:	ESG Limited Doncaster : A6131-16 The Factory Additional GI	**Matrix:**	Water
Job Number:	W23_5015	**Date Booked in:**	07-Feb-17
QC Batch Number:	170081	**Date Extracted:**	13-Feb-17
Directory:	D:\TES\DATA\Y2017\021317TPH_GC3\021317 2017-02-13 16-32-39\087F9701.D	**Date Analysed:**	14-Feb-17, 12:30:24
Method:	Bottle		

*** Sample data with an asterisk are not UKAS accredited.**

		Concentration, (mg/l)				
Sample ID	**Client ID**	**>C8 - C10**	**>C10 - C12**	**>C12 - C16**	**>C16 - C21**	**>C21 - C35**
EX1767885	BH05 W 33 3.15	0.168	1.52	5.35	5.69	1.2

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	EX1767885	**Job Number:**	W23_5015
Multiplier:	0.005	**Client:**	ESG Limited Doncaster
Dilution:	20	**Site:**	A6131-16 The Factory Additional GI
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	BH05 W 33 3.15
Acquisition Date/Time:	14-Feb-17, 12:30:24		
Datafile:	D:\TES\DATA\Y2017\021317TPH_GC3\021317 2017-02-13 16-32-39\087F9701.D		

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W235015

Customer **ESG Limited Doncaster**
Site **A6131-16 The Factory Additional GI**
Report No **W235015**

Consignment No W115659
Date Logged 07-Feb-2017

Report Due 13-Feb-2017

			MethodID	BTEXHSA	Calc_HD	CUSTSERV	GROHSA	ICPMSW										ICPWATVAR			
ID Number	**Description**	**Matrix Type**	**Sampled**	**BTEX-HSA + MTBE analysis**	**Total Hardness as CaCO3 (CALC)**	**Report A**	**GRO-HSA**	**Nickel as Ni MS (Dissolved)**	**Chromium as Cr MS (Dissolved)**	**Cadmium as Cd MS (Dissolved)**	**Copper as Cu MS (Dissolved)**	**Lead as Pb MS (Dissolved)**	**Zinc as Zn MS (Dissolved)**	**Arsenic as As MS (Dissolved)**	**Mercury as Hg MS (Dissolved)**	**Selenium as Se MS (Dissolved)**	**Antimony as Sb MS (Dissolved)**	**Total Sulphur as SO4 (Diss) VAR**	**Calcium as Ca (Dissolved) VAR**	**Magnesium as Mg (Dissolved) VAR**	**Boron as B (Dissolved) VAR**
				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EX/1767885	BH05	Groundwater	02/02/17	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W235015

Customer **ESG Limited Doncaster**
Site **A6131-16 The Factory Additional GI**
Report No **W235015**

Consignment No W115659
Date Logged 07-Feb-2017

Report Due 13-Feb-2017

			MethodID	**ISEF**	**KONENS**	**PAHMSW**	**PCBCONEC**	**PHEHPLCVL**	**SFAPI**	**SFAS**	**TPHFID**			**WSLM13**	**WSLM2**	**WSLM3**
ID Number	**Description**	**Matrix Type**	**Sampled**	**Fluoride as F**	**Chloride as Cl (Kone)**	**PAH GC-MS (16)**	**PCB - 7 Congeners**	**Phenols by HPLC (Low Level)**	**Cyanide (Total) as CN SFA**	**Sulphide as S SFA**	**TPH Carbon Banding**	**TPH GC**	**TPH Interpretation**	**Dissolved Organic Carbon**	**Conductivity uS/cm @ 25C**	**pH units**
				✓	✓	✓			✓	✓	✓	✓			✓	✓
EX/1767885	BH05	Groundwater	02/02/17	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
☐	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	**MethodID**	**Analysis Basis**	**Method Description**
Water	BTEXHSA	As Received	Benzene, Toluene, Ethylbenzene, & Xylenes by headspace extraction GCFID quantitation
Water	Calc_HD	As Received	Calculation based on Dissolved metals analysis by ICPOES
Water	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace FID
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	PCBCONEC	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners by pentane extraction followed by GCECD detection
Water	PHEHPLCVL	As Received	Determination of Phenols by HPLC
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	TPHFID	As Received	Determination of pentane extractable hydrocarbons in water by GCFID
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis
Unless stated otherwise results are expressed as mg/l
Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile	**TR** Denotes Tremolite
CR Denotes Crocidolite	**AC** Denotes Actinolite
AM Denotes Amosite	**AN** Denotes Anthophylite

NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

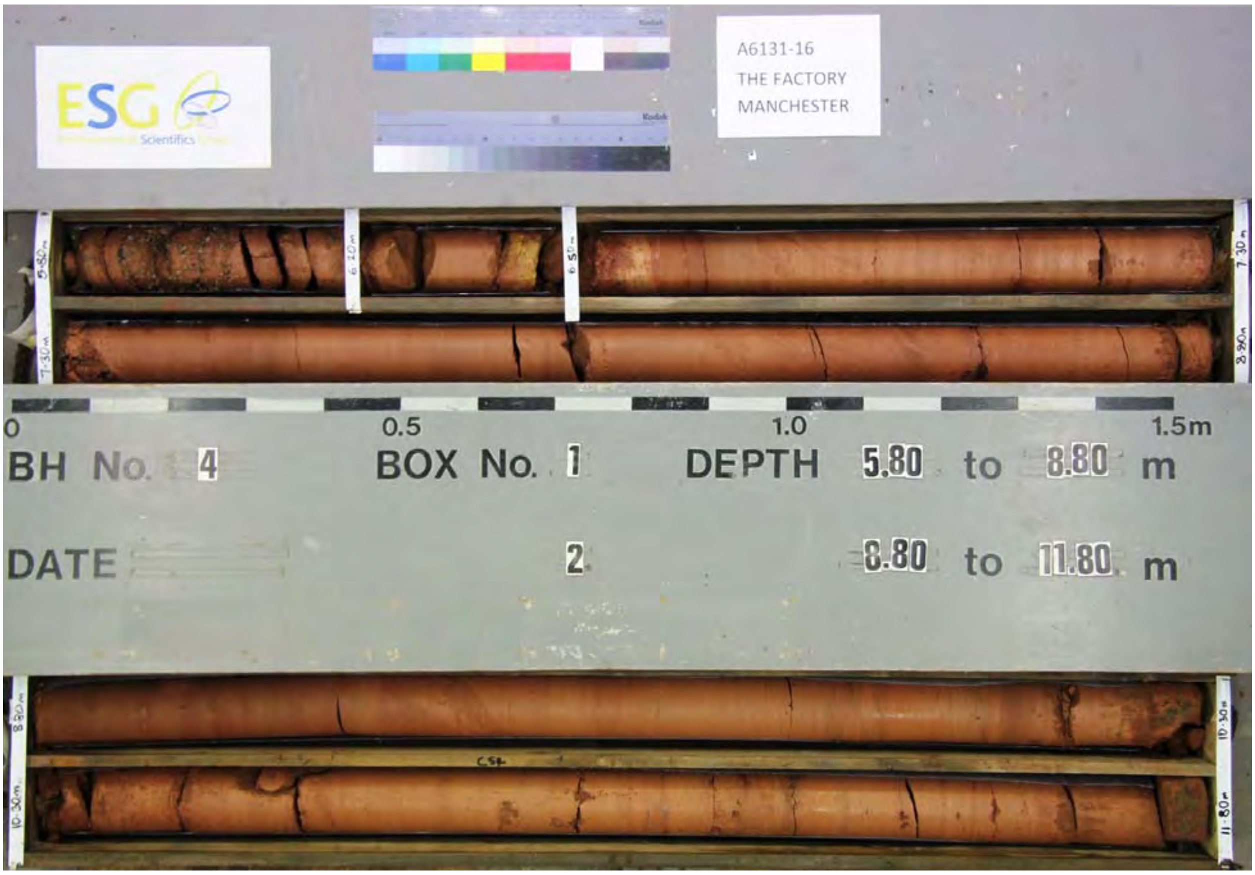
Client : ESG Limited Doncaster
Site : A6131-16 The Factory Additional GI
Report Number : W23_5015

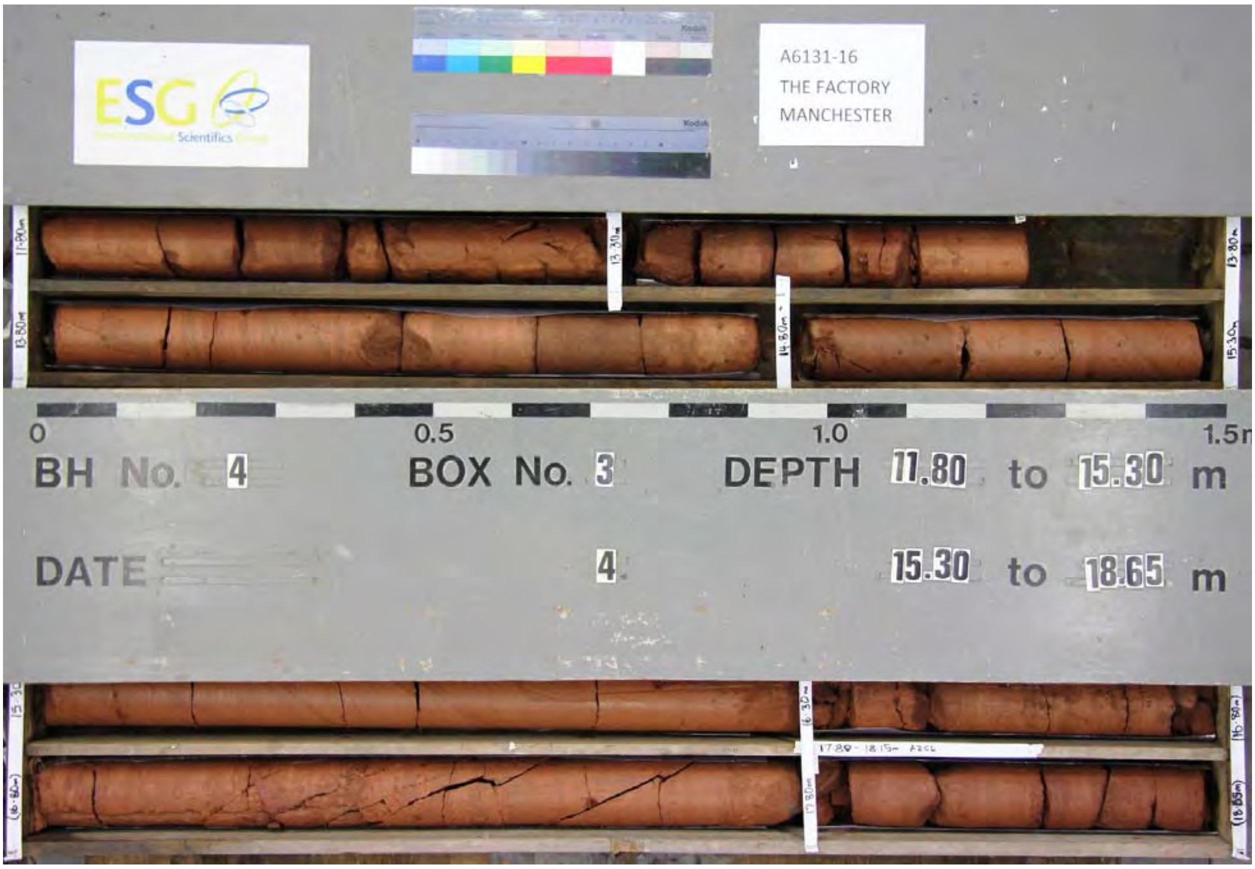
Lab ID Number	Client ID	Description
EX/1767885	BH05 W 33 3.15	Groundwater

APPENDIX F
PHOTOGRAPHS

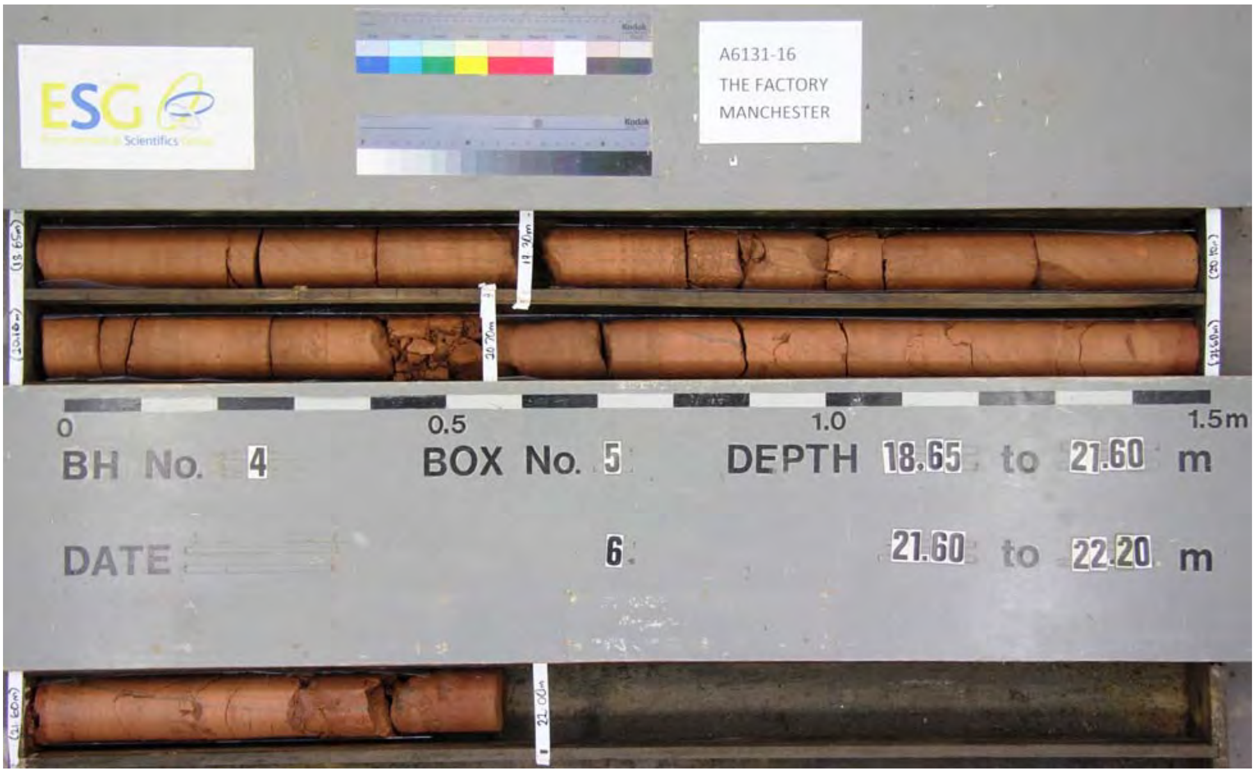
Core Photographs Plate 1 to 3

Core Photographs


A6131-16
THE FACTORY
MANCHESTER
0
0.5
1.0
1.5m
BH No. 4
BOX No. 1
DEPTH 5.80 to 8.80 m
DATE
2
8.80 to 11.80 m


A6131-16
THE FACTORY
MANCHESTER
0
0.5
1.0
1.5
BH No. 4
BOX No. 3
DEPTH 11.80 to 15.30 m
DATE
4
15.30 to 18.65 m

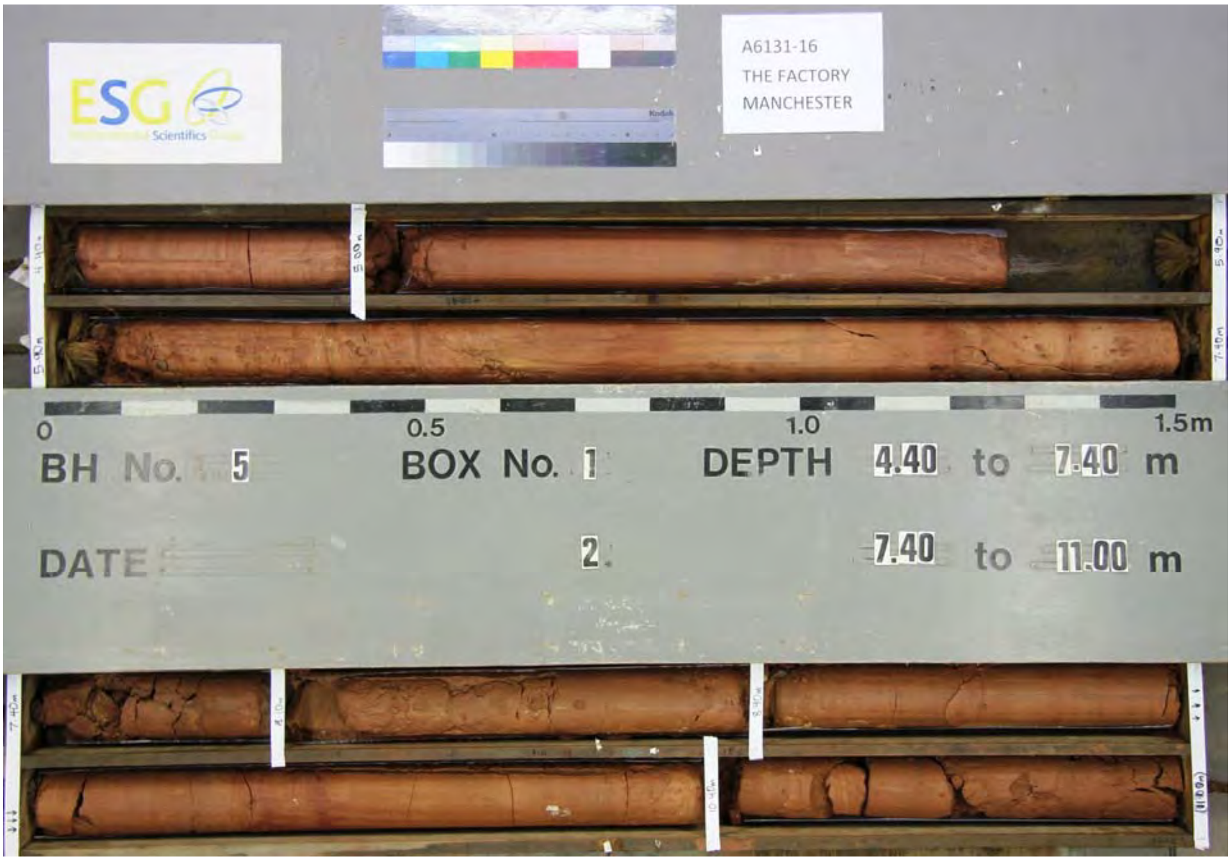
Notes:	Project	THE FACTORY ADDITIONAL GI	**Plate**
	Project No.	A6131-16	1
	Carried out for	Buro Happold	

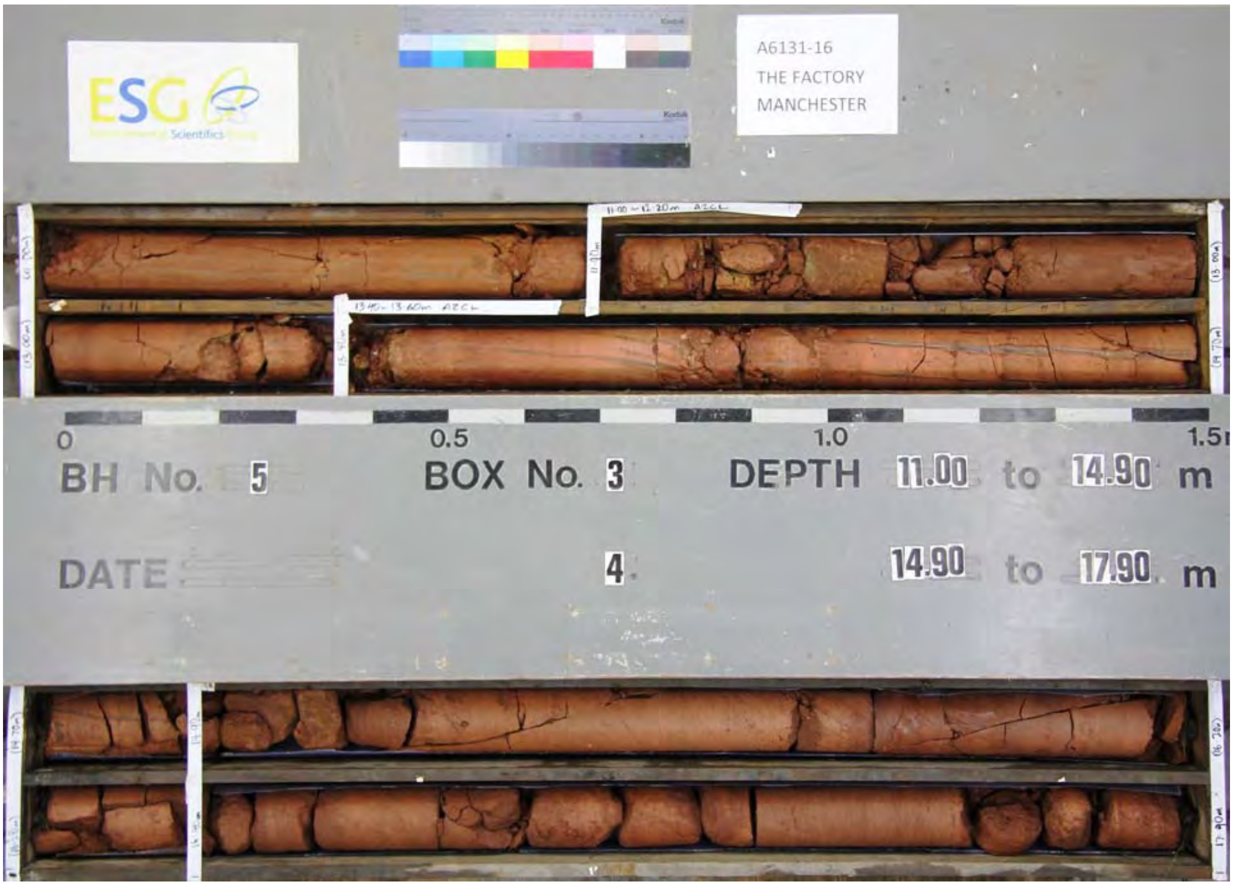

A6131-16
THE FACTORY
MANCHESTER
0
0.5
1.0
1.5m
BH No. 4
BOX No. 5
DEPTH 18.65 to 21.60 m
DATE
6
21.60 to 22.20 m
18.65m
19.70m
20.10m
20.70m
21.60m
21.60m
22.00m

Notes:

Project	THE FACTORY ADDITIONAL GI	Plate
Project No.	A6131-16	2
Carried out for	Buro Happold	

Core Photographs


A6131-16
THE FACTORY
MANCHESTER
0
0.5
1.0
1.5m
BH No. 5
BOX No. 1
DEPTH 4.40 to 7.40 m
DATE
2
7.40 to 11.00 m


A6131-16
THE FACTORY
MANCHESTER
0
0.5
1.0
1.5
BH No. 5
BOX No. 3
DEPTH 11.00 to 14.90 m
DATE
4
14.90 to 17.90 m

Notes:	Project	THE FACTORY ADDITIONAL GI	**Plate**
	Project No.	A6131-16	3
	Carried out for	Buro Happold	

Appendix B

BUROHAPPOLD
ENGINEERING

Factory Theatre

Excavation and Filling Specification – Construction

034933

12 December 2018

Revision 03

MF-BHE-XX-XX-SP-CG-00-0001

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

Revision	Description	Issued by	Date	Checked
00	Excavation and Filling Specification – Stage 3 Draft	GM	21/10/16	COH
01	Excavation and Filling Specification – Stage 3 Draft	GM	11/08/17	COH
02	Excavation and Filling Specification – ER Draft	GM	17/05/18	COH
03	Excavation and Filling Specification – Construction	GM	12/12/18	COH

O:\034933 The Factory, Manchester\F9 Ground Engineering - Site Investigation\05 Specifications\Earthworks\S181212_EW 03_Construction.docx

This report has been prepared for the sole benefit, use and information of **Manchester City Council** for the purposes set out in the report or instructions commissioning it. The liability of Buro Happold Limited in respect of the information contained in the report will not extend to any third party.

author	**George Mitchell**
date	**12th December 2018**
approved	**Chris O’Hara**
signature	
date	**12th December 2018**

..

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

BH D20 EXCAVATING AND FILLING

SCOPE

This specification deals with:

- Forming bulk, pit, trench and surface area excavations (excluding those for services).
- Filling holes and excavations (excluding those for services).
- Making up levels by filling in bulk or in layers including hardcore, but excluding capping layers or sub-bases to roads and paving.
- Subsoil and topsoil engineering requirements.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

BH D20 EXCAVATING AND FILLING

SUBMISSIONS TO BE MADE BY CONTRACTOR

Clause No.	**Submission**	**When Required (Minimum)**
101	Traffic management	As soon as available
103	Accommodation works	10 days before start
104	Temporary fencing	As soon as available
206	Temporary works	14 days before start
208	Excavation of chemically contaminated materials (Method Statements)	14 days before start
510	Tests on fill	As soon as available
605	Suitability of fill	As soon as available
620	Compacted general fill	Before starting work
630	Compacted structural fill	Before starting work

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

BH D20 EXCAVATING AND FILLING

Contents

Reference Documents **v**

British Standards Institution (BSI) v

Building Research Establishment (BRE) Digests: v

Department of Environment, Transport and the Regions v

National House-Building Council (NHBC) vi

100 General Requirements/Information **1**

110 The Site **4**

205 Excavating **7**

400 Disposal of Materials **12**

500 Filling **14**

605 Acceptance of Suitable Fill **19**

620 Compacted General Filling **21**

630 Compacted Structural Filling **24**

700 Backfilling to Temporary Excavations for Foundations **26**

800 Topsoil Areas **28**

Appendix A Contamination Procedures & Documentation **1**

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

Reference Documents

British Standards Institution (BSI)

BS 1377: **1990**	Methods of test for soils for civil engineering purposes.
BS EN 1997-2:2007	Eurocode 7 Geotechnical design. Part 2 – Ground Investigation and testing.
BS 3882: 2007	Recommendations and classification for topsoil.
BS 4428: 1989	Code of practice for general landscape operations (excluding hard surfaces).
BS 6031: 2009	Code of practice for earthworks.
BS 8000:	Workmanship on building sites. Part 1: 1989 Code of practice for excavating and filling.
BS EN 1997-1:2004	Eurocode 7 General design. Part 1 General rules.
BS 8103:	Structural design of low-rise buildings. Part 1: 1986 Code of practice for stability, site investigations, foundations and ground floor slabs for housing.
BS EN 1992-1-1:2004	Eurocode 2 Design on concrete structure. General rules and rules for buildings.
BS EN 1097-2	Tests for mechanical and physical properties of aggregates.

Building Research Establishment (BRE) Digests:

Special Digest 1	Concrete in aggressive ground. (2005)
427	Parts 1, 2 and 3: Low rise buildings on fill.
276	Hardcore.

Department of Environment, Transport and the Regions

Specification for Highway Works 1998 and Notes for Guidance (separate document).

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

National House-Building Council (NHBC)

NHBC Standards (operative from January 1992).

NBS	Specifications
Q20	Bases of roads and pavings
P30	Water, gas, electricity etc. services
R12	Building drainage
R13	Land drainage

100 General Requirements/Information

TO BE READ WITH THE PRELIMINARIES/GENERAL CONDITIONS

100* General

- The Main Contractors (MC) attention is drawn to the nature and extent of material on site. It is anticipated that some proportion of the materials excavated may be suitable for re-use as part of the permanent works construction. The MC shall be responsible for the selection, separation and processing as appropriate for re-use in the permanent works or temporary works as appropriate. The MC is also responsible for the disposal of all unsuitable materials.
- The MC is responsible for the inspection and acceptance of materials, contract drawings and workmanship.
- The works to be executed as specified and in accordance with good practice. No changes are permitted without written approval.
- The MC is to review the detail of this specification and consider the times required for testing, preparation of samples and production of fabrication drawings. This information to be included in the contract programme.
- The MC to include in the price as necessary, the costs for all necessary test pieces, testing, trials and attendance to demonstrate compliance with the requirements of this Specification.
- All publications referred to hereafter are to be the issues current at the date of invitation to tender.
- The following materials are specifically precluded from all specifications pertaining to works carried out under this contract:-

  a) High alumina cement or concrete.

  b) Woodwool slabs as permanent shuttering.

  c) Calcium chloride in admixtures for use in reinforced concrete.

  d) Asbestos in any form.

  e) Sea dredged aggregates for use in reinforced concrete unless otherwise instructed by the client.

  f) Calcium silicate bricks.

  g) Urea formaldehyde.

The MC is required to ensure that all efforts be made, and using the best information available to him, that these substances are not incorporated into the Works. In the event that he is unwilling or unable to comply with these requirements he is to submit in writing in sufficient time for consultations to be held and alternatives to be considered.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

101 Traffic Safety and Control

Controls: Provide, erect and maintain all such traffic signs, barriers and control signals as may be necessary in accordance with the recommendations of Chapter 8 of the Traffic Signs Manual or such other General Directions as are current at the time of execution of the Works.

- Where the particular circumstances are not covered by these recommendations submit proposals for approval.
- Compliance with this clause does not relieve the MC of any other obligations under the Contract or under the relevant provision of the Highway Acts.

Co-ordination: For works on the Public Highway the MC is to co-ordinate his activities with the Highway Authority and to be responsible for obtaining all necessary permits and approvals. Any charges for reinstatement of the Highway are to be met by the MC.

Submission by the MC: After consultations with the appropriate authority submit a programme showing the scheme of traffic management. Thereafter provide such further details and information as required to facilitate the Works.

- No work affecting the public highway is to be started until all traffic control measures are agreed as being fully operational.

Equipment: Unless otherwise specified all traffic signs to comply with BS 873 and danger lamps with BS 3143. In addition:

- All traffic signs to be kept clean and legible at all times and to be repositioned, covered, or removed as required.
- All adjacent public highways and trafficked/pedestrian routes to be kept clear of all construction debris. Tracked vehicles are not to travel over public highways without permission of the MC.

Making Good: Any damage caused to public highways and trafficked/pedestrian routes to be made good as directed by the MC.

102 Temporary Diversion of Traffic

Construct temporary diversion ways wherever:

- The works interfere with existing public or private roads or where there is a public or private right of way.
- The standard of construction and lighting and the width of the diversion route to be agreed with the MC.
- Construct diversion ways in advance of any interference with existing ways. Maintain in such a way as to provide adequately for traffic flows.

- Where any temporary diversion works affect Public Highways the MC is responsible for obtaining all necessary Statutory Authority approvals.

The provisions of this clause do not apply to any temporary access or other works that the MC may construct for his sole usage.

103 Services

Privately Owned Services: If any privately owned service (water, electricity, drainage etc.) passing through the site is affected by the Works the MC is to provide a satisfactory alternative service and notify the interested parties of the measures proposed.

Statutory Undertakers' Services: Verify the positions of all mains, sewers etc and take all measures required by the Statutory Undertaker or Public Authority for the support and full protection of all items concerned.

Liability: The MC is responsible for any costs of breakage, damage and interruption of supply. Confirmation will be required that appropriate insurance is held.

Accommodation Works: The relocation and/or replacement of fences, walls, accesses etc. to properties bounding the site to be completed in an expeditious manner and within a time as approved by the MC. At least 10 days notice before starting the works will be required.

104 Noise, Security

Noise: Comply with the general recommendations of BS 5228 together with any specific requirements described in the Contract Documents.

Security: Erect and maintain temporary fencing as required by the MC. Access in the fencing to be agreed by the MC and/or occupiers of adjacent properties.

- Temporary fencing is to remain in position until it is replaced by permanent fencing or completion of the Works. Submit proposals to the MC.
- Regularly inspect all temporary fencing and make good any defects.
- If temporary fencing must be removed for any part of the Works reinstate it as soon as possible. In the interim provide patrols so as to preclude unauthorised entry into the site.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

110 The Site

110* **Site Investigation:** Refer to the site investigation reports:

- ESG Report entitled ‘The Factory Factual Report on Ground Investigation’ dated October 2016. Report No. A6053-16.
- ESG Report entitled ‘The Factory Site, Manchester. Factual Report on Additional Ground Investigation’ dated May 2017. Report No. A60131-16
- PLANIT UXB Limited Report entitled ‘Explosive Ordnance (EO) Threat Assessment (EOTA), Manchester City Centre Factory’ dated 17 February 2016. Report Ref: 0123 EOTA MCC Factory 170216.
- Stephen Levrant Heritage Architecture Limited Report entitled ‘Heritage Appraisal: St John’s Quarter, Manchester’, dated May 2014.

The output reports from these investigations are provided to the MC by the Employer for information. The Employer offers no warranty, guarantee or undertaking of any kind as to the accuracy of the investigation and none should be inferred.

Attention is drawn to the ground conditions of the Site. The general sequence of strata encountered based on the ESG 2016 GI data comprises Made Ground which is underlain by superficial glacial and alluvial deposits comprising sand, gravel and clay which is underlain by the Chester Pebble Beds Formation (Sherwood Sandstone Group). The Sherwood Sandstone bedrock underlies the superficial deposits at a depth of approximately 22.50 – 23.00 m AOD. It should be noted that the Sherwood Sandstone is a major aquifer used for drinking water supply in the area and this needs to be accounted for in any design.

Attention is also drawn to the various ground constraints present below/adjacent to the development site

140* **Groundwater Level**: Details of the groundwater levels are included in the site investigation reports.

150* **Existing Services:** The existing services must be maintained at all times. The MC shall be responsible for verifying the position of any buried services on the site. An underground utilities geophysical survey has been undertaken of the Factory Theatre Site by L&M Survey Services in April/May 2016 (Utility Survey, The Factory, Water Street, Manchester (Project No. 11543)). It is worthy of note however that at the time of writing, the plot of land to the west of Water Street has not been subject to utility survey due to restricted access as this parcel of the development plot is currently under temporary CPO by Network Rail.

As such, the MC should familiarize themselves with this below ground services survey/report and any other available information prior to commencement on Site.

The MC’s attention is drawn to the presence of known services throughout the site, in particular:

- The presence of a sewer and overflow below Grape Street.
- The presence of various utilities running within the footpaths and carriageway of Water Street.
- Those referred to in the L&M Survey and Report.
- Those recorded in exploratory holes from the ESG Ground Investigation report.

The MC should familiarize themselves with all available historical reports and any associated services information detailed therein.

151 **UXO:** The MC's attention is drawn to the site risk associated with UXO as highlighted in the Explosive Ordnance (EO) Threat Assessment (EOTA) (Clause 110 refers). The MC should familiarize themselves with all available UXO reports and associated information detailed therein.

160* **Site Features to be Retained:** Refer to the Architect's drawings.

161 **Site Features of Archaeological Interest:** Before starting work the MC shall verify which areas of the site, if any, are subject to specific archaeological requirements, e.g. archaeological watching brief prior excavation etc.

It should also be noted that the existing arches which form part of the development are Grade II Listed and as such may be prone to damage from ground bourn vibrations. All reasonable steps must be taken to control vibration levels from the proposed plant and equipment and subject to planning requirements a limit (TBC) for peak particle velocity shall not be exceeded. The MC should familiarize themselves with any restrictions and comply with all associated requirements associated with the Grad II Listed arches that form part of the Planning Conditions.

162 **Site Features:** Before starting work the MC shall verify which existing fences, gates, walls, roads, paved areas and other site features are to be removed. Materials arising are to be removed from site.

170* **Trees:** Before starting work the MC shall verify which trees, shrubs and hedges are to be removed. Cut down, grub up main roots and fill voids with approved material. Dispose of all wood.

180* **Undergrowth:** Clear site of bushes, scrub and undergrowth. Grub up and dispose of large roots.

181* **Japanese Knotweed:** None envisaged.

Japanese Knotweed is an invasive, non-native plant species. The Wildlife and Countryside Act (1981) made it illegal to spread Japanese Knotweed and guidance on the management of Japanese Knotweed on development sites is given in the Environment Agency's (EA) code of practice, 2001.

The MC is responsible for ensuring that Japanese Knotweed is not spread across the site. There are a variety of methods available for treating infested areas including spraying with herbicides or digging, spraying and removal to landfill. The Client is responsible for selecting a method of treatment and obtaining approval for the selected method from the Local Authority.

182* **Site Clearance:** Clear site of all rubbish, debris and vegetation before stripping topsoil. The compaction of topsoil should be avoided.

190* **Cultivated Turf:** Before starting work the MC shall verify any areas of turf to be retained. At the MC's discretion, cost and/or profit, other turf may be either:

- lifted and sold, or
- left to be incorporated with the existing topsoil.

200* **Site Access and Working Area:** Access to the site and the MC's working area will be shown on the drawings. The MC shall provide:

- All necessary signs, safety measures and watchmen to ensure security and safe operation of his traffic.
- All necessary servicing for his own offices, stores, workshops, etc.
- Access routes for the Employer and other contractors as shown on the drawings.

205 Excavating

205* **Basic Workmanship for Excavating:** Comply with BS 8000: Part 1, Sections 3.1, 3.2 and 3.3.

206* **Temporary Works:** The MC is responsible for the design of such works, details of these to be submitted for review at least 14 days before commencing work on site.

208* **Excavation of Chemically Contaminated Materials:** Where contaminated materials are to be excavated the MC shall be responsible for all Health and Safety precautions required to protect the site personnel and the local environment and shall provide method statements covering these issues.

It is worthy of note that no asbestos or fibres were recorded in the material recorded during the ESG 2016 and 2017 investigations. However, due to the historical site uses, the presence of such material within the Made Ground cannot be ruled out and vigilance during site works will be required.

210* **Materials Arising:** From the excavations and surplus to requirements for filling are to remain the property of the Employer unless the MC:

- Is instructed to remove them from the site, or
- Purchases them at a price to be agreed.

220* **Stripping Topsoil**: Before beginning general excavation or filling excavate topsoil from required areas to an average depth of 200 mm and keep separate from excavated subsoil. At the time of excavation the topsoil must be reasonably dry.

221* **Treating Topsoil**: Not less than two weeks before excavating topsoil treat with a suitable herbicide.

225* **Handling Topsoil**: The following requirements shall be complied with:

- Where aggressive weeds as included in the Weeds Act – Section 2 or the Wildlife and Countryside Act – Schedule 9 – Part 2 are encountered, instructions should be obtained prior to moving topsoil.
- Earthmoving equipment shall be selected and used to minimize disturbance, trafficking and compaction of topsoil.
- On no account should topsoil be mixed with:
  a) Subsoil, stone, hardcore, rubbish or material from demolition work.
  b) Oil, fuel, cement or other substances harmful to plant growth.
  c) Other grades of topsoil.
- Multiple handling should be kept to a minimum. Where practicable topsoil should be used immediately after stripping.

- Topsoil handling should be undertaken in the driest condition possible. It should not be handled during or after heavy rainfall or when it is wetter than the plastic limit defined by BS 3882 Annex N2.

230* **Benching:** Surfaces of excavations with a gradient greater than 1 in 5 which are to receive filling must have horizontal benches cut to match the depths of compacted layers of filling.

240* **Adjacent Excavations:** Where an excavation encroaches below a line drawn at an angle of 45^o from the horizontal from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling thereto must be completed before the higher excavation is made.

250* **Accuracy:** Permissible deviations from formation levels:

- Beneath mass concrete foundations: ±25 mm.
- Beneath ground bearing slabs and r.c. foundations: -15 mm, +0 mm.
- Embankments and cuttings: ±50 mm.
- Ground abutting external walls: ±50 mm, but such as to ensure that finished level is not less than 150 mm below dpc.

260* **Formations Generally:**

- MC shall undertake inspection of formations for the following:
  - a) Mass Concrete Pad and Strip Foundations.
  - b) Reinforced Concrete Pad and Strip Foundations.
  - c) Basement and Ground Floor Slabs.
  - d) Basement slabs/lift pits
  - e) Roads, Footpaths or other Pavements.
  - f) Retaining Walls.
- Remove the last 50 mm of excavations just before inspection. Trim excavations to required profiles and levels and remove all loose material.
- When preparing formations, all soft spots shall be removed and replaced with suitable fill materials. Any obstructions encountered shall also be removed. The final surface of all formations shall be well rolled, smooth, and free from movement under compaction plant and from ridges, cracks, loose material, ruts or other defects.
- Unless otherwise instructed seal formations within 4 hours of inspection with concrete or other specified fill.

- Where structural requirements dictate, the allowable bearing characteristics of the formation should be demonstrated by the WC by means of plate bearing tests (BS 1377: Part 9 1990: Part 4: Method 4.1 updated by BS EN 1997-2 – Part 2 Ground Investigation and Testing) at locations and frequencies agreed with the MC.

270* **Foundations Generally:** Obtain instructions if:

- A natural bearing formation of undisturbed subsoil is not obtained at the depth shown on the drawings.
- The formation contains soft or hard spots or highly variable material.

280* **Trench Fill Foundations:**

- Excavate the whole depth of the trench down to formation by machine in one operation. The MC shall undertake inspection of the formation as soon as it is exposed.
- Unless otherwise instructed place concrete immediately after inspection.

290* **Foundations in Made Up Ground:** Excavate down to a natural formation of undisturbed subsoil. Obtain instructions if this is at a lesser depth than that shown on the drawings.

310* **Unstable Ground:** The MC shall satisfy themselves that any newly excavated face will remain unsupported sufficiently long to allow the necessary earthwork support to be inserted. If unexpected unstable conditions are encountered which are likely to affect adjacent structures or roadways, appropriate emergency action should be undertaken until the instability can be rectified.

320* **Recorded Features:** Break out old foundations, beds, drains, etc. where and to the extent stated on the drawings. Seal off drain ends, remove contaminated earth and disinfect as required by local authority. Backfill as specified on the drawings.

A proportion of the piles are located within the existing Grade II Listed arches and as such difficult access and limited headroom will be an issue. This is likely to pose restrictions on the type of plant and equipment used and this will need to be considered.

The existing arches are Grade II Listed and as such may be prone to damage from ground bourn vibrations. All reasonable steps must be taken to control vibration levels from the proposed plant and equipment and subject to planning requirements a limit (TBC) for peak particle velocity shall not be exceeded.

Subject to planning requirements, any monitoring and recording of peak particle velocity remains the responsibility of both the MC and the WC.

Water Street runs through the centre of the proposed development site. As such, associated risks will be present including working adjacent to a live highway and access / phasing / sequencing of the works for moving between the associated areas. Such constraints will need to be considered. In addition, existing utilities are located within

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

the adjacent pavements and roads on and off site. No damage/adverse effects to existing utilities and surface finishes is allowed.

Due to the site having a rich industrial history, a number of obstructions are likely to be present within the ground. It is worthy of note that during the ESG 2016 ground investigation, a number of obstructions were encountered.

The proposed development is directly adjacent to the River Irwell. It is the responsibility of the MC/WC to enter into dialogue with the appropriate Statutory Consultees to agree an acceptable methodology of working when in close proximity to the associated infrastructure. Surcharging of the adjacent river wall from piling plant and equipment will need to be considered.

Numerous services are known to cross the Site. As such, the MC/WC should familiarize themselves with all the relevant service information/drawings available.

It is worthy of note that no asbestos or fibres were recorded in the material recorded during the ESG 2016 and 2017 investigations. However, due to the historical site uses, the presence of such material within the Made Ground cannot be ruled out and vigilance will be required.

Post fieldwork groundwater monitoring levels have been recorded between 23.23 and 24.30 m AOD within the superficial deposits (ESG Factual report refers).

UXO - attention is drawn to any site risk associated with UXO as highlighted in the Explosive Ordnance (EO) Threat Assessment (EOTA) (Section 110). The MC should familiarize themselves with all available UXO reports and associated information detailed therein.

Any Temporary Works requirements are the responsibility of the MC.

330* **Unrecorded Features:** Where old foundations, beds, basements, filling, tanks, service pipes, drains, hotspots of soil contamination etc. not shown on the drawings are encountered, obtain instructions before proceeding. See also Clause 406.

350* **Existing Watercourses** which have been diverted and are to be filled must be cleared of all vegetable growths and soft deposits before filling.

The MC’s attention is drawn to the fact that the proposed development is directly adjacent to the River Irwell. It is the responsibility of the MC/WC to enter into dialogue with the appropriate Statutory Consultees to agree an acceptable methodology of working when in close proximity to the associated infrastructure. Surcharging of the adjacent river wall from piling plant and equipment will need to be considered along with associated health and safety issues when working adjacent to water.

360* **Excess Excavation:** Backfill any excavations taken:

- Wider than required with the material specified for backfilling.

- Deeper than required with well graded granular material or lean mix concrete.

370* **Hauling:** Hauling of material from excavation and spoil heaps to fill areas to proceed only where sufficient spreading and compacting plant are operated at the place of deposition.

380* **Slopes:** Slopes of cuttings to be cleared of all loose material. The MC is responsible for safety and stability.

390* **Use of Plant:** Do not use plant at the surface of the bottom of the excavation unless:

- The excavation is in rock and contains no soft material, or
- The level of the bottom surface is maintained at least 300 mm above formation level.

Any damage to the subgrade to be made good at the MC's expense and using material having the same characteristics as that which has been damaged.

395* **Temporary Stockpiles:** Allowance shall be made for the possible deterioration of the stockpiled material due to weathering. Precautions shall be taken to ensure stability, taking into account the strength of the underlying ground and the effect on drainage. It may be necessary to carry out partial compaction of stockpiles and/or to provide additional protection to maintain the quality of the stockpiled material.

Where temporary stockpiles of contaminated soils are required i.e. either arisings of made ground or any unexpected contamination hot spots, then protective measures will be required to minimize run-off/leachates and washing of fines.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

400 Disposal of Materials

400* **General:** 'Suitable material' comprises all that which is acceptable to the MC in accordance with this specification. "Unsuitable material' is defined in Clause 510.

- No excavated suitable material to be removed from the site unless this suits the MC's operational procedure and then the MC is to make good any subsequent deficit at his own expense.
- Where the excavation reveals a combination of suitable and unsuitable materials the MC is to propose the methods by which suitable material may be excavated without contamination by unsuitable materials.

405* **Contaminated Soils:** Where surplus soils for disposal are chemically contaminated, the MC shall be responsible for disposal of these materials at a suitably licensed landfill and all associated issues such as consignment notes and Environmental Protection Act Section 34 Duty of Care documentation. The MC shall be deemed the producer and holder of the waste and shall be responsible for classifying the materials for disposal to landfill. The MC shall be responsible for carrying out any further soil contaminant testing and Waste Acceptance Criteria testing to enable classification of the waste in accordance with current regulatory guidance and the requirements of the receiving landfill.

The MC shall prepare an earthworks spoil management strategy which shall take account of the range of waste types expected to be encountered and set out any proposed sampling and testing regime for waste classification. The strategy shall include consideration of stockpile management, measures and working methods to protect site worker health and safety and the environment, and working methods to minimize the degree of intermixing of wastes of different classes and to minimize disposal costs.

406* **Unrecorded Contaminated Soils:** Where materials that appear to be contaminated (either visually or on the basis of odour) are encountered during the excavation works the MC shall be responsible for carrying out laboratory testing to enable the materials to be classified for hazard assessment and waste disposal purposes, for disposal to suitably licensed tip as appropriate, and all associated issues such as consignment notes and Environmental Protection Act Section 34 Duty of Care documentation.

420 **Topsoil Spoil Heaps:** To be not more than 2m high. Treat with a suitable herbicide at appropriate times to prevent seeding of weeds. Prevent compaction and contamination.

431* **Surplus Excavated Topsoil:** Remove from site.

443* **Surplus Subsoil:** Remove from site surplus excavated material not specified to be spread and levelled or stockpiled.

451 **Water:** Keep all excavations free from water until the construction of basements and retaining walls is able to resist leakage, water pressure and flotation. The MC shall be responsible for obtaining all discharge licenses for disposal of water via sewer or to surface water.

454* **Running Water:** The MC shall inform the Engineer immediately if any springs or running water are encountered during the Works.

457* **Pumping**: Any pumping undertaken shall comply with the following requirements:

- Excavated faces or stability of adjacent ground or structures shall not be disturbed.
- Pumped water shall be discharged without flooding the site or adjoining property.
- Any sumps shall be constructed clear of excavations and filled on completion.

500 Filling

**510*	Unsuitable Materials:**

- Do not import or use fill materials which would, either in themselves or in combination with other materials or ground water, give rise to a health hazard, damage to building structures or instability in the filling.
- **Site won** Fill materials must not contain any contaminant in the suite listed below that is in excess of its Specified Trigger Concentration:

Determinand	**Soil Concentration**	**Soil Leachate Concentration**
Arsenic	640 mg/kg	-
Cadmium	410 mg/kg	-
Chromium (total)	8,600 mg/kg	-
Chromium (VI)	49 mg/kg	-
Lead	2,330 mg/kg	-
Mercury (inorganic)	58 mg/kg	-
Selenium	12,000 mg/kg	-
Copper	68,000 mg/kg	-
Nickel	980 mg/kg	-
Zinc	730,000 mg/kg	-
TPH	See Table A1	-
Polycyclic Aromatic Hydrocarbons (USEPA 16)	See Table A2	-
Phenol Index	1,300 mg/kg	-
Cyanide	16,000 mg/kg	-
pH	5<pH<9	-
Asbestos	<0.1%	-

Note 1: Values used are all C4SL's or S4UL's (Commercial) with the exception of cyanide (BH Generic Assessment Criteria - GAC).

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

- **Imported fill** materials must not contain any contaminant in the suite listed below that is in excess of its Specified Trigger Concentration:

Determinand	**Soil Concentration**	**Soil Leachate Concentration**
Arsenic	40 mg/kg	-
Cadmium	149 mg/kg	-
Chromium (total)	910 mg/kg	-
Chromium (VI)	21 mg/kg	-
Lead	310 mg/kg	-
Mercury (inorganic)	56 mg/kg	-
Selenium	430 mg/kg	-
Copper	7,100 mg/kg	-
Nickel	180 mg/kg	-
Zinc	40,000 mg/kg	-
TPH [See Note 1]	See Table A1	-
Polycyclic Aromatic Hydrocarbons (USEPA 16)	See Table A2	-
Phenol Index	1,200 mg/kg	-
Cyanide	760 mg/kg	-
pH	5<pH<9	-
Asbestos	<0.001%	-

Note 1: Values used are all C4SL's or S4UL's (residential without plant uptake) with the exception of cyanide (BH Generic Assessment Criteria - GAC).

- Any materials arising or imported that appear suspect in terms of contamination based on either appearance or smell shall be stockpiled separately and tested for the contaminant suite listed above in addition to any other appropriate contaminant as indicated by appearance or by smell and accepted into the Works or disposed of off site as appropriate.
- Soluble sulphate content (SO_4) of imported materials for filling under concrete slabs or within 1 m of substructures must not exceed 1.2 g/litre when tested BS 1377:Part 3, Clause 5 using a 2:1 water-soil extract.
- Other unsuitable materials include: material from marshes or bogs, peat, logs, stumps, slurry, mud and perishable material, material susceptible to spontaneous combustion, material in a frozen condition, clays of liquid limit exceeding 80% and/or plasticity index exceeding 55, material with excessive moisture content.
- See also Clause 100.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

Table A1. Threshold concentrations for risk banded hydrocarbons and BTEX (SOM 1%).

Determinand		Site Won	Imported
Aliphatic	EC5 – EC7	3,200 mg/kg	42 mg/kg
	EC7 – EC8	7,800 mg/kg	100 mg/kg
	EC8 – EC10	2,000 mg/kg	27 mg/kg
	EC10 – EC12	9,700 mg/kg	130 mg/kg
	EC12 – EC16	59,000 mg/kg	1,100 mg/kg
	EC16 – EC35	1,600,000 mg/kg	1,900 mg/kg
Aromatic	EC5 – EC7	26,000 mg/kg	370 mg/kg
	EC7 – EC8	56,000 mg/kg	860 mg/kg
	EC8 – EC10	3,500 mg/kg	47 mg/kg
	EC10 – EC12	16,000 mg/kg	250 mg/kg
	EC12 – EC16	36,000 mg/kg	1,800 mg/kg
	EC16 – EC21	28,000 mg/kg	1,900 mg/kg
	EC21 – EC35	28,000 mg/kg	1,900 mg/kg
Benzene		27 mg/kg	0.38 mg/kg
Ethylbenzene		518 mg/kg	83 mg/kg
Toluene		869 mg/kg	880 mg/kg
Xylenes		576 mg/kg	79 mg/kg

Note 1: Site won - Values used are S4UL's (Commercial).

Note 2: Imported - Values used are S4UL's (Residential without Plant Uptake) with some reductions to TPH fractions.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

Table A2. Threshold concentrations for Poly Aromatic Hydrocarbons (USEPA 16)

Determinand	Site Won	Imported
Naphthalene	190 mg/kg	2.3 mg/kg
Acenaphthylene	83,000 mg/kg	2,900 mg/kg
Acenaphthene	84,000 mg/kg	3,000 mg/kg
Fluorene	63,000 mg/kg	2,800 mg/kg
Phenanthrene	22,000 mg/kg	1,300 mg/kg
Anthracene	520,000 mg/kg	31,000 mg/kg
Fluoranthene	23,000 mg/kg	1,500 mg/kg
Pyrene	54,000 mg/kg	3,700 mg/kg
Benzo(a)anthracene	170 mg/kg	11 mg/kg
Chrysene	350 mg/kg	30 mg/kg
Benzo(b)fluoranthene	44 mg/kg	3.9 mg/kg
Benzo(k)fluoranthene	1,200 mg/kg	110 mg/kg
Benzo(a)pyrene	35 mg/kg	3.2 mg/kg
Indendo(123-cd)pyrene	500 mg/kg	45 mg/kg
Dibenzo(ah)anthracene	3.5 mg/kg	0.31 mg/kg
Benzo(ghi)perylene	3,900 mg/kg	360 mg/kg

Note 1: Site won - Values used are S4UL's (Commercial).
Note 2: Imported - Values used are S4UL's (Residential without Plant Uptake).

520 **Frost Susceptibility:** Except as allowed below, fill must be non frost-susceptible as defined in Highways Agency 'Specification for Highway Works', Clause 801.17. If the following fill materials are proposed, a laboratory report shall be obtained confirming they are non-frost-susceptible:

- Fine grained soil with a plasticity index less than 20%.
- Coarse grained soil or crushed granite with more than 10% retained on a 0.063 mm sieve.

- Crushed chalk.
- Crushed limestone fill with average saturation moisture content in excess of 3%.
- Burnt colliery shale.

Frost-susceptible fill: May only be used if:

- It is to be placed within the external walls of buildings below spaces that will be heated.
- It is placed in excess of 500 mm beneath the proposed final ground level.
- Any frost-susceptible fill shall be protected from frost at all times during construction.

530* Placing Fill Generally:

- Ensure that excavations and areas to be filled are free from loose soil, rubbish and standing water.
- Do not use frozen materials or materials containing ice. Do not place fill on frozen surfaces.
- Take all necessary precautions to ensure stability of adjacent structures. Place and compact fill against structures, membranes or buried services in a sequence and manner which will ensure stability and avoid damage.
- Plant employed for transporting, laying and compacting must be suited to the type of material.
- Lay differing materials separately so that only one type of material occurs in each layer.

540 Benching in Fill: Where, during the progress of the work, the difference in level between adjacent areas of filling exceeds 600 mm, cut into edge of higher filling to form benches having a minimum width of 600 mm and a height equivalent to the depth of a layer of compacted filling. Spread and compact new filling to ensure maximum continuity with the previous filling.

605 Acceptance of Suitable Fill

605 Acceptance of Suitable Fill

For all imported fill from an unknown, mixed or brownfield source, testing shall be carried out to demonstrate that no contaminant listed in the suite given in Clause 510 is in excess of its Trigger Concentration. This testing shall be carried out at a rate of 1 test per 50 m^3 of placed fill material.

For all naturally site won derived as-dug soils or imported soils from a Greenfield source, testing shall be carried out to demonstrate that no contaminant listed in the suite given in Clause 510 is in excess of its Trigger Concentration. This testing shall be carried out at a rate of 1 test per 200 m^3 of placed fill material.

In addition, any materials arising or imported that appear suspect in terms of contamination based on either appearance or smell shall be stockpiled separately and tested for the contaminant suite listed in Clause 510 in addition to any other appropriate contaminant as indicated by appearance or by smell and either accepted into the Works or disposed of off-site as appropriate.

During placement of **General Fill** the MC is also required to provide daily records of testing of the material placed to show compliance with the Specification. The minimum requirements are:

Grading (BS1377: Part 2, Method 9.2): At least once a day or one test for every 500 m^3 placed.

Moisture Content and undrained remoulded shear strength (cohesive materials) (BS1377: Part 2, Method 3.2; and Part 7, Method 8): Three times a day or one test for every 200 m^3 placed.

Plasticity Tests (BS1377: Part 2, Methods 4.3 and 5): One test per day for each source or for every 500 m^3 placed.

During placement of **Structural Fill** the MC is also required to provide daily records of testing of the material placed to show compliance with the Specification. The minimum requirements are:

Grading (BS1377: Part 2, Method 9.2): At least once a day or one test for every 50 m^3 placed.

Moisture Content and undrained remoulded shear strength (cohesive materials) (BS1377: Part 2, Method 3.2; and Part 7, Method 8): Three times a day or one test for every 20 m^3 placed.

Plasticity Tests (BS1377: Part 2, Methods 4.3 and 5): One test per day for each source or for every 50 m^3 placed.

Los Angeles Test (BS EN 1097-2): One test per source and for every 100 m^3 placed.

End product (BS1377: Part 9, Method 2.2): One sand replacement density test for each compacted layer or each 20 m^3 placed.

Note: For each element cited above the option giving the greatest number of tests shall apply.

610* **General Landscape Filling:**

Definition: Fill to soft landscape areas only (excluding sports pitches).

- Materials arising from the excavations or imported, but excluding unsuitable materials as defined in Clause 510, with a maximum particle size of 150 mm.
- Lay in layers not more than 200 mm thick and consolidate each layer with the earthmoving plant.

620 Compacted General Filling

620 Compacted General Filling:

Definition: Fill to hard landscape areas, sports pitches, beneath drainage runs, and other areas as specified on the drawings (see also Clause 630).

- Materials arising from the excavations (or, where instructed, imported) complying with the groups as defined below. If both suitable and unsuitable material is excavated, select and keep separate sufficient suitable material. If there is insufficient suitable excavated material the MC shall provide details and obtain confirmation, as appropriate, regarding the importation of material.
- **Group 1: Wet Cohesive Materials:**

Clays or marls with the following properties:

Grading:	100% passing 125 mm BS sieve. 80 to 100% passing 2 mm BS sieve. 15 to 100% passing 63 μm BS sieve.
Moisture Content:	Lower Limit: Plastic Limit – 4%* Upper Limit: Plastic Limit + 2%*
Liquid Limit:	The fraction passing the 425 μm sieve shall have a Liquid Limit of <50%

Undrained shear strength of remoulded material: > 50 kN/m^2.

- **Group 2: Dry Cohesive Materials:**

Clays or marls with the following properties:

Grading:	100% passing 125 mm BS sieve. 80 to 100% passing 2 mm BS sieve. 15 to 100% passing 63 μm BS sieve.
Moisture Content:	Lower Limit: Plastic Limit – 7%* Upper Limit: Plastic Limit – 4%*
Liquid Limit:	the fraction passing the 425 μm sieve shall have a Liquid Limit of <50%

Undrained shear strength of remoulded material: > 50 kN/m^2

---

[*] Contractor to confirm suitability parameters for method compaction by means of sand replacement tests to confirm fill is placed at greater than 95 % Maximum Dry Density.

- **Group 3: Stony Cohesive Materials:**

Clays or marls with the following properties:

Grading: 100% passing 125 mm BS sieve.
15 to 80% passing 2 mm BS sieve.
15 to 80% passing 63 μm BS sieve.

Moisture Content: Lower Limit: Plastic Limit – 4%*
Upper Limit: Plastic Limit + 2%*

Liquid Limit: the fraction passing the 425 μm sieve shall have a Liquid Limit of <50%

Undrained shear strength of remoulded material: > 50 kN/m^2**.**

- **Group 4: Silty Cohesive Materials:**

Clays or marls with the following properties:

Grading: 100% passing 125 mm BS sieve.
80-100% passing 63 μm BS sieve.
0-20% passing 2 μm BS sieve.

Moisture Content: Lower Limit: Plastic Limit – 4%*
Upper Limit: Plastic Limit + 2%*

Liquid Limit: the fraction passing the 425 μm sieve shall have a Liquid Limit of <50%

Undrained shear strength of remoulded material: > 50 kN/m^2**.**

- **Group 5: Well Graded Granular Materials:**

Sands and gravels, crushed hard rock or quarry waste (other than chalk), crushed concrete, crushed brick or tile, sound blast furnace slag (other than from steel making foundries) or well burnt non plastic shale with the following properties:

Grading: 100% passing 125 mm BS sieve.
<10% passing 63 μm BS sieve.

Uniformity Coefficient (D_{60}/D_{10}): >10

- **Group 6: Uniformly Graded Granular Materials:**

Sands and gravels, crushed hard rock or quarry waste (other than chalk), crushed concrete, crushed brick or tile, sound blast furnace slag (other than from steel making foundries) or well burnt non plastic shale with the following properties:

Grading: 100% passing 125 mm BS sieve.
<10% passing 63 μm BS sieve.

Uniformity Coefficient (D_{60}/D_{10}): <10

The table given below gives requirements for compaction of the materials cited above. The figures given alongside each type of plant, and for each material group, are:

125 (8) – Maximum depth of the compacted layer in mm (Minimum number of passes)

Types of plant (alternatives)	Gp. 1 Materials	Gp. 2, 3 and 5 Materials	Gp. 4 and 6 Materials
Smooth wheeled roller:			
Tonnes per m width of roll			
2.1 - 2.7	125(8)	125(10)	125(10)
2.7 - 5.4	125(6)	125(8)	125(8)
Over 5.4	150(4)	150(8)	unsuitable
Vibrating roller:			
Static load in tonnes per m width of roller			
0.7 - 1.3	100(12)	125(10)	150(6)
1.3 - 1.8	125(8)	150(8)	200(10)
1.8 - 2.3	150 (4)	150 (4)	225(12)
2.3 - 3.6	175(4)	175(4)	250(10)
Over 3.6	225(4)	225(4)	300(8)
Vibrating plate compactor:			
Static load in tonnes per m^2 of base plate			
1.2 - 1.4	-	75(6)	150(6)
1.4 - 1.8	100(6)	125(6)	150(4)
Over 1.8	150(6)	150(5)	200(4)
Vibro-tamper:			
Static load in kg			
50 - 75	100(3)	100(3)	150(3)
Over 75	150(3)	150(3)	225(3)
Power rammer:			
Static load in kg			
Over 100	150(4)	150(6)	unsuitable

NOTE: In areas of general filling, the density of placed fill shall be checked twice daily by means sand replacement density tests to ensure suitable compaction is achieved and to avoid excessive settlement in areas of substantial fill.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

630 Compacted Structural Filling

630 Compacted Structural Filling:

Definition: Fill used to support structural loads, i.e. foundations and ground bearing slabs, and adjacent to structures and retaining walls, but see also Clauses 700 and 720 (if used).

- Well-graded granular material, as defined below, arising from the excavations or imported. If both suitable and unsuitable material is excavated, select and keep separate sufficient suitable material. If there is insufficient suitable excavated material the Contractor shall provide details and obtain confirmation, as appropriate, regarding the importation of material.
- Well graded sands and gravels with a uniformity coefficient of more than 10.
- Crushed hard rock or quarry waste (other than chalk).
- Crushed concrete, crushed brick or tile, free from plaster, wood, organic material and rubbish.
- Sound blast furnace slag (other than from steelmaking foundries).
- Well burnt non-plastic shale.

Properties (suitability is required to be demonstrated for each proposed source of Structural Fill):

Grading: 100% passing 75 mm BS sieve.
<10% passing 63 µm BS sieve.

Uniformity Coefficient (D_{60}/D_{10}): >10.

Los Angeles Test: < 50 (BS EN 1097-2)

Effective angle of internal friction: 35° minimum.

Plasticity: the fraction passing the 425 µm sieve shall be non-plastic.

Soluble sulphate content (SO_4): <1.2 g/l.

The acceptability of the structural fill as compacted shall be assessed based on achieving an **End Product Compaction** of 95% of maximum dry density of BS1377: Part 4, Method 3.7 (Vibrating hammer method).

640 First Layer of Compacted Filling:

To be of suitable hard granular material thoroughly compacted to 150 mm thickness.

650 Protection of Compacted Filling:

Do not allow construction traffic on compacted cohesive soil filling until the level has been raised not less than 150 mm above formation level by properly compacted temporary protective filling.

Remove temporary protective filling from site before beginning permanent construction.

The MC shall be responsible for making good any damage to the compacted fill.

660 Deterioration of Fill Materials:

If the material to be deposited as fill subsequently reaches a condition where it cannot be compacted to the requirements of this specification the MC shall:

- make good by removing the material from site until it is in a suitable condition for reuse and/or replace with suitable material, or
- make good the material by mechanical or chemical means, or
- cease work until the physical condition of the material is such that it can be compacted as described in this specification.

700 Backfilling to Temporary Excavations for Foundations

700* **Backfilling to Temporary Excavations for Foundations:**

Under ground-bearing slabs: hardcore (Clause 710) up to a maximum depth 600 mm, underlain by structural fill (Clause 630) where a greater thickness is required.

Under external oversite concrete and pavings: Hardcore as Clause 710.

Under suspended slabs, and external grassed or landscaped areas: Material excavated from the trench, laid and compacted in layers not exceeding 300 mm thick.

710* **Hardcore:**

Clean granular material, free from harmful or compressible matter, well graded, passing a 75 mm BS sieve and not more than 10% passing a 63 µm sieve, and in any one layer only one of the following:

- Crushed hard rock or quarry waste (other than chalk).
- Crushed concrete, crushed brick or tile, free from old plaster.
- Gravel.
- Sound blast furnace slag (other than from steelmaking foundries).
- Unburnt colliery spoil (minestone).
- Soluble sulphate content (SO_4) <1.2 g/l.

Spread and level in layers not exceeding 150 mm. Thoroughly compact each layer with a vibratory roller, vibrating plate compactor, vibrotamper, power rammer or other suitable means.

720* **Hardcore Under Concrete Slabs:**

To be as Clause 710 and not less than 200 mm thick. Excavate extra material as necessary. Increase thickness of hardcore as necessary to make up levels from stripped site levels to underside of slabs. See also Clause 721 (if used). The requirements of Clause 260* should also be noted.

721 **Hardcore Under Ground Bearing Slabs:**

To be as Clause 710 to a maximum thickness of 600 mm. Where a greater thickness of material is necessary to make up the levels then the fill below the 600 mm of hardcore shall comprise structural fill (Clause 630).

730* **Blinding:**

Surfaces to receive sheet overlays or concrete to have sufficient sand, fine gravel, PFA or other approved fine material applied to fill interstices and provide a close smooth surface.

- Permissible deviations on surface level: +0/-25 mm.

800 Topsoil Areas

800 General:

Refer to Landscape Architect's drawings and specifications for details of subsoil preparation and topsoiling operations but the following requirements in respect of chemical suitability should also be complied with.

810* Grade Subsoil

Grade topsoil to smooth flowing contours and to achieve the specified finished levels of the topsoil. Excavate locally as necessary for areas of thicker topsoil. Small planting beds located in general landscape areas may be excavated separately at a later date.

820* Loosen Subsoil:

Loosen subsoil consisting of light, non-cohesive material with a 3 tine ripper, drawn 300 mm deep at 600 mm centres.

821* Loosen Subsoil:

Loosen subsoil consisting of stiff clays or other cohesive material with a single tine ripper driven 450 mm deep at 1 m centres and drawn by a crawler tractor.

830* Undisturbed Topsoil which is to be Landscaped:

Prepare as necessary to ensure that the topsoil is in a suitable state for the cultivation operations specified in sections Q30 and/or Q31. In particular:

- Where the ground is hard, break up with ripper operated in transverse directions, removing any roots and boulders.
- Where the ground is covered with turf or a thick sward plough or dig over to the full depth of the topsoil.
- After any such cultivation leave fallow for not less than 1 month. During this period treat with a suitable herbicide at appropriate times to prevent seeding of weeds.

841* Imported Topsoil:

Provide as necessary to make up any deficiency of topsoil existing on site and to complete the work.

850* Contamination:

Do not use topsoil contaminated with subsoil, rubbish, oil-based products or other materials toxic to plant life. Dispose of contaminated topsoil as instructed.

Imported topsoil for use as fill to the top metre (if required) on the site will be tested for the contaminant suite listed below to ensure that contaminant threshold levels are not exceeded.

Site won topsoil for use as fill to the top metre shall also be tested for the contaminant suite defined below to ensure that contaminant threshold levels are not exceeded.

Maximum permissible contaminant concentrations in **imported and site won topsoil** (soil concentrations only will be determined):

Determinand	**Soil Concentration**	**Soil Leachate Concentration**
Arsenic	37 mg/kg	Not required
Cadmium	26 mg/kg	Not required
Chromium (total)	910 mg/kg	Not required
Chromium (VI)	21 mg/kg	Not required
Lead	200 mg/kg	Not required
Mercury (inorganic)	40 mg/kg	Not required
Selenium	250 mg/kg	Not required
Copper	2,400 mg/kg	Not required
Nickel	130 mg/kg	Not required
Zinc	3,700 mg/kg	Not required
TPH {See Note 1}	100 mg/kg	Not required
Polycyclic Aromatic Hydrocarbons (USEPA 16) And BTEX	See Note 2	Not required
Phenol Index	380 mg/kg	Not required
Cyanide	4.6 mg/kg	Not required
pH	5<pH<9	Not required
Asbestos	<0.001%	-

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

Note 1: Materials exceeding this threshold shall be subject to speciated analysis and comparison with the below table:

Hydrocarbon band	Soil concentration mg/kg
Aliphatic C5 - C6	42
Aliphatic C6 - C8	100
Aliphatic C8 - C10	27
Aliphatic C10 - C12	130
Aliphatic C12 - C16	1100
Aliphatic C16 - C21	1100
Aliphatic C21 - C35	1100
Aromatic C5 - C7	70
Aromatic C7 - 8	130
Aromatic C8 - C10	34
Aromatic C10 - 12	74
Aromatic C12 - C16	140
Aromatic C16 - C21	260
Aromatic C21 - C35	1100

Note 2: PAH values and BTEX values:

Compound	Soil concentration mg/kg
Naphthalene	2.3
Acenaphthylene	170
Acenaphthene	210
Fluorene	170
Phenanthrene	95
Anthracene	2400
Fluoranthene	280
Pyrene	620
Benzo[a]anthracene	7.2
Chrysene	15
Benzo[b]fluoranthene	2.6
Benzo[k]fluoranthene	77
Benzo[a]pyrene	2.20
Indeno[123-cd]pyrene	27
Dibenzo[ah]anthracene	0.24
Benzo[ghi]perylene	320
Benzene	0.087
Toluene	130
Ethyl Benzene	47
m/p Xylenes	56
o Xylenes	60
Xylenes**	56

The rate of validation testing on **imported topsoil** will be 1 sample per 250 m^3 of backfill.

The rate validation testing on **site won** topsoil will be 10 No. representative samples from stockpile.

BS Certs
Pictures
In-situ top soil testing (plus report from supplier)

860* Spread Topsoil

Spread topsoil over prepared subsoil layers not exceeding 150 mm and firm each layer before spreading the next. At the time of laying, both the material and the weather must be reasonably dry. Overall minimum depths after firming and settlement to be 150 mm but locally increased with tree pits as necessary in accordance with the Architects requirements.

880* Finished Levels of Topsoil:

After settlement, unless otherwise stated, to be:

- 30 mm above adjoining paving or kerbs
- Not less than 150 mm below dpc of adjoining buildings
- 30 mm higher for shrub areas than for adjoining grass areas.
- Married in with adjoining soil areas.

Appendix A Contamination Procedures & Documentation

A1 Validation Strategy

As soon as practicable after the removal of any anticipated or unexpected 'hot spots' a **Validation Report** shall be prepared and submitted by the MC and agreed with the relevant Local Authority Planning Development Department.

The validation strategy shall be as follows:

- Anticipated areas of elevated concentrations or 'hot spots' shall be excavated and removed to at least 1.00 m beyond any visual or olfactory (odorous) indication of contamination.
- Samples of the surrounding soil will be taken from the excavation formed and tested for the suite of determinands listed in Clause 510 in addition to any other appropriate contaminant as indicated by appearance or by smell.
- If the chemical concentrations of the soil samples are less than the concentrations recorded in Clause 510 or other appropriate guidance in respect of other appropriate contaminant, the elevated concentrations or 'hot spot' can be considered to have been removed and no further remedial action is required.
- If the chemical concentrations of the soil samples are greater than the concentrations recorded in Clause 510, further excavation is required and the sequence of sampling and testing should be repeated. Incremental excavation and testing should continue until the chemical concentrations encountered are less than the concentrations recorded in Clause 510 or other appropriate guidance in respect of other appropriate contaminant.
- During this procedure, the following information should be collected and recorded:
    - The exact extent of each phase of excavation should be recorded using 3D topographical surveying techniques.
    - The exact position and depth of each sample taken should be recorded using 3D topographical surveying techniques.
    - The samples should be given a unique reference number.
    - The laboratory testing results for each unique sample shall be recorded.
    - A photographic record of each phase of excavation and sampling will be collected and recorded.
- A general photographic record of the works should also be collected and recorded to provide a general record of the nature and characteristics of the materials encountered and/or laid to form formations etc. Where practicable, the photographic record should be cross referenced with any chemical testing available for the material type.

A validation report should be prepared, comprising substantiating completion documentation to include type of documentation listed above and photographic records in addition to Environmental Protection Act 1990 Section 34 Duty of Care documentation relating to waste disposal of the material removed from site.

A2 Validation Documentation Requirements

The following documentation shall be prepared by the MC and submitted to the relevant Local Authority Planning Development Department.

- Plan or plans showing earthworks movement of materials on site (cut and fill) and imported if appropriate.
- Plan or plans showing the location of any 'hot spots' located, if any, or confirmation that none were encountered.
- Plan or plans showing location of chemical testing undertaken as appropriate plus supporting information.
- Plan or plans showing surface finishes and thickness of build-ups, topsoil or clean cover as appropriate.
- Plan or plans showing the location of any hotspots encountered during service trench excavation, if any, and plan sections of remedial measures undertaken for water pipe provision.
- Appropriate records of material removed from site including testing records.
- Appropriate records of material imported to site including testing records.
- Appropriate records of topsoil imported to site including testing records.
- Appropriate photographic records of the earthworks plus any specific areas of interest ('hotspots', tanks etc).
- Records of any water control of groundwater that may have been contaminated, if any, or confirmation that none were encountered.
- Other records, if appropriate, not included in above summary.
- A statement confirming the earthworks was undertaken in accordance with this specification.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

George Mitchell
Buro Happold Limited
2 Brewery Place
Brewery Wharf
Leeds
LS10 1NE
UK

T: +44 (0)113 204 2200
F: +44 (0)870 787 4144
Email: George.Mitchell@BuroHappold.com

BUROHAPPOLD ENGINEERING

1st October 2018

MF-BHE-XX-XX-RP-CG-0002

Factory, Water Street, Manchester.
Land Contamination Summary and Outline Remediation Strategy

To whom it may concern,

1. Introduction

This letter is in respect of the proposed development at The Factory, Water Street, Manchester (National Grid Reference ^{3}82990 E, ^{3}97960 N), hereafter referred to as 'the Site'. The proposed end use will comprise a new cultural venue comprising flexible auditorium spaces and associated facilities including retail, restaurant, office and educational uses with areas of external public realm (hard and soft landscaping). A Site location plan and architect's impression of the proposed development and associated layout are included as Enclosures 1 & 2 respectively.

This letter summarises the work undertaken to date in relation to ground contamination (Section 2) and sets out the proposed outline remedial strategy for the Site (Section 3).

2. Summary of Site Assessment Work

This section aims to provide sufficient information to the Local Planning Authority and associated statutory consultees in relation to the Site's condition. Table 1 below lists the contamination related assessment and Site investigation works previously undertaken at the Site to date.

Table 1 - Summary timeline of ground contamination works relating to the Site

Report Reference	Description of works undertaken	Contamination Ground Investigation	Date
Report 0	ROC Consulting Phase 1 Desk Study	Preliminary Conceptual Site Model	July 2015
Report 1 (MF-BHE-XX-XX-RP-CG-0001-PO1)	BuroHappold Ground Engineering Desk Study Report	Preliminary Conceptual Site Model	6th September 2016
Report 2 (Factual Report A6053-16)	BuroHappold/ESG – Site Specific Ground Investigation (East of Water Street)	3 No. boreholes, 11 No. window samples, 8 No. hand dug trial pits and 5 No. machine excavated trial pits.	October 2016 (Site work between 23 June 2016 – 12 July 2016)
Report 3 (Factual Report A6131-16)	BuroHappold/ESG – Site Specific Ground Investigation (West of Water Street)	2 No. boreholes, 1 No. machine excavated trial pit.	May 2017 (Site work between 9-23 January)
Report 4 (Factual Letter A7064-17)	BuroHappold/SOCOTEC (formerly ESG) – Site Specific Ground Investigation (Starlight Theatre)	4 No. machine excavated trial pits	12 March 2018 (Site work between 19-20 December 2017)

The following sections summarise pertinent parts the above assessments.

Report 1: BuroHappold Ground Engineering Desk Study Report

The Site is located at the former Granada TV Studio on Water Street, Manchester and is approximately 550 m northwest of Deansgate Railway Station.

The Site is approximately 0.73 hectares in area and is currently occupied by surface car parking, a Grade II Listed Colonnaded Railway Viaduct, the Starlight Theatre (overlying the railway arches), and a number of structures and buildings associated with former Granada TV filming and events. The railway viaduct comprises two sets of railway arches, namely the St. John's arches (on Site) and the Museum of Science and Industry (MoSI) arches (off Site), which approximately form the southern Site boundary. Water Street (orientated SW-NE) runs centrally through the Site.

The Site has had a variety of historical industrial land uses including warehouses, wharfs, and railway sidings. Historically off Site industrial uses have included a timber yard ~20-30 m to the east and an engineering works adjacent to the north of the Site.

No contamination related risks above Low were identified at Desk Study stage.

A copy of the BuroHappold Ground Engineering Desk Study Report has previously been submitted to the Local Planning Authority as part of the original planning submission.

Reports 2, 3 and 4: Three phases of ground investigation

Due to access restrictions (primarily associated with Network Rail occupying the Site to the west of Water Street), three phased ground investigations were undertaken across the Site by ESG supervised by BuroHappold.

Report 2: ESG undertook the first phase of ground investigation at the Site, east of Water Street during June – July 2016. This phase comprised 3 No. cable percussive boreholes with rotary follow-on, 11 No. window samples, 8 No. hand dug trial pits, 5 No. machine dug trial pits, geotechnical and chemical laboratory testing, installation of gas and groundwater monitoring wells and a programme of gas and groundwater monitoring.

Report 3: ESG undertook the second phase of ground investigation (west of Water Street, after Network Rail allowed access) during January 2017. This comprised 2 No. boreholes using combined dynamic sampling and rotary drilling, 1 No. machine excavated trial pit, geotechnical and chemical laboratory testing, installation of gas and groundwater monitoring wells and a programme of gas and groundwater monitoring.

Report 4: SOCOTEC UK Ltd. (formerly ESG) were commissioned to undertake the third phase of ground investigation during December 2017, which comprised 4 No. machine dug trial pits to inspect the material located above the crown of the arches of the Colonnaded Railway Viaduct, along with chemical laboratory testing.

A copy of each of the above Factual Reports have previously been submitted to the Local Planning Authority as part of the original Planning Submission.

Exploratory hole location plans detailing the works undertaken across the three phases of GI are included as Enclosure 3.

The Site ground conditions were assessed on the basis of the Site specific available information. The general sequence of strata encountered beneath the proposed development (summarised in Table 2) comprises Made Ground (MG) which is underlain by superficial deposits: Alluvium (both cohesive and granular), and Glaciofluvial Deposits (granular material – recorded in BH02 only). The cohesive Alluvium was encountered sporadically, within 10 No. exploratory holes out of 28. The Chester Formation bedrock underlies the superficial deposits. Rockhead was recorded between 21.60 and 23.10 m AOD during the GI.

During the ground investigations, groundwater was struck between 2.20 and 3.10 m BGL within several exploratory holes within the granular Alluvium.

Post fieldwork groundwater levels within the Chester Formation bedrock were recorded between 23.13 and 23.51 m AOD (~2.80 to 3.30 m BGL) within the granular Alluvium, and between 22.87 and 23.63 m AOD (~2.80 to 3.80 m BGL). It is therefore considered that the two strata are in hydraulic continuity. Perched water was recorded in 2 No. of the 4 No. wells installed within the Made Ground, between 1.80 and 3.05 m BGL.

Table 2 - Summary of the ground conditions encountered at the Site.

Depth to Top of Strata (m BGL)	Typical Thickness (m)	Generalized Description
0.00	0.80 – 2.50 (3.75 in BH05)	MACADAM or CONCRETE OVER Grey, yellow, brown and black sandy/very sandy gravel and very gravelly sand of sandstone, limestone, mudstone, coal, slate, brick, concrete clinker and glass, with occasional cobble content of sandstone and brick AND Soft to firm brown and black, sandy, gravelly, clay with localised silt and sand of ash. Gravel of fine to course brick, coal, quartzite, limestone, mudstone, slate and timber with occasional cobbles of brick. [MADE GROUND]
1.60 – 1.80 (HTP09 & HTP10)	0.10 – 0.60	Soft yellowish brown and brown slightly sandy, slightly gravelly CLAY. Gravel of sandstone and mudstone. [POSSIBLE MADE GROUND]
0.80 – 2.50 (Sporadic)	0.50 – 1.30	Soft to firm brownish yellow mottled grey, slightly sandy, slightly gravelly CLAY. Gravel of sandstone and mudstone. [ALLUVIUM – COHESIVE]
1.50 – 2.50	1.40 – 3.10	Medium dense to very dense dark brown, orange brown and occasionally grey slightly gravelly to gravelly SAND and sandy, silty GRAVEL. Gravel of sandstone and mudstone with occasional limestone, quartzite and siltstone. [ALLUVIUM – GRANULAR]
3.20 (Encountered in BH02 only)	1.20	Brownish grey, becoming yellowish grey, gravelly SAND and sandy GRAVEL. Gravel of sandstone, quartzite and siltstone. [GLACIOFLUVIAL DEPOSITS]
3.40 – 4.60	>25.60	Reddish brown slightly gravelly silty SAND. AND Extremely weak to weak reddish brown to greenish grey medium grained SANDSTONE. Discontinuities are: 1. Subhorizontal, closely to medium spaced, rough, planar, undulating, smooth. 2. Subvertical, widely spaced, tight, planar, smooth with sand smearing and local clay smearing. [CHESTER FORMATION – SHERWOOD SANDSTONE GROUP]

3. Chemical Testing Results

As part of the three phases of ground investigation, chemical testing was undertaken within both Made Ground and natural material and assessed against the relevant thresholds. A brief summary is presented below.

Soil Results and Risk to Human Health

In total, 20 No. soil samples (Made Ground: 17 No. and natural material: 3 No.) were tested and assessed against the relevant CLEA model thresholds (commercial / industrial, S4SLs and C4SLs derived for 1% SOM).

Commercial criteria are considered suitable for the proposed end use as a theatre / public realm space due to the following reasons:

- End users will be transient;
- The vast majority of the proposed development area will be covered by the building, with the remainder covered by hard or soft landscaping; and
- Floor slabs and landscaped areas will be underlain by a clean capping layer.

No exceedances of the CLEA model commercial / industrial thresholds for the analysed determinands were recorded. No Asbestos Containing Material (ACM) was identified in the 20 No. samples analysed.

Several chemical exceedances were recorded above the more sensitive CLEA model residential without plant uptake thresholds, including TPH, lead, arsenic and PAHs. The results are included as Enclosure 4.

Visual / olfactory evidence of contamination was recorded during the first phase of the ground investigation in 2 No. exploratory holes, namely WS09, 3.30 to >3.85 m BGL (maximum depth drilled with a 'strong diesel odour – hydrocarbon') and MTP05, 0.30 to >3.10 m BGL (maximum depth drilled; 'slight hydrocarbon odour').

Samples of these materials were sent to a laboratory to be analysed for a suite of potential contaminants. Soil analysis results recorded concentrations of TPH, lead and PAH above residential without plant uptake thresholds. The highest TPH value recorded on Site was within HTP11 at 1.00 m BGL (192 0mg/kg TPH), despite no visual / olfactory evidence of contamination being noted; this material represents historic backfilling on top of the St John's arches.

Leachate and Groundwater Results: Risks to Environmental Receptors

Leachate and groundwater testing were undertaken in order to assess indicative current levels of contamination within the groundwater, and to assess the risk of future contamination to nearby controlled water receptors (Chester Formation Principal Aquifer and River Irwell). The results are included as Enclosure 5.

Leachate

Eleven leachate tests undertaken as part of the ground investigation recorded sporadic minor exceedances of the UK DWS of antimony, barium, benzo[a]pyrene and fluoride, and minor exceedances of the Freshwater EQS of pH and sulphate (Note: PAHs and TPH only tested in two of the eleven samples). Several other determinands (lead, copper, zinc and chromium) recorded concentrations between the two assessment criteria used (above the Freshwater EQS but below the UK DWS).

Based on the minor exceedences of the Freshwater EQS and UK DWS, the potential for leaching of contaminants from Site soils into controlled waters is considered to be low. Furthermore, the groundwater concentrations are also low (see next section) giving a further line of evidence to the low leachability of soils.

Groundwater

Two groundwater samples were collected on one occasion by bailer during post-fieldwork monitoring and tested in the laboratory. The two samples were taken from different wells (BH01 and BH05), both with response zones within the Chester Formation bedrock (i.e. deeper groundwater). One exceedance was recorded in BH01: benzo[a]pyrene exceeding the UK DWS by 17 times. In BH05, a substantial concentration of TPH was recorded (14,000 $\mu g/m^3$); however, no visual or olfactory signs of contamination were reported during groundwater sampling.

The monitoring undertaken suggests some hydrocarbon impact to groundwater within the Chester Formation aquifer; however, there is no evidence to suggest that this impact originates from the Site:

- On-Site processes unlikely to have resulted in such contamination;
- The origin of the TPH impacts recorded at BH05 is unclear and may be from an off-Site source (engineering works and timber yard are recorded off Site on historical maps);
- Chemical analysis of soils in the location of BH05 recorded low TPH concentrations (58 and 40 mg/kg at 1 and 3 m BGL respectively).
- Within the upper strata of both BH01 and BH05, no visual / olfactory evidence of contamination was noted, and no elevated TPH was recorded during soil chemical testing. This suggests migration of contamination within the groundwater;
- No CLEA commercial threshold exceedances were recorded in the Site soils; and
- Soil leachability tests reported low leachability.

4. Ground Gas

6 No. ground gas monitoring events were undertaken on the 8 No. monitoring wells as part of the post fieldwork monitoring visits between 28 July and 20 October 2016. The findings of the monitoring events undertaken are outlined below and a summary of the monitoring results obtained is included in Enclosure 6:

- The maximum concentration of carbon dioxide recorded during the monitoring events was 3.7% in 1 No. installation, namely BH04 on the 22.03.2017 (response zone 1.00 to 3.00 m BGL in Glaciofluvial Deposits);
- The maximum concentration of methane was recorded to be <0.1% for the installations; and
- The maximum flow rate was recorded to be 0.1%.

On the basis of this information, the Site is classified as Characteristic Situation 1 (CS1).

Conclusion

Concentrations in soil were recorded below the relevant CLEA commercial thresholds and are therefore considered suitable for use for the proposed development. The soils data indicates that some contaminants are present within Site Made Ground; however, the maximum concentrations recorded do not indicate that the Site is substantially impacted by contamination. Impacts within the Made Ground are therefore not considered to pose a risk either to future end users of the development or environmental receptors.

Suitable and appropriate health and safety measures / procedures will need to be implemented to protect the construction workforce from an associated risk. The procedure for dealing with unexpected contamination 'hotspots' is outlined in the Remediation Strategy (Section 3) and the BuroHappold Excavation and Filling Specification (MF-BHE-XX-XX-SP-CG-00-0001; herein referred to as the E&F Spec).

The evidence from leachate and groundwater results suggests that there is a low potential for impacts to controlled waters originating from the Site.

The future development will introduce impermeable surfaces over the proposed development and sealed drainage discharging to the River Irwell. This will substantially reduce infiltration through Site Made Ground and so will further reduce potential impacts to controlled waters.

The Site is classified as Characteristic Situation 1 (CS1), suggesting that "no special precautions" are required, in accordance with CIRIA C665 and the British Standard BS8485:2015.

3. Outline Remediation Strategy / Works Methodology

This section provides details of the remediation strategy and works methodology for managing the contaminated land aspects of the construction works that is to be managed and implemented by the Site team during the enabling works package/construction phase of works.

This strategy is also presented in the relevant sections of the E&F Spec. These have been compiled into a specific contaminated land document (REM Clauses) which is provided in Enclosure 7.

It should also be noted that as part of the proposed Remediation Strategy, further acceptability testing will be carried out in accordance with the E&F Spec.

The following should be noted:

- Chemical concentrations in soils are not anticipated to pose a risk to future Site users as:
    - Contaminant concentrations of in-situ soils at the Site were reported below CLEA commercial / industrial values;
    - No imported material exceeding the CLEA residential without plant uptake values will be accepted on to the Site from off site sources;
    - Only topsoil with concentrations lower than the CLEA residential with plant uptake values will be used in landscaped areas; and
    - Building and hardstanding is proposed across the Site with only limited soft landscaping.
- No asbestos containing materials were recorded in Site soils during three phases of GI.

The outline remediation strategy is as follows:

- The works for the construction of the proposed development comprise a bulk earthworks exercise to rationalise levels across the Site using Site won material and some cutting and filling of existing levels. Recycled and / or quarried 6F2 will be imported to be utilised for the piling mat laid on a geotextile;
- Earthworks will be completed in accordance with the Buro Happold E&F Spec REM Clauses document (Enclosure 7). Excess material, as well as geotechnically or chemically unsuitable material (as defined in the E&F Spec) encountered during the works will be removed from Site;
- Fill material, either Site won arisings or imported material including topsoil, will be tested for the list of determinands specified in Clauses 510 and 850 of the E&F Spec (Enclosure 7);
- The top ~400 mm of material used within the piling mat will be removed from Site after piling is complete, leaving the lower portion (i.e. ~250 mm envisaged) of the piling mat on Site in the permanent case. This material will double up as the sub-base to the ground bearing slab. This material will be tested as it is placed to ensure it complies geotechnically and chemically with the E&F Spec;
- Imported material used on Site will be tested to ensure that it complies with the CLEA residential without plant uptake thresholds within the E&F Spec (Enclosure 7);
- If asbestos not currently identified in site soils is encountered during construction works, the contractor is to manage residual risk posed to site workers and off Site receptors within arisings generated from excavations on Site. This will be undertaken by employing dust control measures such as damping down and management of on Site vehicle speeds. If encountered, significant asbestos contamination will be removed from Site as part of construction works. Construction works will place sufficient barriers at the Site surface to be protective of future Site users should residual asbestos be encountered in Site soils during the works;
- Imported and Site-won material that is considered non-compliant in terms of geotechnical properties will not be accepted and will be removed from Site;
- The Main Contractor will be required to control the permeation of water through the ground during construction and surface runoff to the River Irwell;

- Construction Site staff will be vigilant for visual or olfactory evidence of contamination, as well as asbestos, during earthworks. Should unexpected contamination be encountered, work will be stopped in that area of the Site, the material location recorded and covered over and an appropriate strategy agreed with the Local Authority. The full procedure is outlined in the E&F Spec (Enclosure 7);
- As detailed above, a ground gas assessment has classified the site as CS1. As such, and in accordance with CIRIA C665 guidance, no special ground gas precautions are required on the Site.

BuroHappold are seeking comment on and approval of this proposed strategy and on the Excavation and Filling Specification provided in Enclosure 7.

Yours sincerely
on behalf of BuroHappold Limited

G. Mitchell

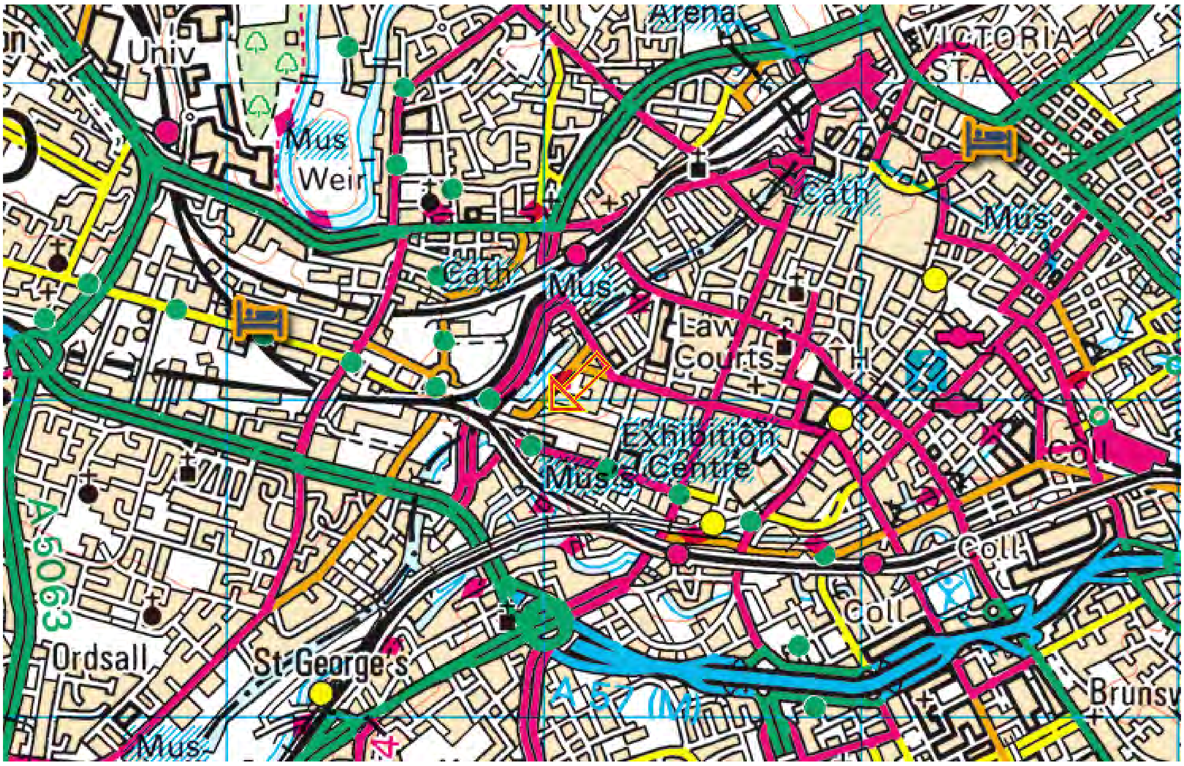
George Mitchell
Ground Engineer
email george.mitchell@burohappold.com

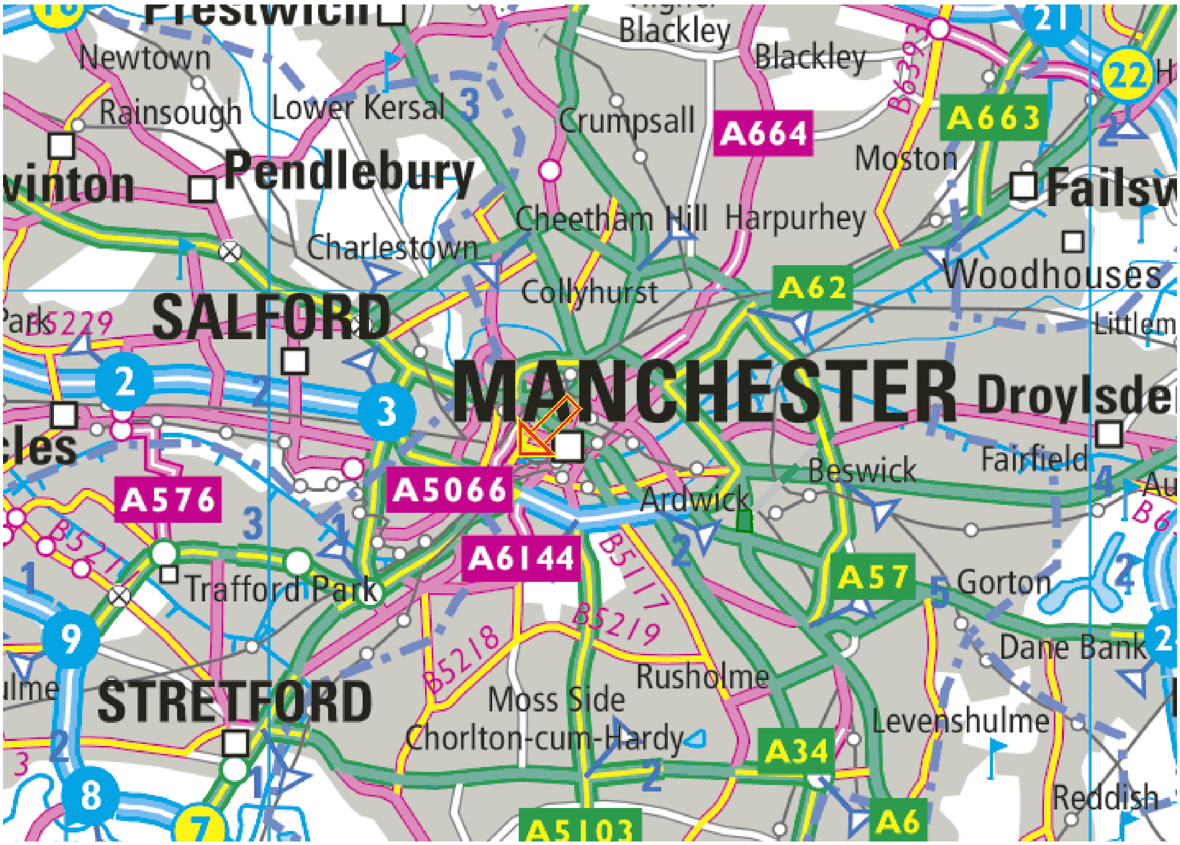
Reviewed by

Rob Frost
Associate Director – Geoenvironmental Consultant

Encs
1. Site Location Plan
2. Development Details – Architectural Plans
3. GI Exploratory Hole Location Plan
4. Chemical Assessment Summary Spreadsheets: Soil
5. Chemical Assessment Summary Spreadsheets: Leachate and Groundwater
6. Ground Gas Summary Spreadsheet
7. BuroHappold Excavation & Filling Specification REM Clauses

Enclosure 1


Univ
Arena
VICTORIA STA
Mus
Weir
Cath
Mus
Cath
Mus
Law Courts
TH
Exhibition Centre
Mus
Coll
Coll
A5063
Ordsall
St George's
A57 (M)
Mus
Brunsw


Prestwich
Newtown
Blackley
Blackley
Rainsough
Lower Kersal
Crumpsall
A664
B6393
A663
22
21
Moston
Pendlebury
Swinton
Failsw
Cheetham Hill
Harpurhey
Charlestown
Woodhouses
Collyhurst
A62
SALFORD
B5229
Park
2
3
MANCHESTER
Droylsde
Eccles
A576
A5066
Beswick
Fairfield
Ardwick
A6144
B5117
B5219
B5218
A57
Gorton
Trafford Park
9
Dane Bank
STRETFORD
Moss Side
Rusholme
Chorlton-cum-Hardy
Levenshulme
A34
A6
A5103
8
7
Reddish

Reproduced from Ordnance Survey by permission of ordnance survey® on behalf of the controller of Her Majesty's stationary office, Crown Copyright 2003 all rights reserved. Licence number: AL 100005517.

Project Name : Factory Theatre

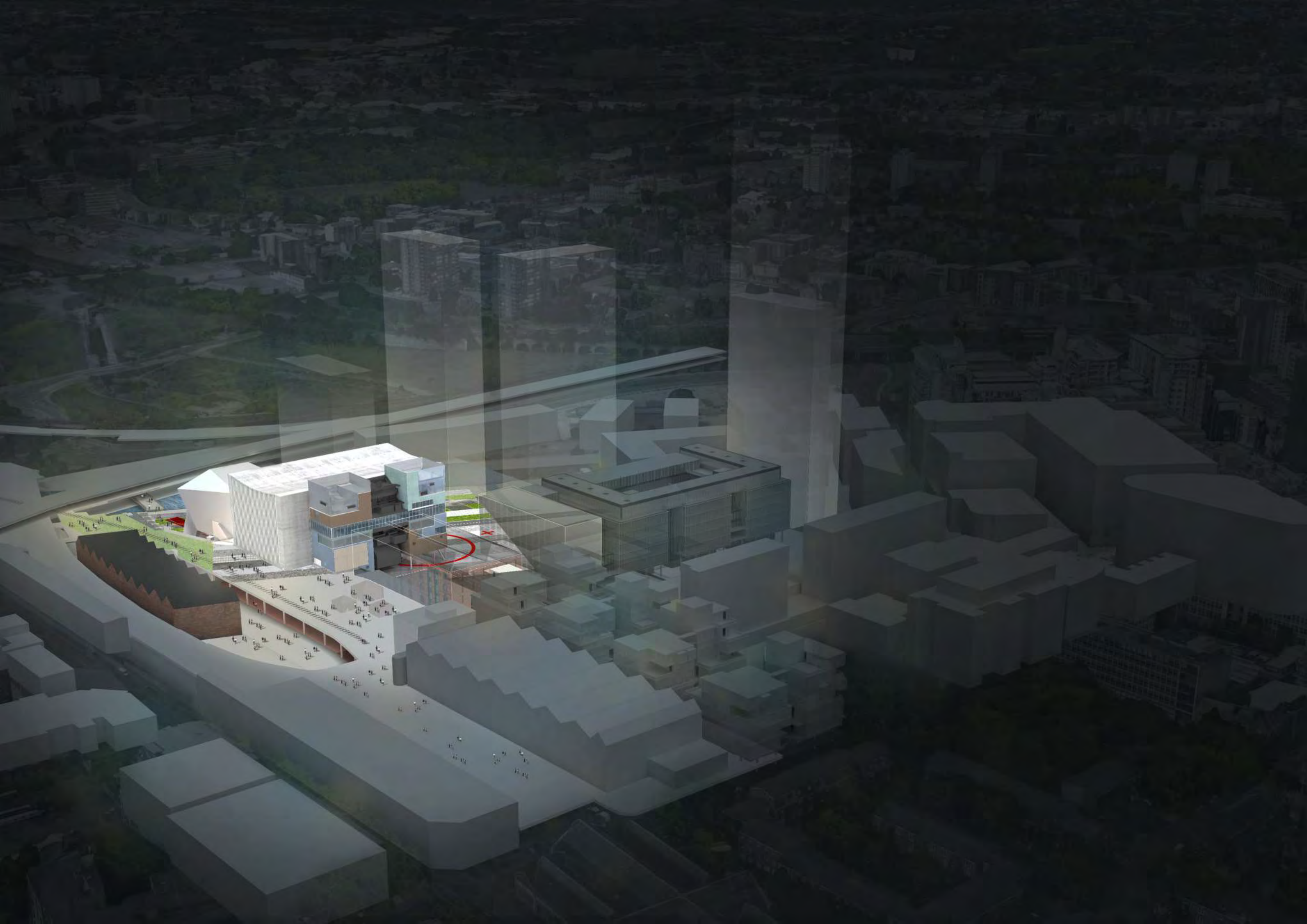
Report Title : Land Contamination Summary and Outline Remediation Strategy

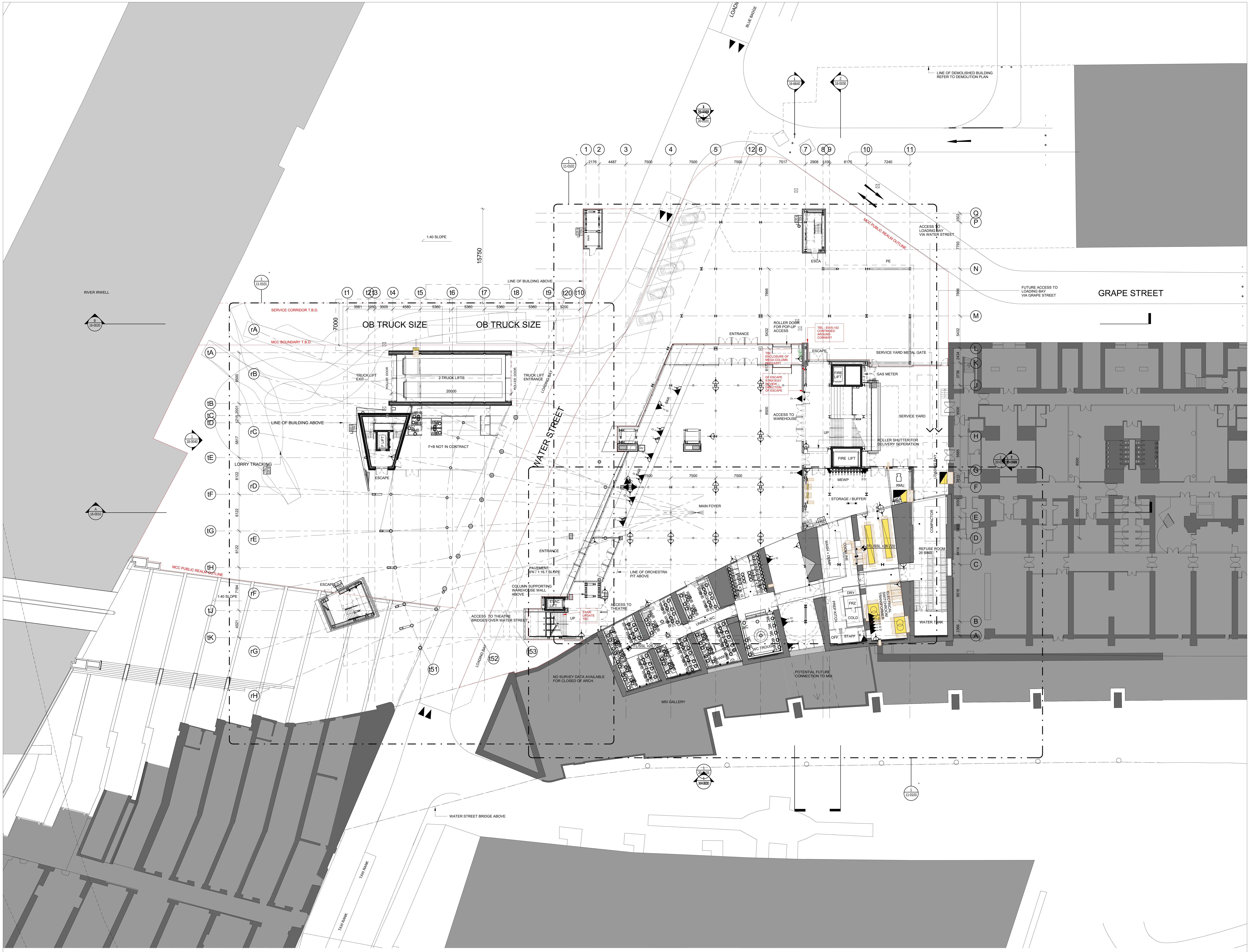
Figure Title : Site Location Plan

Scale: NTS	**Date:** Oct 2018	**Job No:** 034933	**Enclosure:** 1

BUROHAPPOLD ENGINEERING

Enclosure 2




RIVER IRWELL
GRAPE STREET
WATER STREET
OB TRUCK SIZE
OB TRUCK SIZE
LINE OF DEMOLISHED BUILDING
REFER TO DEMOLITION PLAN
LINE OF BUILDING ABOVE
1:40 SLOPE
15750
SERVICE CORRIDOR T.B.D.
MCC BOUNDARY T.B.D.
MCC PUBLIC REALM OUTLINE
TRUCK LIFT EXIT
2-TRUCK LIFTS
20000
TRUCK LIFT ENTRANCE
ROLLER DOOR
LOADING BAY
F+B NOT IN CONTRACT
ESCAPE
LORRY TRACKING
ENTRANCE
ROLLER DOOR FOR POP-UP ACCESS
ACCESS TO WAREHOUSE
SERVICE YARD METAL GATE
GAS METER
FIRE LIFT
SERVICE YARD
ROLLER SHUTTER FOR DELIVERY SEPERATION
ACCESS TO LOADING BAY VIA WATER STREET
FUTURE ACCESS TO LOADING BAY VIA GRAPE STREET
PE
ESCA
MEWP
RMU
STORAGE / BUFFER
COMPACTOR
REFUSE ROOM 20 BINS
MAIN FOYER
BAR
PAVEMENT 6% / 1:16.7 SLOPE
COLUMN SUPPORTING WAREHOUSE WALL ABOVE
LINE OF ORCHESTRA PIT ABOVE
ACCESS TO THEATRE
ACCESS TO THEATRE BRIDGES OVER WATER STREET
STAIR UPDATE TBC
UP
DRY
FRZ
COLD
PREP KITCH
OFF.
STAFF
ELECTRICAL SWITCH / TRANSFORMER
WATER TANK
UNISEX WC
WC TROUGH
FFL/SSL +26.720
POTENTIAL FUTURE CONNECTION TO MSI
NO SURVEY DATA AVAILABLE FOR CLOSED OF ARCH
MSI GALLERY
WATER STREET BRIDGE ABOVE
TAXI RANK
1:40 SLOPE
1 2 3 4 5 12 6 7 8 9 10 11
Q P N M L K J H G F E D C B A
t1 t2 t3 t4 t5 t6 t7 t8 t9 t10 t11 t51 t52 t53
tA tB tC tD tE tF tG tH tJ tK
rA rB rC rD rE rF rG rH
2176 4487 7500 7500 7500 7517 2908 1100 6175 7240
3561 1050 3005 4580 5360 5360 5360 5360 5200
7000 8500 8500 6122 6122 6122 7184 4321
16-0030 16-0040 18-0040 11-0101 11-0102 11-0103 20-0101

1 FLOOR PLAN - GROUND FLOOR
SCALE: 1 : 200

FACTORY MANCHESTER

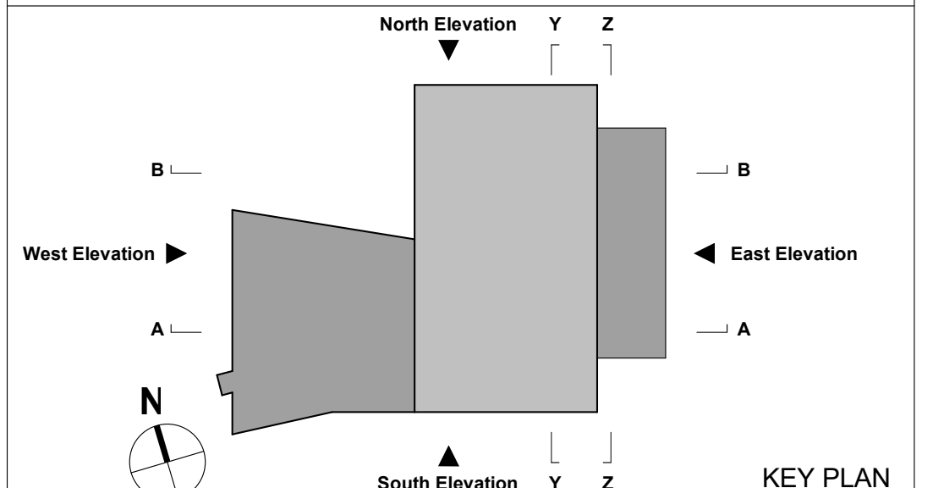
MANCHESTER CITY COUNCIL Albert Square, Town Hall M2 5DB Manchester, United Kingdom T: +44 (0) 161 234 5004	CLIENT
OMA Heer Bokelweg 149 3032 AD Rotterdam, Netherlands t: +31 (0) 10 2438200	ARCHITECT
BURO HAPPOLD 230 Lower Bristol Road BA2 3DQ Bath, United Kingdom T: +44 (0) 122 532 0600	STRUCTURAL ENGINEER
BDP 11 Ducie Street M1 2JB Manchester, United Kingdom T: +44 (0) 161 828 2200	MECHANICAL AND ELECTRICAL ENGINEER
BURO HAPPOLD 230 Lower Bristol Road BA2 3DQ Bath, United Kingdom T: +44 (0) 122 532 0600	FACADE ENGINEER
WSP The Victoria, 150-182 The Quays M50 3SP Manchester, United Kingdom T: +44 (0) 161 886 2400	FIRE ENGINEER
LEVEL ACOUSTICS De Rondom 10 5612 AP Eindhoven, Netherlands T: +31 (0) 40 247 2700	ACOUSTIC CONSULTANT
CHARCOAL BLUE 180 Strand WC2R 3DA London, United Kingdom T: +44 (0) 207 928 0000	THEATRE CONSULTANT

N 398030031 E 383033226	NORTHING COORDINATE EASTING COORDINATE
+26.720	SPOT HEIGHT
GF +26.720	LEVEL LEVEL HEIGHT
FFL/SSL +26.720	LEVEL HEIGHT (FFL SAME AS SSL)
+26.720 +26.670	FINISHED FLOOR LEVEL STRUCTURAL SLAB LEVEL
0	*GRID LINE*
1 11_101	*CALLOUT* DETAIL NUMBER DRAWING REFERENCE
1 11_101	*ELEVATION* DETAIL NUMBER DRAWING REFERENCE
1 11_101	*SECTION* DETAIL NUMBER DRAWING REFERENCE
1 Ref 1 Ref 30_011 1 Ref 1 Ref	*INTERNAL ELEVATION* DETAIL NUMBERS DRAWING REFERENCE
+26.720 +26.720	*SPOT HEIGHT ELEVATION* ARCHITECTURAL ABOVE ARCHITECTURAL BELOW
+26.720 +26.720	STRUCTURAL ABOVE STRUCTURAL BELOW
WAREHOUSE 201	*ROOM TAG* ROOM NAME ROOM NUMBER
FFF000 CFF000 FFB000 CBF000	*ROOM TAG* FLOOR FINISH CEILING FINISH FLOOR BASE CEILING BASE
000A 000 60s 30dB	*DOOR TAG* DOOR NUMBER DOOR TYPE FIRE RATING ACOUSTIC RATING
A1 FireRatingRequired AcousticRatingRequireddB	*WALL TAG* WALL TYPE FIRE RATING ACOUSTIC RATING
EWS522	*WALL TAG* EXTERNAL WALL TYPE
ST-02	*MULTI CATEGORY TAG* TYPE NUMBER
12 Risers 170 / 250	*STAIR TAG* NUMBER OF RISERS RISER HEIGHT TREAD DEPTH
☒	*FLOOR BOX*
	NOT IN CONTRACT

REV	STAT	DATE	DESCRIPTION
P8	S2	23 Mar 2018	ISSUED FOR PLANNING
P7	S3	16 Mar 2018	INTERIM DESIGN RELEASE
P6	S0	21 Dec 2017	WIP INTERIM GA SUBMISSION
P5	S2	29 Sept 2017	PLANNING APPLICATION
P4	S3	11 Aug 2017	RIBA STAGE 3 SUBMISSION

DO NOT SCALE FROM THIS DRAWING. USE FIGURED DIMENSIONS ONLY. FIGURED DIMENSIONS ARE IN MILLIMETRES. ALL LEVELS ARE IN METRES. ALL DIMENSIONS AND LEVELS SHALL BE VERIFIED ON SITE BEFORE PROCEEDING WITH WORKS. DETAILED SITE SURVEY TO BE CARRIED OUT TO VERIFY POSITIONS AND LEVEL RELATIONSHIPS WITH SITE FEATURES AND ORDINANCE SURVEY. BOUNDARIES ARE INDICATIVE ONLY AND ARE TO BE VERIFIED BY OTHERS. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER DOCUMENTATION FROM THE ARCHITECT, DESIGN TEAM, MANAGEMENT CONTRACTOR AND EMPLOYER. THE ARCHITECT MUST BE NOTIFIED OF ANY DISCREPANCIES.
WHERE BUILDING COMPONENTS ARE DESCRIBED IN THE SPECIFICATION AS CONTRACTOR DESIGNED, "CONSTRUCTION" INFORMATION RELATING TO THOSE COMPONENTS THAT ARE SHOWN ON THIS DRAWING REPRESENT DESIGN INTENT ONLY.

THIS DOCUMENT CONTAINS COPYRIGHTED MATERIAL. ANY UNAUTHORIZED USE, DISCLOSURE, DISSEMINATION OR DUPLICATION OF ANY OF THE INFORMATION CONTAINED HEREIN MAY RESULT IN LIABILITY UNDER APPLICABLE LAWS.


North Elevation
Y
Z
B
B
West Elevation
East Elevation
A
A
N
South Elevation
Y
Z

KEY PLAN

DRAWN BY	Author	CHECKED BY	Checker	APPROVED BY	Approver

PROPOSED GROUND FLOOR PLAN

DRAWING NAME

PHASE

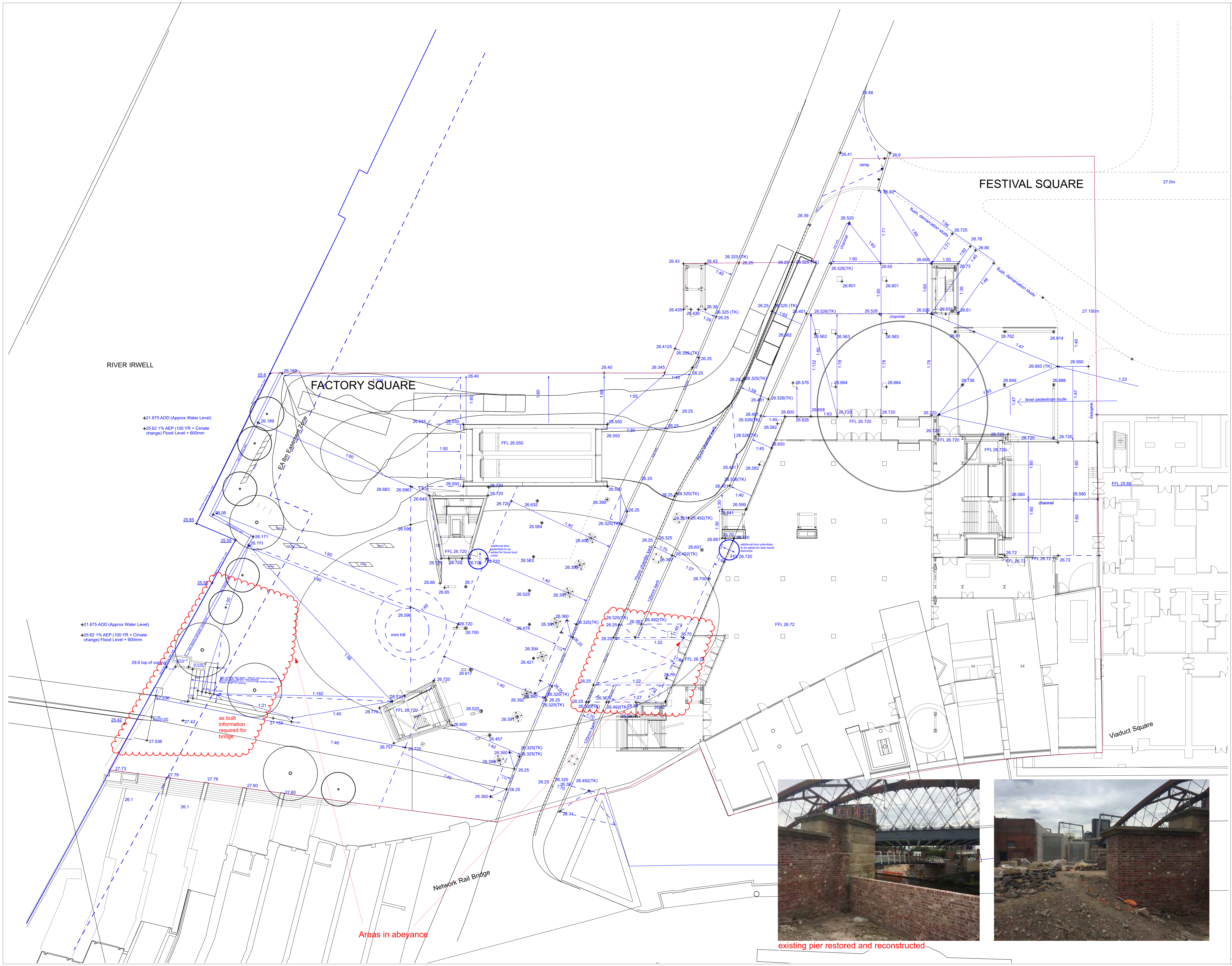
P8
REVISION

xxxx	1:200	A0	03/04/16
PROJ. NR.	SCALE	FORMAT	DATE

MF-OMA-XX-GF-DR-A-10-0100

DRAWING NUMBER

18/07/2018 10:16:53

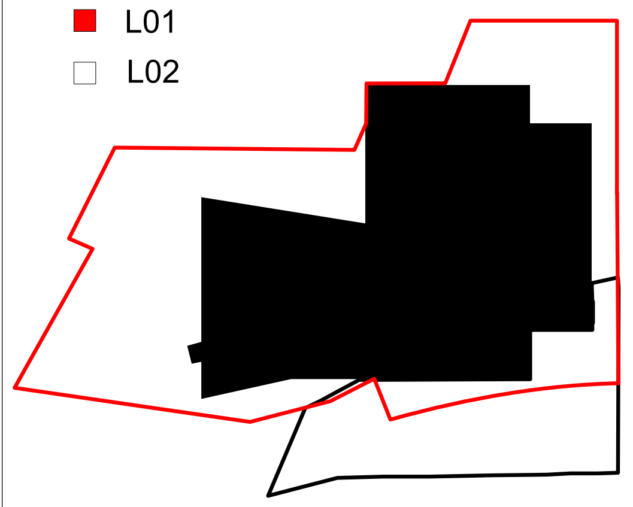

FESTIVAL SQUARE
FACTORY SQUARE
RIVER IRWELL
EA 8m Easement Zone
+21.675 AOD (Approx Water Level)
+25.62 1% AEP (100 YR + Cimate change) Flood Level + 600mm
29.6 top of coping
mini hill
as built information required for bridge
Areas in abeyance
Network Rail Bridge
Viaduct Square
ramp
channel
flush, demarcation studs
level pedestrian route
walkway
FFL 26.550
FFL 26.720
FFL 26.72
FFL 25.85
additional door potentially to be added for future food outlet
additional door potentially to be added for beer barrel deliveries
27.0m
27.150m

existing pier restored and reconstructed

© THIS DRAWING IS COPYRIGHT PROTECTED AND MAY NOT BE REPRODUCED IN WHOLE OR PART WITHOUT WRITTEN AUTHORITY FROM THE OWNER.

NOTE:

1. Do not scale from this drawing. Always work to noted dimensions.
2. All dimensions are in millimetres unless otherwise stated.
3. All setting out, levels and dimensions to be agreed on site.
4. The dimensions of all materials must be checked on site before being laid out.
5. This drawing must be read with the relevant specification clauses and detail drawings.
6. Order of construction and setting out to be agreed on site.



NOTE:

Proposed Levels are indicative only and subject to change once landscape design proposals have been developed.

KEY

🟥	**Assumed Level 01 Site Boundary**
+34.91	**Existing Site Levels retained**
+34.91	**Proposed Site Levels**
+34.91 (TK)	**Top of Kerb Level**
+34.91 (BK)	**Bottom of Kerb Level**
1:50	**Direction of Fall & Gradient**
Drainage Channel	**Drainage Channel**
▭	**Retaining Wall**
Steps	**Steps** 6 no. of steps - 170mm high
	Seating Steps 3 no. seating (big) steps - 340mm high (can be walked up with big steps, therefor more flexible) can be redesigned to 2 - 510mm high seating steps (better height for seating)
	Mini Hill

Issue	Date	Status	Drawn	Apprvd.

Planit Intelligent Environments LLP

E: info@planit-ie.com
W: planit-ie.com

MANCHESTER
2 Back Grafton St
Altrincham
WA14 1DY
T: 0161 928 9281

LONDON
Unit 6 Waterside
44-48 Wharf Road
London
N1 7UX
T: 0207 253 5678

Client OMA/MCC

Project Factory

Drg Title Proposed Levels - L01 - Lower Ground Floor

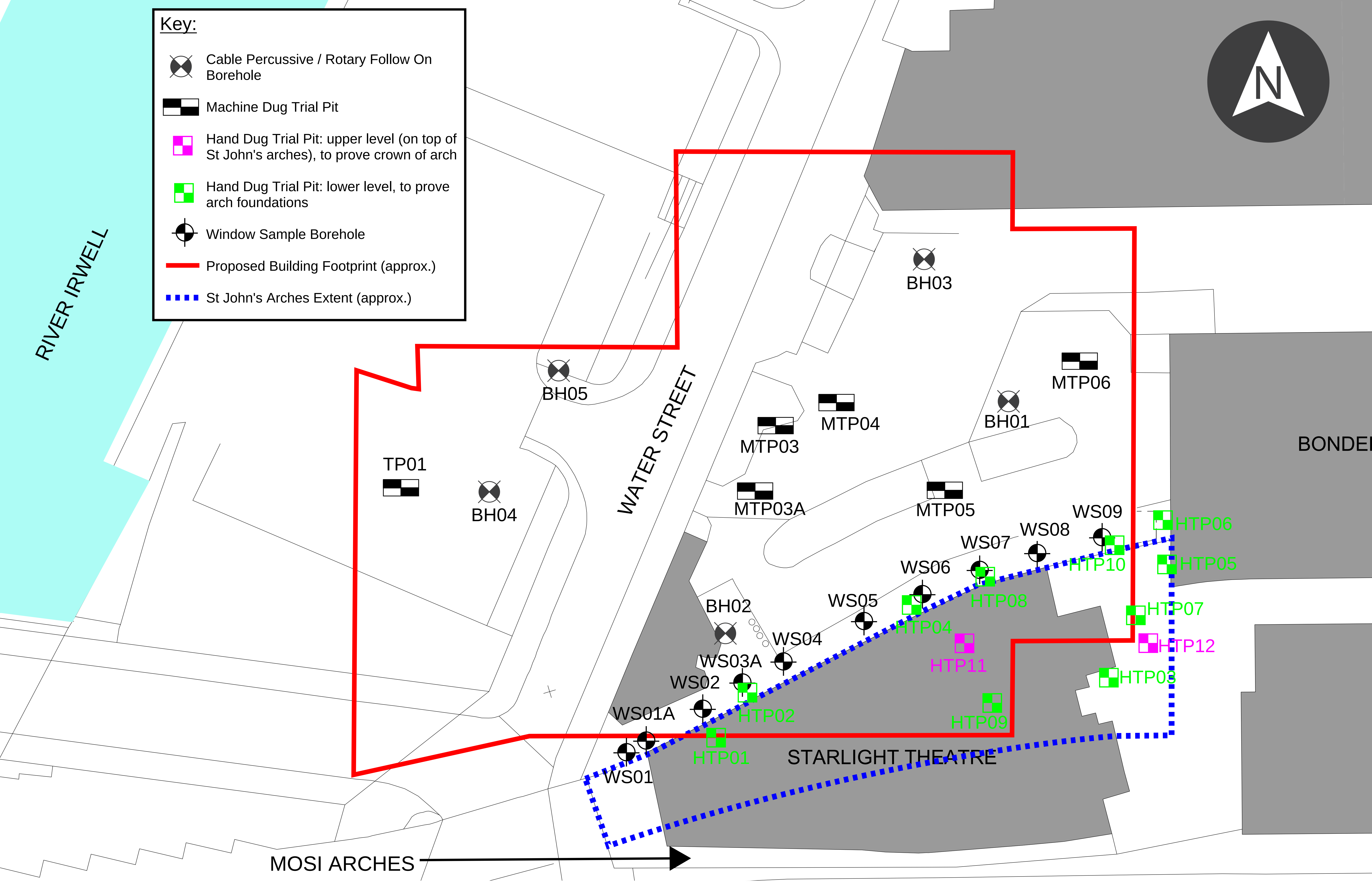
Created on	Created by	Approved by
10.04.18	AS, AM	AM

Scale	Size	Status
1:250	A1	For Comment

Drg No.	Issue No.
PL1803-PLA-L1-DR-L-3003	07

© Planit Intelligent Environments LLP

Enclosure 3


Key:
Cable Percussive / Rotary Follow On Borehole
Machine Dug Trial Pit
Hand Dug Trial Pit: upper level (on top of St John's arches), to prove crown of arch
Hand Dug Trial Pit: lower level, to prove arch foundations
Window Sample Borehole
Proposed Building Footprint (approx.)
St John's Arches Extent (approx.)
N
RIVER IRWELL
WATER STREET
BH03
BH05
BH04
BH01
BH02
TP01
MTP03
MTP03A
MTP04
MTP05
MTP06
BONDE
WS01
WS01A
WS02
WS03A
WS04
WS05
WS06
WS07
WS08
WS09
HTP01
HTP02
HTP03
HTP04
HTP05
HTP06
HTP07
HTP08
HTP09
HTP10
HTP11
HTP12
STARLIGHT THEATRE
MOSI ARCHES

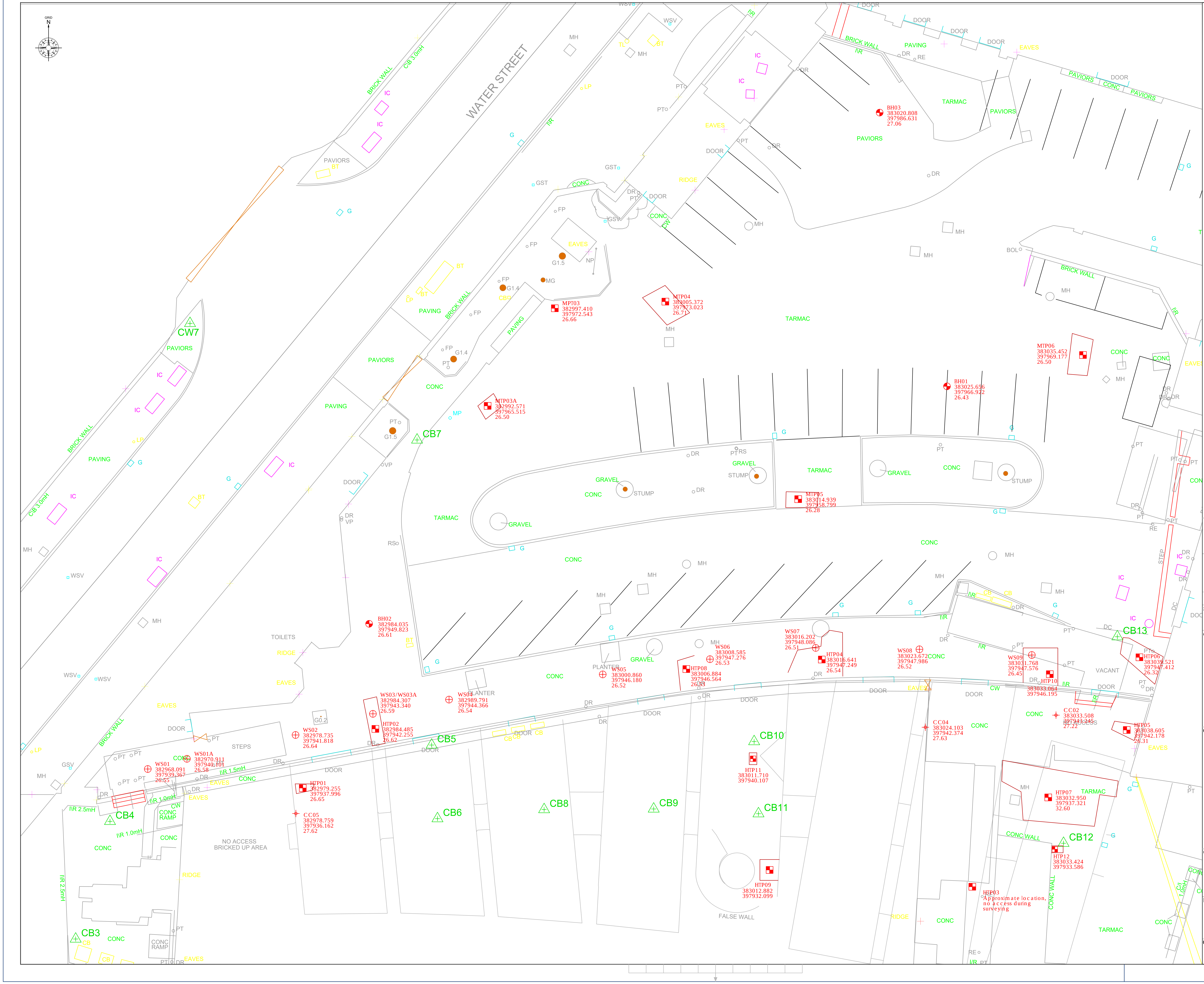
BUROHAPPOLD ENGINEERING

JOB TITLE: Factory Theatre
JOB NUMBER: 034933
DOC NUMBER: MF-BHE-XX-XX-RP-CG-0002

SKETCH NUMBER: Enclosure 3
SKETCH TITLE: Exploratory Hole Location Plan
REVISION NUMBER: 00

DATE: Oct 2018
INITIALS: GM

Copyright © 1976-2018 BuroHappold Engineering. All Rights Reserved.


GRID
N
WATER STREET
BRICK WALL
CB 3.0mH
IC
G
PAVIORS
BT
PAVING
CW7
CB7
CB3
CB4
CB5
CB6
CB8
CB9
CB10
CB11
CB12
CB13
TARMAC
CONC
GRAVEL
STUMP
MH
DR
PT
DOOR
EAVES
RIDGE
TOILETS
STEPS
PLANTER
VACANT
FALSE WALL
NO ACCESS
BRICKED UP AREA
CONC RAMP
CONC WALL
BH01
383025.656
397966.922
26.43
BH02
382984.035
397949.823
26.61
BH03
383020.808
397986.631
27.06
MPT03
382997.410
397972.543
26.66
MTP03A
382992.571
397965.515
26.50
MTP04
383005.372
397973.023
26.71
MTP05
383014.939
397958.799
26.28
MTP06
383035.452
397969.177
26.50
WS01
382968.091
397939.367
26.55
WS01A
382970.911
397940.101
26.58
WS02
382978.735
397941.818
26.64
WS03/WS03A
382984.307
397943.340
26.59
WS04
382989.791
397944.366
26.54
WS05
383000.860
397946.180
26.52
WS06
383008.585
397947.276
26.53
WS07
383016.202
397948.086
26.51
WS08
383023.672
397947.986
26.52
WS09
383031.768
397947.576
26.45
HTP01
382979.255
397937.996
26.65
HTP02
382984.485
397942.255
26.62
HTP03
Approximate location, no access during surveying
HTP04
383016.641
397947.249
26.54
HTP05
383038.605
397942.178
26.31
HTP06
383039.521
397947.412
26.32
HTP07
383032.950
397937.321
32.60
HTP08
383006.884
397946.564
26.53
HTP09
383012.882
397932.099
HTP10
383033.064
397946.195
HTP11
383011.710
397940.107
HTP12
383033.424
397933.586
CC02
383033.508
397943.245
27.22
CC04
383024.103
397942.374
27.63
CC05
382978.759
397936.162
27.62

CONTROL & DATUM INFORMATION

Co-ordinates and levels are based upon OSGB 1936 National Grid (OSGB36) and Ordnance Survey Datum Newlyn (ODN).

They are derived using realtime on site GPS survey, that utilises the National Grid Transformation OSTN15GB and the National Geoid Model OSGM15GB.

The data obtained for use in this drawing involved the use of realtime GPS survey and total station survey.

COODINATES

Ground Investigation Co-ordinates (OSGM15GB-OSTN15GB)

Reference	East	North	Elevation	Description
BH01	383025.656	397966.922	26.43	Borehole
BH02	382984.035	397949.823	26.61	Borehole
BH03	383020.808	397986.631	27.06	Borehole
CC02	383033.508	397943.245	27.22	Wall Core
CC04	383024.103	397942.374	27.63	Wall Core
CC05	382978.759	397936.162	27.62	Wall Core
HTP01	382979.255	397937.996	26.65	Trial Pit
HTP02	382984.485	397942.255	26.62	Trial Pit
HTP03	Unable to suvery			
HTP04	383006.884	397946.564	26.53	Trial Pit
HTP05	383038.605	397942.178	26.31	Trial Pit
HTP06	383039.521	397947.412	26.32	Trial Pit
HTP07	383032.950	397937.321	32.60	Trial Pit
HTP08	383016.641	397947.249	26.54	Trial Pit
HTP09	383012.882	397932.099		
HTP10	383033.064	397946.195		
HTP11	383011.710	397940.107		
HTP12	383033.424	397933.586		
MPT03	382997.410	397972.543	26.66	Trial Pit
MTP03A	382992.571	397965.515	26.50	Trial Pit
MTP04	383005.372	397973.023	26.71	Trial Pit
MTP05	383014.939	397958.799	26.28	Trial Pit
MTP06	383035.452	397969.177	26.50	Trial Pit
WS01	382968.091	397939.367	26.55	Window Sample
WS01A	382970.911	397940.101	26.58	Window Sample
WS02	382978.735	397941.818	26.64	Window Sample
WS03/WS03A	382984.307	397943.340	26.59	Window Sample
WS04	382989.791	397944.366	26.54	Window Sample
WS05	383000.860	397946.180	26.52	Window Sample
WS06	383008.585	397947.276	26.53	Window Sample
WS07	383016.202	397948.086	26.51	Window Sample
WS08	383023.672	397947.986	26.52	Window Sample
WS09	383031.768	397947.576	26.45	Window Sample

LEGEND TO SYMBOLS

◕	Denotes Borehole Location
▣	Denotes Trial Pit Location
⌖	Denotes Wall Core Location
⊕	Denotes Window Sample Location

Scale: 1:125

0 12.5m 25 50 75 100

Rev.	Drawn	Date	Checked	Approved	Details
R1	BS	JAN 2018	MS	MS	Issued

Survey Date: -

Surveyor: SOCOTEC

Drawn By: BS

Client:

MANCHESTER CITY COUNCIL

Contractor:

SOCOTEC

Infrastructure & Energy
Askern Road, Carcroft
Doncaster DN6 8DG
United Kingdom

www.socotec.co.uk
Tel: +44(0)01302 723456

Contract:

THE FACTORY
MANCHESTER

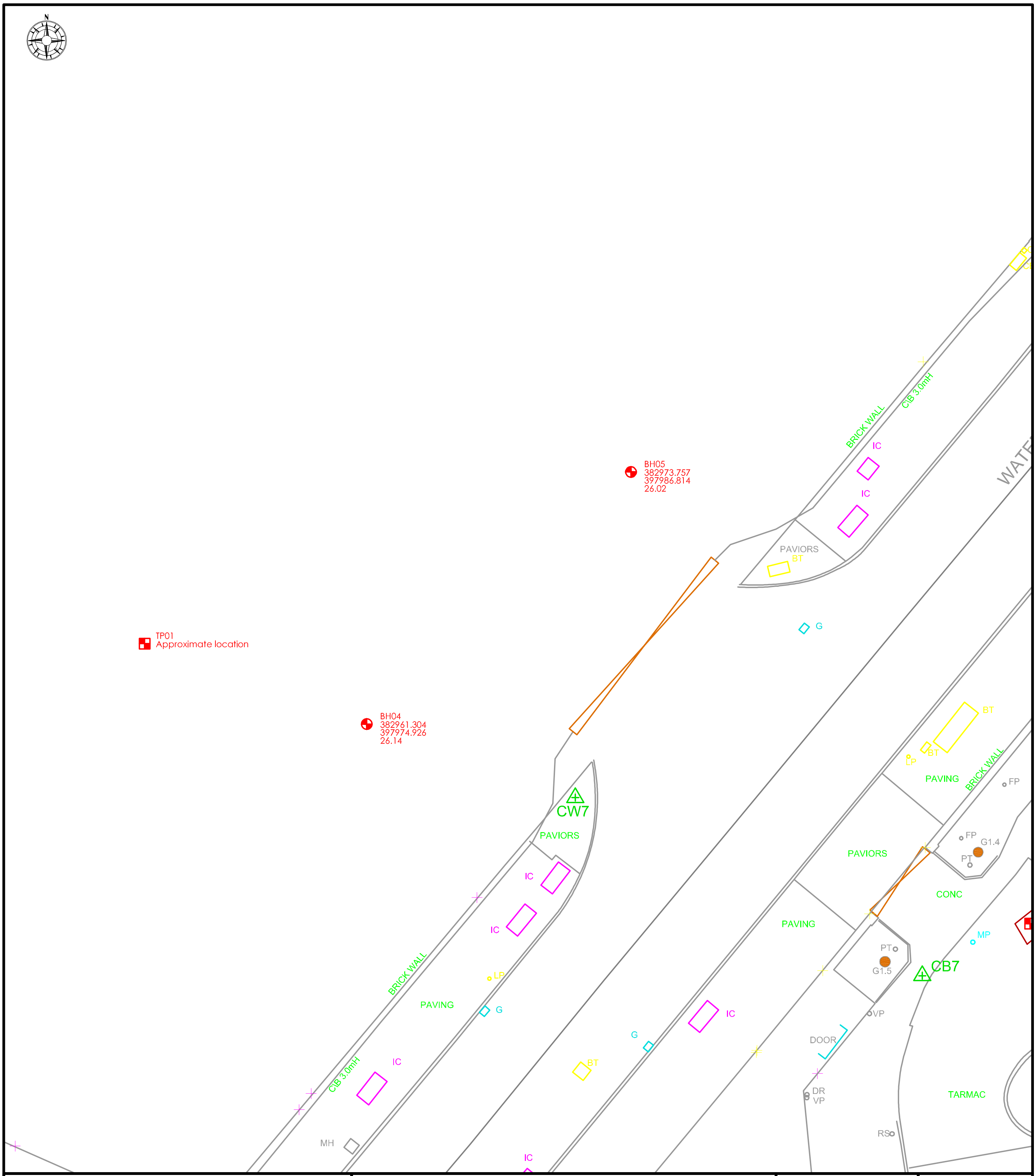
DWG:

SITE PLAN
A7064-17

Original Sheet Size: A1

Scale: Horiz.1:125
Vert.:

Rev.: R1


N
BH05
382973.757
397986.814
26.02
TP01
Approximate location
BH04
382961.304
397974.926
26.14
BRICK WALL
CIB 3.0mH
IC
IC
WATE
PAVIORS
BT
G
BT
BT
LP
PAVING
BRICK WALL
FP
FP
G1.4
PT
PAVIORS
CONC
MP
PAVING
PT
G1.5
CB7
CW7
PAVIORS
IC
IC
LP
BRICK WALL
PAVING
G
IC
CIB 3.0mH
G
BT
IC
VP
DOOR
DR
VP
TARMAC
RS
MH
IC

LEGEND TO SYMBOLS

⊕ Borehole Location

Scale: 1:250

0 12.5m 25 37.5 50 62.5

Title
SITE PLAN

Project
THE FACTORY ADDITIONAL GI

Client
Buro Happold Limited

Date
15/03/17

Drawn By
AW

Scale
1:250

Approv. By
TC

Sheet Size
A4

Project No
A6136-17

Figure No
A2

Rev
0

BUROHAPPOLD
ENGINEERING

Enclosure 4

BUROHAPPOLD
ENGINEERING

Project: Factory Theatre
Project Number: 034933
Date: Oct-2018

Asbestos

Asbestos Screen	No. Samples	No. samples detected	No. samples ND	% of samples detect
	20	0	20	0.00
Asbestos Quantification	No. Quants	No. samples <0.001%	No. samples >0.001% <0.01%	No. samples >0.01%
	0	0	0	0

Soil Results Summary

Number of samples exceeding	Residential with Uptake	12
	Residential without Uptake	11
	Commercial	0

Human Health

Soil Organic Matter 1%
N/A = no screening criteria available

					No. samples exceeding							
		Residential with uptake	Residential without Uptake	Commercial	Residential with uptake	Residential without Uptake	Commercial	No Tests	No <LOD	Min	Max	Location of Maximum
Cyanide	mg/kg	4.6	760	16000				20	13	0.50	1.50	HTP12 0.8mbgl
Arsenic	mg/kg	37	40	640	1	1		20		1.90	49.00	HTP11 1mbgl
Barium	mg/kg	N/A	N/A	N/A								
Beryllium	mg/kg	1.7	1.7	12								
Boron	mg/kg	290	11000	240000				20	2	0.50	2.00	MTP03 0.9mbgl
Cadmium	mg/kg	26	149	410				20	3	0.21	1.15	HTP11 1mbgl
Chromium	mg/kg	910	910	8600				20		7.96	45.00	MTP04 0.5mbgl
Chromium VI	mg/kg	21	21	49				14		0.30	0.30	MTP05 2.5mbgl
Copper	mg/kg	2400	7100	68000				20		8.00	735.10	HTP11 1mbgl
Lead	mg/kg	200	310	2330	6	3		20		17.30	577.20	HTP12 0.8mbgl
Mercury (elemental)	mg/kg	1.2	1.2	58	1	1		14	9	0.33	1.92	HTP12 0.8mbgl
Mercury (inorganic)	mg/kg	40	56	58				6		0.50	0.52	BH05 1mbgl
Nickel	mg/kg	130	180	980				20		7.05	52.20	MTP04 0.5mbgl
Selenium	mg/kg	250	430	12000				20	3	0.50	1.10	MTP03 0.5mbgl
Vanadium	mg/kg	410	1200	9000								
Zinc	mg/kg	3700	40000	730000				20		38.61	358.10	WS9 2mbgl
TPH	mg/kg	490	490	38000	7	7		20		15.00	1920.00	HTP11 1mbgl
Benzene	mg/kg	0.087	0.38	27				19	19			
Toluene	mg/kg	130	869	869				19	19			
Ethyl Benzene	mg/kg	47	83	518				19	18	0.01	0.01	MTP05 2.5mbgl
m/p Xylenes	mg/kg	56	79	576				19	18	0.06	0.06	MTP05 2.5mbgl
o Xylenes	mg/kg	60	88	478				19	19			
Xylenes	mg/kg	56	79	576				17	17			
MTBE	mg/kg	N/A	N/A	N/A				20	20			
Naphthalene	mg/kg	2.3	2.3	190	2	2		20	7	0.09	3.78	WS9 2mbgl
Acenaphthylene	mg/kg	170	2900	83000				20	10	0.08	1.43	MTP03 0.5mbgl
Acenaphthene	mg/kg	210	3000	84000				20	6	0.09	6.20	HTP11 1mbgl
Fluorene	mg/kg	170	2800	63000				20	7	0.09	4.06	MTP03 0.5mbgl
Phenanthrene	mg/kg	95	1300	22000				20	3	0.10	33.50	HTP11 1mbgl
Anthracene	mg/kg	2400	31000	520000				20	3	0.09	8.57	HTP11 1mbgl
Fluoranthene	mg/kg	280	1500	23000				20	2	0.10	52.60	HTP11 1mbgl
Pyrene	mg/kg	620	3700	54000				20	2	0.10	45.90	HTP11 1mbgl
Benzo[a]anthracene	mg/kg	7.2	11	170	2	2		20	6	0.09	27.70	HTP11 1mbgl
Chrysene	mg/kg	15	30	350	1			20	6	0.09	22.90	HTP11 1mbgl
Benzo[b]fluoranthene	mg/kg	2.6	3.9	44	6	5		20	4	0.10	25.70	HTP11 1mbgl
Benzo[k]fluoranthene	mg/kg	77	110	1200				20	5	0.09	8.57	HTP11 1mbgl
Benzo[a]pyrene	mg/kg	2.2	3.2	35	6	5		20	5	0.09	23.00	HTP11 1mbgl
Indeno[123-cd]pyrene	mg/kg	27	45	500				20	5	0.09	16.60	HTP11 1mbgl
Dibenzo[ah]anthracene	mg/kg	0.24	0.31	3.5	6	6		20	7	0.09	3.10	HTP11 1mbgl
Benzo[ghi]perylene	mg/kg	320	360	3900				20	5	0.09	10.80	HTP11 1mbgl
Total USEPA 16 PAHs	mg/kg	N/A	N/A	N/A				20	10	1.57	287.82	HTP11 1mbgl
Aliphatic C5 - C7	mg/kg	42	42	3200				2	2			
Aliphatic C7 - C8	mg/kg	100	100	7800				2	2			
Aliphatic C8 - C10	mg/kg	27	27	2000	1	1		14	6	1.20	29.20	WS9 3.3mbgl
Aliphatic C10 - C12	mg/kg	130	130	9700				14	7	2.00	67.20	WS9 3.3mbgl
Aliphatic C12 - C16	mg/kg	1100	1100	59000				14	4	2.00	199.00	WS9 3.3mbgl
Aliphatic C16 - C21	mg/kg	65000	65000	1600000				14	3	2.49	108.80	WS9 3.3mbgl
Aliphatic C21 - C35	mg/kg	65000	64000	1600000				14	2	11.20	396.00	BH04 0.2mbgl
Total Aliphatic	mg/kg	N/A	N/A	N/A				8	3	102.00	496.00	WS9 3.3mbgl
Aromatic C5 - C7	mg/kg	70	370	26000								
Aromatic C7 - C8	mg/kg	130	860	56000								
Aromatic C8 - C10	mg/kg	34	47	3500				8	8			
Aromatic C10 - C12	mg/kg	74	250	16000				8	7	5.74	5.74	WS9 2mbgl
Aromatic C12 - C16	mg/kg	140	1800	36000				8	3	7.90	23.40	WS9 3.3mbgl
Aromatic C16 - C21	mg/kg	260	1900	28000				8	3	13.00	136.00	MTP05 1mbgl
Aromatic C21 - C35	mg/kg	1100	1900	28000				8	3	25.00	286.00	MTP05 1mbgl
Total Aromatic	mg/kg	1100	1900	28000				8	3	89.50	443.00	MTP05 1mbgl
Total Aliphatic and Aromatic	mg/kg	490	490	38000	7	7		20		15.00	1920.00	HTP11 1mbgl

calculated SOM 8.178
SOM used for threshold 1%
Project: Factory Theatre
Project Number 034933
Date: Oct-2018

N/A = no screening criteria available

Screening criteria: **C4SL**/S4UL

		Residential with	Residential with	Commercial
Cyanide	mg/kg	4.6	760	16000
Arsenic	mg/kg	**37**	**40**	**640**
Barium	mg/kg	*N/A*	*N/A*	*N/A*
Beryllium	mg/kg	1.7	1.7	12
Boron	mg/kg	290	11000	240000
Cadmium	mg/kg	**26**	**149**	**410**
Chromium	mg/kg	910	910	8600
Chromium VI	mg/kg	**21**	**21**	**49**
Copper	mg/kg	2400	7100	68000
Lead	mg/kg	**200**	**310**	**2330**
Mercury (elemental)	mg/kg	1.2	1.2	58
Mercury (inorganic)	mg/kg	40	56	58
Nickel	mg/kg	130	180	980
Selenium	mg/kg	250	430	12000
Vanadium	mg/kg	410	1200	9000
Zinc	mg/kg	3700	40000	730000
TPH	mg/kg	490	490	38000
Benzene	mg/kg	0.087	0.38	27
Toluene	mg/kg	130	869	869
Ethyl Benzene	mg/kg	47	83	518
m/p Xylenes	mg/kg	56	79	576
o Xylenes	mg/kg	60	88	478
Xylenes	mg/kg	56	79	576
MTBE	mg/kg	*N/A*	*N/A*	*N/A*
Naphthalene	mg/kg	2.3	2.3	190
Acenaphthylene	mg/kg	170	2900	83000
Acenaphthene	mg/kg	210	3000	84000
Fluorene	mg/kg	170	2800	63000
Phenanthrene	mg/kg	95	1300	22000
Anthracene	mg/kg	2400	31000	520000
Fluoranthene	mg/kg	280	1500	23000
Pyrene	mg/kg	620	3700	54000
Benzo[a]anthracene	mg/kg	7.2	11	170
Chrysene	mg/kg	15	30	350
Benzo[b]fluoranthene	mg/kg	2.6	3.9	44
Benzo[k]fluoranthene	mg/kg	77	110	1200
Benzo[a]pyrene	mg/kg	2.2	3.2	35
Indeno[123-cd]pyrene	mg/kg	27	45	500
Dibenzo[ah]anthracene	mg/kg	0.24	0.31	3.5
Benzo[ghi]perylene	mg/kg	320	360	3900
Total USEPA 16 PAHs	mg/kg	*N/A*	*N/A*	*N/A*
Aliphatic C5 - C7	mg/kg	42	42	3200
Aliphatic C7 - C8	mg/kg	100	100	7800
Aliphatic C8 - C10	mg/kg	27	27	2000
Aliphatic C10 - C12	mg/kg	130	130	9700
Aliphatic C12 - C16	mg/kg	1100	1100	59000
Aliphatic C16 - C21	mg/kg	65000	65000	1600000
Aliphatic C21 - C35	mg/kg	65000	64000	1600000
Total Aliphatic	mg/kg	*N/A*	*N/A*	*N/A*
Aromatic C5 - C7	mg/kg	70	370	26000
Aromatic C7 - C8	mg/kg	130	860	56000
Aromatic C8 - C10	mg/kg	34	47	3500
Aromatic C10 - C12	mg/kg	74	250	16000
Aromatic C12 - C16	mg/kg	140	1800	36000
Aromatic C16 - C21	mg/kg	260	1900	28000
Aromatic C21 - C35	mg/kg	1100	1900	28000
Total Aromatic	mg/kg	1100	1900	28000
Total Aliphatic and Aromatic	mg/kg	490	490	38000

	MG / NG	MG	NG	MG	MG	MG	MG	MG	MG	MG	NG	MG	NG	MG	MG	MG	MG	MG	MG	MG	MG
	Sample ID	MTP05	MTP05	MTP03	MTP03	MTP04	BH01	WS1	WS6	WS7	WS8	WS9	WS9	HTP12	HTP11	BH04	BH04	BH05	BH05	TP01	TP01
	Depth	1	2.5	.5	.9	.5	2.1	.5	.5	1.1	1.2	2	3.3	.8	1	.2	1	1	3		.8
	Units																				
pH	pH units	7.6	7.6	8.6	8.5	8.7	8.5	11.8	11.1	9.3	8.3	7.7	7.8	8.5	8.1	8.8	8.4	8.6	8.6	9.8	8.8
SOM	%	8.59	1.24	21.8	14.9	17	25.9	0.72	0.31	2.44	2.58	4	0.9	25.9	25.2	1.75	1.41	5.41	0.64	2.2	0.67
Moisture	%	23.3	15.6	9.4	17.9	22.8	16.1	15.4	9.9	3.1	22.5	24.8	8.3	21.9	12.8	5.6	19	22.1	12.1	6.2	22
TOC	%	4.98	0.72	12.7	8.7	9.8	15	0.42	0.18	1.41	1.5	2.32	0.53	15	14.6	1.01	0.82	3.14	0.37	1.28	0.39
Asbestos Screen	D/ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Asbestos Quantification	%																				
Cyanide	mg/kg	<0.7	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.5	<0.6	<0.7	<0.6	1.5	<0.5	0.53	0.6	0.6	0.57	0.5	0.6
Arsenic	mg/kg	13	8.1	24.4	28.5	29.8	15	2.5	1.9	6.3	9.7	12.5	9.8	31.8	49	3	6.8	14.8	4.72	4.3	11.6
Barium	mg/kg																				
Beryllium	mg/kg																				
Boron	mg/kg	1.4	1.2	0.8	2	0.9	1.4	0.5	<0.5	<0.5	0.8	1	0.6	1.5	1.4	0.51	0.5	0.5	0.51	0.5	0.5
Cadmium	mg/kg	<0.21	<0.2	0.84	0.24	0.48	0.77	0.74	0.44	0.53	<0.2	0.89	0.22	0.42	1.15	0.582	0.21	0.4	0.205	0.54	0.25
Chromium	mg/kg	19.4	19.2	18	19.4	45	14.8	20.4	22.1	11.8	24.4	28.1	22.3	18.2	18.2	7.96	16	13	19.1	12.6	16.3
Chromium VI	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
Copper	mg/kg	124.8	27	133.4	68.4	108.4	69	10.1	8	38.9	29	130.4	24.7	249	735.1	15	16.9	44	15.81	26.1	18.1
Lead	mg/kg	127	24.9	253.8	169.1	267.7	178.1	39	21.3	99	318	359.7	32.4	577.2	235.1	187.59	39.7	140.4	20	40.4	17.3
Mercury (elemental)	mg/kg	<0.53	<0.53	0.65	0.64	0.73	<0.50	<0.5	<0.5	<0.5	<0.5	<0.53	<0.5	1.92	0.33						
Mercury (inorganic)	mg/kg															0.51	0.5	0.52	0.51	0.5	0.5
Nickel	mg/kg	23.9	15.4	42.1	33	52.2	32.5	16.7	18.3	9.6	15.3	23.5	25.3	36.4	46	7.05	10.9	17.5	19.1	12.4	16
Selenium	mg/kg	0.8	1	1.1	1	1	1.1	<0.5	<0.5	0.7	0.8	0.8	<0.5	0.6	1	0.51	0.5	0.6	0.51	0.5	0.7
Vanadium	mg/kg																				
Zinc	mg/kg	80	43	219.6	89.4	167.5	293.7	57	41.9	160.5	77.9	358.1	61.7	177	340.4	42.38	46.9	72.4	38.61	43.8	77.6
TPH	mg/kg	915	704	1140	74	109	411	22	16	513	15	315	561	387	1920	576	20	58	40	339	17
Benzene	mg/kg	<0.013	<0.013	<0.011	<0.012	<0.013	<0.012	<0.012	<0.011	<0.01	<0.013	<0.013		<10	<10	<0.011	<0.012	<0.013	<0.011	<0.011	<0.013
Toluene	mg/kg	<0.013	<0.013	<0.011	<0.012	<0.013	<0.012	<0.012	<0.011	<0.01	<0.013	<0.013		<10	<10	<0.011	<0.012	<0.013	<0.011	<0.011	<0.013
Ethyl Benzene	mg/kg	<0.013	0.01	<0.011	<0.012	<0.013	<0.012	<0.012	<0.011	<0.01	<0.013	<0.013		<10	<10	<0.011	<0.012	<0.013	<0.011	<0.011	<0.013
m/p Xylenes	mg/kg	<0.013	0.057	<0.023	<0.024	<0.026	<0.024	<0.024	<0.022	<0.021	<0.026	<0.027		<20	<20	<0.021	<0.025	<0.026	<0.023	<0.021	<0.026
o Xylenes	mg/kg	<0.013	<0.013	<0.011	<0.012	<0.013	<0.012	<0.012	<0.011	<0.01	<0.013	<0.013		<10	<10	<0.011	<0.012	<0.013	<0.011	<0.011	<0.013
Xylenes	mg/kg			<0.034	<0.037	<0.039	<0.036	<0.035	<0.033	<0.031	<0.039	<0.04		<30	<30	<0.032	<0.037	<0.039	<0.034	<0.032	<0.038
MTBE	mg/kg	<0.026	<0.025	<0.023	<0.024	<0.026	<0.024	<0.024	<0.022	<0.021	<0.026	<0.027	<0.022	<20	<20	<0.021	<0.025	<0.026	<0.023	<0.021	<0.026
Naphthalene	mg/kg	0.22	<0.10	2.81	<0.10	<0.10	<0.10	<0.09	<0.09	0.7	<0.10	3.78	0.36	1.11	0.87	1.29	0.1	0.1	0.09	1.51	0.1
Acenaphthylene	mg/kg	<0.10	<0.10	1.43	<0.10	<0.10	<0.10	<0.09	<0.09	0.12	<0.10	<0.11	<0.09	0.43	0.32	0.08	0.1	0.1	0.09	0.09	0.1
Acenaphthene	mg/kg	1.51	1.4	2.59	<0.10	<0.10	<0.10	<0.09	<0.09	1.31	<0.10	0.15	1.62	0.74	6.2	1.37	0.1	0.1	0.09	1.34	0.1
Fluorene	mg/kg	1.92	1	4.06	<0.10	<0.10	<0.10	<0.09	<0.09	1.5	<0.10	<0.11	0.41	0.82	3.58	1.21	0.1	0.1	0.09	1.06	0.1
Phenanthrene	mg/kg	10.9	5.38	29.6	0.3	0.58	1.11	<0.09	<0.09	11.2	<0.10	1.81	0.53	8.29	33.5	7.87	0.1	0.19	0.13	7.47	0.1
Anthracene	mg/kg	0.8	0.68	7.21	0.11	0.19	0.3	<0.09	<0.09	2.78	<0.10	0.43	0.38	2.01	8.57	2.55	0.1	0.1	0.09	1.74	0.1
Fluoranthene	mg/kg	4.26	2.75	24.2	0.76	0.87	1.13	<0.09	<0.09	9.93	0.1	1.22	1.81	9.44	52.6	8.39	0.1	0.3	0.13	6.71	0.1
Pyrene	mg/kg	2.82	2.08	24.5	1.01	1.05	1.3	<0.09	<0.09	9.55	0.1	1.14	3.16	9.68	45.9	7.87	0.1	0.28	0.13	6.2	0.1
Benzo[a]anthracene	mg/kg	<0.10	0.37	12.7	0.6	0.8	<0.10	<0.09	<0.09	5.31	<0.10	0.65	<0.09	5.68	27.7	3.67	0.1	0.17	0.09	2.91	0.1
Chrysene	mg/kg	<0.10	0.28	9.9	0.54	0.71	<0.10	<0.09	<0.09	4.53	<0.10	0.6	<0.09	4.4	22.9	4.05	0.1	0.18	0.09	3.25	0.1
Benzo[b]fluoranthene	mg/kg	0.12	<0.10	12.3	0.82	1.2	1.13	<0.09	<0.09	4.94	<0.10	0.9	0.26	5.1	25.7	4.06	0.1	0.21	0.1	3.06	0.1
Benzo[k]fluoranthene	mg/kg	<0.10	<0.10	3.62	0.35	0.49	0.43	<0.09	<0.09	1.52	<0.10	0.36	0.1	1.76	8.57	1.61	0.1	0.1	0.09	1.11	0.1
Benzo[a]pyrene	mg/kg	<0.10	<0.10	10.4	0.76	1.05	0.97	<0.09	<0.09	4.5	<0.10	0.85	0.21	5.35	23	3.65	0.1	0.17	0.09	2.62	0.1
Indeno[123-cd]pyrene	mg/kg	<0.10	<0.10	7.1	0.6	0.9	0.77	<0.09	<0.09	3.04	<0.10	0.92	0.1	2.98	16.6	2.57	0.1	0.1	0.09	1.73	0.1
Dibenzo[ah]anthracene	mg/kg	<0.10	<0.10	1.68	<0.10	0.16	0.17	<0.09	<0.09	0.73	<0.10	0.15	<0.09	0.64	3.1	0.58	0.1	0.1	0.09	0.41	0.1
Benzo[ghi]perylene	mg/kg	<0.10	<0.10	5.58	0.52	0.88	0.7	<0.09	<0.09	2.4	<0.10	0.92	0.1	2.15	10.8	2.2	0.1	0.12	0.09	1.57	0.1
Total USEPA 16 PAHs	mg/kg	<23.38	<14.76	159.67	<6.86	<9.27	<8.59	<1.51	<1.42	64.12	<1.70	<14.08	<9.42	60.15	287.82	53.05	1.58	2.41	1.57	42.8	1.64
Aliphatic C5 - C7	mg/kg	<0.3	<0.3																		
Aliphatic C7 - C8	mg/kg	<0.3	<0.3																		
Aliphatic C8 - C10	mg/kg	<5	1.2					<5	<4	<4	<5.21	<5	29.2			2	2	3	2	2	3
Aliphatic C10 - C12	mg/kg	<5	<5					<5	<4	<4	<5.21	<5	67.2			3.13	2	3	2	3.25	3
Aliphatic C12 - C16	mg/kg	27.2	29					<5	<4	10	<5.21	<5	199			21	2	4.44	2	17.5	3
Aliphatic C16 - C21	mg/kg	104.7	107.5					<5	<4	23	<5.21	31	108.8			77.1	2.49	14	5.42	66	3
Aliphatic C21 - C35	mg/kg	233	157					11.2	<9.72	88.2	<11.42	68.4	88.9			396	14.6	35.7	30.4	232	11.8
Total Aliphatic	mg/kg	369	297					<24	<22	128	<26.1	102	496								
Aromatic C5 - C7	mg/kg																				
Aromatic C7 - C8	mg/kg																				
Aromatic C8 - C10	mg/kg	<5	<5					<5	<4	<4	<5	<5	<4								
Aromatic C10 - C12	mg/kg	<5	<5					<5	<4	<4	<5	5.74	<4								
Aromatic C12 - C16	mg/kg	15.4	15.7					<5	<4	19.7	<5	7.9	23.4								
Aromatic C16 - C21	mg/kg	136	112.9					<5	<4	86.5	<5	13	44.5								
Aromatic C21 - C35	mg/kg	286	169					<10.35	<9.72	207	<11.30	62	25								
Total Aromatic	mg/kg	443	304					<24	<22	327	<26	89.5	94.5								
Total Aliphatic and Aromatic	mg/kg	915	704	1140	74	109	411	22	16	513	15	315	561	387	1920	576	20	58	40	339	17

Enclosure 5

The Factory, Manchester : Groundwater contamination testing results assessment

		Sample Identity	BH01	BH05	Minimum values	Maximum values	UK Drinking Water Standards (The Water Supply (Water Quality) Regulations 2000	Other Thresholds
		Depth	3.00	3.15				
		Sample Type	**WATER**	**WATER**				
		Sampling Date	**28/07/16**	**02/02/17**				
Determinand	**Method**	**Units**						
Metals								
Arsenic		µg/l	<1	1	1	1	10	50 (1)
Cadmium		µg/l	0.1	<0.1	0.1	0.1	5	-
Chromium		µg/l	<1	9	9	9	50	5 (1)
Copper		µg/l	9	3	3	9	2000	1 (1)
Lead		µg/l	4	<1	4	4	25	4 (1)
Mercury		µg/l	<0.1	0.6	0.6	0.6	1	1 (1)
Nickel		µg/l	3	12	3	12	20	50 (1)
Selenium		µg/l	<1	2	2	2	10	-
Zinc		µg/l	22	3	3	22	3000 **	8 (1)
Barium		µg/l					100 **	-
Antimony		µg/l	<1	1	1	1	5	-
Molybdenum		µg/l					-	-
Boron (w)		µg/l	20	20	20	20	1000	2000 (1)
Other Determinands								
Sulphate as SO4		µg/l	23100	56000	23100	56000	250000	400000 *
Phenol Index		µg/l	<0.5	0.9	0.9	0.9	1 **	30 *
pH (pH Units)		pH units	7.2	7.4	7.2	7.4	-	6<pH<9 (1)
Cyanide (total) (w)		µg/l	<20	<20			50	-
Sulphide (w)		µg/l	<20	<0.02			-	-
Petroluem Hydrocarbons								
TPH (C10-C40)		µg/l	590	14000	590	14000	-	-
Polycyclic Aromatic Hydrocarbons								
Naphthalene		µg/l	<0.02	<0.400	0	0	-	10 (1)
Acenapthylene		µg/l	<0.01	<0.200	0	0	-	-
Acenapthene		µg/l	0.057	<0.200	0.057	0.057	-	-
Fluorene		µg/l	0.019	<0.200	0.019	0.019	-	-
Phenanthrene		µg/l	0.155	<0.200	0.155	0.155	-	-
Anthracene		µg/l	0.032	<0.200	0.032	0.032	-	-
Fluoranthene		µg/l	0.334	<0.200	0.334	0.334	-	-
Pyrene		µg/l	0.326	<0.200	0.326	0.326	-	-
Benzo [a] anthracene		µg/l	0.164	<0.200	0.164	0.164	-	-
Chrysene		µg/l	0.225	<0.200	0.225	0.225	-	-
Benzo [a] pyrene		µg/l	0.178	<0.200	0.178	0.178	0.01	-
Dibenzo [ah] anthracene		µg/l	0.033	<0.200	0.033	0.033	-	-
Benzo [b] fluoranthene		µg/l	0.243	<0.200	0.243	0.243	-	-
Benzo [k] fluoranthene		µg/l	0.086	<0.200	0.086	0.086	-	-
Indeno [123-cd] pyrene		µg/l	0.137	<0.200	0.137	0.137	-	-
Benzo [ghi] perylene		µg/l	0.13	<0.200	0.13	0.13	-	-
Total PAH		µg/l	<2.149	<3.400	0	0	-	10 (1)
Classification Tests								
Total Dissolved Solids		mg/l			0	0	-	400000 (2)
Dissolved Organic Carbon		mg/l	11	65	11	65	-	50000 (2)
Conductivity (µS/cm)		µS/cm	249	500	249	500	2500	-
Chloride		mg/l	10	42	10	42	250	-
Fluoride		mg/l	0.1	0.4	0.1	0.4	1.5	-

🟩 Between criteria - No further consideration

GENERAL NOTES:
(1) Freshwater Environmental Quality Standard. For hardness-related determinands, worse-case hardness band adopted 0 - 50 mg/l CaCO3
(2) Based on Environment Agency 'Guidance on Sampling and Testing of Wastes to meet Landfill Acceptance Procedures' (2005, version 1) Inert waste criteria.
*EA non-statutory
(operational)
**From The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (DW-1)

Project name	**The Factory, Manchester**
Report title	**Land Contamination Summary and Outline Remediation Strategy**
Table title	**Contamination End Use Assessment - Groundwater results**
Date: October 2018	**Job No: 034933**

BUROHAPPOLD
ENGINEERING

The Factory, Manchester : Leachate contamination testing results assessment

		Sample Identity	MTP03	MTP05	WS09	HTP 12	HTP11	BH04	BH04	BH05	BH05	TP01	TP01	Minimum values	Maximum values	UK Drinking Water Standards (The Water Supply (Water Quality) Regulations 2000	Other Thresholds
		Depth	0.50	1.00	3.30	0.80	1.00	0.20	1.00	1.00	3.00	0.00	0.80				
		Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL				
		Material	MG	MG	SAND	MG	MG	MG	MG	MG	MG	MG	MG				
Determinand	**Method**	**Units**															
Metals																	
Arsenic		µg/l	5	3	<1	4	2	1	1	1	1	1	1	1	5	10	50 (1)
Cadmium		µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	5	-
Chromium		µg/l	12	1	<1	<1	<1	6	1	1	1	9	1	1	12	50	5 (1)
Copper		µg/l	7	15	30	13	3	15	5	2	3	8	2	2	30	2000	1 (1)
Lead		µg/l	1	11	<1	18	<1	1	3	2	1	1	1	1	18	25	4 (1)
Mercury		µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	1 (1)
Nickel		µg/l	<1	1	<1	1	1	1	1	1	1	2	5	1	5	20	50 (1)
Selenium		µg/l	1	1	<1	1	<1	2	1	1	1	2	1	1	2	10	-
Zinc		µg/l	34	107	66	12	4	4	61	43	24	9	90	4	107	3000 **	8 (1)
Barium		µg/l	130	170	130	20	20	50	70	70	60	60	<10	20	170	100 **	-
Antimony		µg/l	13	2	1	1	4	<1	<1	<1	<1	<1	<1	1	13	5	-
Molybdenum		µg/l	70	6	4	16	11	60	1	38	29	65	1	1	70	-	-
Boron (w)		µg/l														1000	2000 (1)
Other Determinands																	
Sulphate as SO4		mg/l	77.3	78.9	542	73	134	62	34	14	12	67	16	12	542	250	400 *
Phenol Index		mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.28	<0.05	0.28	0.28	1 **	30 *
pH (pH Units)		pH units	7.8	7.7	7.6	7.5	7.4	9.3	7.8	7.6	7.6	10.4	7.9	7.4	10.4	-	6<pH<9 (1)
Cyanide (total) (w)		µg/l														50	-
Sulphide (w)		µg/l														-	-
Petroluem Hydrocarbons																	
TPH (C10-C40)		µg/l	30	250										30	250	-	-
Polycyclic Aromatic Hydrocarbons																	
Naphthalene		µg/l	0.051	<0.02										0.051	0.051	-	10 (1)
Acenapthylene		µg/l	<0.01	0.127										0.127	0.127	-	-
Acenapthene		µg/l	0.036	0.322										0.036	0.322	-	-
Fluorene		µg/l	<0.01	0.027										0.027	0.027	-	-
Phenanthrene		µg/l	0.035	0.062										0.035	0.062	-	-
Anthracene		µg/l	<0.01	0.06										0.06	0.06	-	-
Fluoranthene		µg/l	0.024	0.273										0.024	0.273	-	-
Pyrene		µg/l	0.018	0.16										0.018	0.16	-	-
Benzo [a] anthracene		µg/l	0.017	0.055										0.017	0.055	-	-
Chrysene		µg/l	<0.01	0.045										0.045	0.045	-	-
Benzo [a] pyrene		µg/l	0.01	0.014										0.01	0.014	0.01	-
Dibenzo [ah] anthracene		µg/l	0.01	<0.01										0.01	0.01	-	-
Benzo [b] fluoranthene		µg/l	0.015	0.025										0.015	0.025	-	-
Benzo [k] fluoranthene		µg/l	<0.01	<0.01										0	0	-	-
Indeno [123-cd] pyrene		µg/l	0.01	<0.01										0.01	0.01	-	-
Benzo [ghi] perylene		µg/l	0.014	<0.01										0.014	0.014	-	-
Total PAH		µg/l	<0.29	<1.23										0	0	-	10 (1)
Classification Tests																	
Total Dissolved Solids		mg/l	306	367	787	308	415	200	300	300	300	300	200	200	787	-	400000 (2)
Dissolved Organic Carbon		mg/l	9.9	22	10	2.5	2.8	12	20	4.9	4.8	6.7	6.4	2.5	22	-	50000 (2)
Conductivity (µS/cm)		µS/cm	392	471	1010	395	532	300	400	300	300	400	300	300	1010	2500	-
Chloride		mg/l	8	32	26	5	6	14	9	32	33	40	5	5	40	250	-
Fluoride		mg/l	2	0.4	0.5	0.5	0.7	0.4	0.1	0.7	0.7	0.3	0.1	0.1	2	1.5	-

Between criteria - No further consideration

GENERAL NOTES:
(1) Freshwater Environmental Quality Standard. For hardness-related determinands, worse-case hardness band adopted 0 - 50 mg/l CaCO3
(2) Based on Environment Agency 'Guidance on Sampling and Testing of Wastes to meet Landfill Acceptance Procedures' (2005, version 1) Inert waste criteria.
*EA non-statutory
(operational)
**From The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (DW-1)
2:1 Leachate results used

Project name	**The Factory, Manchester**
Report title	**Land Contamination Summary and Outline Remediation Strategy**
Table title	**Contamination End Use Assessment - Leachate results**
Date: October 2018	**Job No: 034933**

BUROHAPPOLD
ENGINEERING

Enclosure 6

GROUND GAS ASSESSMENT	034933	Factory Theatre

GUIDANCE:

Assessment based on guidance published in CIRIA C665 (2007) 'Assessing risks posed by hazardous ground gases to buildings.'

Information from Table 8.5 of CIRIA C665

Characteristic Situation 1 conditions

Gas screening value (CH4 or CO2) < 0.07 l/h

Typically methane < 1 % by volume

Typically carbon dioxide < 5% by volume

Characteristic Situation 2 conditions

Gas screening value (CH4 or CO2) < 0.7 l/h

Borehole air flow rate < 70 l/h

Characteristic Situation 3 conditions

Gas screening value (CH4 or CO2) < 3.5 l/h

Key for shading	
🟩	CO_2 > 5% in air
🟧	CH4 > 1 % in air
🟦	Gas screening value > or = 0.07 l/h
🟦	Gas screening value > or = 0.7 l/h

NOTES:

Maximum concentration and flow values are assessed below, using peak values for CO2 % (minimum values for oxygen).

Where no detectable flow is recorded the limit of detection of the instrument is used, following Note 5 of Table 8.5. CIRIA C665

						Gas measurements						CO_2 analysis		CH_4 analysis		Characteristic
Exploratory Hole	Location	Installation response zone stratum	Depth range (m BGL)	Monitored by	Date	Flow Rate (l/hr)	Atmos Pres (mb)	O2 (%) air	CO2 (% air)	CH4 (% air)	H2S (ppm)	CO2 as fraction	Gas screening value CO_2 (l/hr)	CH_4 as fraction	Gas screening value CH_4 (l/hr)	Situation
BH01 (50 mm)		SAND	2.00 - 4.00	ESG	28.7.16	No Data - damage to installation						No Data - damage to installation				
					11.8.16											
					25.8.16											
					22.9.16	No Access (parked vehicles)						No Access (parked vehicles)				
					27.9.16	0.1	1008	20.9	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	1021	20.1	0.2	0.0	0.0	0.002	0.000	0.000	0.000	1
BH02 (50 mm)		MG	1.00 - 1.50	ESG	28.7.16	0.0	1008	20.8	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					11.8.16	0.0	1017	20.9	0.2	0.0	0.0	0.002	0.000	0.000	0.000	1
					25.8.16	0.0	1014	20.8	0.1	0.0	0.0	0.001	0.000	0.000	0.000	1
					22.9.16	No Access (parked vehicles)						No Access (parked vehicles)				
					27.9.16	0.0	1008	20.2	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	1020	20.7	0.1	0.0	0.0	0.001	0.000	0.000	0.000	1
BH03 (50 mm)		MG	1.50 - 3.00	ESG	28.7.16	0.0	1008	21.2	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					11.8.16	No Data						No Data				
					25.8.16	0.0	1014	21.0	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					22.9.16	0.0	1015	20.6	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					27.9.16	0.0	1008	20.6	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	1021	20.5	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
BH04	NR Investigation	Sand / Gravel / Clay	1.00 - 3.00	ESG	2.2.17	No Data						No Data				
					8.3.17	0	1011	21.1	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					14.3.17	0.0	1030	21.4	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					22.3.17	0.0	1004	6.1	3.7	0.0	0.0	0.037	0.004	0.000	0.000	1
					30.3.17	0.0	1014	19.0	0.1	0.0	0.0	0.001	0.000	0.000	0.000	1
BH05	NR Investigation	Sandstone	4.00 - 10.00	ESG	2.2.17	0.1	985	21.4	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					8.3.17	0	1011	21.1	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					14.3.17	0	1030	21.3	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					22.3.17	0.0	1004	21.6	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					30.3.17	0.0	1014	21.2	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
												0.000	0.000	0.000	0.000	1
WS02		MG	1.00 - 2.00	ESG	28.7.16	0.1	1008	20.0	0.3	0.0	0.0	0.003	0.000	0.000	0.000	1
					11.8.16	0.0	1017	21.2	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					25.8.16	0.0	1014	21.1	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					22.9.16	No Access (parked vehicles)						No Access (parked vehicles)				
					27.9.16	-0.1	1008	20.8	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	1020	20.7	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
WS06		MG	1.00 - 2.00	ESG	28.7.16	0.1	1008	19.7	0.6	0.0	0.0	0.006	0.001	0.000	0.000	1
					11.8.16	0.0	1017	20.9	0.1	0.0	0.0	0.001	0.000	0.000	0.000	1
					25.8.16	0.1	1014	19.7	0.8	0.0	0.0	0.008	0.001	0.000	0.000	1
					22.9.16	0.0	1015	19.6	1.1	0.0	0.0	0.011	0.001	0.000	0.000	1
					27.9.16	0.0	1008	20.9	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	10212	20.2	0.2	0.0	0.0	0.002	0.000	0.000	0.000	1
WS08		SAND	2.00 - 3.50	ESG	28.7.16	0.0	1008	20.7	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					11.8.16	0.0	1017	21.1	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					25.8.16	0.0	1014	21.2	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					22.9.16	0.0	1015	20.7	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					27.9.16	0.0	1008	20.8	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	1021	20.6	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					Max reading	0.1	10212	21.6	3.7	0.0	0.0	0.037	0.004	0.000	0.000	1
					Min reading	-0.1	985	6.1	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1

Project Name: Factory Theatre
Report Title: Land Contamination Summary and Outline Remediation Strategy
Figure Title: Ground Gas Summary
Scale: NTS | **Date:** Oct 2018 | **Job No:** 034933 | **Enclosure 6**

BUROHAPPOLD ENGINEERING

Enclosure 7

Factory Theatre

Excavation and Filling Specification – REM Clauses

034933

1 October 2018

Revision 00 Draft – Subject to Local Authority Approval

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

Revision	Description	Issued by	Date	Checked
00	REM Clauses Draft – Subject to Local Authority Approval	GM	01/10/18	COH

O:\034933 The Factory, Manchester\F9 Ground Engineering - Site Investigation\05 Specifications\Earthworks\S181001_REM Clauses.docx

This report has been prepared for the sole benefit, use and information of **Manchester City Council** for the purposes set out in the report or instructions commissioning it. The liability of Buro Happold Limited in respect of the information contained in the report will not extend to any third party.

It should be noted that at the time of issue this document is Preliminary and those clauses related to contaminated land detailed in this specification are subject to Local Authority approval.

author	**George Mitchell**
date	**1st October 2018**
approved	**Chris O'Hara**
signature	
date	**1st October 2018**

..

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

BH D20 EXCAVATING AND FILLING

Contents

Reference Documents **v**

British Standards Institution (BSI) v

Building Research Establishment (BRE) Digests: v

Department of Environment, Transport and the Regions v

National House-Building Council (NHBC) vi

100 General Requirements/Information 1

110 The Site 4

205 Excavating 7

400 Disposal of Materials 12

500 Filling 14

605 Acceptance of Suitable Fill 19

620 Compacted General Filling 21

630 Compacted Structural Filling 24

700 Backfilling to Temporary Excavations for Foundations 26

800 Topsoil Areas 28

Appendix A Contamination Procedures & Documentation 1

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

100 General Requirements/Information

TO BE READ WITH THE PRELIMINARIES/GENERAL CONDITIONS

100* General

- The Main Contractors (MC) attention is drawn to the nature and extent of material on site. It is anticipated that some proportion of the materials excavated may be suitable for re-use as part of the permanent works construction. The MC shall be responsible for the selection, separation and processing as appropriate for re-use in the permanent works or temporary works as appropriate. The MC is also responsible for the disposal of all unsuitable materials.
- The MC is responsible for the inspection and acceptance of materials, contract drawings and workmanship.
- The works to be executed as specified and in accordance with good practice. No changes are permitted without written approval.
- The MC is to review the detail of this specification and consider the times required for testing, preparation of samples and production of fabrication drawings. This information to be included in the contract programme.
- The MC to include in the price as necessary, the costs for all necessary test pieces, testing, trials and attendance to demonstrate compliance with the requirements of this Specification.
- All publications referred to hereafter are to be the issues current at the date of invitation to tender.
- The following materials are specifically precluded from all specifications pertaining to works carried out under this contract:-

  a) High alumina cement or concrete.

  b) Woodwool slabs as permanent shuttering.

  c) Calcium chloride in admixtures for use in reinforced concrete.

  d) Asbestos in any form.

  e) Sea dredged aggregates for use in reinforced concrete unless otherwise instructed by the client.

  f) Calcium silicate bricks.

  g) Urea formaldehyde.

The MC is required to ensure that all efforts be made, and using the best information available to him, that these substances are not incorporated into the Works. In the event that he is unwilling or unable to comply with these requirements he is to submit in writing in sufficient time for consultations to be held and alternatives to be considered.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

110 The Site

181* **Japanese Knotweed:** None envisaged.

Japanese Knotweed is an invasive, non-native plant species. The Wildlife and Countryside Act (1981) made it illegal to spread Japanese Knotweed and guidance on the management of Japanese Knotweed on development sites is given in the Environment Agency's (EA) code of practice, 2001.

The MC is responsible for ensuring that Japanese Knotweed is not spread across the site. There are a variety of methods available for treating infested areas including spraying with herbicides or digging, spraying and removal to landfill. The Client is responsible for selecting a method of treatment and obtaining approval for the selected method from the Local Authority.

205 Excavating

208* **Excavation of Chemically Contaminated Materials:** Where contaminated materials are to be excavated the MC shall be responsible for all Health and Safety precautions required to protect the site personnel and the local environment and shall provide method statements covering these issues.

It is worthy of note that no asbestos or fibres were recorded in the material recorded during the ESG 2016 and 2017 investigations. However, due to the historical site uses, the presence of such material within the Made Ground cannot be ruled out and vigilance during site works will be required.

225* **Handling Topsoil**: The following requirements shall be complied with:

- Where aggressive weeds as included in the Weeds Act – Section 2 or the Wildlife and Countryside Act – Schedule 9 – Part 2 are encountered, instructions should be obtained prior to moving topsoil.
- Earthmoving equipment shall be selected and used to minimize disturbance, trafficking and compaction of topsoil.
- On no account should topsoil be mixed with:
  a) Subsoil, stone, hardcore, rubbish or material from demolition work.
  b) Oil, fuel, cement or other substances harmful to plant growth.
  c) Other grades of topsoil.
- Multiple handling should be kept to a minimum. Where practicable topsoil should be used immediately after stripping.
- Topsoil handling should be undertaken in the driest condition possible. It should not be handled during or after heavy rainfall or when it is wetter than the plastic limit defined by BS 3882 Annex N2.

320* **Recorded Features:** Break out old foundations, beds, drains, etc. where and to the extent stated on the drawings. Seal off drain ends, remove contaminated earth and disinfect as required by local authority. Backfill as specified on the drawings.

Due to the site having a rich industrial history, a number of obstructions are likely to be present within the ground. It is worthy of note that during the ESG 2016 ground investigation, a number of obstructions were encountered.

It is worthy of note that no asbestos or fibres were recorded in the material recorded during the ESG 2016 and 2017 investigations. However, due to the historical site uses, the presence of such material within the Made Ground cannot be ruled out and vigilance will be required.

330* **Unrecorded Features:** Where old foundations, beds, basements, filling, tanks, service pipes, drains, hotspots of soil contamination etc. not shown on the drawings are encountered, obtain instructions before proceeding. See also Clause 406.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

400 Disposal of Materials

400* **General:** 'Suitable material' comprises all that which is acceptable to the MC in accordance with this specification. "Unsuitable material' is defined in Clause 510.

- No excavated suitable material to be removed from the site unless this suits the MC's operational procedure and then the MC is to make good any subsequent deficit at his own expense.
- Where the excavation reveals a combination of suitable and unsuitable materials the MC is to propose the methods by which suitable material may be excavated without contamination by unsuitable materials.

405* **Contaminated Soils:** Where surplus soils for disposal are chemically contaminated, the MC shall be responsible for disposal of these materials at a suitably licensed landfill and all associated issues such as consignment notes and Environmental Protection Act Section 34 Duty of Care documentation. The MC shall be deemed the producer and holder of the waste and shall be responsible for classifying the materials for disposal to landfill. The MC shall be responsible for carrying out any further soil contaminant testing and Waste Acceptance Criteria testing to enable classification of the waste in accordance with current regulatory guidance and the requirements of the receiving landfill.

The MC shall prepare an earthworks spoil management strategy which shall take account of the range of waste types expected to be encountered and set out any proposed sampling and testing regime for waste classification. The strategy shall include consideration of stockpile management, measures and working methods to protect site worker health and safety and the environment, and working methods to minimize the degree of intermixing of wastes of different classes and to minimize disposal costs.

406* **Unrecorded Contaminated Soils:** Where materials that appear to be contaminated (either visually or on the basis of odour) are encountered during the excavation works the MC shall be responsible for carrying out laboratory testing to enable the materials to be classified for hazard assessment and waste disposal purposes, for disposal to suitably licensed tip as appropriate, and all associated issues such as consignment notes and Environmental Protection Act Section 34 Duty of Care documentation.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

500 Filling

510* Unsuitable Materials:

- Do not import or use fill materials which would, either in themselves or in combination with other materials or ground water, give rise to a health hazard, damage to building structures or instability in the filling.
- **Site won** Fill materials must not contain any contaminant in the suite listed below that is in excess of its Specified Trigger Concentration:

Determinand	Soil Concentration	Soil Leachate Concentration
Arsenic	640 mg/kg	-
Cadmium	410 mg/kg	-
Chromium (total)	8,600 mg/kg	-
Chromium (VI)	49 mg/kg	-
Lead	2,330 mg/kg	-
Mercury (inorganic)	58 mg/kg	-
Selenium	12,000 mg/kg	-
Copper	68,000 mg/kg	-
Nickel	980 mg/kg	-
Zinc	730,000 mg/kg	-
TPH	See Table A1	-
Polycyclic Aromatic Hydrocarbons (USEPA 16)	See Table A2	-
Phenol Index	1,300 mg/kg	-
Cyanide	16,000 mg/kg	-
pH	5<pH<9	-
Asbestos	<0.1%	-

Note 1: Values used are all C4SL's or S4UL's (Commercial) with the exception of cyanide (BH Generic Assessment Criteria - GAC).

- **Imported fill** materials must not contain any contaminant in the suite listed below that is in excess of its Specified Trigger Concentration:

Determinand	**Soil Concentration**	**Soil Leachate Concentration**
Arsenic	40 mg/kg	-
Cadmium	149 mg/kg	-
Chromium (total)	910 mg/kg	-
Chromium (VI)	21 mg/kg	-
Lead	310 mg/kg	-
Mercury (inorganic)	56 mg/kg	-
Selenium	430 mg/kg	-
Copper	7,100 mg/kg	-
Nickel	180 mg/kg	-
Zinc	40,000 mg/kg	-
TPH [See Note 1]	See Table A1	-
Polycyclic Aromatic Hydrocarbons (USEPA 16)	See Table A2	-
Phenol Index	1,200 mg/kg	-
Cyanide	760 mg/kg	-
pH	5<pH<9	-
Asbestos	<0.001%	-

Note 1: Values used are all C4SL's or S4UL's (residential without plant uptake) with the exception of cyanide (BH Generic Assessment Criteria - GAC).

- Any materials arising or imported that appear suspect in terms of contamination based on either appearance or smell shall be stockpiled separately and tested for the contaminant suite listed above in addition to any other appropriate contaminant as indicated by appearance or by smell and accepted into the Works or disposed of off site as appropriate.
- Soluble sulphate content (SO_4) of imported materials for filling under concrete slabs or within 1 m of substructures must not exceed 1.2 g/litre when tested BS 1377:Part 3, Clause 5 using a 2:1 water-soil extract.
- Other unsuitable materials include: material from marshes or bogs, peat, logs, stumps, slurry, mud and perishable material, material susceptible to spontaneous combustion, material in a frozen condition, clays of liquid limit exceeding 80% and/or plasticity index exceeding 55, material with excessive moisture content.
- See also Clause 100.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

Table A1. Threshold concentrations for risk banded hydrocarbons and BTEX (SOM 1%).

Determinand		Site Won	Imported
Aliphatic	EC5 – EC7	3,200 mg/kg	42 mg/kg
	EC7 – EC8	7,800 mg/kg	100 mg/kg
	EC8 – EC10	2,000 mg/kg	27 mg/kg
	EC10 – EC12	9,700 mg/kg	130 mg/kg
	EC12 – EC16	59,000 mg/kg	1,100 mg/kg
	EC16 – EC35	1,600,000 mg/kg	1,900 mg/kg
Aromatic	EC5 – EC7	26,000 mg/kg	370 mg/kg
	EC7 – EC8	56,000 mg/kg	860 mg/kg
	EC8 – EC10	3,500 mg/kg	47 mg/kg
	EC10 – EC12	16,000 mg/kg	250 mg/kg
	EC12 – EC16	36,000 mg/kg	1,800 mg/kg
	EC16 – EC21	28,000 mg/kg	1,900 mg/kg
	EC21 – EC35	28,000 mg/kg	1,900 mg/kg
Benzene		27 mg/kg	0.38 mg/kg
Ethylbenzene		518 mg/kg	83 mg/kg
Toluene		869 mg/kg	880 mg/kg
Xylenes		576 mg/kg	79 mg/kg

Note 1: Site won - Values used are S4UL's (Commercial).

Note 2: Imported - Values used are S4UL's (Residential without Plant Uptake) with some reductions to TPH fractions.

Table A2. Threshold concentrations for Poly Aromatic Hydrocarbons (USEPA 16)

Determinand	Site Won	Imported
Naphthalene	190 mg/kg	2.3 mg/kg
Acenaphthylene	83,000 mg/kg	2,900 mg/kg
Acenaphthene	84,000 mg/kg	3,000 mg/kg
Fluorene	63,000 mg/kg	2,800 mg/kg
Phenanthrene	22,000 mg/kg	1,300 mg/kg
Anthracene	520,000 mg/kg	31,000 mg/kg
Fluoranthene	23,000 mg/kg	1,500 mg/kg
Pyrene	54,000 mg/kg	3,700 mg/kg
Benzo(a)anthracene	170 mg/kg	11 mg/kg
Chrysene	350 mg/kg	30 mg/kg
Benzo(b)fluoranthene	44 mg/kg	3.9 mg/kg
Benzo(k)fluoranthene	1,200 mg/kg	110 mg/kg
Benzo(a)pyrene	35 mg/kg	3.2 mg/kg
Indendo(123-cd)pyrene	500 mg/kg	45 mg/kg
Dibenzo(ah)anthracene	3.5 mg/kg	0.31 mg/kg
Benzo(ghi)perylene	3,900 mg/kg	360 mg/kg

Note 1: Site won - Values used are S4UL's (Commercial).
Note 2: Imported - Values used are S4UL's (Residential without Plant Uptake).

605 Acceptance of Suitable Fill

605 Acceptance of Suitable Fill

For all imported fill from an unknown, mixed or brownfield source, testing shall be carried out to demonstrate that no contaminant listed in the suite given in Clause 510 is in excess of its Trigger Concentration. This testing shall be carried out at a rate of 1 test per 50 m^3 of placed fill material.

For all naturally site won derived as-dug soils or imported soils from a Greenfield source, testing shall be carried out to demonstrate that no contaminant listed in the suite given in Clause 510 is in excess of its Trigger Concentration. This testing shall be carried out at a rate of 1 test per 200 m^3 of placed fill material.

In addition, any materials arising or imported that appear suspect in terms of contamination based on either appearance or smell shall be stockpiled separately and tested for the contaminant suite listed in Clause 510 in addition to any other appropriate contaminant as indicated by appearance or by smell and either accepted into the Works or disposed of off-site as appropriate.

During placement of **General Fill** the MC is also required to provide daily records of testing of the material placed to show compliance with the Specification. The minimum requirements are:

Grading (BS1377: Part 2, Method 9.2): At least once a day or one test for every 500 m^3 placed.

Moisture Content and undrained remoulded shear strength (cohesive materials) (BS1377: Part 2, Method 3.2; and Part 7, Method 8): Three times a day or one test for every 200 m^3 placed.

Plasticity Tests (BS1377: Part 2, Methods 4.3 and 5): One test per day for each source or for every 500 m^3 placed.

During placement of **Structural Fill** the MC is also required to provide daily records of testing of the material placed to show compliance with the Specification. The minimum requirements are:

Grading (BS1377: Part 2, Method 9.2): At least once a day or one test for every 50 m^3 placed.

Moisture Content and undrained remoulded shear strength (cohesive materials) (BS1377: Part 2, Method 3.2; and Part 7, Method 8): Three times a day or one test for every 20 m^3 placed.

Plasticity Tests (BS1377: Part 2, Methods 4.3 and 5): One test per day for each source or for every 50 m^3 placed.

Los Angeles Test (BS EN 1097-2): One test per source and for every 100 m^3 placed.

End product (BS1377: Part 9, Method 2.2): One sand replacement density test for each compacted layer or each 20 m^3 placed.

Note: For each element cited above the option giving the greatest number of tests shall apply.

610* General Landscape Filling:

Definition: Fill to soft landscape areas only (excluding sports pitches).

- Materials arising from the excavations or imported, but excluding unsuitable materials as defined in Clause 510, with a maximum particle size of 150 mm.
- Lay in layers not more than 200 mm thick and consolidate each layer with the earthmoving plant.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

630 Compacted Structural Filling

660 Deterioration of Fill Materials:

If the material to be deposited as fill subsequently reaches a condition where it cannot be compacted to the requirements of this specification the MC shall:

- make good by removing the material from site until it is in a suitable condition for reuse and/or replace with suitable material, or
- make good the material by mechanical or chemical means, or
- cease work until the physical condition of the material is such that it can be compacted as described in this specification.

800 Topsoil Areas

850* **Contamination:**

Do not use topsoil contaminated with subsoil, rubbish, oil-based products or other materials toxic to plant life. Dispose of contaminated topsoil as instructed.

Imported topsoil for use as fill to the top metre (if required) on the site will be tested for the contaminant suite listed below to ensure that contaminant threshold levels are not exceeded.

Site won topsoil for use as fill to the top metre shall also be tested for the contaminant suite defined below to ensure that contaminant threshold levels are not exceeded.

Maximum permissible contaminant concentrations in **imported and site won topsoil** (soil concentrations only will be determined):

Determinand	Soil Concentration	Soil Leachate Concentration
Arsenic	37 mg/kg	Not required
Cadmium	26 mg/kg	Not required
Chromium (total)	910 mg/kg	Not required
Chromium (VI)	21 mg/kg	Not required
Lead	200 mg/kg	Not required
Mercury (inorganic)	40 mg/kg	Not required
Selenium	250 mg/kg	Not required
Copper	2,400 mg/kg	Not required
Nickel	130 mg/kg	Not required
Zinc	3,700 mg/kg	Not required
TPH {See Note 1}	100 mg/kg	Not required
Polycyclic Aromatic Hydrocarbons (USEPA 16) And BTEX	See Note 2	Not required
Phenol Index	380 mg/kg	Not required
Cyanide	4.6 mg/kg	Not required
pH	5<pH<9	Not required
Asbestos	<0.001%	-

Note 1: Materials exceeding this threshold shall be subject to speciated analysis and comparison with the below table:

Hydrocarbon band	Soil concentration mg/kg
Aliphatic C5 - C6	42
Aliphatic C6 - C8	100
Aliphatic C8 - C10	27
Aliphatic C10 - C12	130
Aliphatic C12 - C16	1100
Aliphatic C16 - C21	1100
Aliphatic C21 - C35	1100
Aromatic C5 - C7	70
Aromatic C7 - 8	130
Aromatic C8 - C10	34
Aromatic C10 - 12	74
Aromatic C12 - C16	140
Aromatic C16 - C21	260
Aromatic C21 - C35	1100

Note 2: PAH values and BTEX values:

Compound	Soil concentration mg/kg
Naphthalene	2.3
Acenaphthylene	170
Acenaphthene	210
Fluorene	170
Phenanthrene	95
Anthracene	2400
Fluoranthene	280
Pyrene	620
Benzo[a]anthracene	7.2
Chrysene	15
Benzo[b]fluoranthene	2.6
Benzo[k]fluoranthene	77
Benzo[a]pyrene	2.20
Indeno[123-cd]pyrene	27
Dibenzo[ah]anthracene	0.24
Benzo[ghi]perylene	320
Benzene	0.087
Toluene	130
Ethyl Benzene	47
m/p Xylenes	56
o Xylenes	60
Xylenes**	56

The rate of validation testing on **imported topsoil** will be 1 sample per 250 m^3 of backfill.

The rate validation testing on **site won** topsoil will be 10 No. representative samples from stockpile.

Appendix A Contamination Procedures & Documentation

A1 Validation Strategy

As soon as practicable after the removal of any anticipated or unexpected 'hot spots' a **Validation Report** shall be prepared and submitted by the MC and agreed with the relevant Local Authority Planning Development Department.

The validation strategy shall be as follows:

- Anticipated areas of elevated concentrations or 'hot spots' shall be excavated and removed to at least 1.00 m beyond any visual or olfactory (odorous) indication of contamination.
- Samples of the surrounding soil will be taken from the excavation formed and tested for the suite of determinands listed in Clause 510 in addition to any other appropriate contaminant as indicated by appearance or by smell.
- If the chemical concentrations of the soil samples are less than the concentrations recorded in Clause 510 or other appropriate guidance in respect of other appropriate contaminant, the elevated concentrations or 'hot spot' can be considered to have been removed and no further remedial action is required.
- If the chemical concentrations of the soil samples are greater than the concentrations recorded in Clause 510, further excavation is required and the sequence of sampling and testing should be repeated. Incremental excavation and testing should continue until the chemical concentrations encountered are less than the concentrations recorded in Clause 510 or other appropriate guidance in respect of other appropriate contaminant.
- During this procedure, the following information should be collected and recorded:
  - The exact extent of each phase of excavation should be recorded using 3D topographical surveying techniques.
  - The exact position and depth of each sample taken should be recorded using 3D topographical surveying techniques.
  - The samples should be given a unique reference number.
  - The laboratory testing results for each unique sample shall be recorded.
  - A photographic record of each phase of excavation and sampling will be collected and recorded.
- A general photographic record of the works should also be collected and recorded to provide a general record of the nature and characteristics of the materials encountered and/or laid to form formations etc. Where practicable, the photographic record should be cross referenced with any chemical testing available for the material type.

A validation report should be prepared, comprising substantiating completion documentation to include type of documentation listed above and photographic records in addition to Environmental Protection Act 1990 Section 34 Duty of Care documentation relating to waste disposal of the material removed from site.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

A2 Validation Documentation Requirements

The following documentation shall be prepared by the MC and submitted to the relevant Local Authority Planning Development Department.

- Plan or plans showing earthworks movement of materials on site (cut and fill) and imported if appropriate.
- Plan or plans showing the location of any 'hot spots' located, if any, or confirmation that none were encountered.
- Plan or plans showing location of chemical testing undertaken as appropriate plus supporting information.
- Plan or plans showing surface finishes and thickness of build-ups, topsoil or clean cover as appropriate.
- Plan or plans showing the location of any hotspots encountered during service trench excavation, if any, and plan sections of remedial measures undertaken for water pipe provision.
- Appropriate records of material removed from site including testing records.
- Appropriate records of material imported to site including testing records.
- Appropriate records of topsoil imported to site including testing records.
- Appropriate photographic records of the earthworks plus any specific areas of interest ('hotspots', tanks etc).
- Records of any water control of groundwater that may have been contaminated, if any, or confirmation that none were encountered.
- Other records, if appropriate, not included in above summary.
- A statement confirming the earthworks was undertaken in accordance with this specification.

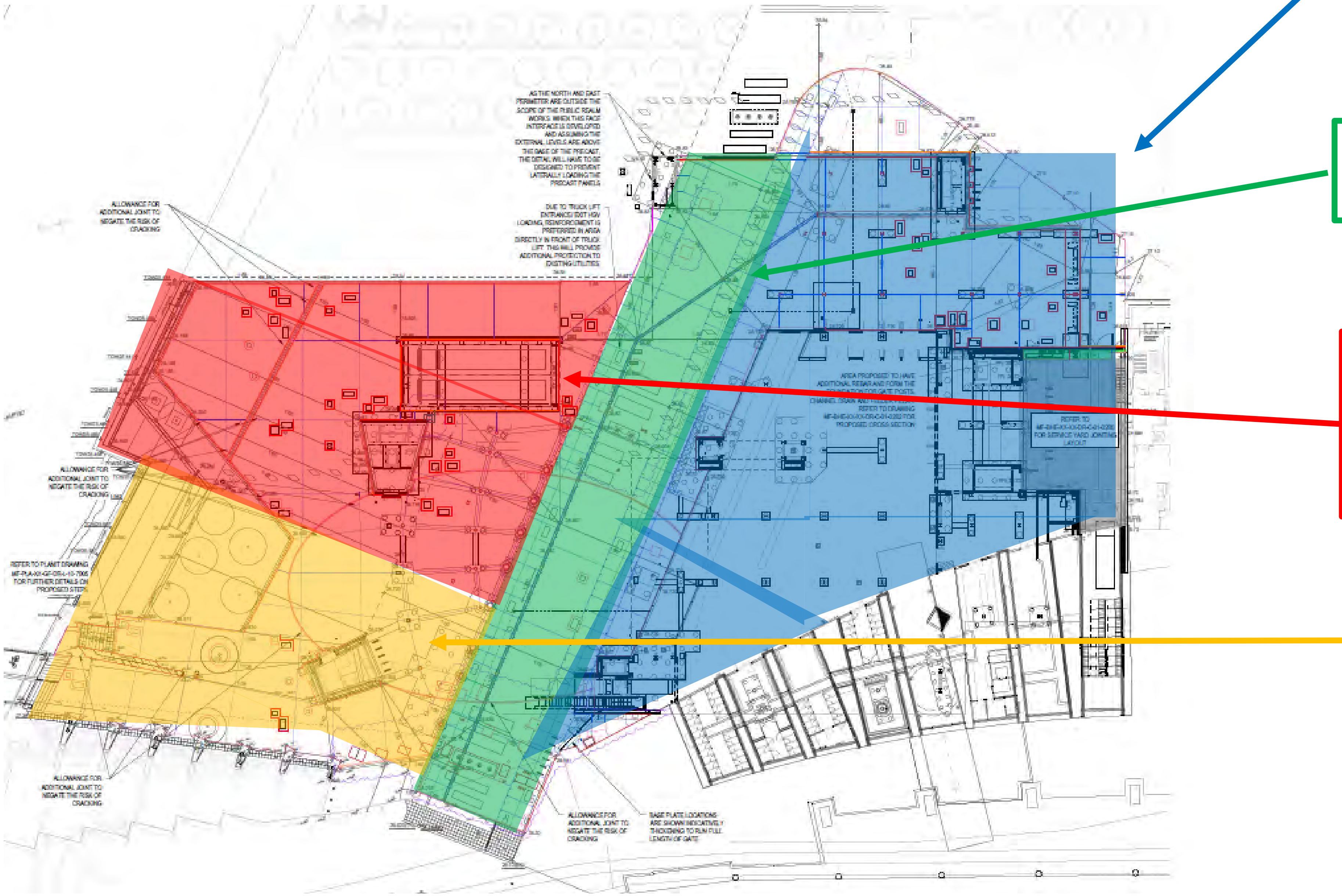
Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

George Mitchell
Buro Happold Limited
2 Brewery Place
Brewery Wharf
Leeds
LS10 1NE
UK

T: +44 (0)113 204 2200
F: +44 (0)870 787 4144
Email: George.Mitchell@BuroHappold.com

Appendix C

Enabling Works Phasing Plan


AS THE NORTH AND EAST PERIMETER ARE OUTSIDE THE SCOPE OF THE PUBLIC REALM WORKS, WHEN THIS FACE INTERFACE IS DEVELOPED AND ASSUMING THE EXTERNAL LEVELS ARE ABOVE THE BASE OF THE PRECAST, THE DETAIL WILL HAVE TO BE DESIGNED TO PREVENT LATERALLY LOADING THE PRECAST PANELS
DUE TO TRUCK LIFT ENTRANCE/ EXIT HGV LOADING, REINFORCEMENT IS PREFERRED IN AREA DIRECTLY IN FRONT OF TRUCK LIFT. THIS WILL PROVIDE ADDITIONAL PROTECTION TO EXISTING UTILITIES
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
AREA PROPOSED TO HAVE ADDITIONAL REBAR AND FORM THE FOUNDATION FOR GATE POSTS
REFER TO DRAWING
PROPOSED CROSS SECTION
REFER TO
FOR SERVICE YARD JOINTING LAYOUT
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
BASE PLATE LOCATIONS ARE SHOWN INDICATIVELY THICKENING TO RUN FULL LENGTH OF GATE

Hardstanding (Forshaws)

Existing Water street Pavement

Imported Material subsequently re-used in pad foundation excavation

Existing Crane Mat Left In-Situ

AS THE NORTH AND EAST PERIMETER ARE OUTSIDE THE SCOPE OF THE PUBLIC REALM WORKS. WHEN THIS FACE INTERFACE IS DEVELOPED AND ASSUMING THE EXTERNAL LEVELS ARE ABOVE THE BASE OF THE PRECAST, THE DETAIL WILL HAVE TO BE DESIGNED TO PREVENT LATERALLY LOADING THE PRECAST PANELS

DUE TO TRUCK LIFT ENTRANCE/ EXIT HGV LOADING, REINFORCEMENT IS PREFERRED IN AREA DIRECTLY IN FRONT OF TRUCK LIFT .THIS WILL PROVIDE ADDITIONAL PROTECTION TO EXISTING UTILITIES.

ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING

ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING

EFER TO PLANIT DRAWING IF-PLA-XX-GF-DR-L-10-7005 FOR FURTHER DETAILS ON PROPOSED STEPS

ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING

ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING

BASE PLATE LOCATIONS ARE SHOWN INDICATIVELY. THICKENING TO RUN FULL LENGTH OF GATE

AREA PROPOSED TO HAVE ADDITIONAL REBAR AND FORM THE FOUNDATION FOR GATE POSTS, CHANNEL DRAIN AND FEEDER PILLAR. REFER TO DRAWING MF-BHE-XX-XX-DR-C-01-0282 FOR PROPOSED CROSS SECTION

REFER TO MF-BHE-XX-XX-DR-C-01-0200 FOR SERVICE YARD JOINTING LAYOUT

IMPORTED BACKFILL REQUIRED IN PAD EXCAV.

PAVEMENT

RAISE TO BACKFILL

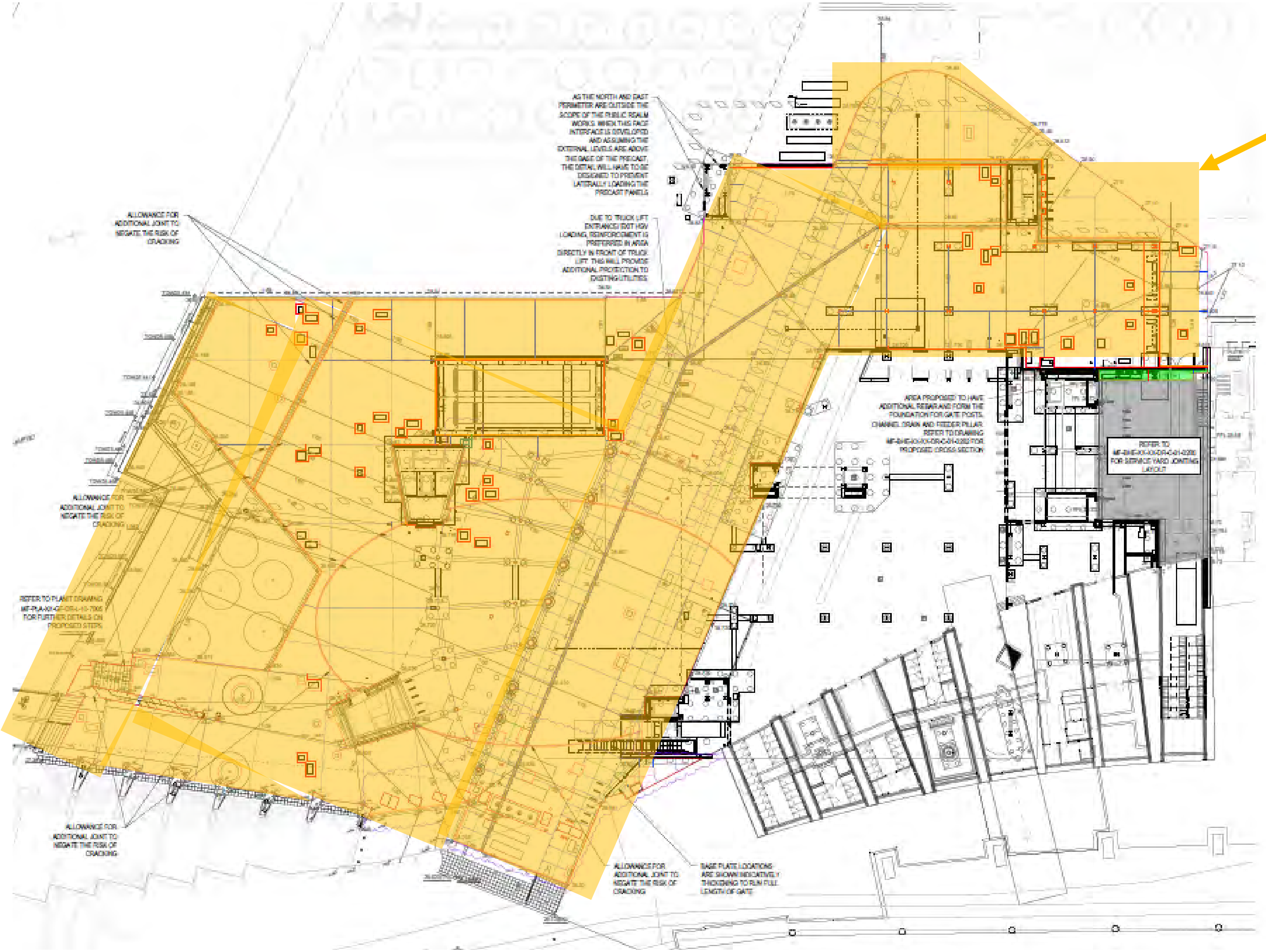
HARD STANDING (FOR CRANES).

CRANE MAT LEFT INSITU.

AS THE NORTH AND EAST PERIMETER ARE OUTSIDE THE SCOPE OF THE PUBLIC REALM WORKS, WHEN THIS FACE INTERFACE IS DEVELOPED AND ASSUMING THE EXTERNAL LEVELS ARE ABOVE THE BASE OF THE PRECAST, THE DETAIL WILL HAVE TO BE DESIGNED TO PREVENT LATERALLY LOADING THE PRECAST PANELS
DUE TO TRUCK LIFT ENTRANCE/ EXIT HGV LOADING, REINFORCEMENT IS PREFERRED IN AREA DIRECTLY IN FRONT OF TRUCK LIFT. THIS WILL PROVIDE ADDITIONAL PROTECTION TO EXISTING UTILITIES.
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
EFER TO PLANT DRAWING MF-PLA-XX-GF-DR-L-10-7005 FOR FURTHER DETAILS ON PROPOSED STEPS
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
BASE PLATE LOCATIONS ARE SHOWN INDICATIVELY. THICKENING TO RUN FULL LENGTH OF GATE
AREA PROPOSED TO HAVE ADDITIONAL REBAR AND FORM THE FOUNDATION FOR GATE POSTS, CHANNEL DRAIN AND FEEDER PILLAR. REFER TO DRAWING MF-BHE-XX-XX-DR-C-01-0282 FOR PROPOSED CROSS SECTION
REFER TO MF-BHE-XX-XX-DR-C-01-0200 FOR SERVICE YARD JOINTING LAYOUT
UOEWEED WASTE CLASS.
NON HAZ TO BACKFILL.
CONTAM
TOW25.451
TOW25.460
TOW25.441
TOW25.449
TOW25.450
TOW25.455
TOW25.557
FFL 25.85
26.94
26.84
26.51
26.54
26.609
26.720
26.410
26.467
26.22
26.12(BH)
26.320(TK)
27.36
27.10
27.0
26.90
26.833
26.80
26.775
1:55
1:109
1:60
1:50
1:150
1:126
1:76
1:97
1:88
1:43
1:45
1:33

TYPE 1 IMPORT TO PUBLIC REALM.
TOPSOIL (CERTS APPLICABLE)
AS THE NORTH AND EAST PERIMETER ARE OUTSIDE THE SCOPE OF THE PUBLIC REALM WORKS, WHEN THIS FACE INTERFACE IS DEVELOPED AND ASSUMING THE EXTERNAL LEVELS ARE ABOVE THE BASE OF THE PRECAST, THE DETAIL WILL HAVE TO BE DESIGNED TO PREVENT LATERALLY LOADING THE PRECAST PANELS
DUE TO TRUCK LIFT ENTRANCE/ EXIT HGV LOADING, REINFORCEMENT IS PREFERRED IN AREA DIRECTLY IN FRONT OF TRUCK LIFT .THIS WILL PROVIDE ADDITIONAL PROTECTION TO EXISTING UTILITIES.
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
EFER TO PLANIT DRAWING MF-PLA-XX-GF-DR-L-10-7005 FOR FURTHER DETAILS ON PROPOSED STEPS
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
BASE PLATE LOCATIONS ARE SHOWN INDICATIVELY. THICKENING TO RUN FULL LENGTH OF GATE
AREA PROPOSED TO HAVE ADDITIONAL REBAR AND FORM THE FOUNDATION FOR GATE POSTS, CHANNEL DRAIN AND FEEDER PILLAR. REFER TO DRAWING MF-BHE-XX-XX-DR-C-01-0282 FOR PROPOSED CROSS SECTION
REFER TO MF-BHE-XX-XX-DR-C-01-0200 FOR SERVICE YARD JOINTING LAYOUT
TOW25.451
TOW25.460
TOW25.441
TOW25.464
TOW25.456
TOW25.455
TOW25.587
TOW25.587
26.609
26.51
26.54
26.467
26.410
26.339
26.320(TK)
26.12(BK)
26.22
FFL 25.85
26.72
26.754
26.720
27.10
26.90
27.0
26.775
26.80
26.833
1:60
1:50
1:70
1:100
1:150
1:109

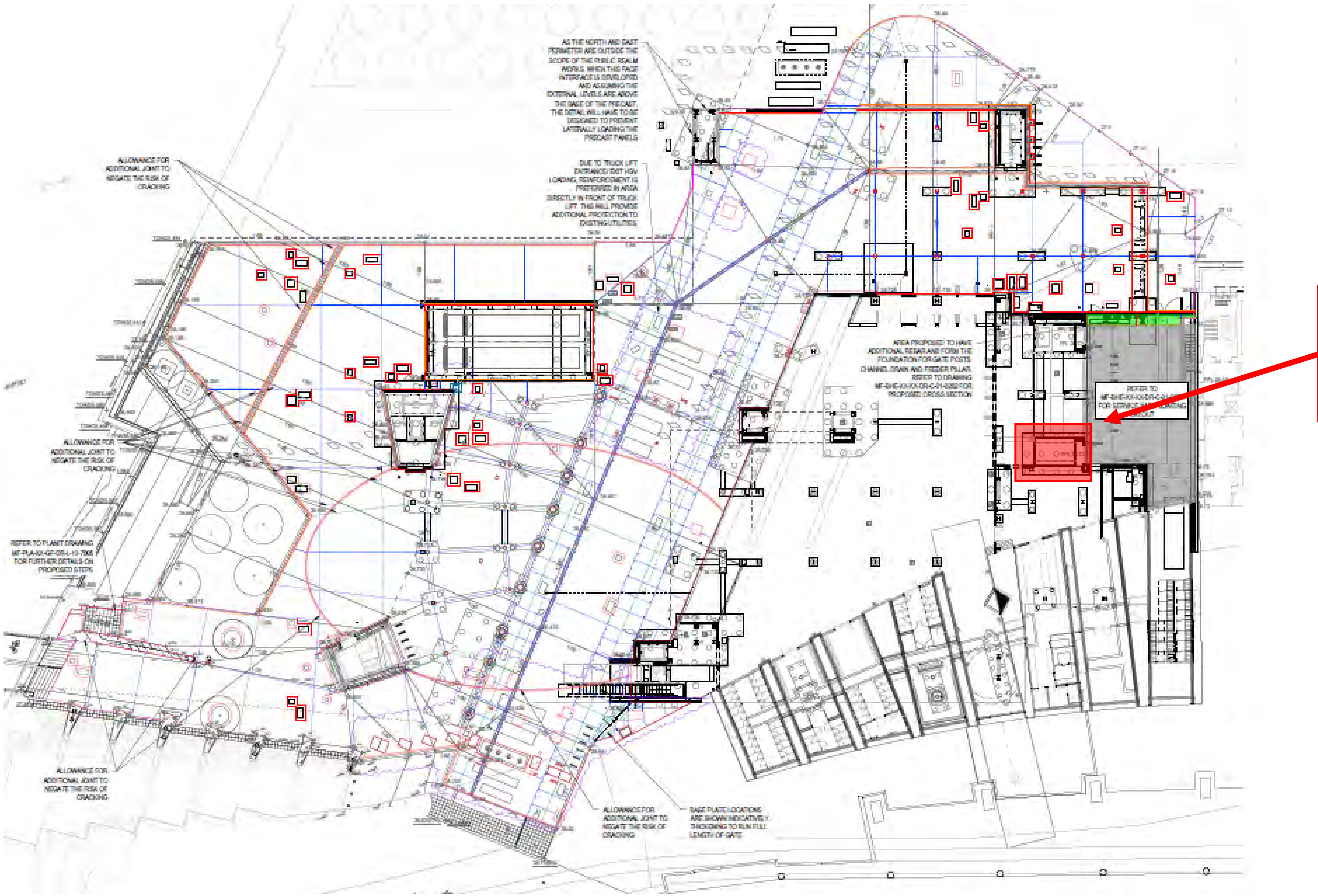
Main Works Phasing Plan


AS THE NORTH AND EAST PERIMETER ARE OUTSIDE THE SCOPE OF THE PUBLIC REALM WORKS. WHEN THIS FACE INTERFACE IS DEVELOPED AND ASSUMING THE EXTERNAL LEVELS ARE ABOVE THE BASE OF THE PRECAST, THE DETAIL WILL HAVE TO BE DESIGNED TO PREVENT LATERALLY LOADING THE PRECAST PANELS
DUE TO TRUCK LIFT ENTRANCE/EXIT HGV LOADING, REINFORCEMENT IS PREFERRED IN AREA DIRECTLY IN FRONT OF TRUCK LIFT. THIS WILL PROVIDE ADDITIONAL PROTECTION TO EXISTING UTILITIES
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
AREA PROPOSED TO HAVE ADDITIONAL REBAR AND FORM THE FOUNDATION FOR GATE POSTS, CHANNEL DRAIN AND FEEDER PILLAR. REFER TO DRAWING FOR PROPOSED CROSS SECTION
REFER TO FOR SERVICE YARD JOINTING LAYOUT
REFER TO PLANT DRAWING FOR FURTHER DETAILS ON PROPOSED STEPS
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
BASE PLATE LOCATIONS ARE SHOWN INDICATIVELY THICKENING TO RUN FULL LENGTH OF GATE

Type 1 Import to Public Realm

Appendix D

LF2 Hotspot Location


AS THE NORTH AND EAST PERIMETER ARE OUTSIDE THE SCOPE OF THE PUBLIC REALM WORKS. WHEN THIS FACE INTERFACE IS DEVELOPED AND ASSUMING THE EXTERNAL LEVELS ARE ABOVE THE BASE OF THE PRECAST, THE DETAIL WILL HAVE TO BE DESIGNED TO PREVENT LATERALLY LOADING THE PRECAST PANELS
DUE TO TRUCK LIFT ENTRANCE/ EXIT HGV LOADING, REINFORCEMENT IS PREFERRED IN AREA DIRECTLY IN FRONT OF TRUCK LIFT. THIS WILL PROVIDE ADDITIONAL PROTECTION TO EXISTING UTILITIES
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
REFER TO PLANT DRAWING FOR FURTHER DETAILS ON PROPOSED STEPS
AREA PROPOSED TO HAVE ADDITIONAL REBAR AND FORM THE FOUNDATION FOR GATE POSTS, CHANNEL DRAIN AND FEEDER PILLAR. REFER TO DRAWING FOR PROPOSED CROSS SECTION
REFER TO
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
ALLOWANCE FOR ADDITIONAL JOINT TO NEGATE THE RISK OF CRACKING
BASE PLATE LOCATIONS ARE SHOWN INDICATIVELY THICKENING TO RUN FULL LENGTH OF GATE

Location of potentially Contaminated material to LF2

BUROHAPPOLD
ENGINEERING

Project The Factory, Manchester.
Subject Contamination Encountered in Lift Pit LF2 Excavation
Project no 0034933
Date 15 March 2019

1. Introduction

As part of the planning process for The Factory site at Water Street, Manchester (National Grid Reference ^{3}82990 E, ^{3}97960 N), a Preliminary Risk Assessment (Desk Study), an Intrusive Site Investigation and a Remediation Strategy were undertaken/prepared and submitted to the Local Planning Authority. The Remediation Strategy was subsequently agreed with the Contaminated Land Team and Local Planning Authority. For ease of reference, a copy of the agreed Remediation Strategy is included in Appendix A herein.

During the construction phase of the works (currently underway), the contractor on site (Laing O'Rourke/Expanded) exposed visual/olfactory evidence of contamination in an excavation associated with Lift Pit base LF2. In accordance with the agreed Remediation Strategy, works were stopped in this area and testing undertaken to establish the chemical concentrations within the ground at this location. The subsequent sections within this document discuss the findings of the test results obtained.

BURO HAPPOLD LIMITED

2 Brewery Place
Brewery Wharf
Leeds, LS10 1NE, UK

T +44 (0)113 204 2200
F +44 (0)870 787 4144
www.burohappold.com

Registered Office: Camden Mill, Lower Bristol Road, Bath, BA2 3DQ, UK
Company Reg: 2049511

2. Basis of Original Validation Strategy

As part of the three phases of ground investigation undertaken prior to commencing construction, chemical testing was undertaken within both Made Ground and natural material and assessed against the relevant thresholds. A brief summary is presented below.

In total, 20 No. soil samples (Made Ground: 17 No. and natural material: 3 No.) were tested and assessed against the relevant CLEA model thresholds (commercial / industrial, S4SLs and C4SLs derived for 1% SOM).

Commercial criteria were considered suitable for the proposed end use as a theatre / public realm space due to the following reasons:

- End users will be transient;
- The vast majority of the proposed development area will be covered by the building, with the remainder covered by hard or soft landscaping; and
- Floor slabs and landscaped areas will be underlain by a clean capping layer.

Although soils data indicated that some contaminants were present within the Made Ground, no exceedances of the CLEA model commercial / industrial thresholds for the analysed determinands were recorded. The maximum concentrations recorded did not indicate that the Site is substantially impacted by contamination. Impacts within the Made Ground were therefore not considered to pose a risk to future end users of the development. No Asbestos Containing Material (ACM) was identified in the 20 No. samples analysed. The results obtained from the original Ground Investigations are included within Enclosure 4 of the original Remediation Strategy (Appendix A refers).

3. Assessment of Data Obtained From LF2 Excavation

As outlined above, during the construction phase of the works (currently underway), the contractor on site has exposed visual/olfactory evidence of contamination in an excavation associated with Lift Pit base LF2. In accordance with the agreed Remediation Strategy, works were stopped in this area and testing undertaken to establish the chemical concentrations within the ground at this location. The test data obtained in relation to Human Health is included within Appendix B herein.

As the material is to be excavated as part of the post bulk earthworks excavations for foundations etc. the material will be taken off site. As such, Laing O'Rourke have undertaken Waste Acceptance Criteria (WAC) testing to classify the waste for disposal purposes The test data obtained in respect of WAC is included within Appendix B. They have then undertaken a Haz Waste On Line assessment which advises that the test results show the material to be "below the Hazardous waste limit" and each of the 5 No. samples tested has been classified as "Non Hazardous". A copy of the Haz Waste On Line assessment is included in Appendix C.

As outlined in the original Remediation Strategy, the relevant documentation relating to waste disposal of the material removed from site is to be included within the final Validation Report.

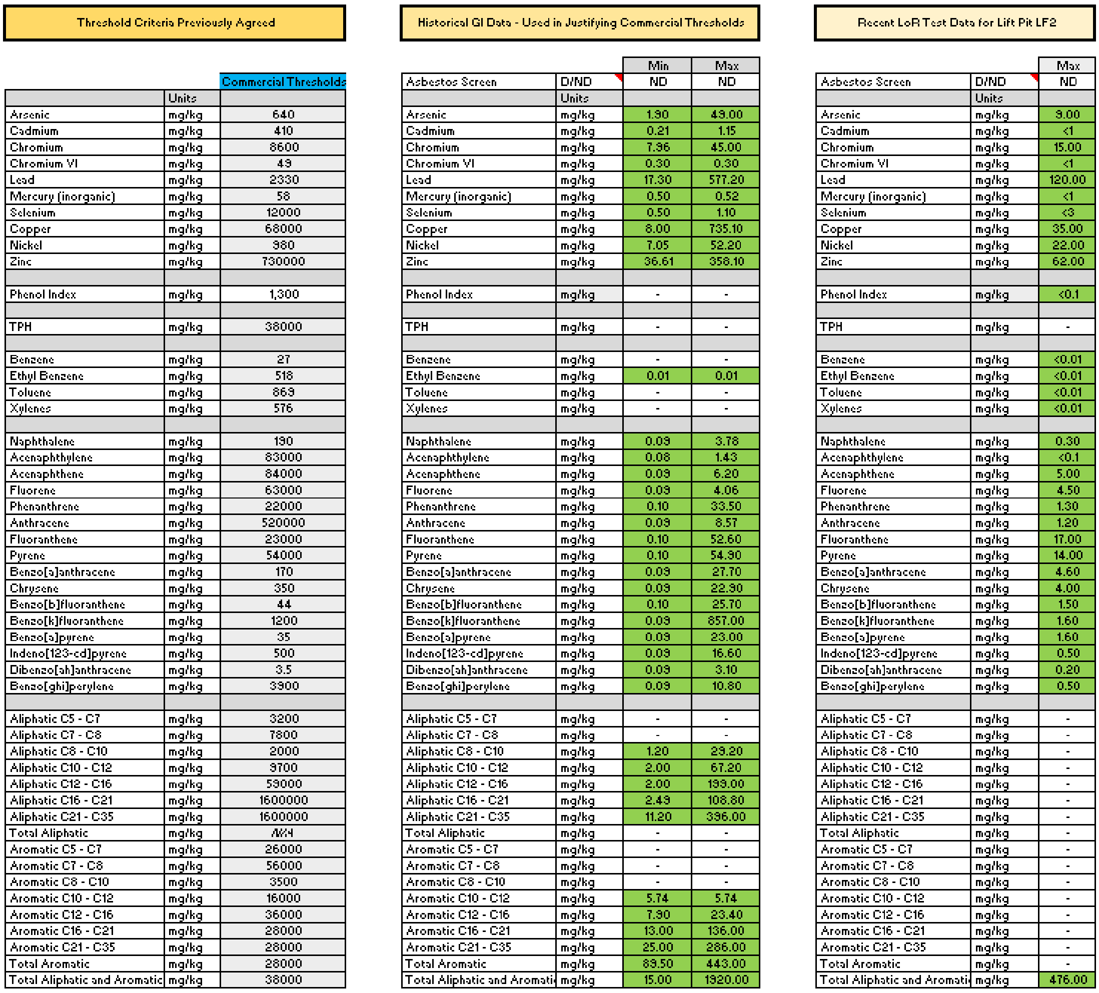
In respect of Human Health, the agreed suite of chemical testing (as detailed in the original Remediation Strategy) has also been undertaken to understand if the material is a 'hotspot' and to establish if the material is suitable to remain on site or if further excavation is required to delineate any hotspot and validate it's removal.

The test data obtained from Lift Pit LF2 is included within Appendix B herein and a summary of the maximum determinand concentrations obtained from the 5 No. samples tested is summarised in Table 1 overleaf. In addition, Table 1 also summarises the Commercial Threshold criteria used for assessment along with the maximum and minimum determinand values obtained during the original GI data assessment.

The data obtained from the chemical tests undertaken within Lift Pit LF2 excavation indicates that all determinands tested fall below the relevant Commercial Threshold criteria and as such, validate that the material falls within the acceptable limits for material on site. Based on the data obtained, no further excavation over and above that required for Lift Pit LF2 is considered necessary.

When compared against the original data set obtained during the Ground Investigations, the data obtained from Lift Pit LF2 not only falls below the associated Commercial Threshold criteria but also falls within the maximum and minimum values recorded during the GI's. Based on the foregoing, the Lift Pit L2 concentrations are considered to be representative/reflective of those results obtained during the original investigations. As such, the chemical concentrations recorded do not indicate the material to be substantially impacted by contamination, the levels recorded are not unexpected and the material is therefore not considered to pose a risk to future end users of the development.

Table 1: Summary of Chemical Data Obtained for the Site.



		Threshold Criteria Previously Agreed	Historical GI Data - Used in Justifying Commercial Thresholds		Recent LoR Test Data for Lift Pit LF2
	Units	Commercial Thresholds	Min	Max	Max
Asbestos Screen	D/ND		ND	ND	ND
Arsenic	mg/kg	640	1.90	49.00	9.00
Cadmium	mg/kg	410	0.21	1.15	<1
Chromium	mg/kg	8600	7.96	45.00	15.00
Chromium VI	mg/kg	49	0.30	0.30	<1
Lead	mg/kg	2330	17.30	577.20	120.00
Mercury (inorganic)	mg/kg	58	0.50	0.52	<1
Selenium	mg/kg	12000	0.50	1.10	<3
Copper	mg/kg	68000	8.00	735.10	35.00
Nickel	mg/kg	980	7.05	52.20	22.00
Zinc	mg/kg	730000	36.61	358.10	62.00
Phenol Index	mg/kg	1,300	-	-	<0.1
TPH	mg/kg	38000	-	-	-
Benzene	mg/kg	27	-	-	<0.01
Ethyl Benzene	mg/kg	518	0.01	0.01	<0.01
Toluene	mg/kg	869	-	-	<0.01
Xylenes	mg/kg	576	-	-	<0.01
Naphthalene	mg/kg	190	0.09	3.78	0.30
Acenaphthylene	mg/kg	83000	0.08	1.43	<0.1
Acenaphthene	mg/kg	84000	0.09	6.20	5.00
Fluorene	mg/kg	63000	0.09	4.06	4.50
Phenanthrene	mg/kg	22000	0.10	33.50	1.30
Anthracene	mg/kg	520000	0.09	8.57	1.20
Fluoranthene	mg/kg	23000	0.10	52.60	17.00
Pyrene	mg/kg	54000	0.10	54.90	14.00
Benzo[a]anthracene	mg/kg	170	0.09	27.70	4.60
Chrysene	mg/kg	350	0.09	22.90	4.00
Benzo[b]fluoranthene	mg/kg	44	0.10	25.70	1.50
Benzo[k]fluoranthene	mg/kg	1200	0.09	857.00	1.60
Benzo[a]pyrene	mg/kg	35	0.09	23.00	1.60
Indeno[123-cd]pyrene	mg/kg	500	0.09	16.60	0.50
Dibenzo[ah]anthracene	mg/kg	3.5	0.09	3.10	0.20
Benzo[ghi]perylene	mg/kg	3900	0.09	10.80	0.50
Aliphatic C5 - C7	mg/kg	3200	-	-	-
Aliphatic C7 - C8	mg/kg	7800	-	-	-
Aliphatic C8 - C10	mg/kg	2000	1.20	29.20	-
Aliphatic C10 - C12	mg/kg	9700	2.00	67.20	-
Aliphatic C12 - C16	mg/kg	59000	2.00	199.00	-
Aliphatic C16 - C21	mg/kg	1600000	2.49	108.80	-
Aliphatic C21 - C35	mg/kg	1600000	11.20	396.00	-
Total Aliphatic	mg/kg	N/A	-	-	-
Aromatic C5 - C7	mg/kg	26000	-	-	-
Aromatic C7 - C8	mg/kg	56000	-	-	-
Aromatic C8 - C10	mg/kg	3500	-	-	-
Aromatic C10 - C12	mg/kg	16000	5.74	5.74	-
Aromatic C12 - C16	mg/kg	36000	7.90	23.40	-
Aromatic C16 - C21	mg/kg	28000	13.00	136.00	-
Aromatic C21 - C35	mg/kg	28000	25.00	286.00	-
Total Aromatic	mg/kg	28000	89.50	443.00	-
Total Aliphatic and Aromatic	mg/kg	38000	15.00	1920.00	476.00

Moving forward, construction site staff are to remain vigilant for visual or olfactory evidence of contamination, as well as asbestos, during subsequent excavation. Should any further unexpected contamination be encountered, work will need to be stopped in that area of the Site, the material location recorded and covered over and an appropriate strategy agreed with the Local Authority (as agreed and outlined in the original remediation strategy included as Appendix A).

APPENDIX A

BUROHAPPOLD
ENGINEERING

1st October 2018

MF-BHE-XX-XX-RP-CG-0002

Factory, Water Street, Manchester.
Land Contamination Summary and Outline Remediation Strategy

To whom it may concern,

1. Introduction

This letter is in respect of the proposed development at The Factory, Water Street, Manchester (National Grid Reference ^{3}82990 E, ^{3}97960 N), hereafter referred to as 'the Site'. The proposed end use will comprise a new cultural venue comprising flexible auditorium spaces and associated facilities including retail, restaurant, office and educational uses with areas of external public realm (hard and soft landscaping). A Site location plan and architect's impression of the proposed development and associated layout are included as Enclosures 1 & 2 respectively.

This letter summarises the work undertaken to date in relation to ground contamination (Section 2) and sets out the proposed outline remedial strategy for the Site (Section 3).

2. Summary of Site Assessment Work

This section aims to provide sufficient information to the Local Planning Authority and associated statutory consultees in relation to the Site's condition. Table 1 below lists the contamination related assessment and Site investigation works previously undertaken at the Site to date.

Table 1 - Summary timeline of ground contamination works relating to the Site

Report Reference	Description of works undertaken	Contamination Ground Investigation	Date
Report 0	ROC Consulting Phase 1 Desk Study	Preliminary Conceptual Site Model	July 2015
Report 1 (MF-BHE-XX-XX-RP-CG-0001-PO1)	BuroHappold Ground Engineering Desk Study Report	Preliminary Conceptual Site Model	6th September 2016
Report 2 (Factual Report A6053-16)	BuroHappold/ESG – Site Specific Ground Investigation (East of Water Street)	3 No. boreholes, 11 No. window samples, 8 No. hand dug trial pits and 5 No. machine excavated trial pits.	October 2016 (Site work between 23 June 2016 – 12 July 2016)
Report 3 (Factual Report A6131-16)	BuroHappold/ESG – Site Specific Ground Investigation (West of Water Street)	2 No. boreholes, 1 No. machine excavated trial pit.	May 2017 (Site work between 9-23 January)
Report 4 (Factual Letter A7064-17)	BuroHappold/SOCOTEC (formerly ESG) – Site Specific Ground Investigation (Starlight Theatre)	4 No. machine excavated trial pits	12 March 2018 (Site work between 19-20 December 2017)

The following sections summarise pertinent parts the above assessments.

Report 1: BuroHappold Ground Engineering Desk Study Report

The Site is located at the former Granada TV Studio on Water Street, Manchester and is approximately 550 m northwest of Deansgate Railway Station.

The Site is approximately 0.73 hectares in area and is currently occupied by surface car parking, a Grade II Listed Colonnaded Railway Viaduct, the Starlight Theatre (overlying the railway arches), and a number of structures and buildings associated with former Granada TV filming and events. The railway viaduct comprises two sets of railway arches, namely the St. John's arches (on Site) and the Museum of Science and Industry (MoSI) arches (off Site), which approximately form the southern Site boundary. Water Street (orientated SW-NE) runs centrally through the Site.

The Site has had a variety of historical industrial land uses including warehouses, wharfs, and railway sidings. Historically off Site industrial uses have included a timber yard ~20-30 m to the east and an engineering works adjacent to the north of the Site.

No contamination related risks above Low were identified at Desk Study stage.

A copy of the BuroHappold Ground Engineering Desk Study Report has previously been submitted to the Local Planning Authority as part of the original planning submission.

Reports 2, 3 and 4: Three phases of ground investigation

Due to access restrictions (primarily associated with Network Rail occupying the Site to the west of Water Street), three phased ground investigations were undertaken across the Site by ESG supervised by BuroHappold.

Report 2: ESG undertook the first phase of ground investigation at the Site, east of Water Street during June – July 2016. This phase comprised 3 No. cable percussive boreholes with rotary follow-on, 11 No. window samples, 8 No. hand dug trial pits, 5 No. machine dug trial pits, geotechnical and chemical laboratory testing, installation of gas and groundwater monitoring wells and a programme of gas and groundwater monitoring.

Report 3: ESG undertook the second phase of ground investigation (west of Water Street, after Network Rail allowed access) during January 2017. This comprised 2 No. boreholes using combined dynamic sampling and rotary drilling, 1 No. machine excavated trial pit, geotechnical and chemical laboratory testing, installation of gas and groundwater monitoring wells and a programme of gas and groundwater monitoring.

Report 4: SOCOTEC UK Ltd. (formerly ESG) were commissioned to undertake the third phase of ground investigation during December 2017, which comprised 4 No. machine dug trial pits to inspect the material located above the crown of the arches of the Colonnaded Railway Viaduct, along with chemical laboratory testing.

A copy of each of the above Factual Reports have previously been submitted to the Local Planning Authority as part of the original Planning Submission.

Exploratory hole location plans detailing the works undertaken across the three phases of GI are included as Enclosure 3.

The Site ground conditions were assessed on the basis of the Site specific available information. The general sequence of strata encountered beneath the proposed development (summarised in Table 2) comprises Made Ground (MG) which is underlain by superficial deposits: Alluvium (both cohesive and granular), and Glaciofluvial Deposits (granular material – recorded in BH02 only). The cohesive Alluvium was encountered sporadically, within 10 No. exploratory holes out of 28. The Chester Formation bedrock underlies the superficial deposits. Rockhead was recorded between 21.60 and 23.10 m AOD during the GI.

During the ground investigations, groundwater was struck between 2.20 and 3.10 m BGL within several exploratory holes within the granular Alluvium.

Post fieldwork groundwater levels within the Chester Formation bedrock were recorded between 23.13 and 23.51 m AOD (~2.80 to 3.30 m BGL) within the granular Alluvium, and between 22.87 and 23.63 m AOD (~2.80 to 3.80 m BGL). It is therefore considered that the two strata are in hydraulic continuity. Perched water was recorded in 2 No. of the 4 No. wells installed within the Made Ground, between 1.80 and 3.05 m BGL.

Table 2 - Summary of the ground conditions encountered at the Site.

Depth to Top of Strata (m BGL)	Typical Thickness (m)	Generalized Description
0.00	0.80 – 2.50 (3.75 in BH05)	MACADAM or CONCRETE OVER Grey, yellow, brown and black sandy/very sandy gravel and very gravelly sand of sandstone, limestone, mudstone, coal, slate, brick, concrete clinker and glass, with occasional cobble content of sandstone and brick AND Soft to firm brown and black, sandy, gravelly, clay with localised silt and sand of ash. Gravel of fine to course brick, coal, quartzite, limestone, mudstone, slate and timber with occasional cobbles of brick. [MADE GROUND]
1.60 – 1.80 (HTP09 & HTP10)	0.10 – 0.60	Soft yellowish brown and brown slightly sandy, slightly gravelly CLAY. Gravel of sandstone and mudstone. [POSSIBLE MADE GROUND]
0.80 – 2.50 (Sporadic)	0.50 – 1.30	Soft to firm brownish yellow mottled grey, slightly sandy, slightly gravelly CLAY. Gravel of sandstone and mudstone. [ALLUVIUM – COHESIVE]
1.50 – 2.50	1.40 – 3.10	Medium dense to very dense dark brown, orange brown and occasionally grey slightly gravelly to gravelly SAND and sandy, silty GRAVEL. Gravel of sandstone and mudstone with occasional limestone, quartzite and siltstone. [ALLUVIUM – GRANULAR]
3.20 (Encountered in BH02 only)	1.20	Brownish grey, becoming yellowish grey, gravelly SAND and sandy GRAVEL. Gravel of sandstone, quartzite and siltstone. [GLACIOFLUVIAL DEPOSITS]
3.40 – 4.60	>25.60	Reddish brown slightly gravelly silty SAND. AND Extremely weak to weak reddish brown to greenish grey medium grained SANDSTONE. Discontinuities are: 1. Subhorizontal, closely to medium spaced, rough, planar, undulating, smooth. 2. Subvertical, widely spaced, tight, planar, smooth with sand smearing and local clay smearing. [CHESTER FORMATION – SHERWOOD SANDSTONE GROUP]

3. Chemical Testing Results

As part of the three phases of ground investigation, chemical testing was undertaken within both Made Ground and natural material and assessed against the relevant thresholds. A brief summary is presented below.

Soil Results and Risk to Human Health

In total, 20 No. soil samples (Made Ground: 17 No. and natural material: 3 No.) were tested and assessed against the relevant CLEA model thresholds (commercial / industrial, S4SLs and C4SLs derived for 1% SOM).

Commercial criteria are considered suitable for the proposed end use as a theatre / public realm space due to the following reasons:

- End users will be transient;
- The vast majority of the proposed development area will be covered by the building, with the remainder covered by hard or soft landscaping; and
- Floor slabs and landscaped areas will be underlain by a clean capping layer.

No exceedances of the CLEA model commercial / industrial thresholds for the analysed determinands were recorded. No Asbestos Containing Material (ACM) was identified in the 20 No. samples analysed.

Several chemical exceedances were recorded above the more sensitive CLEA model residential without plant uptake thresholds, including TPH, lead, arsenic and PAHs. The results are included as Enclosure 4.

Visual / olfactory evidence of contamination was recorded during the first phase of the ground investigation in 2 No. exploratory holes, namely WS09, 3.30 to >3.85 m BGL (maximum depth drilled with a 'strong diesel odour – hydrocarbon') and MTP05, 0.30 to >3.10 m BGL (maximum depth drilled; 'slight hydrocarbon odour').

Samples of these materials were sent to a laboratory to be analysed for a suite of potential contaminants. Soil analysis results recorded concentrations of TPH, lead and PAH above residential without plant uptake thresholds. The highest TPH value recorded on Site was within HTP11 at 1.00 m BGL (192 0mg/kg TPH), despite no visual / olfactory evidence of contamination being noted; this material represents historic backfilling on top of the St John's arches.

Leachate and Groundwater Results: Risks to Environmental Receptors

Leachate and groundwater testing were undertaken in order to assess indicative current levels of contamination within the groundwater, and to assess the risk of future contamination to nearby controlled water receptors (Chester Formation Principal Aquifer and River Irwell). The results are included as Enclosure 5.

Leachate

Eleven leachate tests undertaken as part of the ground investigation recorded sporadic minor exceedances of the UK DWS of antimony, barium, benzo[a]pyrene and fluoride, and minor exceedances of the Freshwater EQS of pH and sulphate (Note: PAHs and TPH only tested in two of the eleven samples). Several other determinands (lead, copper, zinc and chromium) recorded concentrations between the two assessment criteria used (above the Freshwater EQS but below the UK DWS).

Based on the minor exceedences of the Freshwater EQS and UK DWS, the potential for leaching of contaminants from Site soils into controlled waters is considered to be low. Furthermore, the groundwater concentrations are also low (see next section) giving a further line of evidence to the low leachability of soils.

Groundwater

Two groundwater samples were collected on one occasion by bailer during post-fieldwork monitoring and tested in the laboratory. The two samples were taken from different wells (BH01 and BH05), both with response zones within the Chester Formation bedrock (i.e. deeper groundwater). One exceedance was recorded in BH01: benzo[a]pyrene exceeding the UK DWS by 17 times. In BH05, a substantial concentration of TPH was recorded (14,000 $\mu g/m^3$); however, no visual or olfactory signs of contamination were reported during groundwater sampling.

The monitoring undertaken suggests some hydrocarbon impact to groundwater within the Chester Formation aquifer; however, there is no evidence to suggest that this impact originates from the Site:

- On-Site processes unlikely to have resulted in such contamination;
- The origin of the TPH impacts recorded at BH05 is unclear and may be from an off-Site source (engineering works and timber yard are recorded off Site on historical maps);
- Chemical analysis of soils in the location of BH05 recorded low TPH concentrations (58 and 40 mg/kg at 1 and 3 m BGL respectively).
- Within the upper strata of both BH01 and BH05, no visual / olfactory evidence of contamination was noted, and no elevated TPH was recorded during soil chemical testing. This suggests migration of contamination within the groundwater;
- No CLEA commercial threshold exceedances were recorded in the Site soils; and
- Soil leachability tests reported low leachability.

4. Ground Gas

6 No. ground gas monitoring events were undertaken on the 8 No. monitoring wells as part of the post fieldwork monitoring visits between 28 July and 20 October 2016. The findings of the monitoring events undertaken are outlined below and a summary of the monitoring results obtained is included in Enclosure 6:

- The maximum concentration of carbon dioxide recorded during the monitoring events was 3.7% in 1 No. installation, namely BH04 on the 22.03.2017 (response zone 1.00 to 3.00 m BGL in Glaciofluvial Deposits);
- The maximum concentration of methane was recorded to be <0.1% for the installations; and
- The maximum flow rate was recorded to be 0.1%.

On the basis of this information, the Site is classified as Characteristic Situation 1 (CS1).

Conclusion

Concentrations in soil were recorded below the relevant CLEA commercial thresholds and are therefore considered suitable for use for the proposed development. The soils data indicates that some contaminants are present within Site Made Ground; however, the maximum concentrations recorded do not indicate that the Site is substantially impacted by contamination. Impacts within the Made Ground are therefore not considered to pose a risk either to future end users of the development or environmental receptors.

Suitable and appropriate health and safety measures / procedures will need to be implemented to protect the construction workforce from an associated risk. The procedure for dealing with unexpected contamination ‘hotspots’ is outlined in the Remediation Strategy (Section 3) and the BuroHappold Excavation and Filling Specification (MF-BHE-XX-XX-SP-CG-00-0001; herein referred to as the E&F Spec).

The evidence from leachate and groundwater results suggests that there is a low potential for impacts to controlled waters originating from the Site.

The future development will introduce impermeable surfaces over the proposed development and sealed drainage discharging to the River Irwell. This will substantially reduce infiltration through Site Made Ground and so will further reduce potential impacts to controlled waters.

The Site is classified as Characteristic Situation 1 (CS1), suggesting that ”no special precautions” are required, in accordance with CIRIA C665 and the British Standard BS8485:2015.

3. Outline Remediation Strategy / Works Methodology

This section provides details of the remediation strategy and works methodology for managing the contaminated land aspects of the construction works that is to be managed and implemented by the Site team during the enabling works package/construction phase of works.

This strategy is also presented in the relevant sections of the E&F Spec. These have been compiled into a specific contaminated land document (REM Clauses) which is provided in Enclosure 7.

It should also be noted that as part of the proposed Remediation Strategy, further acceptability testing will be carried out in accordance with the E&F Spec.

The following should be noted:

- Chemical concentrations in soils are not anticipated to pose a risk to future Site users as:
  - Contaminant concentrations of in-situ soils at the Site were reported below CLEA commercial / industrial values;
  - No imported material exceeding the CLEA residential without plant uptake values will be accepted on to the Site from off site sources;
  - Only topsoil with concentrations lower than the CLEA residential with plant uptake values will be used in landscaped areas; and
  - Building and hardstanding is proposed across the Site with only limited soft landscaping.
- No asbestos containing materials were recorded in Site soils during three phases of GI.

The outline remediation strategy is as follows:

- The works for the construction of the proposed development comprise a bulk earthworks exercise to rationalise levels across the Site using Site won material and some cutting and filling of existing levels. Recycled and / or quarried 6F2 will be imported to be utilised for the piling mat laid on a geotextile;
- Earthworks will be completed in accordance with the Buro Happold E&F Spec REM Clauses document (Enclosure 7). Excess material, as well as geotechnically or chemically unsuitable material (as defined in the E&F Spec) encountered during the works will be removed from Site;
- Fill material, either Site won arisings or imported material including topsoil, will be tested for the list of determinands specified in Clauses 510 and 850 of the E&F Spec (Enclosure 7);
- The top ~400 mm of material used within the piling mat will be removed from Site after piling is complete, leaving the lower portion (i.e. ~250 mm envisaged) of the piling mat on Site in the permanent case. This material will double up as the sub-base to the ground bearing slab. This material will be tested as it is placed to ensure it complies geotechnically and chemically with the E&F Spec;
- Imported material used on Site will be tested to ensure that it complies with the CLEA residential without plant uptake thresholds within the E&F Spec (Enclosure 7);
- If asbestos not currently identified in site soils is encountered during construction works, the contractor is to manage residual risk posed to site workers and off Site receptors within arisings generated from excavations on Site. This will be undertaken by employing dust control measures such as damping down and management of on Site vehicle speeds. If encountered, significant asbestos contamination will be removed from Site as part of construction works. Construction works will place sufficient barriers at the Site surface to be protective of future Site users should residual asbestos be encountered in Site soils during the works;
- Imported and Site-won material that is considered non-compliant in terms of geotechnical properties will not be accepted and will be removed from Site;
- The Main Contractor will be required to control the permeation of water through the ground during construction and surface runoff to the River Irwell;

- Construction Site staff will be vigilant for visual or olfactory evidence of contamination, as well as asbestos, during earthworks. Should unexpected contamination be encountered, work will be stopped in that area of the Site, the material location recorded and covered over and an appropriate strategy agreed with the Local Authority. The full procedure is outlined in the E&F Spec (Enclosure 7);
- As detailed above, a ground gas assessment has classified the site as CS1. As such, and in accordance with CIRIA C665 guidance, no special ground gas precautions are required on the Site.

BuroHappold are seeking comment on and approval of this proposed strategy and on the Excavation and Filling Specification provided in Enclosure 7.

Yours sincerely
on behalf of BuroHappold Limited

G. Mitchell

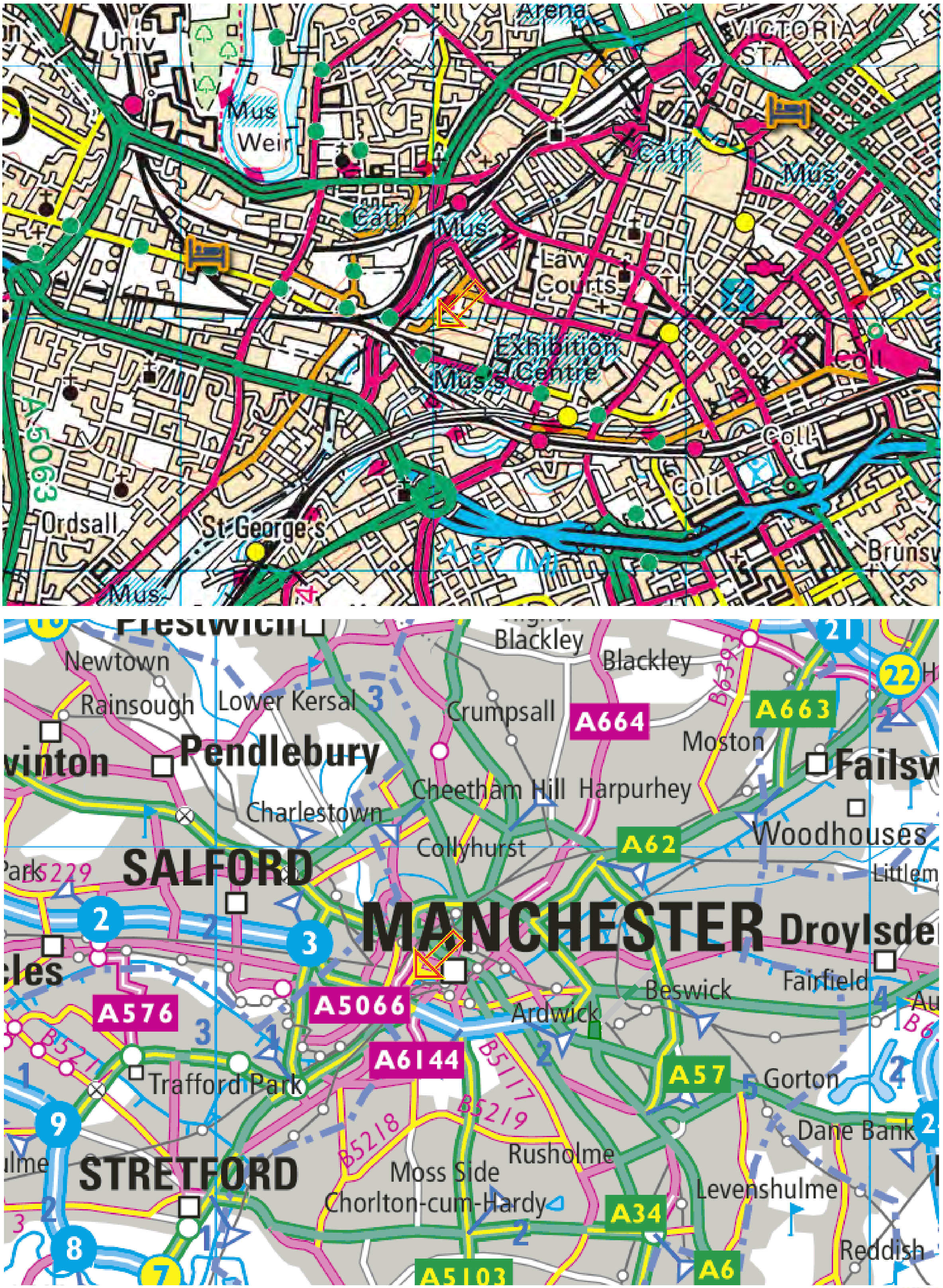
George Mitchell
Ground Engineer
email george.mitchell@burohappold.com

Reviewed by

Rob Frost
Associate Director – Geoenvironmental Consultant

Encs
1. Site Location Plan
2. Development Details – Architectural Plans
3. GI Exploratory Hole Location Plan
4. Chemical Assessment Summary Spreadsheets: Soil
5. Chemical Assessment Summary Spreadsheets: Leachate and Groundwater
6. Ground Gas Summary Spreadsheet
7. BuroHappold Excavation & Filling Specification REM Clauses

Enclosure 1


Univ
Arena
VICTORIA STA
Mus
Weir
Cath
Mus
Cath
Mus
Law Courts
TH
Exhibition Centre
Mus
Coll
Coll
A 5063
Ordsall
St George's
A 57 (M)
Mus
Brunsw
Prestwich
Newtown
Blackley
Blackley
Rainsough
Lower Kersal
Crumpsall
A664
B6393
A663
Moston
Failsw
Pendlebury
Cheetham Hill
Harpurhey
Charlestown
Woodhouses
Collyhurst
A62
SALFORD
B5229
MANCHESTER
Droylsde
Fairfield
A576
A5066
Beswick
Ardwick
A6144
B5117
A57
Gorton
Trafford Park
B5219
B5218
Dane Bank
STRETFORD
Moss Side
Rusholme
Chorlton-cum-Hardy
Levenshulme
A34
A6
A5103
Reddish
2
3
9
8
7
21
22

Reproduced from Ordnance Survey by permission of ordnance survey® on behalf of the controller of Her Majesty's stationary office, Crown Copyright 2003 all rights reserved. Licence number: AL 100005517.

Project Name : Factory Theatre

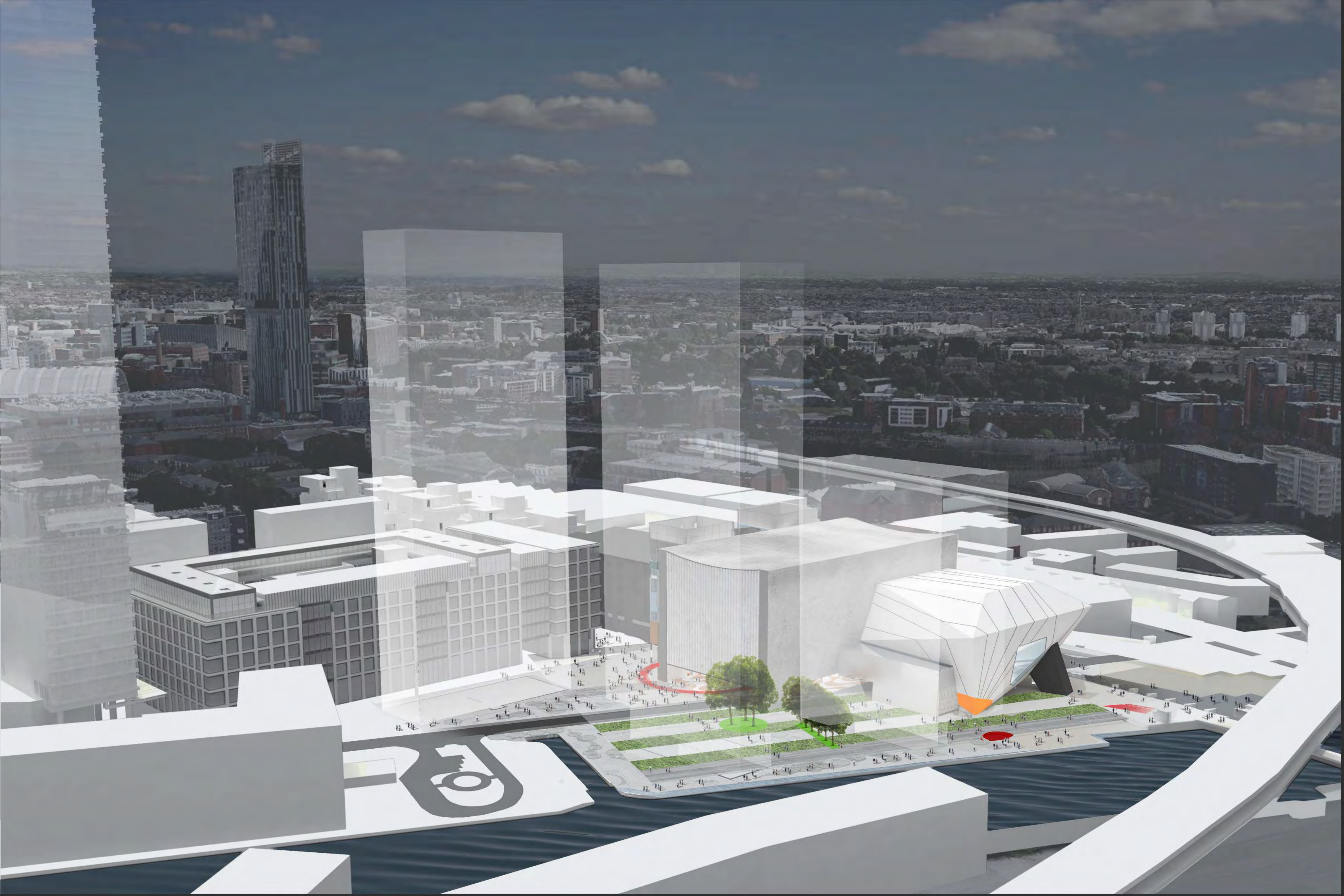
Report Title : Land Contamination Summary and Outline Remediation Strategy

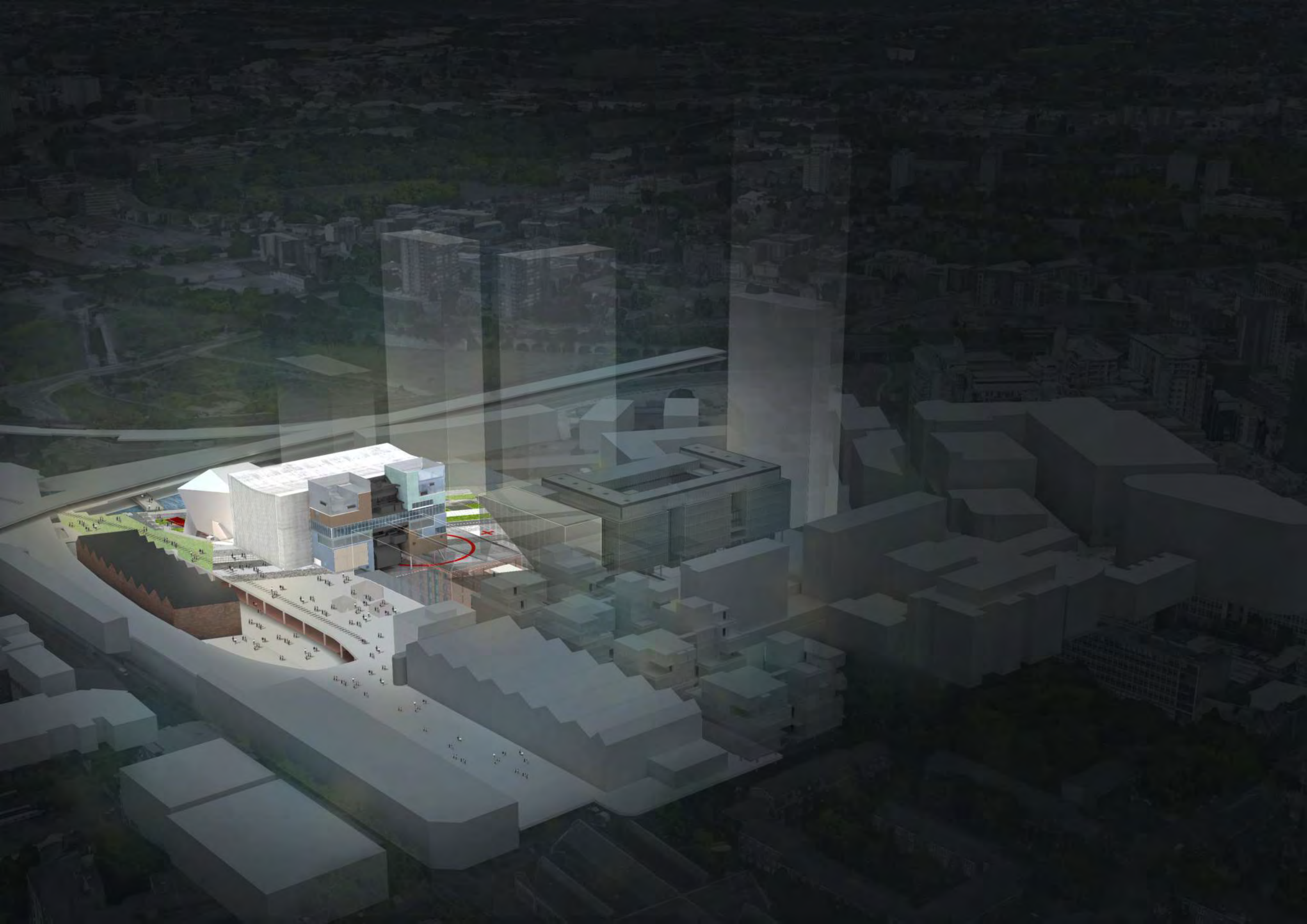
Figure Title : Site Location Plan

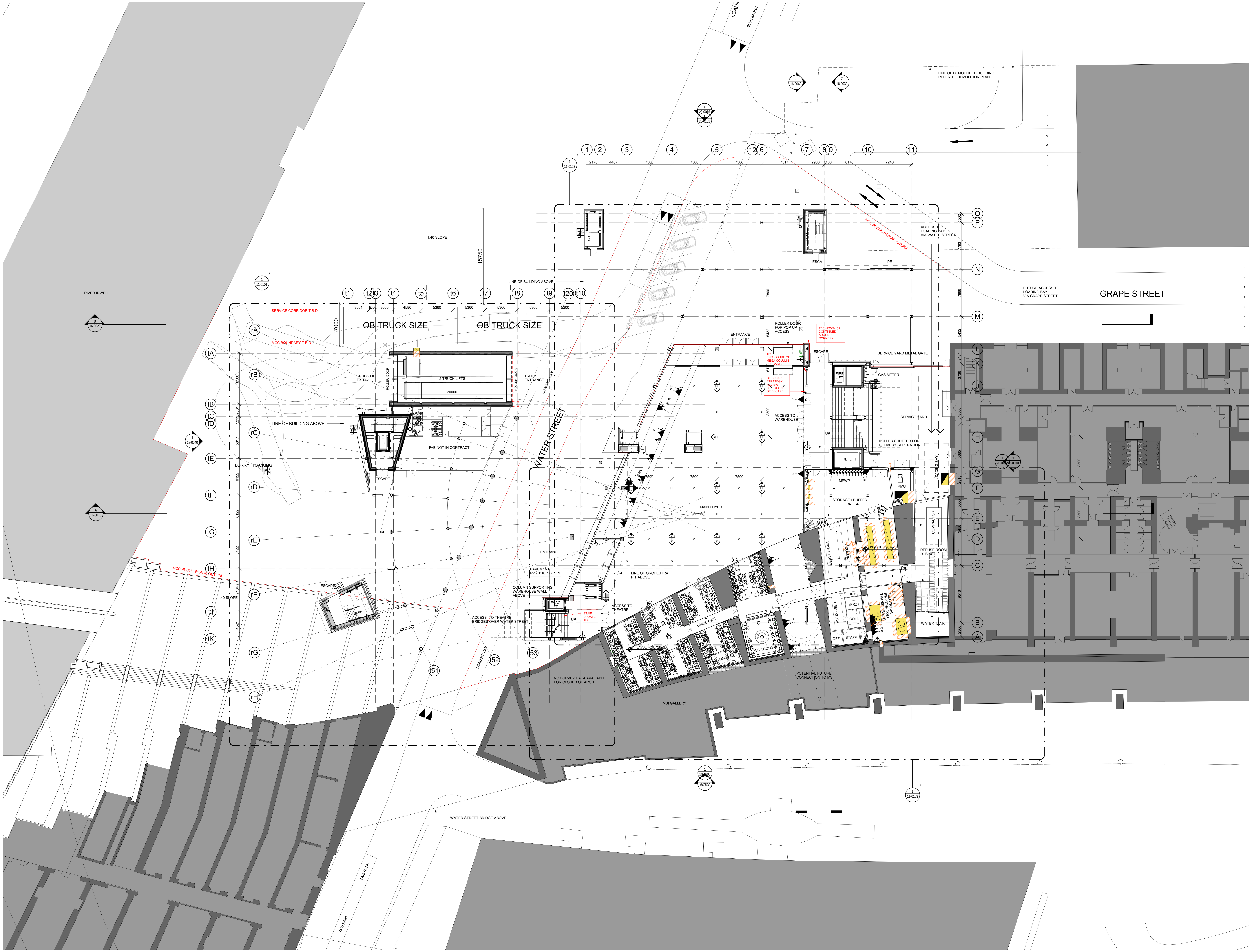
Scale: NTS	**Date:** Oct 2018	**Job No:** 034933	**Enclosure:** 1

BUROHAPPOLD ENGINEERING

Enclosure 2






RIVER IRWELL
WATER STREET
GRAPE STREET
OB TRUCK SIZE
OB TRUCK SIZE
2 TRUCK LIFTS
TRUCK LIFT EXIT
TRUCK LIFT ENTRANCE
LOADING BAY
LINE OF BUILDING ABOVE
LINE OF DEMOLISHED BUILDING REFER TO DEMOLITION PLAN
SERVICE CORRIDOR T.B.D.
MCC BOUNDARY T.B.D.
MCC PUBLIC REALM OUTLINE
LORRY TRACKING
F+B NOT IN CONTRACT
ESCAPE
1:40 SLOPE
ENTRANCE
ROLLER DOOR FOR POP-UP ACCESS
ACCESS TO WAREHOUSE
MAIN FOYER
SERVICE YARD METAL GATE
GAS METER
FIRE LIFT
SERVICE YARD
ROLLER SHUTTER FOR DELIVERY SEPERATION
ACCESS TO LOADING BAY VIA WATER STREET
FUTURE ACCESS TO LOADING BAY VIA GRAPE STREET
MEWP
STORAGE / BUFFER
RMU
COMPACTOR
REFUSE ROOM 20 BINS
WATER TANK
DRY
FRZ
COLD
PREP KITCH
STAFF
OFF.
ELECTRICAL SUBSTATION TRANSFORMERS
UNISEX WC
WC TROUGH
PAVEMENT 6% / 1:16.7 SLOPE
COLUMN SUPPORTING WAREHOUSE WALL ABOVE
LINE OF ORCHESTRA PIT ABOVE
ACCESS TO THEATRE
ACCESS TO THEATRE BRIDGES OVER WATER STREET
NO SURVEY DATA AVAILABLE FOR CLOSED OF ARCH
MSI GALLERY
POTENTIAL FUTURE CONNECTION TO MSI
WATER STREET BRIDGE ABOVE
TAXI RANK
BLUE BADGE
FFL/SSL +26.720
15750
20000

1 FLOOR PLAN - GROUND FLOOR

SCALE: 1 : 200

FACTORY MANCHESTER

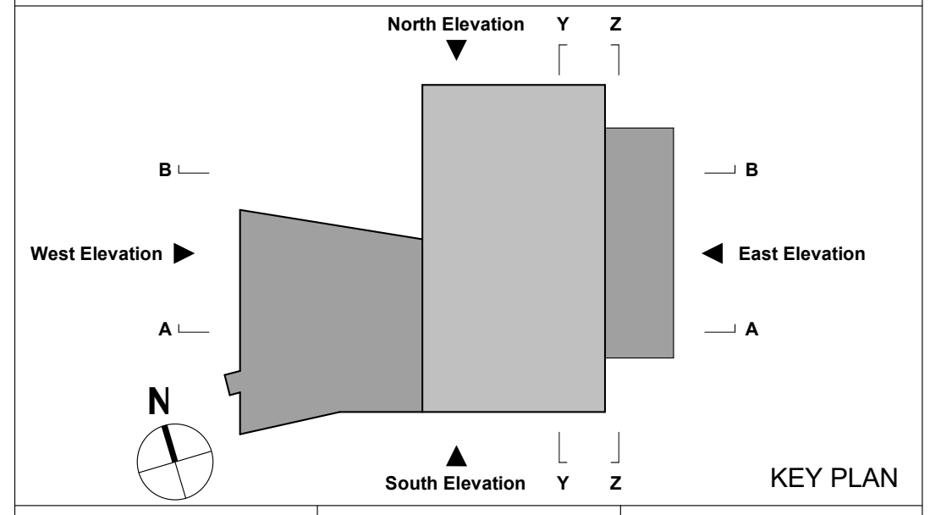
MANCHESTER CITY COUNCIL Albert Square, Town Hall M2 5DB Manchester, United Kingdom T: +44 (0) 161 234 5004	CLIENT
OMA Heer Bokelweg 149 3032 AD Rotterdam, Netherlands t: +31 (0) 10 2438200	ARCHITECT
BURO HAPPOLD 230 Lower Bristol Road BA2 3DQ Bath, United Kingdom T: +44 (0) 122 532 0600	STRUCTURAL ENGINEER
BDP 11 Ducie Street M1 2JB Manchester, United Kingdom T: +44 (0) 161 828 2200	MECHANICAL AND ELECTRICAL ENGINEER
BURO HAPPOLD 230 Lower Bristol Road BA2 3DQ Bath, United Kingdom T: +44 (0) 122 532 0600	FACADE ENGINEER
WSP The Victoria, 150-182 The Quays M50 3SP Manchester, United Kingdom T: +44 (0) 161 886 2400	FIRE ENGINEER
LEVEL ACOUSTICS De Rondom 10 5612 AP Eindhoven, Netherlands T: +31 (0) 40 247 2700	ACOUSTIC CONSULTANT
CHARCOAL BLUE 180 Strand WC2R 3DA London, United Kingdom T: +44 (0) 207 928 0000	THEATRE CONSULTANT

N 398030031 E 383033226	NORTHING COORDINATE EASTING COORDINATE
+26.720	SPOT HEIGHT
GF +26.720	LEVEL LEVEL HEIGHT
FFL/SSL +26.720	LEVEL HEIGHT (FFL SAME AS SSL)
+26.720 +26.670	FINISHED FLOOR LEVEL STRUCTURAL SLAB LEVEL
0	*GRID LINE*
1 11_101	*CALLOUT* DETAIL NUMBER DRAWING REFERENCE
1 11_101	*ELEVATION* DETAIL NUMBER DRAWING REFERENCE
1 11_101	*SECTION* DETAIL NUMBER DRAWING REFERENCE
1 Ref 1 Ref 30_011 1 Ref 1 Ref	*INTERNAL ELEVATION* DETAIL NUMBERS DRAWING REFERENCE
+26.720 +26.720	*SPOT HEIGHT ELEVATION* ARCHITECTURAL ABOVE ARCHITECTURAL BELOW
+26.720 +26.720	STRUCTURAL ABOVE STRUCTURAL BELOW
WAREHOUSE 201	*ROOM TAG* ROOM NAME ROOM NUMBER
FFF000 CFF000 FFB000 CBF000	*ROOM TAG* FLOOR FINISH CEILING FINISH FLOOR BASE CEILING BASE
000A 000 60s 30dB	*DOOR TAG* DOOR NUMBER DOOR TYPE FIRE RATING ACOUSTIC RATING
A1 FireRatingRequired AcousticRatingRequireddB	*WALL TAG* WALL TYPE FIRE RATING ACOUSTIC RATING
EWS522	*WALL TAG* EXTERNAL WALL TYPE
ST-02	*MULTI CATEGORY TAG* TYPE NUMBER
12 Risers 170 / 250	*STAIR TAG* NUMBER OF RISERS RISER HEIGHT TREAD DEPTH
⊠	*FLOOR BOX*
	NOT IN CONTRACT

P8	S2	23 Mar 2018	ISSUED FOR PLANNING
P7	S3	16 Mar 2018	INTERIM DESIGN RELEASE
P6	S0	21 Dec 2017	WIP INTERIM GA SUBMISSION
P5	S2	29 Sept 2017	PLANNING APPLICATION
P4	S3	11 Aug 2017	RIBA STAGE 3 SUBMISSION
REV	STAT	DATE	DESCRIPTION

DO NOT SCALE FROM THIS DRAWING. USE FIGURED DIMENSIONS ONLY. FIGURED DIMENSIONS ARE IN MILLIMETRES. ALL LEVELS ARE IN METRES. ALL DIMENSIONS AND LEVELS SHALL BE VERIFIED ON SITE BEFORE PROCEEDING WITH WORKS. DETAILED SITE SURVEY TO BE CARRIED OUT TO VERIFY POSITIONS AND LEVEL RELATIONSHIPS WITH SITE FEATURES AND ORDINANCE SURVEY. BOUNDARIES ARE INDICATIVE ONLY AND ARE TO BE VERIFIED BY OTHERS. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER DOCUMENTATION FROM THE ARCHITECT, DESIGN TEAM, MANAGEMENT CONTRACTOR AND EMPLOYER. THE ARCHITECT MUST BE NOTIFIED OF ANY DISCREPANCIES.
WHERE BUILDING COMPONENTS ARE DESCRIBED IN THE SPECIFICATION AS CONTRACTOR DESIGNED, "CONSTRUCTION" INFORMATION RELATING TO THOSE COMPONENTS THAT ARE SHOWN ON THIS DRAWING REPRESENT DESIGN INTENT ONLY.

THIS DOCUMENT CONTAINS COPYRIGHTED MATERIAL. ANY UNAUTHORIZED USE, DISCLOSURE, DISSEMINATION OR DUPLICATION OF ANY OF THE INFORMATION CONTAINED HEREIN MAY RESULT IN LIABILITY UNDER APPLICABLE LAWS.


North Elevation
Y
Z
B
B
West Elevation
East Elevation
A
A
N
South Elevation
Y
Z

KEY PLAN

DRAWN BY	Author	CHECKED BY	Checker	APPROVED BY	Approver

PROPOSED GROUND FLOOR PLAN

DRAWING NAME

PHASE

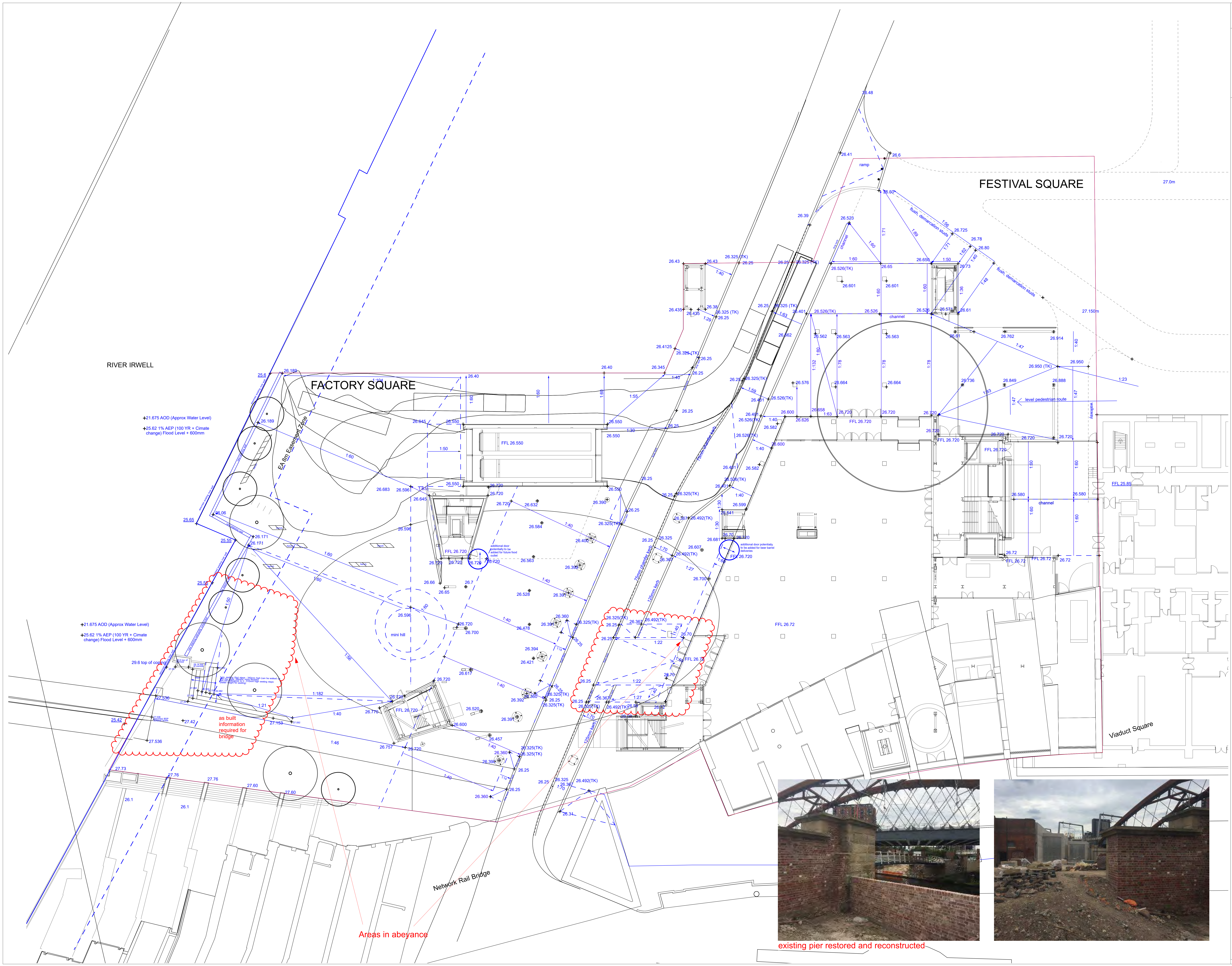
P8
REVISION

xxxx	1:200	A0	03/04/16
PROJ. NR.	SCALE	FORMAT	DATE

MF-OMA-XX-GF-DR-A-10-0100

DRAWING NUMBER

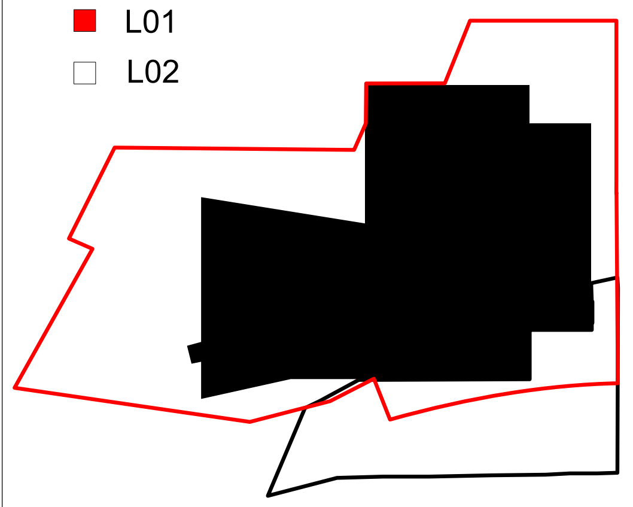
18/07/2018 10:16:53


RIVER IRWELL
FACTORY SQUARE
FESTIVAL SQUARE
EA 8m Easement Zone
+21.675 AOD (Approx Water Level)
+25.62 1% AEP (100 YR + Cimate change) Flood Level + 600mm
mini hill
29.6 top of coping
as built information required for bridge
Areas in abeyance
Network Rail Bridge
Viaduct Square
ramp
channel
walkway
flush demarcation studs
level pedestrian route
additional door potentially to be added for future flood outlet
additional door potentially to be added for beer barrel deliveries
FFL 26.550
FFL 26.720
FFL 26.72
FFL 25.85
27.0m
27.150m
existing pier restored and reconstructed

© THIS DRAWING IS COPYRIGHT PROTECTED AND MAY NOT BE REPRODUCED IN WHOLE OR PART WITHOUT WRITTEN AUTHORITY FROM THE OWNER.

NOTE:

1. Do not scale from this drawing.
   Always work to noted dimensions.
2. All dimensions are in millimetres unless otherwise stated.
3. All setting out, levels and dimensions to be agreed on site.
4. The dimensions of all materials must be checked on site before being laid out.
5. This drawing must be read with the relevant specification clauses and detail drawings.
6. Order of construction and setting out to be agreed on site.



NOTE:

Proposed Levels are indicative only and subject to change once landscape design proposals have been developed.

KEY

🟥	**Assumed Level 01 Site Boundary**
+34.91	**Existing Site Levels retained**
+34.91	**Proposed Site Levels**
+34.91 (TK)	**Top of Kerb Level**
+34.91 (BK)	**Bottom of Kerb Level**
← 1:50	**Direction of Fall & Gradient**
Drainage Channel	**Drainage Channel**
▭	**Retaining Wall**
steps	**Steps** 6 no. of steps - 170mm high
	Seating Steps 3 no. seating (big) steps - 340mm high (can be walked up with big steps, therefor more flexible) can be redesigned to 2 - 510mm high seating steps (better height for seating)
◯	**Mini Hill**

Issue	Date	Status	Drawn	Apprvd.

Planit Intelligent Environments LLP
E: info@planit-ie.com
W: planit-ie.com

MANCHESTER
2 Back Grafton St
Altrincham
WA14 1DY
T: 0161 928 9281

LONDON
Unit 6 Waterside
44-48 Wharf Road
London
N1 7UX
T: 0207 253 5678

Client OMA/MCC

Project Factory

Drg Title Proposed Levels - L01
- Lower Ground Floor

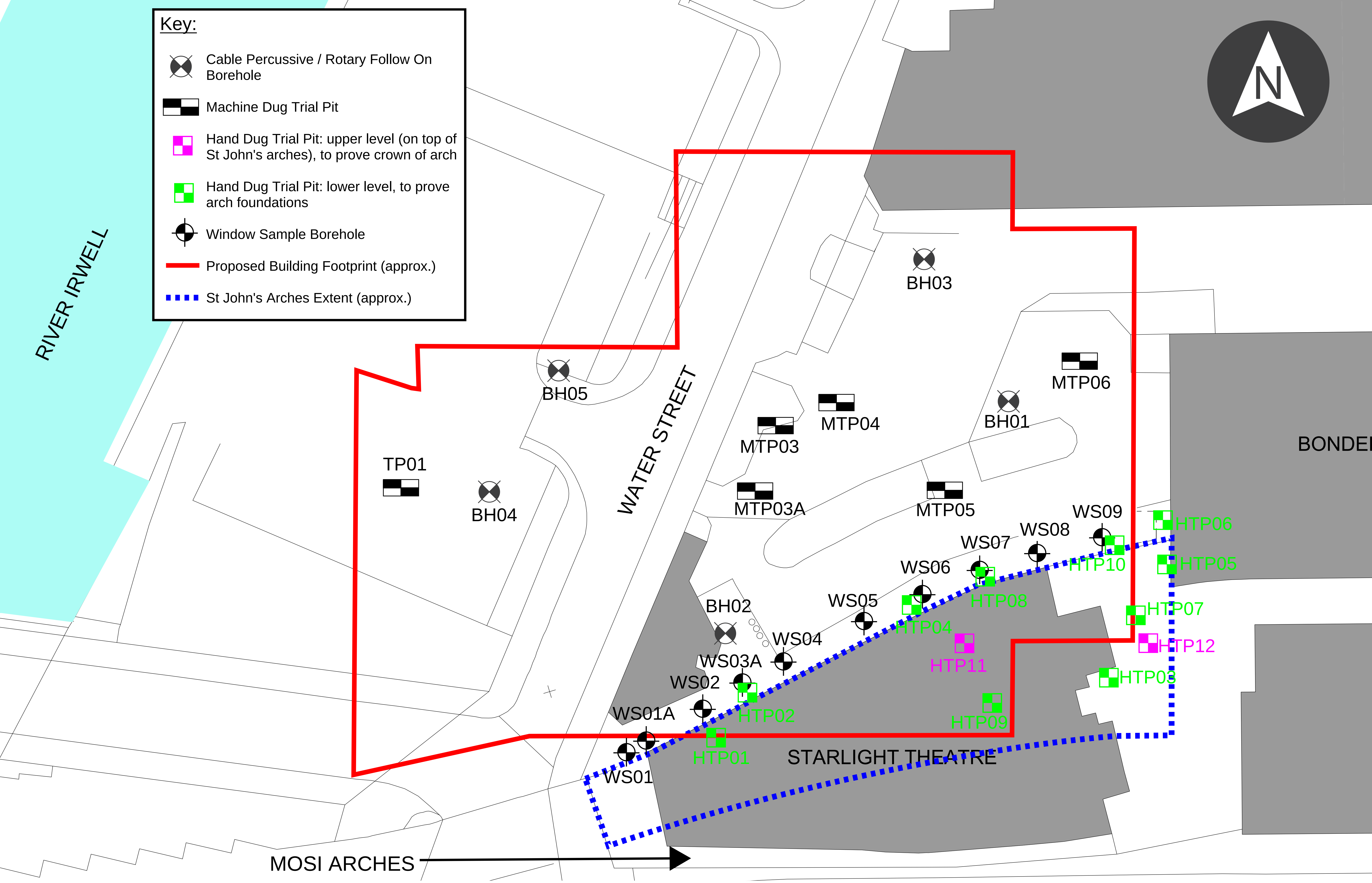
Created on	Created by	Approved by
10.04.18	AS, AM	AM

Scale	Size	Status
1:250	A1	For Comment

Drg No.	Issue No.
PL1803-PLA-L1-DR-L-3003	07

© Planit Intelligent Environments LLP

Enclosure 3


Key:
Cable Percussive / Rotary Follow On Borehole
Machine Dug Trial Pit
Hand Dug Trial Pit: upper level (on top of St John's arches), to prove crown of arch
Hand Dug Trial Pit: lower level, to prove arch foundations
Window Sample Borehole
Proposed Building Footprint (approx.)
St John's Arches Extent (approx.)
N
RIVER IRWELL
WATER STREET
BH03
BH05
BH04
BH01
BH02
TP01
MTP03
MTP03A
MTP04
MTP05
MTP06
BONDE
WS01
WS01A
WS02
WS03A
WS04
WS05
WS06
WS07
WS08
WS09
HTP01
HTP02
HTP03
HTP04
HTP05
HTP06
HTP07
HTP08
HTP09
HTP10
HTP11
HTP12
STARLIGHT THEATRE
MOSI ARCHES

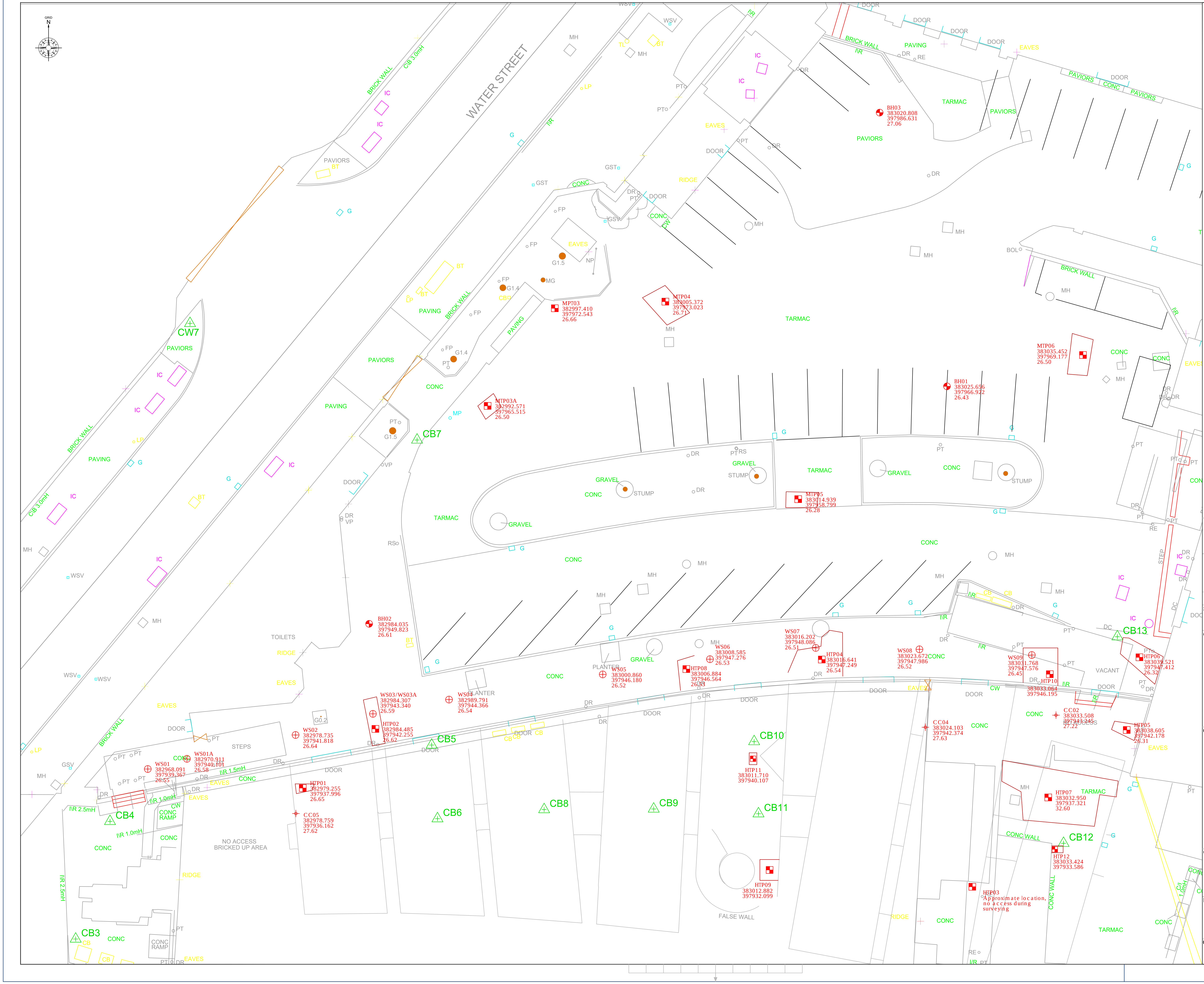
BUROHAPPOLD
ENGINEERING

JOB TITLE: Factory Theatre
JOB NUMBER: 034933
DOC NUMBER: MF-BHE-XX-XX-RP-CG-0002

SKETCH NUMBER: Enclosure 3
SKETCH TITLE: Exploratory Hole Location Plan
REVISION NUMBER: 00

DATE: Oct 2018
INITIALS: GM

Copyright © 1976-2018 BuroHappold Engineering. All Rights Reserved.


GRID
N
WATER STREET
BRICK WALL
CB 3.0mH
PAVIORS
PAVING
TARMAC
CONC
GRAVEL
STUMP
TOILETS
STEPS
NO ACCESS
BRICKED UP AREA
FALSE WALL
VACANT
CW7
CB3
CB4
CB5
CB6
CB7
CB8
CB9
CB10
CB11
CB12
CB13
BH01 383025.656 397966.922 26.43
BH02 382984.035 397949.823 26.61
BH03 383020.808 397986.631 27.06
MPT03 382997.410 397972.543 26.66
MTP03A 382992.571 397965.515 26.50
MTP04 383005.372 397973.023 26.71
MTP05 383014.939 397958.799 26.28
MTP06 383035.452 397969.177 26.50
WS01 382968.091 397939.367 26.55
WS01A 382970.911 397940.101 26.58
WS02 382978.735 397941.818 26.64
WS03/WS03A 382984.307 397943.340 26.59
WS04 382989.791 397944.366 26.54
WS05 383000.860 397946.180 26.52
WS06 383008.585 397947.276 26.53
WS07 383016.202 397948.086 26.51
WS08 383023.672 397947.986 26.52
WS09 383031.768 397947.576 26.45
HTP01 382979.255 397937.996 26.65
HTP02 382984.485 397942.255 26.62
HTP03 Approximate location, no access during surveying
HTP04 383016.641 397947.249 26.54
HTP05 383038.605 397942.178 26.31
HTP06 383039.521 397947.412 26.32
HTP07 383032.950 397937.321 32.60
HTP08 383006.884 397946.564 26.53
HTP09 383012.882 397932.099
HTP10 383033.064 397946.195
HTP11 383011.710 397940.107
HTP12 383033.424 397933.586
CC02 383033.508 397943.245 27.22
CC04 383024.103 397942.374 27.63
CC05 382978.759 397936.162 27.62

CONTROL & DATUM INFORMATION

Co-ordinates and levels are based upon OSGB 1936 National Grid (OSGB36) and Ordnance Survey Datum Newlyn (ODN).

They are derived using realtime on site GPS survey, that utilises the National Grid Transformation OSTN15GB and the National Geoid Model OSGM15GB.

The data obtained for use in this drawing involved the use of realtime GPS survey and total station survey.

COODINATES

Ground Investigation Co-ordinates (OSGM15GB-OSTN15GB)

Reference	East	North	Elevation	Description
BH01	383025.656	397966.922	26.43	Borehole
BH02	382984.035	397949.823	26.61	Borehole
BH03	383020.808	397986.631	27.06	Borehole
CC02	383033.508	397943.245	27.22	Wall Core
CC04	383024.103	397942.374	27.63	Wall Core
CC05	382978.759	397936.162	27.62	Wall Core
HTP01	382979.255	397937.996	26.65	Trial Pit
HTP02	382984.485	397942.255	26.62	Trial Pit
HTP03	Unable to suvery			
HTP04	383006.884	397946.564	26.53	Trial Pit
HTP05	383038.605	397942.178	26.31	Trial Pit
HTP06	383039.521	397947.412	26.32	Trial Pit
HTP07	383032.950	397937.321	32.60	Trial Pit
HTP08	383016.641	397947.249	26.54	Trial Pit
HTP09	383012.882	397932.099		
HTP10	383033.064	397946.195		
HTP11	383011.710	397940.107		
HTP12	383033.424	397933.586		
MPT03	382997.410	397972.543	26.66	Trial Pit
MTP03A	382992.571	397965.515	26.50	Trial Pit
MTP04	383005.372	397973.023	26.71	Trial Pit
MTP05	383014.939	397958.799	26.28	Trial Pit
MTP06	383035.452	397969.177	26.50	Trial Pit
WS01	382968.091	397939.367	26.55	Window Sample
WS01A	382970.911	397940.101	26.58	Window Sample
WS02	382978.735	397941.818	26.64	Window Sample
WS03/WS03A	382984.307	397943.340	26.59	Window Sample
WS04	382989.791	397944.366	26.54	Window Sample
WS05	383000.860	397946.180	26.52	Window Sample
WS06	383008.585	397947.276	26.53	Window Sample
WS07	383016.202	397948.086	26.51	Window Sample
WS08	383023.672	397947.986	26.52	Window Sample
WS09	383031.768	397947.576	26.45	Window Sample

LEGEND TO SYMBOLS

◐	Denotes Borehole Location
▣	Denotes Trial Pit Location
⌖	Denotes Wall Core Location
⊕	Denotes Window Sample Location

Scale: 1:125

0 12.5m 25 50 75 100

R1	BS	JAN 2018	MS	MS	Issued
Rev.	Drawn	Date	Checked	Approved	Details

Survey Date:	Surveyor:	Drawn By:
-	SOCOTEC	BS

Client:

MANCHESTER CITY COUNCIL

Contractor:

SOCOTEC

Infrastructure & Energy
Askern Road, Carcroft
Doncaster DN6 8DG
United Kingdom

www.socotec.co.uk
Tel: +44(0)01302 723456

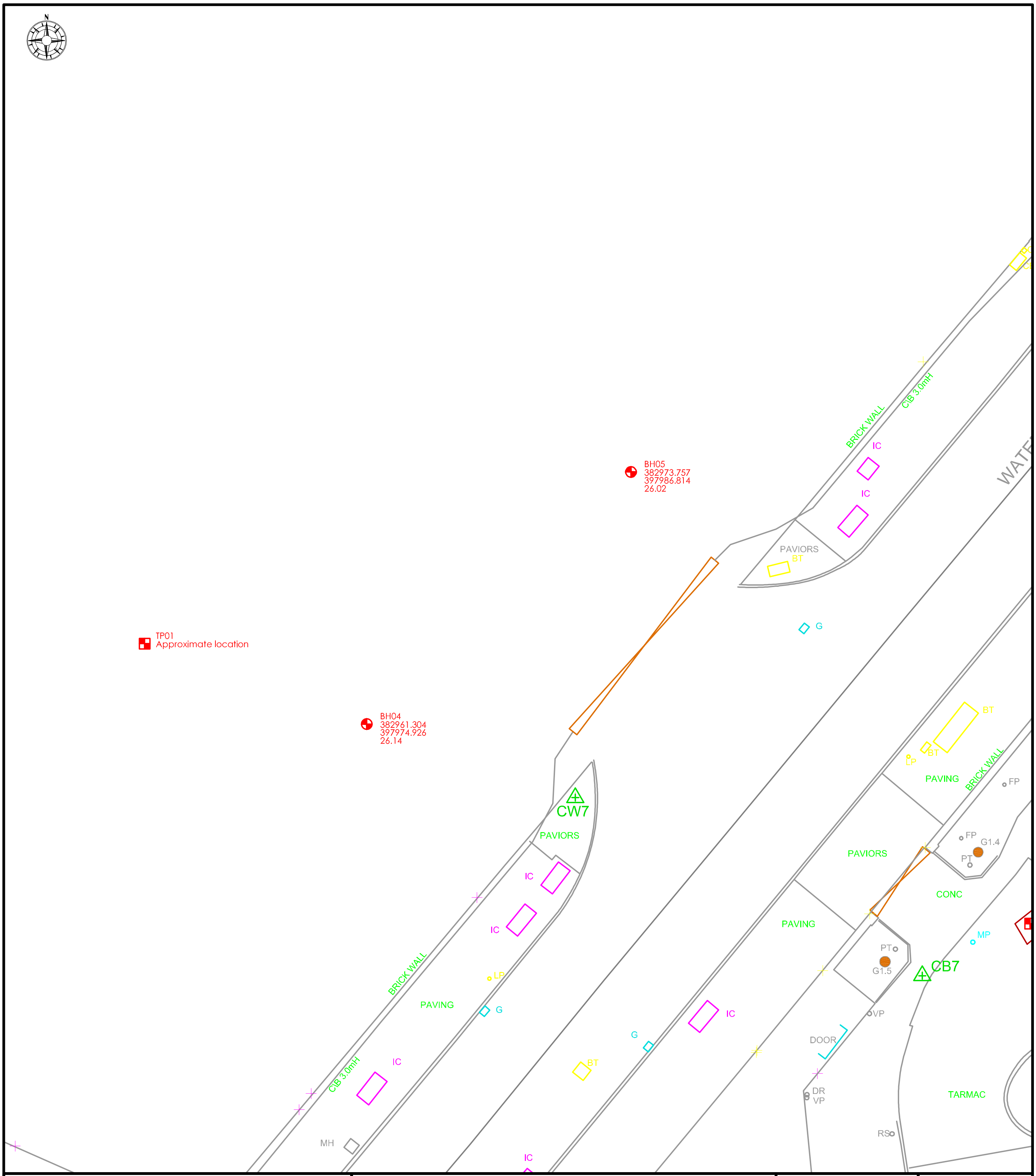
Contract:

THE FACTORY
MANCHESTER

DWG:

SITE PLAN
A7064-17

Original Sheet Size:	Scale:	Rev.:
A1	Horiz.1:125 Vert.:	R1


N
BH05
382973.757
397986.814
26.02
TP01
Approximate location
BH04
382961.304
397974.926
26.14
BRICK WALL
CIB 3.0mH
IC
IC
WATE
PAVIORS
BT
G
BT
BT
LP
PAVING
BRICK WALL
FP
FP
G1.4
PT
CW7
PAVIORS
IC
IC
PAVIORS
CONC
LP
PAVING
PT
G1.5
MP
CB7
BRICK WALL
PAVING
G
IC
VP
G
BT
DOOR
CIB 3.0mH
IC
DR
VP
TARMAC
RS
MH
IC

LEGEND TO SYMBOLS

⊕ Borehole Location

Scale: 1:250

0 12.5m 25 37.5 50 62.5

Title
SITE PLAN

Project
THE FACTORY ADDITIONAL GI

Client
Buro Happold Limited

Date 15/03/17	Drawn By AW
Scale 1:250	Approv. By TC
Sheet Size A4	Project No A6136-17
Figure No A2	Rev 0

ESG

Enclosure 4

BUROHAPPOLD
ENGINEERING

Project: Factory Theatre
Project Number: 034933
Date: Oct-2018

Asbestos

Asbestos Screen	No. Samples	No. samples detected	No. samples ND	% of samples detect
	20	0	20	0.00
Asbestos Quantification	No. Quants	No. samples <0.001%	No. samples >0.001% <0.01%	No. samples >0.01%
	0	0	0	0

Soil Results Summary

Number of samples exceeding	Residential with Uptake	12
	Residential without Uptake	11
	Commercial	0

Human Health

Soil Organic Matter 1%
N/A = no screening criteria available

					No. samples exceeding							
		Residential with uptake	Residential without Uptake	Commercial	Residential with uptake	Residential without Uptake	Commercial	No Tests	No <LOD	Min	Max	Location of Maximum
Cyanide	mg/kg	4.6	760	16000				20	13	0.50	1.50	HTP12 0.8mbgl
Arsenic	mg/kg	37	40	640	1	1		20		1.90	49.00	HTP11 1mbgl
Barium	mg/kg	N/A	N/A	N/A								
Beryllium	mg/kg	1.7	1.7	12								
Boron	mg/kg	290	11000	240000				20	2	0.50	2.00	MTP03 0.9mbgl
Cadmium	mg/kg	26	149	410				20	3	0.21	1.15	HTP11 1mbgl
Chromium	mg/kg	910	910	8600				20		7.96	45.00	MTP04 0.5mbgl
Chromium VI	mg/kg	21	21	49				14		0.30	0.30	MTP05 2.5mbgl
Copper	mg/kg	2400	7100	68000				20		8.00	735.10	HTP11 1mbgl
Lead	mg/kg	200	310	2330	6	3		20		17.30	577.20	HTP12 0.8mbgl
Mercury (elemental)	mg/kg	1.2	1.2	58	1	1		14	9	0.33	1.92	HTP12 0.8mbgl
Mercury (inorganic)	mg/kg	40	56	58				6		0.50	0.52	BH05 1mbgl
Nickel	mg/kg	130	180	980				20		7.05	52.20	MTP04 0.5mbgl
Selenium	mg/kg	250	430	12000				20	3	0.50	1.10	MTP03 0.5mbgl
Vanadium	mg/kg	410	1200	9000								
Zinc	mg/kg	3700	40000	730000				20		38.61	358.10	WS9 2mbgl
TPH	mg/kg	490	490	38000	7	7		20		15.00	1920.00	HTP11 1mbgl
Benzene	mg/kg	0.087	0.38	27				19	19			
Toluene	mg/kg	130	869	869				19	19			
Ethyl Benzene	mg/kg	47	83	518				19	18	0.01	0.01	MTP05 2.5mbgl
m/p Xylenes	mg/kg	56	79	576				19	18	0.06	0.06	MTP05 2.5mbgl
o Xylenes	mg/kg	60	88	478				19	19			
Xylenes	mg/kg	56	79	576				17	17			
MTBE	mg/kg	N/A	N/A	N/A				20	20			
Naphthalene	mg/kg	2.3	2.3	190	2	2		20	7	0.09	3.78	WS9 2mbgl
Acenaphthylene	mg/kg	170	2900	83000				20	10	0.08	1.43	MTP03 0.5mbgl
Acenaphthene	mg/kg	210	3000	84000				20	6	0.09	6.20	HTP11 1mbgl
Fluorene	mg/kg	170	2800	63000				20	7	0.09	4.06	MTP03 0.5mbgl
Phenanthrene	mg/kg	95	1300	22000				20	3	0.10	33.50	HTP11 1mbgl
Anthracene	mg/kg	2400	31000	520000				20	3	0.09	8.57	HTP11 1mbgl
Fluoranthene	mg/kg	280	1500	23000				20	2	0.10	52.60	HTP11 1mbgl
Pyrene	mg/kg	620	3700	54000				20	2	0.10	45.90	HTP11 1mbgl
Benzo[a]anthracene	mg/kg	7.2	11	170	2	2		20	6	0.09	27.70	HTP11 1mbgl
Chrysene	mg/kg	15	30	350	1			20	6	0.09	22.90	HTP11 1mbgl
Benzo[b]fluoranthene	mg/kg	2.6	3.9	44	6	5		20	4	0.10	25.70	HTP11 1mbgl
Benzo[k]fluoranthene	mg/kg	77	110	1200				20	5	0.09	8.57	HTP11 1mbgl
Benzo[a]pyrene	mg/kg	2.2	3.2	35	6	5		20	5	0.09	23.00	HTP11 1mbgl
Indeno[123-cd]pyrene	mg/kg	27	45	500				20	5	0.09	16.60	HTP11 1mbgl
Dibenzo[ah]anthracene	mg/kg	0.24	0.31	3.5	6	6		20	7	0.09	3.10	HTP11 1mbgl
Benzo[ghi]perylene	mg/kg	320	360	3900				20	5	0.09	10.80	HTP11 1mbgl
Total USEPA 16 PAHs	mg/kg	N/A	N/A	N/A				20	10	1.57	287.82	HTP11 1mbgl
Aliphatic C5 - C7	mg/kg	42	42	3200				2	2			
Aliphatic C7 - C8	mg/kg	100	100	7800				2	2			
Aliphatic C8 - C10	mg/kg	27	27	2000	1	1		14	6	1.20	29.20	WS9 3.3mbgl
Aliphatic C10 - C12	mg/kg	130	130	9700				14	7	2.00	67.20	WS9 3.3mbgl
Aliphatic C12 - C16	mg/kg	1100	1100	59000				14	4	2.00	199.00	WS9 3.3mbgl
Aliphatic C16 - C21	mg/kg	65000	65000	1600000				14	3	2.49	108.80	WS9 3.3mbgl
Aliphatic C21 - C35	mg/kg	65000	64000	1600000				14	2	11.20	396.00	BH04 0.2mbgl
Total Aliphatic	mg/kg	N/A	N/A	N/A				8	3	102.00	496.00	WS9 3.3mbgl
Aromatic C5 - C7	mg/kg	70	370	26000								
Aromatic C7 - C8	mg/kg	130	860	56000								
Aromatic C8 - C10	mg/kg	34	47	3500				8	8			
Aromatic C10 - C12	mg/kg	74	250	16000				8	7	5.74	5.74	WS9 2mbgl
Aromatic C12 - C16	mg/kg	140	1800	36000				8	3	7.90	23.40	WS9 3.3mbgl
Aromatic C16 - C21	mg/kg	260	1900	28000				8	3	13.00	136.00	MTP05 1mbgl
Aromatic C21 - C35	mg/kg	1100	1900	28000				8	3	25.00	286.00	MTP05 1mbgl
Total Aromatic	mg/kg	1100	1900	28000				8	3	89.50	443.00	MTP05 1mbgl
Total Aliphatic and Aromatic	mg/kg	490	490	38000	7	7		20		15.00	1920.00	HTP11 1mbgl

calculated SOM	8.178	Project:	Factory Theatre
SOM used for threshold	1%	Project Number	034933
		Date:	Oct-2018

N/A = no screening criteria available

***Screening criteria:* C4SL**/S4UL

		Residential with	Residential with	Commercial
Cyanide	mg/kg	4.6	760	16000
Arsenic	mg/kg	**37**	**40**	**640**
Barium	mg/kg	*N/A*	*N/A*	*N/A*
Beryllium	mg/kg	1.7	1.7	12
Boron	mg/kg	290	11000	240000
Cadmium	mg/kg	**26**	**149**	**410**
Chromium	mg/kg	910	910	8600
Chromium VI	mg/kg	**21**	**21**	**49**
Copper	mg/kg	2400	7100	68000
Lead	mg/kg	**200**	**310**	**2330**
Mercury (elemental)	mg/kg	1.2	1.2	58
Mercury (inorganic)	mg/kg	40	56	58
Nickel	mg/kg	130	180	980
Selenium	mg/kg	250	430	12000
Vanadium	mg/kg	410	1200	9000
Zinc	mg/kg	3700	40000	730000
TPH	mg/kg	490	490	38000
Benzene	mg/kg	0.087	0.38	27
Toluene	mg/kg	130	869	869
Ethyl Benzene	mg/kg	47	83	518
m/p Xylenes	mg/kg	56	79	576
o Xylenes	mg/kg	60	88	478
Xylenes	mg/kg	56	79	576
MTBE	mg/kg	*N/A*	*N/A*	*N/A*
Naphthalene	mg/kg	2.3	2.3	190
Acenaphthylene	mg/kg	170	2900	83000
Acenaphthene	mg/kg	210	3000	84000
Fluorene	mg/kg	170	2800	63000
Phenanthrene	mg/kg	95	1300	22000
Anthracene	mg/kg	2400	31000	520000
Fluoranthene	mg/kg	280	1500	23000
Pyrene	mg/kg	620	3700	54000
Benzo[a]anthracene	mg/kg	7.2	11	170
Chrysene	mg/kg	15	30	350
Benzo[b]fluoranthene	mg/kg	2.6	3.9	44
Benzo[k]fluoranthene	mg/kg	77	110	1200
Benzo[a]pyrene	mg/kg	2.2	3.2	35
Indeno[123-cd]pyrene	mg/kg	27	45	500
Dibenzo[ah]anthracene	mg/kg	0.24	0.31	3.5
Benzo[ghi]perylene	mg/kg	320	360	3900
Total USEPA 16 PAHs	mg/kg	*N/A*	*N/A*	*N/A*
Aliphatic C5 - C7	mg/kg	42	42	3200
Aliphatic C7 - C8	mg/kg	100	100	7800
Aliphatic C8 - C10	mg/kg	27	27	2000
Aliphatic C10 - C12	mg/kg	130	130	9700
Aliphatic C12 - C16	mg/kg	1100	1100	59000
Aliphatic C16 - C21	mg/kg	65000	65000	1600000
Aliphatic C21 - C35	mg/kg	65000	64000	1600000
Total Aliphatic	mg/kg	*N/A*	*N/A*	*N/A*
Aromatic C5 - C7	mg/kg	70	370	26000
Aromatic C7 - C8	mg/kg	130	860	56000
Aromatic C8 - C10	mg/kg	34	47	3500
Aromatic C10 - C12	mg/kg	74	250	16000
Aromatic C12 - C16	mg/kg	140	1800	36000
Aromatic C16 - C21	mg/kg	260	1900	28000
Aromatic C21 - C35	mg/kg	1100	1900	28000
Total Aromatic	mg/kg	1100	1900	28000
Total Aliphatic and Aromatic	mg/kg	490	490	38000

	MG / NG	MG	NG	MG	MG	MG	MG	MG	MG	MG	NG	MG	NG	MG	MG	MG	MG	MG	MG	MG	MG
	Sample ID	MTP05	MTP05	MTP03	MTP03	MTP04	BH01	WS1	WS6	WS7	WS8	WS9	WS9	HTP12	HTP11	BH04	BH04	BH05	BH05	TP01	TP01
	epth	1	.5	.5	.9	.5	.1	.5	.5	1.1	1.2		.3	.8	1	.2	1	1			.8
	Units																				
pH	pH units	7.6	7.6	8.6	8.5	8.7	8.5	11.8	11.1	9.3	8.3	7.7	7.8	8.5	8.1	8.8	8.4	8.6	8.6	9.8	8.8
SOM	%	8.59	1.24	21.8	14.9	17	25.9	0.72	0.31	2.44	2.58	4	0.9	25.9	25.2	1.75	1.41	5.41	0.64	2.2	0.67
Moisture	%	23.3	15.6	9.4	17.9	22.8	16.1	15.4	9.9	3.1	22.5	24.8	8.3	21.9	12.8	5.6	19	22.1	12.1	6.2	22
TOC	%	4.98	0.72	12.7	8.7	9.8	15	0.42	0.18	1.41	1.5	2.32	0.53	15	14.6	1.01	0.82	3.14	0.37	1.28	0.39
Asbestos Screen	D/ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Asbestos Quantification	%																				
Cyanide	mg/kg	<0.7	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.5	<0.6	<0.7	<0.6	1.5	<0.5	0.53	0.6	0.6	0.57	0.5	0.6
Arsenic	mg/kg	13	8.1	24.4	28.5	29.8	15	2.5	1.9	6.3	9.7	12.5	9.8	31.8	49	3	6.8	14.8	4.72	4.3	11.6
Barium	mg/kg																				
Beryllium	mg/kg																				
Boron	mg/kg	1.4	1.2	0.8	2	0.9	1.4	0.5	<0.5	<0.5	0.8	1	0.6	1.5	1.4	0.51	0.5	0.5	0.51	0.5	0.5
Cadmium	mg/kg	<0.21	<0.2	0.84	0.24	0.48	0.77	0.74	0.44	0.53	<0.2	0.89	0.22	0.42	1.15	0.582	0.21	0.4	0.205	0.54	0.25
Chromium	mg/kg	19.4	19.2	18	19.4	45	14.8	20.4	22.1	11.8	24.4	28.1	22.3	18.2	18.2	7.96	16	13	19.1	12.6	16.3
Chromium VI	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						
Copper	mg/kg	124.8	27	133.4	68.4	108.4	69	10.1	8	38.9	29	130.4	24.7	249	735.1	15	16.9	44	15.81	26.1	18.1
Lead	mg/kg	127	24.9	253.8	169.1	267.7	178.1	39	21.3	99	318	359.7	32.4	577.2	235.1	187.59	39.7	140.4	20	40.4	17.3
Mercury (elemental)	mg/kg	<0.53	<0.53	0.65	0.64	0.73	<0.50	<0.5	<0.5	<0.5	<0.5	<0.53	<0.5	1.92	0.33						
Mercury (inorganic)	mg/kg															0.51	0.5	0.52	0.51	0.5	0.5
Nickel	mg/kg	23.9	15.4	42.1	33	52.2	32.5	16.7	18.3	9.6	15.3	23.5	25.3	36.4	46	7.05	10.9	17.5	19.1	12.4	16
Selenium	mg/kg	0.8	1	1.1	1	1	1.1	<0.5	<0.5	0.7	0.8	0.8	<0.5	0.6	1	0.51	0.5	0.6	0.51	0.5	0.7
Vanadium	mg/kg																				
Zinc	mg/kg	80	43	219.6	89.4	167.5	293.7	57	41.9	160.5	77.9	358.1	61.7	177	340.4	42.38	46.9	72.4	38.61	43.8	77.6
TPH	mg/kg	915	704	1140	74	109	411	22	16	513	15	315	561	387	1920	576	20	58	40	339	17
Benzene	mg/kg	<0.013	<0.013	<0.011	<0.012	<0.013	<0.012	<0.012	<0.011	<0.01	<0.013	<0.013		<10	<10	<0.011	<0.012	<0.013	<0.011	<0.011	<0.013
Toluene	mg/kg	<0.013	<0.013	<0.011	<0.012	<0.013	<0.012	<0.012	<0.011	<0.01	<0.013	<0.013		<10	<10	<0.011	<0.012	<0.013	<0.011	<0.011	<0.013
Ethyl Benzene	mg/kg	<0.013	0.01	<0.011	<0.012	<0.013	<0.012	<0.012	<0.011	<0.01	<0.013	<0.013		<10	<10	<0.011	<0.012	<0.013	<0.011	<0.011	<0.013
m/p Xylenes	mg/kg	<0.013	0.057	<0.023	<0.024	<0.026	<0.024	<0.024	<0.022	<0.021	<0.026	<0.027		<20	<20	<0.021	<0.025	<0.026	<0.023	<0.021	<0.026
o Xylenes	mg/kg	<0.013	<0.013	<0.011	<0.012	<0.013	<0.012	<0.012	<0.011	<0.01	<0.013	<0.013		<10	<10	<0.011	<0.012	<0.013	<0.011	<0.011	<0.013
Xylenes	mg/kg			<0.034	<0.037	<0.039	<0.036	<0.035	<0.033	<0.031	<0.039	<0.04		<30	<30	<0.032	<0.037	<0.039	<0.034	<0.032	<0.038
MTBE	mg/kg	<0.026	<0.025	<0.023	<0.024	<0.026	<0.024	<0.024	<0.022	<0.021	<0.026	<0.027	<0.022	<20	<20	<0.021	<0.025	<0.026	<0.023	<0.021	<0.026
Naphthalene	mg/kg	0.22	<0.10	2.81	<0.10	<0.10	<0.10	<0.09	<0.09	0.7	<0.10	3.78	0.36	1.11	0.87	1.29	0.1	0.1	0.09	1.51	0.1
Acenaphthylene	mg/kg	<0.10	<0.10	1.43	<0.10	<0.10	<0.10	<0.09	<0.09	0.12	<0.10	<0.11	<0.09	0.43	0.32	0.08	0.1	0.1	0.09	0.09	0.1
Acenaphthene	mg/kg	1.51	1.4	2.59	<0.10	<0.10	<0.10	<0.09	<0.09	1.31	<0.10	0.15	1.62	0.74	6.2	1.37	0.1	0.1	0.09	1.34	0.1
Fluorene	mg/kg	1.92	1	4.06	<0.10	<0.10	<0.10	<0.09	<0.09	1.5	<0.10	<0.11	0.41	0.82	3.58	1.21	0.1	0.1	0.09	1.06	0.1
Phenanthrene	mg/kg	10.9	5.38	29.6	0.3	0.58	1.11	<0.09	<0.09	11.2	<0.10	1.81	0.53	8.29	33.5	7.87	0.1	0.19	0.13	7.47	0.1
Anthracene	mg/kg	0.8	0.68	7.21	0.11	0.19	0.3	<0.09	<0.09	2.78	<0.10	0.43	0.38	2.01	8.57	2.55	0.1	0.1	0.09	1.74	0.1
Fluoranthene	mg/kg	4.26	2.75	24.2	0.76	0.87	1.13	<0.09	<0.09	9.93	0.1	1.22	1.81	9.44	52.6	8.39	0.1	0.3	0.13	6.71	0.1
Pyrene	mg/kg	2.82	2.08	24.5	1.01	1.05	1.3	<0.09	<0.09	9.55	0.1	1.14	3.16	9.68	45.9	7.87	0.1	0.28	0.13	6.2	0.1
Benzo[a]anthracene	mg/kg	<0.10	0.37	12.7	0.6	0.8	<0.10	<0.09	<0.09	5.31	<0.10	0.65	<0.09	5.68	27.7	3.67	0.1	0.17	0.09	2.91	0.1
Chrysene	mg/kg	<0.10	0.28	9.9	0.54	0.71	<0.10	<0.09	<0.09	4.53	<0.10	0.6	<0.09	4.4	22.9	4.05	0.1	0.18	0.09	3.25	0.1
Benzo[b]fluoranthene	mg/kg	0.12	<0.10	12.3	0.82	1.2	1.13	<0.09	<0.09	4.94	<0.10	0.9	0.26	5.1	25.7	4.06	0.1	0.21	0.1	3.06	0.1
Benzo[k]fluoranthene	mg/kg	<0.10	<0.10	3.62	0.35	0.49	0.43	<0.09	<0.09	1.52	<0.10	0.36	0.1	1.76	8.57	1.61	0.1	0.1	0.09	1.11	0.1
Benzo[a]pyrene	mg/kg	<0.10	<0.10	10.4	0.76	1.05	0.97	<0.09	<0.09	4.5	<0.10	0.85	0.21	5.35	23	3.65	0.1	0.17	0.09	2.62	0.1
Indeno[123-cd]pyrene	mg/kg	<0.10	<0.10	7.1	0.6	0.9	0.77	<0.09	<0.09	3.04	<0.10	0.92	0.1	2.98	16.6	2.57	0.1	0.1	0.09	1.73	0.1
Dibenzo[ah]anthracene	mg/kg	<0.10	<0.10	1.68	<0.10	0.16	0.17	<0.09	<0.09	0.73	<0.10	0.15	<0.09	0.64	3.1	0.58	0.1	0.1	0.09	0.41	0.1
Benzo[ghi]perylene	mg/kg	<0.10	<0.10	5.58	0.52	0.88	0.7	<0.09	<0.09	2.4	<0.10	0.92	0.1	2.15	10.8	2.2	0.1	0.12	0.09	1.57	0.1
Total USEPA 16 PAHs	mg/kg	<23.38	<14.76	159.67	<6.86	<9.27	<8.59	<1.51	<1.42	64.12	<1.70	<14.08	<9.42	60.15	287.82	53.05	1.58	2.41	1.57	42.8	1.64
Aliphatic C5 - C7	mg/kg	<0.3	<0.3																		
Aliphatic C7 - C8	mg/kg	<0.3	<0.3																		
Aliphatic C8 - C10	mg/kg	<5	1.2					<5	<4	<4	<5.21	<5	29.2			2	2	3	2	2	3
Aliphatic C10 - C12	mg/kg	<5	<5					<5	<4	<4	<5.21	<5	67.2			3.13	2	3	2	3.25	3
Aliphatic C12 - C16	mg/kg	27.2	29					<5	<4	10	<5.21	<5	199			21	2	4.44	2	17.5	3
Aliphatic C16 - C21	mg/kg	104.7	107.5					<5	<4	23	<5.21	31	108.8			77.1	2.49	14	5.42	66	3
Aliphatic C21 - C35	mg/kg	233	157					11.2	<9.72	88.2	<11.42	68.4	88.9			396	14.6	35.7	30.4	232	11.8
Total Aliphatic	mg/kg	369	297					<24	<22	128	<26.1	102	496								
Aromatic C5 - C7	mg/kg																				
Aromatic C7 - C8	mg/kg																				
Aromatic C8 - C10	mg/kg	<5	<5					<5	<4	<4	<5	<5	<4								
Aromatic C10 - C12	mg/kg	<5	<5					<5	<4	<4	<5	5.74	<4								
Aromatic C12 - C16	mg/kg	15.4	15.7					<5	<4	19.7	<5	7.9	23.4								
Aromatic C16 - C21	mg/kg	136	112.9					<5	<4	86.5	<5	13	44.5								
Aromatic C21 - C35	mg/kg	286	169					<10.35	<9.72	207	<11.30	62	25								
Total Aromatic	mg/kg	443	304					<24	<22	327	<26	89.5	94.5								
Total Aliphatic and Aromatic	mg/kg	915	704	1140	74	109	411	22	16	513	15	315	561	387	1920	576	20	58	40	339	17

Enclosure 5

The Factory, Manchester : Groundwater contamination testing results assessment

		Sample Identity	BH01	BH05	Minimum values	Maximum values	**UK Drinking Water Standards (The Water Supply (Water Quality) Regulations 2000**	**Other Thresholds**
		Depth	3.00	3.15				
		Sample Type	**WATER**	**WATER**				
		Sampling Date	**28/07/16**	**02/02/17**				
Determinand	**Method**	**Units**						
Metals								
Arsenic		µg/l	<1	1	1	1	10	50 (1)
Cadmium		µg/l	0.1	<0.1	0.1	0.1	5	-
Chromium		µg/l	<1	9	9	9	50	5 (1)
Copper		µg/l	9	3	3	9	2000	1 (1)
Lead		µg/l	4	<1	4	4	25	4 (1)
Mercury		µg/l	<0.1	0.6	0.6	0.6	1	1 (1)
Nickel		µg/l	3	12	3	12	20	50 (1)
Selenium		µg/l	<1	2	2	2	10	-
Zinc		µg/l	22	3	3	22	3000 **	8 (1)
Barium		µg/l					100 **	-
Antimony		µg/l	<1	1	1	1	5	-
Molybdenum		µg/l					-	-
Boron (w)		µg/l	20	20	20	20	1000	2000 (1)
Other Determinands								
Sulphate as SO4		µg/l	23100	56000	23100	56000	250000	400000 *
Phenol Index		µg/l	<0.5	0.9	0.9	0.9	1 **	30 *
pH (pH Units)		pH units	7.2	7.4	7.2	7.4	-	6<pH<9 (1)
Cyanide (total) (w)		µg/l	<20	<20			50	-
Sulphide (w)		µg/l	<20	<0.02			-	-
Petroluem Hydrocarbons								
TPH (C10-C40)		µg/l	590	14000	590	14000	-	-
Polycyclic Aromatic Hydrocarbons								
Naphthalene		µg/l	<0.02	<0.400	0	0	-	10 (1)
Acenapthylene		µg/l	<0.01	<0.200	0	0	-	-
Acenapthene		µg/l	0.057	<0.200	0.057	0.057	-	-
Fluorene		µg/l	0.019	<0.200	0.019	0.019	-	-
Phenanthrene		µg/l	0.155	<0.200	0.155	0.155	-	-
Anthracene		µg/l	0.032	<0.200	0.032	0.032	-	-
Fluoranthene		µg/l	0.334	<0.200	0.334	0.334	-	-
Pyrene		µg/l	0.326	<0.200	0.326	0.326	-	-
Benzo [a] anthracene		µg/l	0.164	<0.200	0.164	0.164	-	-
Chrysene		µg/l	0.225	<0.200	0.225	0.225	-	-
Benzo [a] pyrene		µg/l	0.178	<0.200	0.178	0.178	0.01	-
Dibenzo [ah] anthracene		µg/l	0.033	<0.200	0.033	0.033	-	-
Benzo [b] fluoranthene		µg/l	0.243	<0.200	0.243	0.243	-	-
Benzo [k] fluoranthene		µg/l	0.086	<0.200	0.086	0.086	-	-
Indeno [123-cd] pyrene		µg/l	0.137	<0.200	0.137	0.137	-	-
Benzo [ghi] perylene		µg/l	0.13	<0.200	0.13	0.13	-	-
Total PAH		µg/l	<2.149	<3.400	0	0	-	10 (1)
Classification Tests								
Total Dissolved Solids		mg/l			0	0	-	400000 (2)
Dissolved Organic Carbon		mg/l	11	65	11	65	-	50000 (2)
Conductivity (µS/cm)		µS/cm	249	500	249	500	2500	-
Chloride		mg/l	10	42	10	42	250	-
Fluoride		mg/l	0.1	0.4	0.1	0.4	1.5	-

🟩 Between criteria - No further consideration

GENERAL NOTES:
(1) Freshwater Environmental Quality Standard. For hardness-related determinands, worse-case hardness band adopted 0 - 50 mg/l CaCO3
(2) Based on Environment Agency 'Guidance on Sampling and Testing of Wastes to meet Landfill Acceptance Procedures' (2005, version 1) Inert waste criteria.
*EA non-statutory
(operational)
**From The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (DW-1)

Project name	**The Factory, Manchester**
Report title	**Land Contamination Summary and Outline Remediation Strategy**
Table title	**Contamination End Use Assessment - Groundwater results**
Date: October 2018	**Job No: 034933**

BUROHAPPOLD
ENGINEERING

The Factory, Manchester : Leachate contamination testing results assessment

		Sample Identity	MTP03	MTP05	WS09	HTP 12	HTP11	BH04	BH04	BH05	BH05	TP01	TP01	Minimum values	Maximum values	**UK Drinking Water Standards (The Water Supply (Water Quality) Regulations 2000**	**Other Thresholds**
		Depth	0.50	1.00	3.30	0.80	1.00	0.20	1.00	1.00	3.00	0.00	0.80				
		Sample Type	**SOIL**	**SOIL**	**SOIL**	**SOIL**	**SOIL**	**SOIL**	**SOIL**	**SOIL**	**SOIL**	**SOIL**	**SOIL**				
		Material	**MG**	**MG**	**SAND**	**MG**	**MG**	**MG**	**MG**	**MG**	**MG**	**MG**	**MG**				
Determinand	**Method**	**Units**															
Metals																	
Arsenic		µg/l	5	3	<1	4	2	1	1	1	1	1	1	1	5	10	50 (1)
Cadmium		µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	5	-
Chromium		µg/l	12	1	<1	<1	<1	6	1	1	1	9	1	1	12	50	5 (1)
Copper		µg/l	7	15	30	13	3	15	5	2	3	8	2	2	30	2000	1 (1)
Lead		µg/l	1	11	<1	18	<1	1	3	2	1	1	1	1	18	25	4 (1)
Mercury		µg/l	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	1 (1)
Nickel		µg/l	<1	1	<1	1	1	1	1	1	1	2	5	1	5	20	50 (1)
Selenium		µg/l	1	1	<1	1	<1	2	1	1	1	2	1	1	2	10	-
Zinc		µg/l	34	107	66	12	4	4	61	43	24	9	90	4	107	3000 **	8 (1)
Barium		µg/l	130	170	130	20	20	50	70	70	60	60	<10	20	170	100 **	-
Antimony		µg/l	13	2	1	1	4	<1	<1	<1	<1	<1	<1	1	13	5	-
Molybdenum		µg/l	70	6	4	16	11	60	1	38	29	65	1	1	70	-	-
Boron (w)		µg/l														1000	2000 (1)
Other Determinands																	
Sulphate as SO4		mg/l	77.3	78.9	542	73	134	62	34	14	12	67	16	12	542	250	400 *
Phenol Index		mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.28	<0.05	0.28	0.28	1 **	30 *
pH (pH Units)		pH units	7.8	7.7	7.6	7.5	7.4	9.3	7.8	7.6	7.6	10.4	7.9	7.4	10.4	-	6<pH<9 (1)
Cyanide (total) (w)		µg/l														50	-
Sulphide (w)		µg/l														-	-
Petroluem Hydrocarbons																	
TPH (C10-C40)		µg/l	30	250										30	250	-	-
Polycyclic Aromatic Hydrocarbons																	
Naphthalene		µg/l	0.051	<0.02										0.051	0.051	-	10 (1)
Acenapthylene		µg/l	<0.01	0.127										0.127	0.127	-	-
Acenapthene		µg/l	0.036	0.322										0.036	0.322	-	-
Fluorene		µg/l	<0.01	0.027										0.027	0.027	-	-
Phenanthrene		µg/l	0.035	0.062										0.035	0.062	-	-
Anthracene		µg/l	<0.01	0.06										0.06	0.06	-	-
Fluoranthene		µg/l	0.024	0.273										0.024	0.273	-	-
Pyrene		µg/l	0.018	0.16										0.018	0.16	-	-
Benzo [a] anthracene		µg/l	0.017	0.055										0.017	0.055	-	-
Chrysene		µg/l	<0.01	0.045										0.045	0.045	-	-
Benzo [a] pyrene		µg/l	0.01	0.014										0.01	0.014	0.01	-
Dibenzo [ah] anthracene		µg/l	0.01	<0.01										0.01	0.01	-	-
Benzo [b] fluoranthene		µg/l	0.015	0.025										0.015	0.025	-	-
Benzo [k] fluoranthene		µg/l	<0.01	<0.01										0	0	-	-
Indeno [123-cd] pyrene		µg/l	0.01	<0.01										0.01	0.01	-	-
Benzo [ghi] perylene		µg/l	0.014	<0.01										0.014	0.014	-	-
Total PAH		µg/l	<0.29	<1.23										0	0	-	10 (1)
Classification Tests																	
Total Dissolved Solids		mg/l	306	367	787	308	415	200	300	300	300	300	200	200	787	-	400000 (2)
Dissolved Organic Carbon		mg/l	9.9	22	10	2.5	2.8	12	20	4.9	4.8	6.7	6.4	2.5	22	-	50000 (2)
Conductivity (µS/cm)		µS/cm	392	471	1010	395	532	300	400	300	300	400	300	300	1010	2500	-
Chloride		mg/l	8	32	26	5	6	14	9	32	33	40	5	5	40	250	-
Fluoride		mg/l	2	0.4	0.5	0.5	0.7	0.4	0.1	0.7	0.7	0.3	0.1	0.1	2	1.5	-

🟩 Between criteria - No further consideration

GENERAL NOTES:
(1) Freshwater Environmental Quality Standard. For hardness-related determinands, worse-case hardness band adopted 0 - 50 mg/l CaCO3
(2) Based on Environment Agency 'Guidance on Sampling and Testing of Wastes to meet Landfill Acceptance Procedures' (2005, version 1) Inert waste criteria.
*EA non-statutory
(operational)
**From The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (DW-1)
2:1 Leachate results used

Project name	**The Factory, Manchester**
Report title	**Land Contamination Summary and Outline Remediation Strategy**
Table title	**Contamination End Use Assessment - Leachate results**
Date: October 2018	**Job No: 034933**

BUROHAPPOLD
ENGINEERING

Enclosure 6

GROUND GAS ASSESSMENT	**034933**	**Factory Theatre**

GUIDANCE:

Assessment based on guidance published in CIRIA C665 (2007) 'Assessing risks posed by hazardous ground gases to buildings.'

Information from Table 8.5 of CIRIA C665

Characteristic Situation 1 conditions
Gas screening value (CH4 or CO2) < 0.07 l/h
Typically methane < 1 % by volume
Typically carbon dioxide < 5% by volume
Characteristic Situation 2 conditions
Gas screening value (CH4 or CO2) < 0.7 l/h
Borehole air flow rate < 70 l/h
Characteristic Situation 3 conditions
Gas screening value (CH4 or CO2) < 3.5 l/h

Key for shading	
🟩	CO_2 > 5% in air
🟧	CH4 > 1 % in air
🟦	Gas screening value > or = 0.07 l/h
🟦	Gas screening value > or = 0.7 l/h

NOTES:

Maximum concentration and flow values are assessed below, using peak values for CO2 % (minimum values for oxygen).
Where no detectable flow is recorded the limit of detection of the instrument is used, following Note 5 of Table 8.5. CIRIA C665

						Gas measurements						CO_2 analysis		**CH_4 analysis**		**Characteristic**
Exploratory Hole	**Location**	**Installation response zone stratum**	**Depth range (m BGL)**	**Monitored by**	**Date**	**Flow Rate (l/hr)**	**Atmos Pres (mb)**	**O2 (%) air**	**CO2 (% air)**	**CH4 (% air)**	**H2S (ppm)**	**CO2 as fraction**	**Gas screening value CO_2 (l/hr)**	**CH_4 as fraction**	**Gas screening value CH_4 (l/hr)**	**Situation**
BH01 (50 mm)		SAND	2.00 - 4.00	ESG	28.7.16	No Data - damage to installation						No Data - damage to installation				
					11.8.16											
					25.8.16											
					22.9.16	No Access (parked vehicles)						No Access (parked vehicles)				
					27.9.16	0.1	1008	20.9	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	1021	20.1	0.2	0.0	0.0	0.002	0.000	0.000	0.000	1
BH02 (50 mm)		MG	1.00 - 1.50	ESG	28.7.16	0.0	1008	20.8	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					11.8.16	0.0	1017	20.9	0.2	0.0	0.0	0.002	0.000	0.000	0.000	1
					25.8.16	0.0	1014	20.8	0.1	0.0	0.0	0.001	0.000	0.000	0.000	1
					22.9.16	No Access (parked vehicles)						No Access (parked vehicles)				
					27.9.16	0.0	1008	20.2	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	1020	20.7	0.1	0.0	0.0	0.001	0.000	0.000	0.000	1
BH03 (50 mm)		MG	1.50 - 3.00	ESG	28.7.16	0.0	1008	21.2	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					11.8.16	No Data						No Data				
					25.8.16	0.0	1014	21.0	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					22.9.16	0.0	1015	20.6	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					27.9.16	0.0	1008	20.6	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	1021	20.5	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
BH04	NR Investigation	Sand / Gravel / Clay	1.00 - 3.00	ESG	2.2.17	No Data						No Data				
					8.3.17	0	1011	21.1	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					14.3.17	0.0	1030	21.4	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					22.3.17	0.0	1004	6.1	3.7	0.0	0.0	0.037	0.004	0.000	0.000	1
					30.3.17	0.0	1014	19.0	0.1	0.0	0.0	0.001	0.000	0.000	0.000	1
BH05	NR Investigation	Sandstone	4.00 - 10.00	ESG	2.2.17	0.1	985	21.4	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					8.3.17	0	1011	21.1	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					14.3.17	0	1030	21.3	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					22.3.17	0.0	1004	21.6	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					30.3.17	0.0	1014	21.2	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
												0.000	0.000	0.000	0.000	1
WS02		MG	1.00 - 2.00	ESG	28.7.16	0.1	1008	20.0	0.3	0.0	0.0	0.003	0.000	0.000	0.000	1
					11.8.16	0.0	1017	21.2	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					25.8.16	0.0	1014	21.1	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					22.9.16	No Access (parked vehicles)						No Access (parked vehicles)				
					27.9.16	-0.1	1008	20.8	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	1020	20.7	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
WS06		MG	1.00 - 2.00	ESG	28.7.16	0.1	1008	19.7	0.6	0.0	0.0	0.006	0.001	0.000	0.000	1
					11.8.16	0.0	1017	20.9	0.1	0.0	0.0	0.001	0.000	0.000	0.000	1
					25.8.16	0.1	1014	19.7	0.8	0.0	0.0	0.008	0.001	0.000	0.000	1
					22.9.16	0.0	1015	19.6	1.1	0.0	0.0	0.011	0.001	0.000	0.000	1
					27.9.16	0.0	1008	20.9	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	10212	20.2	0.2	0.0	0.0	0.002	0.000	0.000	0.000	1
WS08		SAND	2.00 - 3.50	ESG	28.7.16	0.0	1008	20.7	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					11.8.16	0.0	1017	21.1	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					25.8.16	0.0	1014	21.2	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					22.9.16	0.0	1015	20.7	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					27.9.16	0.0	1008	20.8	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					20.10.16	0.0	1021	20.6	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1
					Max reading	0.1	10212	21.6	3.7	0.0	0.0	0.037	0.004	0.000	0.000	1
					Min reading	-0.1	985	6.1	0.0	0.0	0.0	0.000	0.000	0.000	0.000	1

Project Name: Factory Theatre
Report Title: Land Contamination Summary and Outline Remediation Strategy
Figure Title: Ground Gas Summary
Scale: NTS **Date:** Oct 2018 **Job No:** 034933 **Enclosure 6**

BUROHAPPOLD
ENGINEERING

Enclosure 7

BUROHAPPOLD
ENGINEERING

Factory Theatre

Excavation and Filling Specification – REM Clauses

034933

1 October 2018

Revision 00 Draft – Subject to Local Authority Approval

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

Revision	Description	Issued by	Date	Checked
00	REM Clauses Draft – Subject to Local Authority Approval	GM	01/10/18	COH

O:\034933 The Factory, Manchester\F9 Ground Engineering - Site Investigation\05 Specifications\Earthworks\S181001_REM Clauses.docx

This report has been prepared for the sole benefit, use and information of **Manchester City Council** for the purposes set out in the report or instructions commissioning it. The liability of Buro Happold Limited in respect of the information contained in the report will not extend to any third party.

It should be noted that at the time of issue this document is Preliminary and those clauses related to contaminated land detailed in this specification are subject to Local Authority approval.

author	**George Mitchell**
date	**1st October 2018**
approved	**Chris O'Hara**
signature	
date	**1st October 2018**

..

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

BH D20 EXCAVATING AND FILLING

Contents

Reference Documents **v**

British Standards Institution (BSI) v

Building Research Establishment (BRE) Digests: v

Department of Environment, Transport and the Regions v

National House-Building Council (NHBC) vi

100 General Requirements/Information 1

110 The Site 4

205 Excavating 7

400 Disposal of Materials 12

500 Filling 14

605 Acceptance of Suitable Fill 19

620 Compacted General Filling 21

630 Compacted Structural Filling 24

700 Backfilling to Temporary Excavations for Foundations 26

800 Topsoil Areas 28

Appendix A Contamination Procedures & Documentation 1

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

100 General Requirements/Information

TO BE READ WITH THE PRELIMINARIES/GENERAL CONDITIONS

100* General

- The Main Contractors (MC) attention is drawn to the nature and extent of material on site. It is anticipated that some proportion of the materials excavated may be suitable for re-use as part of the permanent works construction. The MC shall be responsible for the selection, separation and processing as appropriate for re-use in the permanent works or temporary works as appropriate. The MC is also responsible for the disposal of all unsuitable materials.
- The MC is responsible for the inspection and acceptance of materials, contract drawings and workmanship.
- The works to be executed as specified and in accordance with good practice. No changes are permitted without written approval.
- The MC is to review the detail of this specification and consider the times required for testing, preparation of samples and production of fabrication drawings. This information to be included in the contract programme.
- The MC to include in the price as necessary, the costs for all necessary test pieces, testing, trials and attendance to demonstrate compliance with the requirements of this Specification.
- All publications referred to hereafter are to be the issues current at the date of invitation to tender.
- The following materials are specifically precluded from all specifications pertaining to works carried out under this contract:-

  a) High alumina cement or concrete.

  b) Woodwool slabs as permanent shuttering.

  c) Calcium chloride in admixtures for use in reinforced concrete.

  d) Asbestos in any form.

  e) Sea dredged aggregates for use in reinforced concrete unless otherwise instructed by the client.

  f) Calcium silicate bricks.

  g) Urea formaldehyde.

The MC is required to ensure that all efforts be made, and using the best information available to him, that these substances are not incorporated into the Works. In the event that he is unwilling or unable to comply with these requirements he is to submit in writing in sufficient time for consultations to be held and alternatives to be considered.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

110 The Site

181* **Japanese Knotweed:** None envisaged.

Japanese Knotweed is an invasive, non-native plant species. The Wildlife and Countryside Act (1981) made it illegal to spread Japanese Knotweed and guidance on the management of Japanese Knotweed on development sites is given in the Environment Agency's (EA) code of practice, 2001.

The MC is responsible for ensuring that Japanese Knotweed is not spread across the site. There are a variety of methods available for treating infested areas including spraying with herbicides or digging, spraying and removal to landfill. The Client is responsible for selecting a method of treatment and obtaining approval for the selected method from the Local Authority.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

205 Excavating

208* **Excavation of Chemically Contaminated Materials:** Where contaminated materials are to be excavated the MC shall be responsible for all Health and Safety precautions required to protect the site personnel and the local environment and shall provide method statements covering these issues.

It is worthy of note that no asbestos or fibres were recorded in the material recorded during the ESG 2016 and 2017 investigations. However, due to the historical site uses, the presence of such material within the Made Ground cannot be ruled out and vigilance during site works will be required.

225* **Handling Topsoil**: The following requirements shall be complied with:

- Where aggressive weeds as included in the Weeds Act – Section 2 or the Wildlife and Countryside Act – Schedule 9 – Part 2 are encountered, instructions should be obtained prior to moving topsoil.
- Earthmoving equipment shall be selected and used to minimize disturbance, trafficking and compaction of topsoil.
- On no account should topsoil be mixed with:
    a) Subsoil, stone, hardcore, rubbish or material from demolition work.
    b) Oil, fuel, cement or other substances harmful to plant growth.
    c) Other grades of topsoil.
- Multiple handling should be kept to a minimum. Where practicable topsoil should be used immediately after stripping.
- Topsoil handling should be undertaken in the driest condition possible. It should not be handled during or after heavy rainfall or when it is wetter than the plastic limit defined by BS 3882 Annex N2.

320* **Recorded Features:** Break out old foundations, beds, drains, etc. where and to the extent stated on the drawings. Seal off drain ends, remove contaminated earth and disinfect as required by local authority. Backfill as specified on the drawings.

Due to the site having a rich industrial history, a number of obstructions are likely to be present within the ground. It is worthy of note that during the ESG 2016 ground investigation, a number of obstructions were encountered.

It is worthy of note that no asbestos or fibres were recorded in the material recorded during the ESG 2016 and 2017 investigations. However, due to the historical site uses, the presence of such material within the Made Ground cannot be ruled out and vigilance will be required.

330* **Unrecorded Features:** Where old foundations, beds, basements, filling, tanks, service pipes, drains, hotspots of soil contamination etc. not shown on the drawings are encountered, obtain instructions before proceeding. See also Clause 406.

400 Disposal of Materials

400* **General:** 'Suitable material' comprises all that which is acceptable to the MC in accordance with this specification. "Unsuitable material' is defined in Clause 510.

- No excavated suitable material to be removed from the site unless this suits the MC's operational procedure and then the MC is to make good any subsequent deficit at his own expense.
- Where the excavation reveals a combination of suitable and unsuitable materials the MC is to propose the methods by which suitable material may be excavated without contamination by unsuitable materials.

405* **Contaminated Soils:** Where surplus soils for disposal are chemically contaminated, the MC shall be responsible for disposal of these materials at a suitably licensed landfill and all associated issues such as consignment notes and Environmental Protection Act Section 34 Duty of Care documentation. The MC shall be deemed the producer and holder of the waste and shall be responsible for classifying the materials for disposal to landfill. The MC shall be responsible for carrying out any further soil contaminant testing and Waste Acceptance Criteria testing to enable classification of the waste in accordance with current regulatory guidance and the requirements of the receiving landfill.

The MC shall prepare an earthworks spoil management strategy which shall take account of the range of waste types expected to be encountered and set out any proposed sampling and testing regime for waste classification. The strategy shall include consideration of stockpile management, measures and working methods to protect site worker health and safety and the environment, and working methods to minimize the degree of intermixing of wastes of different classes and to minimize disposal costs.

406* **Unrecorded Contaminated Soils:** Where materials that appear to be contaminated (either visually or on the basis of odour) are encountered during the excavation works the MC shall be responsible for carrying out laboratory testing to enable the materials to be classified for hazard assessment and waste disposal purposes, for disposal to suitably licensed tip as appropriate, and all associated issues such as consignment notes and Environmental Protection Act Section 34 Duty of Care documentation.

500 Filling

510* Unsuitable Materials:

- Do not import or use fill materials which would, either in themselves or in combination with other materials or ground water, give rise to a health hazard, damage to building structures or instability in the filling.
- **Site won** Fill materials must not contain any contaminant in the suite listed below that is in excess of its Specified Trigger Concentration:

Determinand	**Soil Concentration**	**Soil Leachate Concentration**
Arsenic	640 mg/kg	-
Cadmium	410 mg/kg	-
Chromium (total)	8,600 mg/kg	-
Chromium (VI)	49 mg/kg	-
Lead	2,330 mg/kg	-
Mercury (inorganic)	58 mg/kg	-
Selenium	12,000 mg/kg	-
Copper	68,000 mg/kg	-
Nickel	980 mg/kg	-
Zinc	730,000 mg/kg	-
TPH	See Table A1	-
Polycyclic Aromatic Hydrocarbons (USEPA 16)	See Table A2	-
Phenol Index	1,300 mg/kg	-
Cyanide	16,000 mg/kg	-
pH	5<pH<9	-
Asbestos	<0.1%	-

Note 1: Values used are all C4SL's or S4UL's (Commercial) with the exception of cyanide (BH Generic Assessment Criteria - GAC).

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

- **Imported fill** materials must not contain any contaminant in the suite listed below that is in excess of its Specified Trigger Concentration:

Determinand	**Soil Concentration**	**Soil Leachate Concentration**
Arsenic	40 mg/kg	-
Cadmium	149 mg/kg	-
Chromium (total)	910 mg/kg	-
Chromium (VI)	21 mg/kg	-
Lead	310 mg/kg	-
Mercury (inorganic)	56 mg/kg	-
Selenium	430 mg/kg	-
Copper	7,100 mg/kg	-
Nickel	180 mg/kg	-
Zinc	40,000 mg/kg	-
TPH [See Note 1]	See Table A1	-
Polycyclic Aromatic Hydrocarbons (USEPA 16)	See Table A2	-
Phenol Index	1,200 mg/kg	-
Cyanide	760 mg/kg	-
pH	5<pH<9	-
Asbestos	<0.001%	-

Note 1: Values used are all C4SL's or S4UL's (residential without plant uptake) with the exception of cyanide (BH Generic Assessment Criteria - GAC).

- Any materials arising or imported that appear suspect in terms of contamination based on either appearance or smell shall be stockpiled separately and tested for the contaminant suite listed above in addition to any other appropriate contaminant as indicated by appearance or by smell and accepted into the Works or disposed of off site as appropriate.
- Soluble sulphate content (SO_4) of imported materials for filling under concrete slabs or within 1 m of substructures must not exceed 1.2 g/litre when tested BS 1377:Part 3, Clause 5 using a 2:1 water-soil extract.
- Other unsuitable materials include: material from marshes or bogs, peat, logs, stumps, slurry, mud and perishable material, material susceptible to spontaneous combustion, material in a frozen condition, clays of liquid limit exceeding 80% and/or plasticity index exceeding 55, material with excessive moisture content.
- See also Clause 100.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

Table A1. Threshold concentrations for risk banded hydrocarbons and BTEX (SOM 1%).

Determinand		Site Won	Imported
Aliphatic	EC5 – EC7	3,200 mg/kg	42 mg/kg
	EC7 – EC8	7,800 mg/kg	100 mg/kg
	EC8 – EC10	2,000 mg/kg	27 mg/kg
	EC10 – EC12	9,700 mg/kg	130 mg/kg
	EC12 – EC16	59,000 mg/kg	1,100 mg/kg
	EC16 – EC35	1,600,000 mg/kg	1,900 mg/kg
Aromatic	EC5 – EC7	26,000 mg/kg	370 mg/kg
	EC7 – EC8	56,000 mg/kg	860 mg/kg
	EC8 – EC10	3,500 mg/kg	47 mg/kg
	EC10 – EC12	16,000 mg/kg	250 mg/kg
	EC12 – EC16	36,000 mg/kg	1,800 mg/kg
	EC16 – EC21	28,000 mg/kg	1,900 mg/kg
	EC21 – EC35	28,000 mg/kg	1,900 mg/kg
Benzene		27 mg/kg	0.38 mg/kg
Ethylbenzene		518 mg/kg	83 mg/kg
Toluene		869 mg/kg	880 mg/kg
Xylenes		576 mg/kg	79 mg/kg

Note 1: Site won - Values used are S4UL's (Commercial).

Note 2: Imported - Values used are S4UL's (Residential without Plant Uptake) with some reductions to TPH fractions.

Table A2. Threshold concentrations for Poly Aromatic Hydrocarbons (USEPA 16)

Determinand	Site Won	Imported
Naphthalene	190 mg/kg	2.3 mg/kg
Acenaphthylene	83,000 mg/kg	2,900 mg/kg
Acenaphthene	84,000 mg/kg	3,000 mg/kg
Fluorene	63,000 mg/kg	2,800 mg/kg
Phenanthrene	22,000 mg/kg	1,300 mg/kg
Anthracene	520,000 mg/kg	31,000 mg/kg
Fluoranthene	23,000 mg/kg	1,500 mg/kg
Pyrene	54,000 mg/kg	3,700 mg/kg
Benzo(a)anthracene	170 mg/kg	11 mg/kg
Chrysene	350 mg/kg	30 mg/kg
Benzo(b)fluoranthene	44 mg/kg	3.9 mg/kg
Benzo(k)fluoranthene	1,200 mg/kg	110 mg/kg
Benzo(a)pyrene	35 mg/kg	3.2 mg/kg
Indendo(123-cd)pyrene	500 mg/kg	45 mg/kg
Dibenzo(ah)anthracene	3.5 mg/kg	0.31 mg/kg
Benzo(ghi)perylene	3,900 mg/kg	360 mg/kg

Note 1: Site won - Values used are S4UL's (Commercial).
Note 2: Imported - Values used are S4UL's (Residential without Plant Uptake).

605 Acceptance of Suitable Fill

605 Acceptance of Suitable Fill

For all imported fill from an unknown, mixed or brownfield source, testing shall be carried out to demonstrate that no contaminant listed in the suite given in Clause 510 is in excess of its Trigger Concentration. This testing shall be carried out at a rate of 1 test per 50 m^3 of placed fill material.

For all naturally site won derived as-dug soils or imported soils from a Greenfield source, testing shall be carried out to demonstrate that no contaminant listed in the suite given in Clause 510 is in excess of its Trigger Concentration. This testing shall be carried out at a rate of 1 test per 200 m^3 of placed fill material.

In addition, any materials arising or imported that appear suspect in terms of contamination based on either appearance or smell shall be stockpiled separately and tested for the contaminant suite listed in Clause 510 in addition to any other appropriate contaminant as indicated by appearance or by smell and either accepted into the Works or disposed of off-site as appropriate.

During placement of **General Fill** the MC is also required to provide daily records of testing of the material placed to show compliance with the Specification. The minimum requirements are:

Grading (BS1377: Part 2, Method 9.2): At least once a day or one test for every 500 m^3 placed.

Moisture Content and undrained remoulded shear strength (cohesive materials) (BS1377: Part 2, Method 3.2; and Part 7, Method 8): Three times a day or one test for every 200 m^3 placed.

Plasticity Tests (BS1377: Part 2, Methods 4.3 and 5): One test per day for each source or for every 500 m^3 placed.

During placement of **Structural Fill** the MC is also required to provide daily records of testing of the material placed to show compliance with the Specification. The minimum requirements are:

Grading (BS1377: Part 2, Method 9.2): At least once a day or one test for every 50 m^3 placed.

Moisture Content and undrained remoulded shear strength (cohesive materials) (BS1377: Part 2, Method 3.2; and Part 7, Method 8): Three times a day or one test for every 20 m^3 placed.

Plasticity Tests (BS1377: Part 2, Methods 4.3 and 5): One test per day for each source or for every 50 m^3 placed.

Los Angeles Test (BS EN 1097-2): One test per source and for every 100 m^3 placed.

End product (BS1377: Part 9, Method 2.2): One sand replacement density test for each compacted layer or each 20 m^3 placed.

Note: For each element cited above the option giving the greatest number of tests shall apply.

610* General Landscape Filling:

Definition: Fill to soft landscape areas only (excluding sports pitches).

- Materials arising from the excavations or imported, but excluding unsuitable materials as defined in Clause 510, with a maximum particle size of 150 mm.
- Lay in layers not more than 200 mm thick and consolidate each layer with the earthmoving plant.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

630 Compacted Structural Filling

660 Deterioration of Fill Materials:

If the material to be deposited as fill subsequently reaches a condition where it cannot be compacted to the requirements of this specification the MC shall:

- make good by removing the material from site until it is in a suitable condition for reuse and/or replace with suitable material, or
- make good the material by mechanical or chemical means, or
- cease work until the physical condition of the material is such that it can be compacted as described in this specification.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

800 Topsoil Areas

850* Contamination:

Do not use topsoil contaminated with subsoil, rubbish, oil-based products or other materials toxic to plant life. Dispose of contaminated topsoil as instructed.

Imported topsoil for use as fill to the top metre (if required) on the site will be tested for the contaminant suite listed below to ensure that contaminant threshold levels are not exceeded.

Site won topsoil for use as fill to the top metre shall also be tested for the contaminant suite defined below to ensure that contaminant threshold levels are not exceeded.

Maximum permissible contaminant concentrations in **imported and site won topsoil** (soil concentrations only will be determined):

Determinand	**Soil Concentration**	**Soil Leachate Concentration**
Arsenic	37 mg/kg	Not required
Cadmium	26 mg/kg	Not required
Chromium (total)	910 mg/kg	Not required
Chromium (VI)	21 mg/kg	Not required
Lead	200 mg/kg	Not required
Mercury (inorganic)	40 mg/kg	Not required
Selenium	250 mg/kg	Not required
Copper	2,400 mg/kg	Not required
Nickel	130 mg/kg	Not required
Zinc	3,700 mg/kg	Not required
TPH {See Note 1}	100 mg/kg	Not required
Polycyclic Aromatic Hydrocarbons (USEPA 16) And BTEX	See Note 2	Not required
Phenol Index	380 mg/kg	Not required
Cyanide	4.6 mg/kg	Not required
pH	5<pH<9	Not required
Asbestos	<0.001%	-

Note 1: Materials exceeding this threshold shall be subject to speciated analysis and comparison with the below table:

Hydrocarbon band	Soil concentration mg/kg
Aliphatic C5 - C6	42
Aliphatic C6 - C8	100
Aliphatic C8 - C10	27
Aliphatic C10 - C12	130
Aliphatic C12 - C16	1100
Aliphatic C16 - C21	1100
Aliphatic C21 - C35	1100
Aromatic C5 - C7	70
Aromatic C7 - 8	130
Aromatic C8 - C10	34
Aromatic C10 - 12	74
Aromatic C12 - C16	140
Aromatic C16 - C21	260
Aromatic C21 - C35	1100

Note 2: PAH values and BTEX values:

Compound	Soil concentration mg/kg
Naphthalene	2.3
Acenaphthylene	170
Acenaphthene	210
Fluorene	170
Phenanthrene	95
Anthracene	2400
Fluoranthene	280
Pyrene	620
Benzo[a]anthracene	7.2
Chrysene	15
Benzo[b]fluoranthene	2.6
Benzo[k]fluoranthene	77
Benzo[a]pyrene	2.20
Indeno[123-cd]pyrene	27
Dibenzo[ah]anthracene	0.24
Benzo[ghi]perylene	320
Benzene	0.087
Toluene	130
Ethyl Benzene	47
m/p Xylenes	56
o Xylenes	60
Xylenes**	56

The rate of validation testing on **imported topsoil** will be 1 sample per 250 m^3 of backfill.

The rate validation testing on **site won** topsoil will be 10 No. representative samples from stockpile.

Appendix A Contamination Procedures & Documentation

A1 Validation Strategy

As soon as practicable after the removal of any anticipated or unexpected 'hot spots' a **Validation Report** shall be prepared and submitted by the MC and agreed with the relevant Local Authority Planning Development Department.

The validation strategy shall be as follows:

- Anticipated areas of elevated concentrations or 'hot spots' shall be excavated and removed to at least 1.00 m beyond any visual or olfactory (odorous) indication of contamination.
- Samples of the surrounding soil will be taken from the excavation formed and tested for the suite of determinands listed in Clause 510 in addition to any other appropriate contaminant as indicated by appearance or by smell.
- If the chemical concentrations of the soil samples are less than the concentrations recorded in Clause 510 or other appropriate guidance in respect of other appropriate contaminant, the elevated concentrations or 'hot spot' can be considered to have been removed and no further remedial action is required.
- If the chemical concentrations of the soil samples are greater than the concentrations recorded in Clause 510, further excavation is required and the sequence of sampling and testing should be repeated. Incremental excavation and testing should continue until the chemical concentrations encountered are less than the concentrations recorded in Clause 510 or other appropriate guidance in respect of other appropriate contaminant.
- During this procedure, the following information should be collected and recorded:
  - The exact extent of each phase of excavation should be recorded using 3D topographical surveying techniques.
  - The exact position and depth of each sample taken should be recorded using 3D topographical surveying techniques.
  - The samples should be given a unique reference number.
  - The laboratory testing results for each unique sample shall be recorded.
  - A photographic record of each phase of excavation and sampling will be collected and recorded.
- A general photographic record of the works should also be collected and recorded to provide a general record of the nature and characteristics of the materials encountered and/or laid to form formations etc. Where practicable, the photographic record should be cross referenced with any chemical testing available for the material type.

A validation report should be prepared, comprising substantiating completion documentation to include type of documentation listed above and photographic records in addition to Environmental Protection Act 1990 Section 34 Duty of Care documentation relating to waste disposal of the material removed from site.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

A2 Validation Documentation Requirements

The following documentation shall be prepared by the MC and submitted to the relevant Local Authority Planning Development Department.

- Plan or plans showing earthworks movement of materials on site (cut and fill) and imported if appropriate.
- Plan or plans showing the location of any 'hot spots' located, if any, or confirmation that none were encountered.
- Plan or plans showing location of chemical testing undertaken as appropriate plus supporting information.
- Plan or plans showing surface finishes and thickness of build-ups, topsoil or clean cover as appropriate.
- Plan or plans showing the location of any hotspots encountered during service trench excavation, if any, and plan sections of remedial measures undertaken for water pipe provision.
- Appropriate records of material removed from site including testing records.
- Appropriate records of material imported to site including testing records.
- Appropriate records of topsoil imported to site including testing records.
- Appropriate photographic records of the earthworks plus any specific areas of interest ('hotspots', tanks etc).
- Records of any water control of groundwater that may have been contaminated, if any, or confirmation that none were encountered.
- Other records, if appropriate, not included in above summary.
- A statement confirming the earthworks was undertaken in accordance with this specification.

Copyright © 1976 - 2018 BuroHappold Engineering. All Rights Reserved.

George Mitchell
Buro Happold Limited
2 Brewery Place
Brewery Wharf
Leeds
LS10 1NE
UK

T: +44 (0)113 204 2200
F: +44 (0)870 787 4144
Email: George.Mitchell@BuroHappold.com

APPENDIX B

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

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

Concept Life Sciences

Certificate of Analysis

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

Report Number: 805359-1 Report A

Date of Report: 07-Mar-2019

Customer: Laing O'Rourke
The Factory
Water Street
M3 4JQ

Customer Contact: Mr Ryan

Customer Job Reference:
Customer Site Reference: THE FACTORY
Date Job Received at Concept: 20-Feb-2019
Date Analysis Started: 27-Feb-2019
Date Analysis Completed: 07-Mar-2019

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

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

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

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

UKAS TESTING
1549

Report checked
and authorised by :
Toni Morris
Customer Service Advisor

Issued by :
Aneta Dybek-Echtermeyer
Customer Service Advisor

A. Dybek-Echtermeyer

Waste Acceptance Criteria

Customer Sample Reference : F55 1
Our Sample Reference : 805359 006
Project Site : THE FACTORY
Test Portion Mass (g) : 175
Empty Dish Weight : 0
Sample in Dish @ 105C : 89.2
Wet Sample in Dish Weight : 100
Depth : 22.620
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	(13) **130**			
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **130**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**1.0**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**3.0**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.070	mg/kg	M	(9) <0.070	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**14**	100.0		
pH	Probe			M	**8.4**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.016**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.025**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.079**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**17**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.012**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.030**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**53**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**3.0**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0054**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.062**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0062**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**550**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**1100**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : F55 2
Our Sample Reference : 805359 007
Project Site : THE FACTORY
Test Portion Mass (g) : 175
Sample in Dish @ 105C : 86.1
Wet Sample in Dish Weight : 100
Depth : 22.620
Empty Dish Weight : 0
Date Sampled : 19-FEB-2019
Matrix Class : Other

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	(13) **230**			
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **230**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**0.6**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**1.9**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	N	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.0070	mg/kg	N	<0.0070	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**53**	100.0		
pH	Probe			N	**8.4**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.0045**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.032**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**23**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0099**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**25**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**1.3**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.011**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**21**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	<1000	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : F55 3
Our Sample Reference : 805359 008
Project Site : THE FACTORY
Wet Sample in Dish Weight : 100
Depth : 22.620
Empty Dish Weight : 0
Test Portion Mass (g) : 175
Sample in Dish @ 105C : 87.1
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	(13) **240**			
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **240**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**1.1**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**3.0**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**21**	100.0		
pH	Probe			M	**8.5**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.013**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.017**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.10**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**12**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.011**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.048**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**53**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**2.5**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0042**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.051**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**530**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**1100**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : F55 4
Our Sample Reference : 805359 009
Project Site : THE FACTORY
Empty Dish Weight : 0
Depth : 22.620
Test Portion Mass (g) : 175
Wet Sample in Dish Weight : 100
Sample in Dish @ 105C : 84.9
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	(13) **480**			
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **480**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**1.4**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**3.3**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**22**	100.0		
pH	Probe			M	**8.6**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.015**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.021**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.087**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	<10	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.011**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.018**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**49**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**2.6**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0037**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.049**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**850**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**1500**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : F55 5
Our Sample Reference : 805359 010
Project Site : THE FACTORY
Wet Sample in Dish Weight : 100
Depth : 22.620
Empty Dish Weight : 0
Sample in Dish @ 105C : 88
Test Portion Mass (g) : 175
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	(13) **240**			
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **240**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**1.1**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**2.9**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**15**	100.0		
pH	Probe			M	**8.5**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.014**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.017**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.088**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**15**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.011**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.022**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**50**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**2.9**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0032**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.056**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0051**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**570**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**1200**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
MCERTS Preparation

				Concept Reference	805359 006	805359 007	805359 008	805359 009	805359 010
				Customer Sample Reference	F55 1	F55 2	F55 3	F55 4	F55 5
				Test Sample	AR	AR	AR	AR	AR
				Depth	22.620	22.620	22.620	22.620	22.620
				Date Sampled	19-FEB-2019	19-FEB-2019	19-FEB-2019	19-FEB-2019	19-FEB-2019
				Matrix Class	Sandy Soil	Other	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	11	16	13	15	12
Moisture @40C	Grav (1 Dec) (40 C)	0.1	%	N	11	36	13	12	12

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
MCERTS Preparation

				Concept Reference	805359 006	805359 007	805359 008	805359 009	805359 010
				Customer Sample Reference	F55 1	F55 2	F55 3	F55 4	F55 5
				Test Sample	M40	M40	M40	M40	M40
				Depth	22.620	22.620	22.620	22.620	22.620
				Date Sampled	19-FEB-2019	19-FEB-2019	19-FEB-2019	19-FEB-2019	19-FEB-2019
				Matrix Class	Sandy Soil	Other	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Retained on 10mm sieve	Grav	0.1	%	N	31.5	27.1	31.7	22.9	24.1

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis

				Concept Reference	805359 006	805359 008	805359 009	805359 010
				Customer Sample Reference	F55 1	F55 3	F55 4	F55 5
				Test Sample	A40	A40	A40	A40
				Depth	22.620	22.620	22.620	22.620
				Date Sampled	19-FEB-2019	19-FEB-2019	19-FEB-2019	19-FEB-2019
				Matrix Class	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**LOD**	**Units**	**Symbol**				
Boron (water-soluble)	ICP/OES	1	mg/kg	N	<1	<1	<1	<1
Mercury (Inorganic)	ICP/OES (Inorganic Mercury)	1	mg/kg	N	<1	<1	<1	<1
Asbestos ID	PLM			SU	N.D.	N.D.	N.D.	N.D.

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis

				Concept Reference	805359 006	805359 008	805359 009	805359 010
				Customer Sample Reference	F55 1	F55 3	F55 4	F55 5
				Test Sample	M105	M105	M105	M105
				Depth	22.620	22.620	22.620	22.620
				Date Sampled	19-FEB-2019	19-FEB-2019	19-FEB-2019	19-FEB-2019
				Matrix Class	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**LOD**	**Units**	**Symbol**				
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10
Polychlorinated biphenyl BZ#28	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#52	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#101	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#118	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#153	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#138	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#180	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Naphthalene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.3**	<0.1	**0.1**	**0.2**
Acenaphthylene	GC/MS (MCERTS)	0.1	mg/kg	U	<0.1	<0.1	<0.1	<0.1
Acenaphthene	GC/MS (MCERTS)	0.1	mg/kg	M	**1.1**	**5.0**	**3.6**	**1.3**
Fluorene	GC/MS (MCERTS)	0.1	mg/kg	M	**1.4**	**4.5**	**3.2**	**2.0**
Phenanthrene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.6**	**0.9**	**1.3**	**0.4**
Anthracene	GC/MS (MCERTS)	0.1	mg/kg	U	**0.9**	**1.1**	**1.2**	**1.1**
Fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	**4.3**	**4.6**	**5.2**	**4.8**
Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**3.1**	**3.2**	**3.7**	**3.4**
Benzo(a)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.7**	**0.6**	**0.9**	**0.7**
Chrysene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.6**	**0.5**	**0.8**	**0.6**
Benzo(b)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.3**	**0.2**	**0.4**	**0.2**
Benzo(k)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.3**	**0.2**	**0.4**	**0.2**
Benzo(a)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.3**	**0.2**	**0.4**	**0.2**
Indeno(123-cd)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.1**	<0.1	**0.2**	<0.1
Dibenzo(ah)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.1**	<0.1	**0.2**	<0.1
Coronene	GC/MS	0.1	mg/kg	N	<0.1	<0.1	<0.1	<0.1
Phenol	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS (MCERTS)	0.1	mg/kg	U	**14**	**21**	**22**	**15**
Total Petroleum Hydrocarbons (C10-C35)	GC/FID	1	mg/kg	M	**120(13)**	**230(13)**	**420(13)**	**220(13)**
Total Petroleum Hydrocarbons (C35-C40)	GC/FID	1	mg/kg	N	**13(13)**	**10(13)**	**56(13)**	**17(13)**

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis

				Concept Reference	805359 006	805359 008	805359 009	805359 010
				Customer Sample Reference	F55 1	F55 3	F55 4	F55 5
				Test Sample	M40	M40	M40	M40
				Depth	22.620	22.620	22.620	22.620
				Date Sampled	19-FEB-2019	19-FEB-2019	19-FEB-2019	19-FEB-2019
				Matrix Class	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Determinand	**Method**	**LOD**	**Units**	**Symbol**				
Arsenic	ICP/OES	2	mg/kg	M	**9**	**9**	**8**	**8**
Cadmium	ICP/OES	1	mg/kg	M	<1	<1	<1	<1
Chromium	ICP/OES	1	mg/kg	M	**13**	**12**	**11**	**10**
Lead	ICP/OES	1	mg/kg	M	**110**	**100**	**120**	**94**
Nickel	ICP/OES	1	mg/kg	M	**17**	**15**	**15**	**13**
Selenium	ICP/OES	3	mg/kg	M	<3	<3	<3	<3
Copper	ICP/OES	1	mg/kg	M	**34**	**35**	**31**	**28**
Zinc	ICP/OES	1	mg/kg	M	**61**	**62**	**55**	**51**

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis (Other Sample)

Concept Reference	**805359 007**
Customer Sample Reference	**F55 2**
Test Sample	**A40**
Depth	**22.620**
Date Sampled	**19-FEB-2019**
Matrix Class	**Other**

Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Boron (water-soluble)	ICP/OES	1	mg/kg	N	<1
Mercury (Inorganic)	ICP/OES (Inorganic Mercury)	1	mg/kg	N	<1
Asbestos ID	PLM			SN	N.D.

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis (Other Sample)

Concept Reference	**805359 007**
Customer Sample Reference	**F55 2**
Test Sample	**M105**
Depth	**22.620**
Date Sampled	**19-FEB-2019**
Matrix Class	**Other**

Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	<10
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	<10
Polychlorinated biphenyl BZ#28	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#52	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#101	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#118	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#153	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#138	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#180	GC/MS (SIR)	1	µg/kg	N	<1
Naphthalene	GC/MS (MCERTS)	0.1	mg/kg	N	**0.2**
Acenaphthylene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1
Acenaphthene	GC/MS (MCERTS)	0.1	mg/kg	N	**1.4**
Fluorene	GC/MS (MCERTS)	0.1	mg/kg	N	**2.8**
Phenanthrene	GC/MS (MCERTS)	0.1	mg/kg	N	**0.9**
Anthracene	GC/MS (MCERTS)	0.1	mg/kg	N	**1.1**
Fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	N	**17**
Pyrene	GC/MS (MCERTS)	0.1	mg/kg	N	**14**
Benzo(a)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	N	**4.6**
Chrysene	GC/MS (MCERTS)	0.1	mg/kg	N	**4.0**
Benzo(b)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	N	**1.5**
Benzo(k)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	N	**1.6**
Benzo(a)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	N	**1.6**
Indeno(123-cd)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	N	**0.5**
Dibenzo(ah)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	N	**0.2**
Benzo(ghi)Perylene	GC/MS (MCERTS)	0.1	mg/kg	N	**0.5**
Coronene	GC/MS	0.1	mg/kg	N	<0.1
Phenol	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS (MCERTS)	0.1	mg/kg	N	**53**
Total Petroleum Hydrocarbons (C10-C35)	GC/FID	1	mg/kg	N	**220**(13)
Total Petroleum Hydrocarbons (C35-C40)	GC/FID	1	mg/kg	N	**7**(13)

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis (Other Sample)

				Concept Reference	**805359 007**
				Customer Sample Reference	**F55 2**
				Test Sample	**M40**
				Depth	**22.620**
				Date Sampled	**19-FEB-2019**
				Matrix Class	**Other**
Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Arsenic	ICP/OES	2.0	mg/kg	N	**8.4**
Cadmium	ICP/OES	1.0	mg/kg	N	<1.0
Chromium	ICP/OES	1	mg/kg	N	**15**
Lead	ICP/OES	1	mg/kg	N	**11**
Nickel	ICP/OES	1	mg/kg	N	**22**
Selenium	ICP/OES	3	mg/kg	N	<3
Copper	ICP/OES	1	mg/kg	N	**12**
Zinc	ICP/OES	1	mg/kg	N	**53**

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
Miscellaneous

				Concept Reference	**805359 006**	**805359 007**	**805359 008**	**805359 009**	**805359 010**
				Customer Sample Reference	**F55 1**	**F55 2**	**F55 3**	**F55 4**	**F55 5**
				Test Sample	**A40**	**A40**	**A40**	**A40**	**A40**
				Depth	**22.620**	**22.620**	**22.620**	**22.620**	**22.620**
				Date Sampled	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
				Matrix Class	**Sandy Soil**	**Other**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Chromium VI	ICP/OES	1	mg/kg	N	<1	<1	<1	<1	<1

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
Miscellaneous

				Concept Reference	**805359 006**	**805359 007**	**805359 008**	**805359 009**	**805359 010**
				Customer Sample Reference	**F55 1**	**F55 2**	**F55 3**	**F55 4**	**F55 5**
				Test Sample	**M105**	**M105**	**M105**	**M105**	**M105**
				Depth	**22.620**	**22.620**	**22.620**	**22.620**	**22.620**
				Date Sampled	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
				Matrix Class	**Sandy Soil**	**Other**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Total Petroleum Hydrocarbons (C6 - C10)	GC/MS (Headspace)	10	µg/kg	N	<10	<10	<10	<10	<10

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

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

Combined Leachate and WAC Leachate Suite

				Concept Reference	805359 006	805359 007	805359 008	805359 009	805359 010
				Customer Sample Reference	**F55 1**	**F55 2**	**F55 3**	**F55 4**	**F55 5**
				Test Sample	**10:1**	**10:1**	**10:1**	**10:1**	**10:1**
				Depth	**22.620**	**22.620**	**22.620**	**22.620**	**22.620**
				Date Sampled	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
				Matrix Class	**Sandy Soil**	**Other**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
pH	Probe			U	**7.67**	**7.94**	**7.78**	**7.58**	**7.73**
Boron (Dissolved)	ICP/OES (Filtered)	0.01	mg/l	N	**0.02**	<0.01	**0.02**	**0.02**	**0.02**
Arsenic (Dissolved)	ICP/MS (Filtered)	0.2	µg/l	U	**2.5**	**0.4**	**1.7**	**2.1**	**1.7**
Cadmium (Dissolved)	ICP/MS (Filtered)	0.02	µg/l	U	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**1**	<1	**1**	**1**	**1**
Lead (Dissolved)	ICP/MS (Filtered)	0.3	µg/l	U	**0.5**	<0.3	**0.4**	**0.4**	**0.3**
Mercury (Dissolved)	ICP/MS (Filtered)	0.05	µg/l	U	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	<1	<1	<1	<1	<1
Copper (Dissolved)	ICP/MS (Filtered)	0.5	µg/l	U	**3.0**	**1.0**	**4.8**	**1.8**	**2.2**
Zinc (Dissolved)	ICP/MS (Filtered)	2	µg/l	U	<2	<2	<2	<2	<2
Total Petroleum Hydrocarbons	GC/FID	0.1	mg/l	U	**0.3**(13)	**0.2**(13)	**1.4**(13)	**0.6**(13)	**0.6**(13)
PAH (sum of 4)	Calc		µg/l	N	**1.6**	**1.5**	**2.2**	**0.69**	**1.0**
Benzo(b)fluoranthene	GC/MS (SIR)	0.01	µg/l	U	**0.65**(13)	**0.62**(13)	**0.90**(13)	**0.25**(13)	**0.40**(13)
Benzo(ghi)Perylene	GC/MS (SIR)	0.01	µg/l	U	**0.29**(13)	**0.20**(13)	**0.33**(13)	**0.12**(13)	**0.17**(13)
Benzo(k)fluoranthene	GC/MS (SIR)	0.01	µg/l	U	**0.47**(13)	**0.52**(13)	**0.66**(13)	**0.22**(13)	**0.31**(13)
Indeno(123-cd)Pyrene	GC/MS (SIR)	0.01	µg/l	U	**0.22**(13)	**0.16**(13)	**0.27**(13)	**0.10**(13)	**0.13**(13)
Barium (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**8**	**3**	**10**	**9**	**9**
Molybdenum (Dissolved)	ICP/MS (Filtered)	1	µg/l	N	**6**	**1**	**5**	**5**	**6**
Total Dissolved Solids	Grav	100	mg/l	N	**110**	<100	**110**	**150**	**120**
Phenols (Total-Mono)	Colorimetry	0.1	mg/l	U	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Organic Carbon	OX/IR	1	mg/l	N	**5**	**3**	**5**	**5**	**5**
Electrical Conductivity	Probe	10	µS/cm	N	**190**	**89**	**180**	**250**	**200**
Antimony (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**2**	<1	**1**	**2**	**1**
Selenium (Dissolved)	ICP/MS (Filtered)	0.5	µg/l	U	**0.6**	<0.5	<0.5	<0.5	**0.5**
Chloride	Discrete Analyser	1	mg/l	U	**2**	**2**	**1**	<1	**1**
Fluoride	Discrete Analyser	0.05	mg/l	U	**0.30**	**0.13**	**0.25**	**0.26**	**0.29**
Sulphate	Discrete Analyser	0.5	mg/l	U	**55**	**2.1**	**53**	**85**	**57**

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Water Analysed as Water

Miscellaneous

				Concept Reference	805359 001
				Customer Sample Reference	**F55 A**
				Test Sample	**AR**
				Depth	**22.620**
				Date Sampled	**19-FEB-2019**
				Sample Received (ml)	**2500**
Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Total Petroleum Hydrocarbons (C6 - C10)	GC/MS (Headspace)(LV)	10	µg/l	N	<10
Total Petroleum Hydrocarbons (C10 - C40)	GC/FID (LV)	0.01	mg/l	N	**1.2**(13)
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	0.01	mg/l	N	**1.2**(13)

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Water Analysed as Water
Miscellaneous

Concept Reference	**805359 001**
Customer Sample Reference	**F55 A**
Test Sample	**F**
Depth	**22.620**
Date Sampled	**19-FEB-2019**
Sample Received (ml)	**2500**

Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Chromium VI	Discrete Analyser	0.003	mg/l	U	<0.003

Index to symbols used in 805359-1 Report A

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

Notes

Samples submitted for GC/MS (Headspace) analysis were submitted in inappropriate containers. It is possible therefore that the results provided may be compromised.
"Other" samples are outside the scope of our accreditation.
Asbestos testing is subcontracted to REC Asbestos.
Report A to include the WAC results only.

APPENDIX C

Waste Classification Report

G3DPE-DHZB3-3GVKT

Job name

The Factory Lift Pit

Description/Comments

Area of contamination discovered on site and sent for further testing. Hydrocarbon odour present and visual evidence of oil contamination. However, hydrocarbon testing shows them to be below hazardous waste limit.

Project

The Factory

Site

Related Documents

#	Name	Description
None		

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name:
Nadia Bidzinska
Date:
11 Mar 2019 15:53 GMT
Telephone:
01322 296200

Company:
Laing O'Rourke
Bridge Place
Anchor Boulevard
Crossings
DA2 6SN

Report

Created by: Nadia Bidzinska
Created date: 11 Mar 2019 15:53 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	F551	22.620	Non Hazardous		2
2	F552	22.620	Non Hazardous		5
3	F553	22.620	Non Hazardous		8
4	F554	22.620	Non Hazardous		11
5	F555	22.620	Non Hazardous		14

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	17
Appendix B: Rationale for selection of metal species	20
Appendix C: Version	20

Classification of sample: F551

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
F551		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
22.620 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
11% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 11% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	**User entered data**	Conv. Factor	Compound conc.	**Classification value**	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9 mg/kg	1.32	10.705 mg/kg	0.00107 %	✓	
2		boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		**<LOD**
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<1 mg/kg	1.142	<1.142 mg/kg	<0.000114 %		**<LOD**
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		13 mg/kg	1.462	17.117 mg/kg	0.00171 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		**<LOD**
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		34 mg/kg	1.126	34.487 mg/kg	0.00345 %	✓	
7		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	110 mg/kg	1.56	154.576 mg/kg	0.00991 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		**<LOD**
9		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		17 mg/kg	2.976	45.582 mg/kg	0.00456 %	✓	
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3 mg/kg	2.554	<7.661 mg/kg	<0.000766 %		**<LOD**
11		zinc { zinc chromate }	024-007-00-3				61 mg/kg	2.774	152.453 mg/kg	0.0152 %	✓	
12	●	TPH (C6 to C40) petroleum group			TPH		133 mg/kg		119.82 mg/kg	0.012 %	✓	
13		benzene	601-020-00-8	200-753-7	71-43-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
14		toluene	601-021-00-3	203-625-9	108-88-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
17	●	pH			PH		8.4	pH		8.4	pH	8.4 pH		
18		naphthalene	601-052-00-2	202-049-5	91-20-3		0.3	mg/kg		0.27	mg/kg	0.000027 %	✓	
19	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
20	●	acenaphthene		201-469-6	83-32-9		1.1	mg/kg		0.991	mg/kg	0.0000991 %	✓	
21	●	fluorene		201-695-5	86-73-7		1.4	mg/kg		1.261	mg/kg	0.000126 %	✓	
22	●	phenanthrene		201-581-5	85-01-8		0.6	mg/kg		0.541	mg/kg	0.0000541 %	✓	
23	●	anthracene		204-371-1	120-12-7		0.9	mg/kg		0.811	mg/kg	0.0000811 %	✓	
24	●	fluoranthene		205-912-4	206-44-0		4.3	mg/kg		3.874	mg/kg	0.000387 %	✓	
25	●	pyrene		204-927-3	129-00-0		3.1	mg/kg		2.793	mg/kg	0.000279 %	✓	
26		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.7	mg/kg		0.631	mg/kg	0.0000631 %	✓	
27		chrysene	601-048-00-0	205-923-4	218-01-9		0.6	mg/kg		0.541	mg/kg	0.0000541 %	✓	
28		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.3	mg/kg		0.27	mg/kg	0.000027 %	✓	
29		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.3	mg/kg		0.27	mg/kg	0.000027 %	✓	
30		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.3	mg/kg		0.27	mg/kg	0.000027 %	✓	
31	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.1	mg/kg		0.0901	mg/kg	0.00000901 %	✓	
32		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
33	●	benzo[ghi]perylene		205-883-8	191-24-2		0.1	mg/kg		0.0901	mg/kg	0.00000901 %	✓	
34		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
35	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
36	●	2,3,7,8-TeCDD		217-122-7	1746-01-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		<LOD
37	●	1,2,3,7,8-PeCDD			40321-76-4		<0.55	ng/kg		<5.5e-07	mg/kg	<5.5e-11 %		<LOD
38	●	1,2,3,4,7,8-HxCDD			39227-28-6		<0.24	ng/kg		<2.4e-07	mg/kg	<2.4e-11 %		<LOD
39	●	1,2,3,6,7,8-HxCDD			57653-85-7		<1.2	ng/kg		<1.2e-06	mg/kg	<1.2e-10 %		<LOD
40	●	1,2,3,7,8,9-HxCDD			19408-74-3		0.63	ng/kg		5.68e-07	mg/kg	5.68e-11 %	✓	
41	●	1,2,3,4,6,7,8-HpCDD			35822-46-9		7.4	ng/kg		6.67e-06	mg/kg	6.67e-10 %	✓	
42	●	OCDD			3268-87-9		39	ng/kg		3.51e-05	mg/kg	0.000000003 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
43	●	2,3,7,8-TeCDF				1.5	ng/kg		1.35e-06 mg/kg	1.35e-10 %	✓	
				51207-31-9								
44	●	1,2,3,7,8-PeCDF				1.2	ng/kg		1.08e-06 mg/kg	1.08e-10 %	✓	
				57117-41-6								
45	●	2,3,4,7,8-PeCDF				1.7	ng/kg		1.53e-06 mg/kg	1.53e-10 %	✓	
				57117-31-4								
46	●	1,2,3,4,7,8-HxCDF				2	ng/kg		1.8e-06 mg/kg	1.8e-10 %	✓	
				70648-26-9								
47	●	1,2,3,6,7,8-HxCDF				<1.9	ng/kg		<1.9e-06 mg/kg	<1.9e-10 %		<**LOD**
				57117-44-9								
48	●	1,2,3,7,8,9-HxCDF				<0.7	ng/kg		<7.0e-07 mg/kg	<7.0e-11 %		<**LOD**
				72918-21-9								
49	●	2,3,4,6,7,8-HxCDF				1.7	ng/kg		1.53e-06 mg/kg	1.53e-10 %	✓	
				60851-34-5								
50	●	1,2,3,4,6,7,8-HpCDF				5.4	ng/kg		4.86e-06 mg/kg	4.86e-10 %	✓	
				67562-39-4								
51	●	1,2,3,4,7,8,9-HpCDF				0.88	ng/kg		7.93e-07 mg/kg	7.93e-11 %	✓	
				55673-89-7								
52	●	OCDF				<6	ng/kg		<6.0e-06 mg/kg	<6.0e-10 %		<**LOD**
				39001-02-0								
									Total:	0.0508 %		

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
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 Soils will be dewatered prior to excavation and removal from site. Therefore it's unlikely that a flammable liquid fraction will be present. Hydrocarbon extraction will be implemented for dewatering.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.012%)

Classification of sample: F552

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
F552		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
22.620 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
16% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 16% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		8.4	mg/kg	1.32	9.561	mg/kg	0.000956 %	✓	
2		boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		15	mg/kg	1.462	18.899	mg/kg	0.00189 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		12	mg/kg	1.126	11.647	mg/kg	0.00116 %	✓	
7		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	11	mg/kg	1.56	14.791	mg/kg	0.000948 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
9		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		22	mg/kg	2.976	56.446	mg/kg	0.00564 %	✓	
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
11		zinc { zinc chromate }	024-007-00-3				53	mg/kg	2.774	126.75	mg/kg	0.0127 %	✓	
12	●	TPH (C6 to C40) petroleum group			TPH		227	mg/kg		195.69	mg/kg	0.0196 %	✓	
13		benzene	601-020-00-8	200-753-7	71-43-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14		toluene	601-021-00-3	203-625-9	108-88-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
17	●	pH			PH		8.4	pH		8.4	pH	8.4 pH		
18		naphthalene	601-052-00-2	202-049-5	91-20-3		0.2	mg/kg		0.172	mg/kg	0.0000172 %	✓	
19	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
20	●	acenaphthene		201-469-6	83-32-9		1.4	mg/kg		1.207	mg/kg	0.000121 %	✓	
21	●	fluorene		201-695-5	86-73-7		2.8	mg/kg		2.414	mg/kg	0.000241 %	✓	
22	●	phenanthrene		201-581-5	85-01-8		0.9	mg/kg		0.776	mg/kg	0.0000776 %	✓	
23	●	anthracene		204-371-1	120-12-7		1.1	mg/kg		0.948	mg/kg	0.0000948 %	✓	
24	●	fluoranthene		205-912-4	206-44-0		17	mg/kg		14.655	mg/kg	0.00147 %	✓	
25	●	pyrene		204-927-3	129-00-0		14	mg/kg		12.069	mg/kg	0.00121 %	✓	
26		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		4.6	mg/kg		3.966	mg/kg	0.000397 %	✓	
27		chrysene	601-048-00-0	205-923-4	218-01-9		4	mg/kg		3.448	mg/kg	0.000345 %	✓	
28		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.5	mg/kg		1.293	mg/kg	0.000129 %	✓	
29		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.6	mg/kg		1.379	mg/kg	0.000138 %	✓	
30		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.6	mg/kg		1.379	mg/kg	0.000138 %	✓	
31	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.5	mg/kg		0.431	mg/kg	0.0000431 %	✓	
32		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.2	mg/kg		0.172	mg/kg	0.0000172 %	✓	
33	●	benzo[ghi]perylene		205-883-8	191-24-2		0.5	mg/kg		0.431	mg/kg	0.0000431 %	✓	
34		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
36	●	2,3,7,8-TeCDD		217-122-7	1746-01-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		**<LOD**
37	●	1,2,3,7,8-PeCDD			40321-76-4		0.87	ng/kg		7.5e-07	mg/kg	7.5e-11 %	✓	
38	●	1,2,3,4,7,8-HxCDD			39227-28-6		0.39	ng/kg		3.36e-07	mg/kg	3.36e-11 %	✓	
39	●	1,2,3,6,7,8-HxCDD			57653-85-7		0.61	ng/kg		5.26e-07	mg/kg	5.26e-11 %	✓	
40	●	1,2,3,7,8,9-HxCDD			19408-74-3		0.75	ng/kg		6.47e-07	mg/kg	6.47e-11 %	✓	
41	●	1,2,3,4,6,7,8-HpCDD			35822-46-9		3.6	ng/kg		3.1e-06	mg/kg	3.1e-10 %	✓	
42	●	OCDD			3268-87-9		5.9	ng/kg		5.09e-06	mg/kg	5.09e-10 %	✓	

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
43	●	2,3,7,8-TeCDF				1 ng/kg		8.62e-07 mg/kg	8.62e-11 %	✓	
				51207-31-9							
44	●	1,2,3,7,8-PeCDF				0.65 ng/kg		5.6e-07 mg/kg	5.6e-11 %	✓	
				57117-41-6							
45	●	2,3,4,7,8-PeCDF				1.1 ng/kg		9.48e-07 mg/kg	9.48e-11 %	✓	
				57117-31-4							
46	●	1,2,3,4,7,8-HxCDF				0.86 ng/kg		7.41e-07 mg/kg	7.41e-11 %	✓	
				70648-26-9							
47	●	1,2,3,6,7,8-HxCDF				0.92 ng/kg		7.93e-07 mg/kg	7.93e-11 %	✓	
				57117-44-9							
48	●	1,2,3,7,8,9-HxCDF				<0.3 ng/kg		<3.0e-07 mg/kg	<3.0e-11 %		**<LOD**
				72918-21-9							
49	●	2,3,4,6,7,8-HxCDF				1.4 ng/kg		1.21e-06 mg/kg	1.21e-10 %	✓	
				60851-34-5							
50	●	1,2,3,4,6,7,8-HpCDF				2.6 ng/kg		2.24e-06 mg/kg	2.24e-10 %	✓	
				67562-39-4							
51	●	1,2,3,4,7,8,9-HpCDF				0.49 ng/kg		4.22e-07 mg/kg	4.22e-11 %	✓	
				55673-89-7							
52	●	OCDF				2.5 ng/kg		2.16e-06 mg/kg	2.16e-10 %	✓	
				39001-02-0							
								Total:	0.0489 %		

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
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 Soils will be dewatered prior to excavation and removal from site. Therefore it's unlikely that a flammable liquid fraction will be present. Hydrocarbon extraction will be implemented for dewatering.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0196%)

Classification of sample: F553

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
F553		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
22.620 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
13% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 13% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	**User entered data**	Conv. Factor	Compound conc.	**Classification value**	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9 mg/kg	1.32	10.516 mg/kg	0.00105 %	✓	
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		<LOD
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<1 mg/kg	1.142	<1.142 mg/kg	<0.000114 %		<LOD
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		12 mg/kg	1.462	15.521 mg/kg	0.00155 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		35 mg/kg	1.126	34.873 mg/kg	0.00349 %	✓	
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	100 mg/kg	1.56	138.037 mg/kg	0.00885 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		<LOD
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		15 mg/kg	2.976	39.508 mg/kg	0.00395 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3 mg/kg	2.554	<7.661 mg/kg	<0.000766 %		<LOD
11	zinc { zinc chromate }	024-007-00-3				62 mg/kg	2.774	152.21 mg/kg	0.0152 %	✓	
12	TPH (C6 to C40) petroleum group			TPH		240 mg/kg		212.389 mg/kg	0.0212 %	✓	
13	benzene	601-020-00-8	200-753-7	71-43-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
14	toluene	601-021-00-3	203-625-9	108-88-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
15	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
17	●	pH			PH		8.5	pH		8.5	pH	8.5 pH		
18		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
19	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
20	●	acenaphthene		201-469-6	83-32-9		5	mg/kg		4.425	mg/kg	0.000442 %	✓	
21	●	fluorene		201-695-5	86-73-7		4.5	mg/kg		3.982	mg/kg	0.000398 %	✓	
22	●	phenanthrene		201-581-5	85-01-8		0.9	mg/kg		0.796	mg/kg	0.0000796 %	✓	
23	●	anthracene		204-371-1	120-12-7		1.1	mg/kg		0.973	mg/kg	0.0000973 %	✓	
24	●	fluoranthene		205-912-4	206-44-0		4.6	mg/kg		4.071	mg/kg	0.000407 %	✓	
25	●	pyrene		204-927-3	129-00-0		3.2	mg/kg		2.832	mg/kg	0.000283 %	✓	
26		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.6	mg/kg		0.531	mg/kg	0.0000531 %	✓	
27		chrysene	601-048-00-0	205-923-4	218-01-9		0.5	mg/kg		0.442	mg/kg	0.0000442 %	✓	
28		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.2	mg/kg		0.177	mg/kg	0.0000177 %	✓	
29		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.2	mg/kg		0.177	mg/kg	0.0000177 %	✓	
30		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.2	mg/kg		0.177	mg/kg	0.0000177 %	✓	
31	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
32		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
34		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
36	●	2,3,7,8-TeCDD		217-122-7	1746-01-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		**<LOD**
37	●	1,2,3,7,8-PeCDD			40321-76-4		<0.33	ng/kg		<3.3e-07	mg/kg	<3.3e-11 %		**<LOD**
38	●	1,2,3,4,7,8-HxCDD			39227-28-6		<0.4	ng/kg		<4.0e-07	mg/kg	<4.0e-11 %		**<LOD**
39	●	1,2,3,6,7,8-HxCDD			57653-85-7		<0.9	ng/kg		<9.0e-07	mg/kg	<9.0e-11 %		**<LOD**
40	●	1,2,3,7,8,9-HxCDD			19408-74-3		<0.9	ng/kg		<9.0e-07	mg/kg	<9.0e-11 %		**<LOD**
41	●	1,2,3,4,6,7,8-HpCDD			35822-46-9		9.1	ng/kg		8.05e-06	mg/kg	8.05e-10 %	✓	
42	●	OCDD			3268-87-9		49	ng/kg		4.34e-05	mg/kg	0.000000004 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
43	●	2,3,7,8-TeCDF			51207-31-9		<1.4	ng/kg		<1.4e-06	mg/kg	<1.4e-10 %		<LOD
44	●	1,2,3,7,8-PeCDF			57117-41-6		<1	ng/kg		<1.0e-06	mg/kg	<1.0e-10 %		<LOD
45	●	2,3,4,7,8-PeCDF			57117-31-4		<1.1	ng/kg		<1.1e-06	mg/kg	<1.1e-10 %		<LOD
46	●	1,2,3,4,7,8-HxCDF			70648-26-9		1.8	ng/kg		1.59e-06	mg/kg	1.59e-10 %	✓	
47	●	1,2,3,6,7,8-HxCDF			57117-44-9		<1.6	ng/kg		<1.6e-06	mg/kg	<1.6e-10 %		<LOD
48	●	1,2,3,7,8,9-HxCDF			72918-21-9		<0.5	ng/kg		<5.0e-07	mg/kg	<5.0e-11 %		<LOD
49	●	2,3,4,6,7,8-HxCDF			60851-34-5		1.3	ng/kg		1.15e-06	mg/kg	1.15e-10 %	✓	
50	●	1,2,3,4,6,7,8-HpCDF			67562-39-4		6.1	ng/kg		5.4e-06	mg/kg	5.4e-10 %	✓	
51	●	1,2,3,4,7,8,9-HpCDF			55673-89-7		0.87	ng/kg		7.7e-07	mg/kg	7.7e-11 %	✓	
52	●	OCDF			39001-02-0		<6	ng/kg		<6.0e-06	mg/kg	<6.0e-10 %		<LOD
											Total:	0.0588 %		

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
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 Soils will be dewatered prior to excavation and removal from site. Therefore it's unlikely that a flammable liquid fraction will be present. Hydrocarbon extraction will be implemented for dewatering.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0212%)

Classification of sample: F554

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
F554
Sample Depth:
22.620 m
Moisture content:
15%
(dry 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: 15% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				8	mg/kg	1.32	9.185	mg/kg	0.000918 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
		005-008-00-8	215-125-8	1303-86-2									
3		cadmium { cadmium oxide }				<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { chromium(III) oxide }				11	mg/kg	1.462	13.98	mg/kg	0.0014 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				31	mg/kg	1.126	30.35	mg/kg	0.00304 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { lead chromate }			1	120	mg/kg	1.56	162.763	mg/kg	0.0104 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
8		mercury { mercury dichloride }				<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		nickel { nickel chromate }				15	mg/kg	2.976	38.821	mg/kg	0.00388 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
		034-002-00-8											
11		zinc { zinc chromate }				55	mg/kg	2.774	132.677	mg/kg	0.0133 %	✓	
		024-007-00-3											
12		TPH (C6 to C40) petroleum group				476	mg/kg		413.913	mg/kg	0.0414 %	✓	
				TPH									
13		benzene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
14		toluene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			CLP index number	EC Number	CAS Number								
15	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
17	●	pH			PH		8.6	pH		8.6	pH	8.6 pH		
18		naphthalene	601-052-00-2	202-049-5	91-20-3		0.1	mg/kg		0.087	mg/kg	0.0000087 %	✓	
19	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
20	●	acenaphthene		201-469-6	83-32-9		3.6	mg/kg		3.13	mg/kg	0.000313 %	✓	
21	●	fluorene		201-695-5	86-73-7		3.2	mg/kg		2.783	mg/kg	0.000278 %	✓	
22	●	phenanthrene		201-581-5	85-01-8		1.3	mg/kg		1.13	mg/kg	0.000113 %	✓	
23	●	anthracene		204-371-1	120-12-7		1.2	mg/kg		1.043	mg/kg	0.000104 %	✓	
24	●	fluoranthene		205-912-4	206-44-0		5.2	mg/kg		4.522	mg/kg	0.000452 %	✓	
25	●	pyrene		204-927-3	129-00-0		3.7	mg/kg		3.217	mg/kg	0.000322 %	✓	
26		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.9	mg/kg		0.783	mg/kg	0.0000783 %	✓	
27		chrysene	601-048-00-0	205-923-4	218-01-9		0.8	mg/kg		0.696	mg/kg	0.0000696 %	✓	
28		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.4	mg/kg		0.348	mg/kg	0.0000348 %	✓	
29		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.4	mg/kg		0.348	mg/kg	0.0000348 %	✓	
30		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.4	mg/kg		0.348	mg/kg	0.0000348 %	✓	
31	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.2	mg/kg		0.174	mg/kg	0.0000174 %	✓	
32		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
33	●	benzo[ghi]perylene		205-883-8	191-24-2		0.2	mg/kg		0.174	mg/kg	0.0000174 %	✓	
34		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
35	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
36	●	2,3,7,8-TeCDD		217-122-7	1746-01-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		<LOD
37	●	1,2,3,7,8-PeCDD			40321-76-4		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		<LOD
38	●	1,2,3,4,7,8-HxCDD			39227-28-6		<0.3	ng/kg		<3.0e-07	mg/kg	<3.0e-11 %		<LOD
39	●	1,2,3,6,7,8-HxCDD			57653-85-7		0.93	ng/kg		8.09e-07	mg/kg	8.09e-11 %	✓	
40	●	1,2,3,7,8,9-HxCDD			19408-74-3		0.51	ng/kg		4.43e-07	mg/kg	4.43e-11 %	✓	
41	●	1,2,3,4,6,7,8-HpCDD			35822-46-9		7	ng/kg		6.09e-06	mg/kg	6.09e-10 %	✓	
42	●	OCDD			3268-87-9		39	ng/kg		3.39e-05	mg/kg	0.000000003 %	✓	

#		Determinand CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
43	●	2,3,7,8-TeCDF		51207-31-9		<2.1 ng/kg		<2.1e-06 mg/kg	<2.1e-10 %		**<LOD**
44	●	1,2,3,7,8-PeCDF		57117-41-6		1.2 ng/kg		1.04e-06 mg/kg	1.04e-10 %	✓	
45	●	2,3,4,7,8-PeCDF		57117-31-4		<1.4 ng/kg		<1.4e-06 mg/kg	<1.4e-10 %		**<LOD**
46	●	1,2,3,4,7,8-HxCDF		70648-26-9		1.9 ng/kg		1.65e-06 mg/kg	1.65e-10 %	✓	
47	●	1,2,3,6,7,8-HxCDF		57117-44-9		1.4 ng/kg		1.22e-06 mg/kg	1.22e-10 %	✓	
48	●	1,2,3,7,8,9-HxCDF		72918-21-9		<0.45 ng/kg		<4.5e-07 mg/kg	<4.5e-11 %		**<LOD**
49	●	2,3,4,6,7,8-HxCDF		60851-34-5		1.3 ng/kg		1.13e-06 mg/kg	1.13e-10 %	✓	
50	●	1,2,3,4,6,7,8-HpCDF		67562-39-4		4.7 ng/kg		4.09e-06 mg/kg	4.09e-10 %	✓	
51	●	1,2,3,4,7,8,9-HpCDF		55673-89-7		0.7 ng/kg		6.09e-07 mg/kg	6.09e-11 %	✓	
52	●	OCDF		39001-02-0		5.1 ng/kg		4.43e-06 mg/kg	4.43e-10 %	✓	
								Total:	0.0778 %		

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
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 Soils will be dewatered prior to excavation and removal from site. Therefore it's unlikely that a flammable liquid fraction will be present. Hydrocarbon extraction will be implemented for dewatering.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0414%)

Classification of sample: F555

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
F555		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
22.620 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
12% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 12% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				8	mg/kg	1.32	9.431	mg/kg	0.000943 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		**<LOD**
	005-008-00-8	215-125-8	1303-86-2									
3	cadmium { cadmium oxide }				<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		**<LOD**
	048-002-00-0	215-146-2	1306-19-0									
4	chromium in chromium(III) compounds { chromium(III) oxide }				10	mg/kg	1.462	13.05	mg/kg	0.0013 %	✓	
		215-160-9	1308-38-9									
5	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		**<LOD**
	024-001-00-0	215-607-8	1333-82-0									
6	copper { dicopper oxide; copper (I) oxide }				28	mg/kg	1.126	28.147	mg/kg	0.00281 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
7	lead { lead chromate }			1	94	mg/kg	1.56	130.913	mg/kg	0.00839 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
8	mercury { mercury dichloride }				<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		**<LOD**
	080-010-00-X	231-299-8	7487-94-7									
9	nickel { nickel chromate }				13	mg/kg	2.976	34.546	mg/kg	0.00345 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		**<LOD**
	034-002-00-8											
11	zinc { zinc chromate }				51	mg/kg	2.774	126.323	mg/kg	0.0126 %	✓	
	024-007-00-3											
12	TPH (C6 to C40) petroleum group				237	mg/kg		211.607	mg/kg	0.0212 %	✓	
			TPH									
13	benzene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
	601-020-00-8	200-753-7	71-43-2									
14	toluene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
	601-021-00-3	203-625-9	108-88-3									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
17	●	pH			PH		8.5	pH		8.5	pH	8.5 pH		
18		naphthalene	601-052-00-2	202-049-5	91-20-3		0.2	mg/kg		0.179	mg/kg	0.0000179 %	✓	
19	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
20	●	acenaphthene		201-469-6	83-32-9		1.3	mg/kg		1.161	mg/kg	0.000116 %	✓	
21	●	fluorene		201-695-5	86-73-7		2	mg/kg		1.786	mg/kg	0.000179 %	✓	
22	●	phenanthrene		201-581-5	85-01-8		0.4	mg/kg		0.357	mg/kg	0.0000357 %	✓	
23	●	anthracene		204-371-1	120-12-7		1.1	mg/kg		0.982	mg/kg	0.0000982 %	✓	
24	●	fluoranthene		205-912-4	206-44-0		4.8	mg/kg		4.286	mg/kg	0.000429 %	✓	
25	●	pyrene		204-927-3	129-00-0		3.4	mg/kg		3.036	mg/kg	0.000304 %	✓	
26		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.7	mg/kg		0.625	mg/kg	0.0000625 %	✓	
27		chrysene	601-048-00-0	205-923-4	218-01-9		0.6	mg/kg		0.536	mg/kg	0.0000536 %	✓	
28		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.2	mg/kg		0.179	mg/kg	0.0000179 %	✓	
29		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.2	mg/kg		0.179	mg/kg	0.0000179 %	✓	
30		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.2	mg/kg		0.179	mg/kg	0.0000179 %	✓	
31	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
32		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
34		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
36	●	2,3,7,8-TeCDD		217-122-7	1746-01-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		**<LOD**
37	●	1,2,3,7,8-PeCDD			40321-76-4		<0.3	ng/kg		<3.0e-07	mg/kg	<3.0e-11 %		**<LOD**
38	●	1,2,3,4,7,8-HxCDD			39227-28-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		**<LOD**
39	●	1,2,3,6,7,8-HxCDD			57653-85-7		<0.8	ng/kg		<8.0e-07	mg/kg	<8.0e-11 %		**<LOD**
40	●	1,2,3,7,8,9-HxCDD			19408-74-3		0.93	ng/kg		8.3e-07	mg/kg	8.3e-11 %	✓	
41	●	1,2,3,4,6,7,8-HpCDD			35822-46-9		20	ng/kg		1.79e-05	mg/kg	0.000000001 %	✓	
42	●	OCDD			3268-87-9		120	ng/kg		0.0001	mg/kg	0.00000001 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
43	●	2,3,7,8-TeCDF				1.4	ng/kg		1.25e-06 mg/kg	1.25e-10 %	✓	
				51207-31-9								
44	●	1,2,3,7,8-PeCDF				1.1	ng/kg		9.82e-07 mg/kg	9.82e-11 %	✓	
				57117-41-6								
45	●	2,3,4,7,8-PeCDF				<1.1	ng/kg		<1.1e-06 mg/kg	<1.1e-10 %		**<LOD**
				57117-31-4								
46	●	1,2,3,4,7,8-HxCDF				<2.2	ng/kg		<2.2e-06 mg/kg	<2.2e-10 %		**<LOD**
				70648-26-9								
47	●	1,2,3,6,7,8-HxCDF				1.8	ng/kg		1.61e-06 mg/kg	1.61e-10 %	✓	
				57117-44-9								
48	●	1,2,3,7,8,9-HxCDF				<0.8	ng/kg		<8.0e-07 mg/kg	<8.0e-11 %		**<LOD**
				72918-21-9								
49	●	2,3,4,6,7,8-HxCDF				1.9	ng/kg		1.7e-06 mg/kg	1.7e-10 %	✓	
				60851-34-5								
50	●	1,2,3,4,6,7,8-HpCDF				6.1	ng/kg		5.45e-06 mg/kg	5.45e-10 %	✓	
				67562-39-4								
51	●	1,2,3,4,7,8,9-HpCDF				0.98	ng/kg		8.75e-07 mg/kg	8.75e-11 %	✓	
				55673-89-7								
52	●	OCDF				<7	ng/kg		<7.0e-06 mg/kg	<7.0e-10 %		**<LOD**
				39001-02-0								
									Total:	0.0537 %		

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
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 Soils will be dewatered prior to excavation and removal from site. Therefore it's unlikely that a flammable liquid fraction will be present. Hydrocarbon extraction will be implemented for dewatering.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0212%)

Appendix A: Classifier defined and non CLP determinands

- **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

- **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: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

- **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: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

- **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: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **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 Chronic 1 H410 , Aquatic Acute 1 H400

- **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: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

- **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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

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 Chronic 1 H410 , Aquatic Acute 1 H400

polychlorobiphenyls; PCB (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

2,3,7,8-TeCDD (EC Number: 217-122-7, CAS Number: 1746-01-6)

Description/Comments: 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=1)

1,2,3,7,8-PeCDD (CAS Number: 40321-76-4)

Description/Comments: 1,2,3,7,8-pentachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=1)

1,2,3,4,7,8-HxCDD (CAS Number: 39227-28-6)

Description/Comments: 1,2,3,4,7,8-hexachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

1,2,3,6,7,8-HxCDD (CAS Number: 57653-85-7)

Description/Comments: 1,2,3,6,7,8-hexachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

1,2,3,7,8,9-HxCDD (CAS Number: 19408-74-3)

Description/Comments: 1,2,3,7,8,9-hexachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,4,6,7,8-HpCDD** (CAS Number: 35822-46-9)

Description/Comments: 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.01)

- **OCDD** (CAS Number: 3268-87-9)

Description/Comments: octachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.0003)

- **2,3,7,8-TeCDF** (CAS Number: 51207-31-9)

Description/Comments: 2,3,7,8-tetrachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,7,8-PeCDF** (CAS Number: 57117-41-6)

Description/Comments: 1,2,3,7,8-pentachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.03)

- **2,3,4,7,8-PeCDF** (CAS Number: 57117-31-4)

Description/Comments: 2,3,4,7,8-pentachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.3)

- **1,2,3,4,7,8-HxCDF** (CAS Number: 70648-26-9)

Description/Comments: 1,2,3,4,7,8-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,6,7,8-HxCDF** (CAS Number: 57117-44-9)

Description/Comments: 1,2,3,6,7,8-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,7,8,9-HxCDF** (CAS Number: 72918-21-9)

Description/Comments: 1,2,3,7,8,9-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **2,3,4,6,7,8-HxCDF** (CAS Number: 60851-34-5)

Description/Comments: 2,3,4,6,7,8-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,4,6,7,8-HpCDF** (CAS Number: 67562-39-4)

Description/Comments: 1,2,3,4,6,7,8-heptachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.01)

- **1,2,3,4,7,8,9-HpCDF** (CAS Number: 55673-89-7)

Description/Comments: 1,2,3,4,7,8,9-heptachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.01)

● **OCDF** (CAS Number: 39001-02-0)

Description/Comments: octachlorodibenzo[b,d]furan
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.0003)

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2019.67.3824.7797 (09 Mar 2019)
HazWasteOnline Database: 2019.67.3824.7797 (09 Mar 2019)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
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 Wastes 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
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

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

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

Concept Life Sciences

Certificate of Analysis

Report Number: Report B 805359-1

Date of Report: 06-Mar-2019

Customer: Laing O'Rourke
The Factory
Water Street
M3 4JQ

Customer Contact: Mr Ryan

Customer Job Reference:
Customer Site Reference: THE FACTORY
Date Job Received at Concept: 20-Feb-2019
Date Analysis Started: 27-Feb-2019
Date Analysis Completed: 06-Mar-2019

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

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

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

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

UKAS TESTING
1549

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

Issued by :
Aleksandra Pacula
Senior Customer Service
Advisor

Summary Of Results

Water

Dioxins

				WHO2005 Toxic Equivalents ng/l		WHO Toxic Equivalents ng/l	
Concept Reference	**Customer Sample Reference**	**Analysis**	**Symbol**	**Lower Bound**	**Upper Bound**	**Lower Bound**	**Upper Bound**
805359 001	F55 A	Dioxins and Furans (Based on US EPA 1613)	U	0.0	**0.18**	0.0	**0.19**

Soil

Dioxins

				WHO2005 Toxic Equivalents ng/kg		WHO Toxic Equivalents ng/kg	
Concept Reference	**Customer Sample Reference**	**Analysis**	**Symbol**	**Lower Bound**	**Upper Bound**	**Lower Bound**	**Upper Bound**
805359 006	F55 1	Dioxins and Furans (Based on US EPA 1613)	U	1.3	**2.4**	1.6	**2.8**
805359 007	F55 2	Dioxins and Furans (Based on US EPA 1613)	N	1.9	**2.1**	2.1	**2.4**
805359 008	F55 3	Dioxins and Furans (Based on US EPA 1613)	U	0.48	**1.9**	0.47	**2.2**
805359 009	F55 4	Dioxins and Furans (Based on US EPA 1613)	U	0.78	**1.9**	0.79	**2.2**
805359 010	F55 5	Dioxins and Furans (Based on US EPA 1613)	U	0.94	**2.2**	0.94	**2.4**

Water

Customer Sample Reference : F55 A
Our Sample Reference : 805359 001
Depth : 22.620
Test Portion Mass (g) : 175
Date Sampled : 19-FEB-2019
Sample Received (ml) : 2500

Dioxins and Furans (Based on US EPA 1613)

Technique : GC/MS (HR)

				WHO2005 Toxic Equivalents ng/l		WHO Toxic Equivalents ng/l	
Determinand	**Symbol**	**LOD ng/l**	**Result ng/l**	**Lower Bound**	**Upper Bound**	**Lower Bound**	**Upper Bound**
2,3,7,8-TCDD	U	0.0060	<0.0060	0.0	**0.0060**	0.0	**0.0060**
1,2,3,7,8-PeCDD	U	0.026	<0.026	0.0	**0.026**	0.0	**0.026**
1,2,3,4,7,8-HxCDD	U	0.050	<0.050	0.0	**0.0050**	0.0	**0.0050**
1,2,3,6,7,8-HxCDD	U	0.12	<0.12	0.0	**0.012**	0.0	**0.012**
1,2,3,7,8,9-HxCDD	U	0.10	<0.10	0.0	**0.010**	0.0	**0.010**
1,2,3,4,6,7,8-HpCDD	U	1.5	<1.5	0.0	**0.015**	0.0	**0.015**
OCDD	U	4.0	<4.0	0.0	**0.0012**	0.0	**0.00040**
			Dioxins Totals :	0.0	**0.075**	0.0	**0.074**
2,3,7,8-TCDF	U	0.050	<0.050	0.0	**0.0050**	0.0	**0.0050**
1,2,3,7,8-PeCDF	U	0.040	<0.040	0.0	**0.0012**	0.0	**0.0020**
2,3,4,7,8-PeCDF	U	0.090	<0.090	0.0	**0.027**	0.0	**0.045**
1,2,3,4,7,8-HxCDF	U	0.10	<0.10	0.0	**0.010**	0.0	**0.010**
1,2,3,6,7,8-HxCDF	U	0.12	<0.12	0.0	**0.012**	0.0	**0.012**
2,3,4,6,7,8-HxCDF	U	0.30	<0.30	0.0	**0.030**	0.0	**0.030**
1,2,3,7,8,9-HxCDF	U	0.055	<0.055	0.0	**0.0055**	0.0	**0.0055**
1,2,3,4,6,7,8-HpCDF	U	0.80	<0.80	0.0	**0.0080**	0.0	**0.0080**
1,2,3,4,7,8,9-HpCDF	U	0.15	<0.15	0.0	**0.0015**	0.0	**0.0015**
OCDF	U	1.3	<1.3	0.0	**0.00039**	0.0	**0.00013**
			Furans Totals :	0.0	**0.10**	0.0	**0.12**
			Totals :	**0.0**	**0.18**	**0.0**	**0.19**

Soil

Customer Sample Reference : F55 1
Our Sample Reference : 805359 006
Empty Dish Weight : 0
Test Portion Mass (g) : 175
Sample in Dish @ 105C : 89.2
Wet Sample in Dish Weight : 100
Depth : 22.620
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Dioxins and Furans (Based on US EPA 1613)

Technique : GC/MS (HR)

				WHO2005 Toxic Equivalents ng/kg		**WHO Toxic Equivalents ng/kg**	
Determinand	**Symbol**	**LOD ng/kg**	**Result ng/kg**	**Lower Bound**	**Upper Bound**	**Lower Bound**	**Upper Bound**
2,3,7,8-TCDD	U	0.20	<0.20	0.0	**0.20**	0.0	**0.20**
1,2,3,7,8-PeCDD	U	0.55	<0.55	0.0	**0.55**	0.0	**0.55**
1,2,3,4,7,8-HxCDD	U	0.24	<0.24	0.0	**0.024**	0.0	**0.024**
1,2,3,6,7,8-HxCDD	U	1.2	<1.2	0.0	**0.12**	0.0	**0.12**
1,2,3,7,8,9-HxCDD	U	0.30	**0.63**	0.063	**0.063**	0.063	**0.063**
1,2,3,4,6,7,8-HpCDD	U	0.12	**7.4**	0.074	**0.074**	0.074	**0.074**
OCDD	U	0.24	**39**	0.012	**0.012**	0.0039	**0.0039**
			Dioxins Totals :	0.15	**1.0**	0.14	**1.0**
2,3,7,8-TCDF	U	0.16	**1.5**	0.15	**0.15**	0.15	**0.15**
1,2,3,7,8-PeCDF	U	0.29	**1.2**	0.037	**0.037**	0.062	**0.062**
2,3,4,7,8-PeCDF	U	0.27	**1.7**	0.50	**0.50**	0.83	**0.83**
1,2,3,4,7,8-HxCDF	U	0.20	**2.0**	0.20	**0.20**	0.20	**0.20**
1,2,3,6,7,8-HxCDF	U	1.9	<1.9	0.0	**0.19**	0.0	**0.19**
2,3,4,6,7,8-HxCDF	U	0.21	**1.7**	0.17	**0.17**	0.17	**0.17**
1,2,3,7,8,9-HxCDF	U	0.70	<0.70	0.0	**0.070**	0.0	**0.070**
1,2,3,4,6,7,8-HpCDF	U	0.24	**5.4**	0.054	**0.054**	0.054	**0.054**
1,2,3,4,7,8,9-HpCDF	U	0.29	**0.88**	0.0088	**0.0088**	0.0088	**0.0088**
OCDF	U	6.0	<6.0	0.0	**0.0018**	0.0	**0.00060**
			Furans Totals :	1.1	**1.4**	1.5	**1.7**
			Totals :	**1.3**	**2.4**	**1.6**	**2.8**

Soil

Customer Sample Reference : F55 2
Our Sample Reference : 805359 007
Sample in Dish @ 105C : 86.1
Test Portion Mass (g) : 175
Wet Sample in Dish Weight : 100
Depth : 22.620
Empty Dish Weight : 0
Date Sampled : 19-FEB-2019
Matrix Class : Other

Dioxins and Furans (Based on US EPA 1613)

Technique : GC/MS (HR)

				WHO2005 Toxic Equivalents ng/kg		**WHO Toxic Equivalents ng/kg**	
Determinand	**Symbol**	**LOD ng/kg**	**Result ng/kg**	**Lower Bound**	**Upper Bound**	**Lower Bound**	**Upper Bound**
2,3,7,8-TCDD	N	0.20	<0.20	0.0	**0.20**	0.0	**0.20**
1,2,3,7,8-PeCDD	N	0.25	**0.87**	0.87	**0.87**	0.87	**0.87**
1,2,3,4,7,8-HxCDD	N	0.13	**0.39**	0.039	**0.039**	0.039	**0.039**
1,2,3,6,7,8-HxCDD	N	0.15	**0.61**	0.061	**0.061**	0.061	**0.061**
1,2,3,7,8,9-HxCDD	N	0.16	**0.75**	0.075	**0.075**	0.075	**0.075**
1,2,3,4,6,7,8-HpCDD	N	0.097	**3.6**	0.036	**0.036**	0.036	**0.036**
OCDD	N	0.14	**5.9**	0.0018	**0.0018**	0.00059	**0.00059**
			Dioxins Totals :	1.1	**1.3**	1.1	**1.3**
2,3,7,8-TCDF	N	0.20	**1.0**	0.10	**0.10**	0.10	**0.10**
1,2,3,7,8-PeCDF	N	0.20	**0.65**	0.019	**0.019**	0.032	**0.032**
2,3,4,7,8-PeCDF	N	0.18	**1.1**	0.34	**0.34**	0.57	**0.57**
1,2,3,4,7,8-HxCDF	N	0.13	**0.86**	0.086	**0.086**	0.086	**0.086**
1,2,3,6,7,8-HxCDF	N	0.12	**0.92**	0.092	**0.092**	0.092	**0.092**
2,3,4,6,7,8-HxCDF	N	0.13	**1.4**	0.14	**0.14**	0.14	**0.14**
1,2,3,7,8,9-HxCDF	N	0.30	<0.30	0.0	**0.030**	0.0	**0.030**
1,2,3,4,6,7,8-HpCDF	N	0.16	**2.6**	0.026	**0.026**	0.026	**0.026**
1,2,3,4,7,8,9-HpCDF	N	0.19	**0.49**	0.0049	**0.0049**	0.0049	**0.0049**
OCDF	N	0.21	**2.5**	0.00074	**0.00074**	0.00025	**0.00025**
			Furans Totals :	0.82	**0.85**	1.1	**1.1**
			Totals :	**1.9**	**2.1**	**2.1**	**2.4**

Soil

Customer Sample Reference : F55 3
Our Sample Reference : 805359 008
Depth : 22.620
Empty Dish Weight : 0
Test Portion Mass (g) : 175
Sample in Dish @ 105C : 87.1
Wet Sample in Dish Weight : 100
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Dioxins and Furans (Based on US EPA 1613)

Technique : GC/MS (HR)

				WHO2005 Toxic Equivalents ng/kg		**WHO Toxic Equivalents ng/kg**	
Determinand	**Symbol**	**LOD ng/kg**	**Result ng/kg**	**Lower Bound**	**Upper Bound**	**Lower Bound**	**Upper Bound**
2,3,7,8-TCDD	U	0.20	<0.20	0.0	**0.20**	0.0	**0.20**
1,2,3,7,8-PeCDD	U	0.33	<0.33	0.0	**0.33**	0.0	**0.33**
1,2,3,4,7,8-HxCDD	U	0.40	<0.40	0.0	**0.040**	0.0	**0.040**
1,2,3,6,7,8-HxCDD	U	0.90	<0.90	0.0	**0.090**	0.0	**0.090**
1,2,3,7,8,9-HxCDD	U	0.90	<0.90	0.0	**0.090**	0.0	**0.090**
1,2,3,4,6,7,8-HpCDD	U	0.18	**9.1**	0.091	**0.091**	0.091	**0.091**
OCDD	U	0.28	**49**	0.015	**0.015**	0.0049	**0.0049**
			Dioxins Totals :	0.11	**0.86**	0.096	**0.85**
2,3,7,8-TCDF	U	1.4	<1.4	0.0	**0.14**	0.0	**0.14**
1,2,3,7,8-PeCDF	U	1.0	<1.0	0.0	**0.030**	0.0	**0.050**
2,3,4,7,8-PeCDF	U	1.1	<1.1	0.0	**0.33**	0.0	**0.55**
1,2,3,4,7,8-HxCDF	U	0.27	**1.8**	0.18	**0.18**	0.18	**0.18**
1,2,3,6,7,8-HxCDF	U	1.6	<1.6	0.0	**0.16**	0.0	**0.16**
2,3,4,6,7,8-HxCDF	U	0.30	**1.3**	0.13	**0.13**	0.13	**0.13**
1,2,3,7,8,9-HxCDF	U	0.50	<0.50	0.0	**0.050**	0.0	**0.050**
1,2,3,4,6,7,8-HpCDF	U	0.24	**6.1**	0.061	**0.061**	0.061	**0.061**
1,2,3,4,7,8,9-HpCDF	U	0.28	**0.87**	0.0087	**0.0087**	0.0087	**0.0087**
OCDF	U	6.0	<6.0	0.0	**0.0018**	0.0	**0.00060**
			Furans Totals :	0.37	**1.1**	0.37	**1.3**
			Totals :	**0.48**	**1.9**	**0.47**	**2.2**

Soil

Customer Sample Reference : F55 4
Our Sample Reference : 805359 009
Test Portion Mass (g) : 175
Empty Dish Weight : 0
Depth : 22.620
Sample in Dish @ 105C : 84.9
Wet Sample in Dish Weight : 100
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Dioxins and Furans (Based on US EPA 1613)

Technique : GC/MS (HR)

				WHO2005 Toxic Equivalents ng/kg		**WHO Toxic Equivalents ng/kg**	
Determinand	**Symbol**	**LOD ng/kg**	**Result ng/kg**	**Lower Bound**	**Upper Bound**	**Lower Bound**	**Upper Bound**
2,3,7,8-TCDD	U	0.20	<0.20	0.0	**0.20**	0.0	**0.20**
1,2,3,7,8-PeCDD	U	0.20	<0.20	0.0	**0.20**	0.0	**0.20**
1,2,3,4,7,8-HxCDD	U	0.30	<0.30	0.0	**0.030**	0.0	**0.030**
1,2,3,6,7,8-HxCDD	U	0.23	**0.93**	0.093	**0.093**	0.093	**0.093**
1,2,3,7,8,9-HxCDD	U	0.24	**0.51**	0.051	**0.051**	0.051	**0.051**
1,2,3,4,6,7,8-HpCDD	U	0.25	**7.0**	0.070	**0.070**	0.070	**0.070**
OCDD	U	0.37	**39**	0.012	**0.012**	0.0039	**0.0039**
			Dioxins Totals :	0.23	**0.66**	0.22	**0.65**
2,3,7,8-TCDF	U	2.1	<2.1	0.0	**0.21**	0.0	**0.21**
1,2,3,7,8-PeCDF	U	0.31	**1.2**	0.035	**0.035**	0.058	**0.058**
2,3,4,7,8-PeCDF	U	1.4	<1.4	0.0	**0.42**	0.0	**0.70**
1,2,3,4,7,8-HxCDF	U	0.18	**1.9**	0.19	**0.19**	0.19	**0.19**
1,2,3,6,7,8-HxCDF	U	0.17	**1.4**	0.14	**0.14**	0.14	**0.14**
2,3,4,6,7,8-HxCDF	U	0.19	**1.3**	0.13	**0.13**	0.13	**0.13**
1,2,3,7,8,9-HxCDF	U	0.45	<0.45	0.0	**0.045**	0.0	**0.045**
1,2,3,4,6,7,8-HpCDF	U	0.20	**4.7**	0.047	**0.047**	0.047	**0.047**
1,2,3,4,7,8,9-HpCDF	U	0.26	**0.70**	0.0070	**0.0070**	0.0070	**0.0070**
OCDF	U	0.39	**5.1**	0.0015	**0.0015**	0.00051	**0.00051**
			Furans Totals :	0.55	**1.2**	0.57	**1.5**
			Totals :	**0.78**	**1.9**	**0.79**	**2.2**

Soil

Customer Sample Reference : F55 5
Our Sample Reference : 805359 010
Wet Sample in Dish Weight : 100
Sample in Dish @ 105C : 88
Empty Dish Weight : 0
Depth : 22.620
Test Portion Mass (g) : 175
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Dioxins and Furans (Based on US EPA 1613)

Technique : GC/MS (HR)

				WHO2005 Toxic Equivalents ng/kg		**WHO Toxic Equivalents ng/kg**	
Determinand	**Symbol**	**LOD ng/kg**	**Result ng/kg**	**Lower Bound**	**Upper Bound**	**Lower Bound**	**Upper Bound**
2,3,7,8-TCDD	U	0.20	<0.20	0.0	**0.20**	0.0	**0.20**
1,2,3,7,8-PeCDD	U	0.30	<0.30	0.0	**0.30**	0.0	**0.30**
1,2,3,4,7,8-HxCDD	U	0.20	<0.20	0.0	**0.020**	0.0	**0.020**
1,2,3,6,7,8-HxCDD	U	0.80	<0.80	0.0	**0.080**	0.0	**0.080**
1,2,3,7,8,9-HxCDD	U	0.21	**0.93**	0.093	**0.093**	0.093	**0.093**
1,2,3,4,6,7,8-HpCDD	U	0.31	**20**	0.20	**0.20**	0.20	**0.20**
OCDD	U	0.51	**120**	0.037	**0.037**	0.012	**0.012**
			Dioxins Totals :	0.33	**0.93**	0.30	**0.90**
2,3,7,8-TCDF	U	0.30	**1.4**	0.14	**0.14**	0.14	**0.14**
1,2,3,7,8-PeCDF	U	0.36	**1.1**	0.033	**0.033**	0.055	**0.055**
2,3,4,7,8-PeCDF	U	1.1	<1.1	0.0	**0.33**	0.0	**0.55**
1,2,3,4,7,8-HxCDF	U	2.2	<2.2	0.0	**0.22**	0.0	**0.22**
1,2,3,6,7,8-HxCDF	U	0.27	**1.8**	0.18	**0.18**	0.18	**0.18**
2,3,4,6,7,8-HxCDF	U	0.32	**1.9**	0.19	**0.19**	0.19	**0.19**
1,2,3,7,8,9-HxCDF	U	0.80	<0.80	0.0	**0.080**	0.0	**0.080**
1,2,3,4,6,7,8-HpCDF	U	0.26	**6.1**	0.061	**0.061**	0.061	**0.061**
1,2,3,4,7,8,9-HpCDF	U	0.33	**0.98**	0.0098	**0.0098**	0.0098	**0.0098**
OCDF	U	7.0	<7.0	0.0	**0.0021**	0.0	**0.00070**
			Furans Totals :	0.61	**1.2**	0.64	**1.5**
			Totals :	**0.94**	**2.2**	**0.94**	**2.4**

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WM3 POPs screen suite

				Concept Reference	**805359 006**	**805359 007**	**805359 008**	**805359 009**	**805359 010**
				Customer Sample Reference	**F55 1**	**F55 2**	**F55 3**	**F55 4**	**F55 5**
				Test Sample	**AR**	**AR**	**AR**	**AR**	**AR**
				Depth	**22.620**	**22.620**	**22.620**	**22.620**	**22.620**
				Date Sampled	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
				Matrix Class	**Sandy Soil**	**Other**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Aldrin	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0
Chlordane (sum of cis and trans isomers)	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0
Chlordecone	GC/MS	50	mg/kg	N	<50	<50	<50	<50	<50
DDT	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0
Dieldrin	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0
Endrin	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0
Heptachlor	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0
Hexabromobiphenyl	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0
Hexachlorobenzene	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0
Hexachlorocyclohexane (sum of alpha, beta and gamma)	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0
Mirex	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0
Pentachlorobenzene	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0
Poly-Chlorinated Biphenyls (Total Tri-Hepta)	GC/MS (HR)	0.05	µg/kg	U	<0.50(9)	-	<0.11(2)	<0.18(2)	<0.50(2)
Poly-Chlorinated Biphenyls (Total Tri-Hepta)	GC/MS (HR)	0.05	µg/kg	N	-	<0.10(2)	-	-	-
Toxaphene	GC/MS (Scanning)	5.0	mg/kg	N	<5.0	<5.0	<5.0	<5.0	<5.0

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Water Analysed as Water
WM3 POPs screen suite

				Concept Reference	**805359 001**
				Customer Sample Reference	**F55 A**
				Test Sample	**AR**
				Depth	**22.620**
				Date Sampled	**19-FEB-2019**
				Sample Received (ml)	**2500**
Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Mirex	GC/MS	0.01	µg/l	N	<0.01
Poly-Chlorinated Biphenyls (Total Tri-Hepta)	GC/MS (HR)	0.005	µg/l	U	<0.005
Aldrin	GC/MS	0.01	µg/l	N	<0.01
Chlordane (sum of cis and trans isomers)	GC/MS	0.01	µg/l	N	<0.01
DDT	GC/MS	0.01	µg/l	N	<0.02(162)
Dieldrin	GC/MS	0.01	µg/l	N	<0.01
Endrin	GC/MS	0.01	µg/l	N	<0.01
Heptachlor	GC/MS	0.01	µg/l	N	<0.01
Hexachlorocyclohexane (sum of alpha, beta and gamma)	GC/MS	0.01	µg/l	N	<0.01
Hexachlorobenzene	GC/MS	0.01	µg/l	N	<0.01
Pentachlorobenzene	GC/MS	10	µg/l	N	<10
Toxaphene	GC/MS (1l ext.)	10	µg/l	N	<10

Index to symbols used in Report B 805359-1

Value	Description
AR	As Received
2	LOD Raised Due to Matrix Interference
9	LOD raised due to dilution of sample
162	LOD determined by matrix spike recovery
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

"Other" samples are outside the scope of our accreditation.
Report B to include POPs suite and Dioxins only.

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

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

Concept Life Sciences

Certificate of Analysis

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

Report Number: 805359-1 Report A

Date of Report: 07-Mar-2019

Customer: Laing O'Rourke
The Factory
Water Street
M3 4JQ

Customer Contact: Mr Ryan

Customer Job Reference:
Customer Site Reference: THE FACTORY
Date Job Received at Concept: 20-Feb-2019
Date Analysis Started: 27-Feb-2019
Date Analysis Completed: 07-Mar-2019

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

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

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

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

UKAS TESTING
1549

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked
and authorised by :
Toni Morris
Customer Service Advisor

Issued by :
Aneta Dybek-Echtermeyer
Customer Service Advisor
A. Dybek-Echtermeyer

Waste Acceptance Criteria

Customer Sample Reference : F55 1
Our Sample Reference : 805359 006
Project Site : THE FACTORY
Test Portion Mass (g) : 175
Empty Dish Weight : 0
Sample in Dish @ 105C : 89.2
Wet Sample in Dish Weight : 100
Depth : 22.620
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	(13) **130**			
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **130**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**1.0**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**3.0**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.070	mg/kg	M	(9) <0.070	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**14**	100.0		
pH	Probe			M	**8.4**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.016**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.025**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.079**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**17**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.012**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.030**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**53**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**3.0**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0054**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.062**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0062**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**550**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**1100**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : F55 2
Our Sample Reference : 805359 007
Project Site : THE FACTORY
Test Portion Mass (g) : 175
Sample in Dish @ 105C : 86.1
Wet Sample in Dish Weight : 100
Depth : 22.620
Empty Dish Weight : 0
Date Sampled : 19-FEB-2019
Matrix Class : Other

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	(13) **230**			
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **230**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**0.6**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**1.9**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	N	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.0070	mg/kg	N	<0.0070	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**53**	100.0		
pH	Probe			N	**8.4**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.0045**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.032**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**23**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0099**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**25**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**1.3**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.011**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**21**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	<1000	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : F55 3
Our Sample Reference : 805359 008
Project Site : THE FACTORY
Wet Sample in Dish Weight : 100
Depth : 22.620
Empty Dish Weight : 0
Test Portion Mass (g) : 175
Sample in Dish @ 105C : 87.1
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	(13) **240**			
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **240**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**1.1**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**3.0**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**21**	100.0		
pH	Probe			M	**8.5**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.013**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.017**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.10**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**12**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.011**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.048**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**53**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**2.5**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0042**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.051**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**530**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**1100**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : F55 4
Our Sample Reference : 805359 009
Project Site : THE FACTORY
Empty Dish Weight : 0
Depth : 22.620
Test Portion Mass (g) : 175
Wet Sample in Dish Weight : 100
Sample in Dish @ 105C : 84.9
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Soil					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	$^{(13)}$ **480**			
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	$^{(13)}$ **480**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**1.4**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**3.3**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	$^{(13)}$ <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**22**	100.0		
pH	Probe			M	**8.6**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.015**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.021**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.087**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	<10	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.011**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.018**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**49**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**2.6**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0037**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.049**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**850**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**1500**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : F55 5
Our Sample Reference : 805359 010
Project Site : THE FACTORY
Wet Sample in Dish Weight : 100
Depth : 22.620
Empty Dish Weight : 0
Sample in Dish @ 105C : 88
Test Portion Mass (g) : 175
Date Sampled : 19-FEB-2019
Matrix Class : Sandy Soil

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	(13) **240**			
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **240**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**1.1**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**2.9**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**15**	100.0		
pH	Probe			M	**8.5**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.014**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.017**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.088**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**15**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.011**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.022**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**50**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**2.9**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0032**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.056**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0051**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**570**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**1200**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
MCERTS Preparation

Concept Reference					**805359 006**	**805359 007**	**805359 008**	**805359 009**	**805359 010**
Customer Sample Reference					**F55 1**	**F55 2**	**F55 3**	**F55 4**	**F55 5**
Test Sample					**AR**	**AR**	**AR**	**AR**	**AR**
Depth					**22.620**	**22.620**	**22.620**	**22.620**	**22.620**
Date Sampled					**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
Matrix Class					**Sandy Soil**	**Other**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	**11**	**16**	**13**	**15**	**12**
Moisture @40C	Grav (1 Dec) (40 C)	0.1	%	N	**11**	**36**	**13**	**12**	**12**

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
MCERTS Preparation

Concept Reference					**805359 006**	**805359 007**	**805359 008**	**805359 009**	**805359 010**
Customer Sample Reference					**F55 1**	**F55 2**	**F55 3**	**F55 4**	**F55 5**
Test Sample					**M40**	**M40**	**M40**	**M40**	**M40**
Depth					**22.620**	**22.620**	**22.620**	**22.620**	**22.620**
Date Sampled					**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
Matrix Class					**Sandy Soil**	**Other**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Retained on 10mm sieve	Grav	0.1	%	N	**31.5**	**27.1**	**31.7**	**22.9**	**24.1**

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis

Concept Reference					**805359 006**	**805359 008**	**805359 009**	**805359 010**
Customer Sample Reference					**F55 1**	**F55 3**	**F55 4**	**F55 5**
Test Sample					**A40**	**A40**	**A40**	**A40**
Depth					**22.620**	**22.620**	**22.620**	**22.620**
Date Sampled					**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
Matrix Class					**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**				
Boron (water-soluble)	ICP/OES	1	mg/kg	N	<1	<1	<1	<1
Mercury (Inorganic)	ICP/OES (Inorganic Mercury)	1	mg/kg	N	<1	<1	<1	<1
Asbestos ID	PLM			SU	N.D.	N.D.	N.D.	N.D.

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis

Concept Reference					**805359 006**	**805359 008**	**805359 009**	**805359 010**
Customer Sample Reference					**F55 1**	**F55 3**	**F55 4**	**F55 5**
Test Sample					**M105**	**M105**	**M105**	**M105**
Depth					**22.620**	**22.620**	**22.620**	**22.620**
Date Sampled					**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
Matrix Class					**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**				
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10
Polychlorinated biphenyl BZ#28	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#52	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#101	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#118	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#153	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#138	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Polychlorinated biphenyl BZ#180	GC/MS (SIR)	1	µg/kg	M	<10(9)	<1	<1	<1
Naphthalene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.3**	<0.1	**0.1**	**0.2**
Acenaphthylene	GC/MS (MCERTS)	0.1	mg/kg	U	<0.1	<0.1	<0.1	<0.1
Acenaphthene	GC/MS (MCERTS)	0.1	mg/kg	M	**1.1**	**5.0**	**3.6**	**1.3**
Fluorene	GC/MS (MCERTS)	0.1	mg/kg	M	**1.4**	**4.5**	**3.2**	**2.0**
Phenanthrene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.6**	**0.9**	**1.3**	**0.4**
Anthracene	GC/MS (MCERTS)	0.1	mg/kg	U	**0.9**	**1.1**	**1.2**	**1.1**
Fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	**4.3**	**4.6**	**5.2**	**4.8**
Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**3.1**	**3.2**	**3.7**	**3.4**
Benzo(a)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.7**	**0.6**	**0.9**	**0.7**
Chrysene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.6**	**0.5**	**0.8**	**0.6**
Benzo(b)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.3**	**0.2**	**0.4**	**0.2**
Benzo(k)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.3**	**0.2**	**0.4**	**0.2**
Benzo(a)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.3**	**0.2**	**0.4**	**0.2**
Indeno(123-cd)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.1**	<0.1	**0.2**	<0.1
Dibenzo(ah)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	GC/MS (MCERTS)	0.1	mg/kg	M	**0.1**	<0.1	**0.2**	<0.1
Coronene	GC/MS	0.1	mg/kg	N	<0.1	<0.1	<0.1	<0.1
Phenol	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS (MCERTS)	0.1	mg/kg	U	**14**	**21**	**22**	**15**
Total Petroleum Hydrocarbons (C10-C35)	GC/FID	1	mg/kg	M	**120(13)**	**230(13)**	**420(13)**	**220(13)**
Total Petroleum Hydrocarbons (C35-C40)	GC/FID	1	mg/kg	N	**13(13)**	**10(13)**	**56(13)**	**17(13)**

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis

Concept Reference					**805359 006**	**805359 008**	**805359 009**	**805359 010**
Customer Sample Reference					**F55 1**	**F55 3**	**F55 4**	**F55 5**
Test Sample					**M40**	**M40**	**M40**	**M40**
Depth					**22.620**	**22.620**	**22.620**	**22.620**
Date Sampled					**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
Matrix Class					**Sandy Soil**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**				
Arsenic	ICP/OES	2	mg/kg	M	**9**	**9**	**8**	**8**
Cadmium	ICP/OES	1	mg/kg	M	<1	<1	<1	<1
Chromium	ICP/OES	1	mg/kg	M	**13**	**12**	**11**	**10**
Lead	ICP/OES	1	mg/kg	M	**110**	**100**	**120**	**94**
Nickel	ICP/OES	1	mg/kg	M	**17**	**15**	**15**	**13**
Selenium	ICP/OES	3	mg/kg	M	<3	<3	<3	<3
Copper	ICP/OES	1	mg/kg	M	**34**	**35**	**31**	**28**
Zinc	ICP/OES	1	mg/kg	M	**61**	**62**	**55**	**51**

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis (Other Sample)

				Concept Reference	**805359 007**
				Customer Sample Reference	**F55 2**
				Test Sample	**A40**
				Depth	**22.620**
				Date Sampled	**19-FEB-2019**
				Matrix Class	**Other**
Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Boron (water-soluble)	ICP/OES	1	mg/kg	N	<1
Mercury (Inorganic)	ICP/OES (Inorganic Mercury)	1	mg/kg	N	<1
Asbestos ID	PLM			SN	N.D.

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis (Other Sample)

				Concept Reference	**805359 007**
				Customer Sample Reference	**F55 2**
				Test Sample	**M105**
				Depth	**22.620**
				Date Sampled	**19-FEB-2019**
				Matrix Class	**Other**
Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	<10
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	N	<10
Polychlorinated biphenyl BZ#28	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#52	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#101	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#118	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#153	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#138	GC/MS (SIR)	1	µg/kg	N	<1
Polychlorinated biphenyl BZ#180	GC/MS (SIR)	1	µg/kg	N	<1
Naphthalene	GC/MS (MCERTS)	0.1	mg/kg	N	**0.2**
Acenaphthylene	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1
Acenaphthene	GC/MS (MCERTS)	0.1	mg/kg	N	**1.4**
Fluorene	GC/MS (MCERTS)	0.1	mg/kg	N	**2.8**
Phenanthrene	GC/MS (MCERTS)	0.1	mg/kg	N	**0.9**
Anthracene	GC/MS (MCERTS)	0.1	mg/kg	N	**1.1**
Fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	N	**17**
Pyrene	GC/MS (MCERTS)	0.1	mg/kg	N	**14**
Benzo(a)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	N	**4.6**
Chrysene	GC/MS (MCERTS)	0.1	mg/kg	N	**4.0**
Benzo(b)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	N	**1.5**
Benzo(k)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	N	**1.6**
Benzo(a)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	N	**1.6**
Indeno(123-cd)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	N	**0.5**
Dibenzo(ah)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	N	**0.2**
Benzo(ghi)Perylene	GC/MS (MCERTS)	0.1	mg/kg	N	**0.5**
Coronene	GC/MS	0.1	mg/kg	N	<0.1
Phenol	GC/MS (MCERTS)	0.1	mg/kg	N	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS (MCERTS)	0.1	mg/kg	N	**53**
Total Petroleum Hydrocarbons (C10-C35)	GC/FID	1	mg/kg	N	**220**(13)
Total Petroleum Hydrocarbons (C35-C40)	GC/FID	1	mg/kg	N	**7**(13)

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WAC Analysis (Other Sample)

Concept Reference					**805359 007**
Customer Sample Reference					**F55 2**
Test Sample					**M40**
Depth					**22.620**
Date Sampled					**19-FEB-2019**
Matrix Class					**Other**
Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Arsenic	ICP/OES	2.0	mg/kg	N	**8.4**
Cadmium	ICP/OES	1.0	mg/kg	N	<1.0
Chromium	ICP/OES	1	mg/kg	N	**15**
Lead	ICP/OES	1	mg/kg	N	**11**
Nickel	ICP/OES	1	mg/kg	N	**22**
Selenium	ICP/OES	3	mg/kg	N	<3
Copper	ICP/OES	1	mg/kg	N	**12**
Zinc	ICP/OES	1	mg/kg	N	**53**

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
Miscellaneous

Concept Reference					**805359 006**	**805359 007**	**805359 008**	**805359 009**	**805359 010**
Customer Sample Reference					**F55 1**	**F55 2**	**F55 3**	**F55 4**	**F55 5**
Test Sample					**A40**	**A40**	**A40**	**A40**	**A40**
Depth					**22.620**	**22.620**	**22.620**	**22.620**	**22.620**
Date Sampled					**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
Matrix Class					**Sandy Soil**	**Other**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Chromium VI	ICP/OES	1	mg/kg	N	<1	<1	<1	<1	<1

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
Miscellaneous

Concept Reference					**805359 006**	**805359 007**	**805359 008**	**805359 009**	**805359 010**
Customer Sample Reference					**F55 1**	**F55 2**	**F55 3**	**F55 4**	**F55 5**
Test Sample					**M105**	**M105**	**M105**	**M105**	**M105**
Depth					**22.620**	**22.620**	**22.620**	**22.620**	**22.620**
Date Sampled					**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
Matrix Class					**Sandy Soil**	**Other**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Total Petroleum Hydrocarbons (C6 - C10)	GC/MS (Headspace)	10	µg/kg	N	<10	<10	<10	<10	<10

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

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

Combined Leachate and WAC Leachate Suite

Concept Reference	**805359 006**	**805359 007**	**805359 008**	**805359 009**	**805359 010**
Customer Sample Reference	**F55 1**	**F55 2**	**F55 3**	**F55 4**	**F55 5**
Test Sample	**10:1**	**10:1**	**10:1**	**10:1**	**10:1**
Depth	**22.620**	**22.620**	**22.620**	**22.620**	**22.620**
Date Sampled	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**	**19-FEB-2019**
Matrix Class	**Sandy Soil**	**Other**	**Sandy Soil**	**Sandy Soil**	**Sandy Soil**

Determinand	Method	LOD	Units	Symbol					
pH	Probe			U	**7.67**	**7.94**	**7.78**	**7.58**	**7.73**
Boron (Dissolved)	ICP/OES (Filtered)	0.01	mg/l	N	**0.02**	<0.01	**0.02**	**0.02**	**0.02**
Arsenic (Dissolved)	ICP/MS (Filtered)	0.2	µg/l	U	**2.5**	**0.4**	**1.7**	**2.1**	**1.7**
Cadmium (Dissolved)	ICP/MS (Filtered)	0.02	µg/l	U	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**1**	<1	**1**	**1**	**1**
Lead (Dissolved)	ICP/MS (Filtered)	0.3	µg/l	U	**0.5**	<0.3	**0.4**	**0.4**	**0.3**
Mercury (Dissolved)	ICP/MS (Filtered)	0.05	µg/l	U	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	<1	<1	<1	<1	<1
Copper (Dissolved)	ICP/MS (Filtered)	0.5	µg/l	U	**3.0**	**1.0**	**4.8**	**1.8**	**2.2**
Zinc (Dissolved)	ICP/MS (Filtered)	2	µg/l	U	<2	<2	<2	<2	<2
Total Petroleum Hydrocarbons	GC/FID	0.1	mg/l	U	**0.3**(13)	**0.2**(13)	**1.4**(13)	**0.6**(13)	**0.6**(13)
PAH (sum of 4)	Calc		µg/l	N	**1.6**	**1.5**	**2.2**	**0.69**	**1.0**
Benzo(b)fluoranthene	GC/MS (SIR)	0.01	µg/l	U	**0.65**(13)	**0.62**(13)	**0.90**(13)	**0.25**(13)	**0.40**(13)
Benzo(ghi)Perylene	GC/MS (SIR)	0.01	µg/l	U	**0.29**(13)	**0.20**(13)	**0.33**(13)	**0.12**(13)	**0.17**(13)
Benzo(k)fluoranthene	GC/MS (SIR)	0.01	µg/l	U	**0.47**(13)	**0.52**(13)	**0.66**(13)	**0.22**(13)	**0.31**(13)
Indeno(123-cd)Pyrene	GC/MS (SIR)	0.01	µg/l	U	**0.22**(13)	**0.16**(13)	**0.27**(13)	**0.10**(13)	**0.13**(13)
Barium (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**8**	**3**	**10**	**9**	**9**
Molybdenum (Dissolved)	ICP/MS (Filtered)	1	µg/l	N	**6**	**1**	**5**	**5**	**6**
Total Dissolved Solids	Grav	100	mg/l	N	**110**	<100	**110**	**150**	**120**
Phenols (Total-Mono)	Colorimetry	0.1	mg/l	U	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Organic Carbon	OX/IR	1	mg/l	N	**5**	**3**	**5**	**5**	**5**
Electrical Conductivity	Probe	10	µS/cm	N	**190**	**89**	**180**	**250**	**200**
Antimony (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**2**	<1	**1**	**2**	**1**
Selenium (Dissolved)	ICP/MS (Filtered)	0.5	µg/l	U	**0.6**	<0.5	<0.5	<0.5	**0.5**
Chloride	Discrete Analyser	1	mg/l	U	**2**	**2**	**1**	<1	**1**
Fluoride	Discrete Analyser	0.05	mg/l	U	**0.30**	**0.13**	**0.25**	**0.26**	**0.29**
Sulphate	Discrete Analyser	0.5	mg/l	U	**55**	**2.1**	**53**	**85**	**57**

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Water Analysed as Water
Miscellaneous

Concept Reference	**805359 001**
Customer Sample Reference	**F55 A**
Test Sample	**AR**
Depth	**22.620**
Date Sampled	**19-FEB-2019**
Sample Received (ml)	**2500**

Determinand	Method	LOD	Units	Symbol	
Total Petroleum Hydrocarbons (C6 - C10)	GC/MS (Headspace)(LV)	10	µg/l	N	<10
Total Petroleum Hydrocarbons (C10 - C40)	GC/FID (LV)	0.01	mg/l	N	**1.2**(13)
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	0.01	mg/l	N	**1.2**(13)

Concept Reference: 805359
Project Site: THE FACTORY
Customer Reference:

Water Analysed as Water
Miscellaneous

Concept Reference	**805359 001**
Customer Sample Reference	**F55 A**
Test Sample	**F**
Depth	**22.620**
Date Sampled	**19-FEB-2019**
Sample Received (ml)	**2500**

Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Chromium VI	Discrete Analyser	0.003	mg/l	U	<0.003

Index to symbols used in 805359-1 Report A

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

Notes

Samples submitted for GC/MS (Headspace) analysis were submitted in inappropriate containers. It is possible therefore that the results provided may be compromised.
"Other" samples are outside the scope of our accreditation.
Asbestos testing is subcontracted to REC Asbestos.
Report A to include the WAC results only.

Waste Classification Report

G3DPE-DHZB3-3GVKT

Job name

The Factory Lift Pit

Description/Comments

Area of contamination discovered on site and sent for further testing. Hydrocarbon odour present and visual evidence of oil contamination. However, hydrocarbon testing shows them to be below hazardous waste limit.

Project

The Factory

Site

Related Documents

#	Name	Description
None		

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name: **Nadia Bidzinska** Date: **11 Mar 2019 15:53 GMT** Telephone: **01322 296200**	Company: **Laing O'Rourke** **Bridge Place** **Anchor Boulevard** **Crossings** **DA2 6SN**

Report

Created by: Nadia Bidzinska
Created date: 11 Mar 2019 15:53 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	F551	22.620	Non Hazardous		2
2	F552	22.620	Non Hazardous		5
3	F553	22.620	Non Hazardous		8
4	F554	22.620	Non Hazardous		11
5	F555	22.620	Non Hazardous		14

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	17
Appendix B: Rationale for selection of metal species	20
Appendix C: Version	20

Classification of sample: F551

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
F551		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
22.620 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
11% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 11% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9	mg/kg	1.32	10.705	mg/kg	0.00107 %	✓	
2		boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		**<LOD**
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		**<LOD**
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		13	mg/kg	1.462	17.117	mg/kg	0.00171 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		**<LOD**
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		34	mg/kg	1.126	34.487	mg/kg	0.00345 %	✓	
7		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	110	mg/kg	1.56	154.576	mg/kg	0.00991 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		**<LOD**
9		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		17	mg/kg	2.976	45.582	mg/kg	0.00456 %	✓	
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		**<LOD**
11		zinc { zinc chromate }	024-007-00-3				61	mg/kg	2.774	152.453	mg/kg	0.0152 %	✓	
12	●	TPH (C6 to C40) petroleum group			TPH		133	mg/kg		119.82	mg/kg	0.012 %	✓	
13		benzene	601-020-00-8	200-753-7	71-43-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		toluene	601-021-00-3	203-625-9	108-88-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
17	●	pH			PH		8.4	pH		8.4	pH	8.4 pH		
18		naphthalene	601-052-00-2	202-049-5	91-20-3		0.3	mg/kg		0.27	mg/kg	0.000027 %	✓	
19	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
20	●	acenaphthene		201-469-6	83-32-9		1.1	mg/kg		0.991	mg/kg	0.0000991 %	✓	
21	●	fluorene		201-695-5	86-73-7		1.4	mg/kg		1.261	mg/kg	0.000126 %	✓	
22	●	phenanthrene		201-581-5	85-01-8		0.6	mg/kg		0.541	mg/kg	0.0000541 %	✓	
23	●	anthracene		204-371-1	120-12-7		0.9	mg/kg		0.811	mg/kg	0.0000811 %	✓	
24	●	fluoranthene		205-912-4	206-44-0		4.3	mg/kg		3.874	mg/kg	0.000387 %	✓	
25	●	pyrene		204-927-3	129-00-0		3.1	mg/kg		2.793	mg/kg	0.000279 %	✓	
26		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.7	mg/kg		0.631	mg/kg	0.0000631 %	✓	
27		chrysene	601-048-00-0	205-923-4	218-01-9		0.6	mg/kg		0.541	mg/kg	0.0000541 %	✓	
28		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.3	mg/kg		0.27	mg/kg	0.000027 %	✓	
29		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.3	mg/kg		0.27	mg/kg	0.000027 %	✓	
30		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.3	mg/kg		0.27	mg/kg	0.000027 %	✓	
31	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.1	mg/kg		0.0901	mg/kg	0.00000901 %	✓	
32		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33	●	benzo[ghi]perylene		205-883-8	191-24-2		0.1	mg/kg		0.0901	mg/kg	0.00000901 %	✓	
34		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
36	●	2,3,7,8-TeCDD		217-122-7	1746-01-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		**<LOD**
37	●	1,2,3,7,8-PeCDD			40321-76-4		<0.55	ng/kg		<5.5e-07	mg/kg	<5.5e-11 %		**<LOD**
38	●	1,2,3,4,7,8-HxCDD			39227-28-6		<0.24	ng/kg		<2.4e-07	mg/kg	<2.4e-11 %		**<LOD**
39	●	1,2,3,6,7,8-HxCDD			57653-85-7		<1.2	ng/kg		<1.2e-06	mg/kg	<1.2e-10 %		**<LOD**
40	●	1,2,3,7,8,9-HxCDD			19408-74-3		0.63	ng/kg		5.68e-07	mg/kg	5.68e-11 %	✓	
41	●	1,2,3,4,6,7,8-HpCDD			35822-46-9		7.4	ng/kg		6.67e-06	mg/kg	6.67e-10 %	✓	
42	●	OCDD			3268-87-9		39	ng/kg		3.51e-05	mg/kg	0.000000003 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
43	●	2,3,7,8-TeCDF				1.5	ng/kg		1.35e-06 mg/kg	1.35e-10 %	✓	
				51207-31-9								
44	●	1,2,3,7,8-PeCDF				1.2	ng/kg		1.08e-06 mg/kg	1.08e-10 %	✓	
				57117-41-6								
45	●	2,3,4,7,8-PeCDF				1.7	ng/kg		1.53e-06 mg/kg	1.53e-10 %	✓	
				57117-31-4								
46	●	1,2,3,4,7,8-HxCDF				2	ng/kg		1.8e-06 mg/kg	1.8e-10 %	✓	
				70648-26-9								
47	●	1,2,3,6,7,8-HxCDF				<1.9	ng/kg		<1.9e-06 mg/kg	<1.9e-10 %		**<LOD**
				57117-44-9								
48	●	1,2,3,7,8,9-HxCDF				<0.7	ng/kg		<7.0e-07 mg/kg	<7.0e-11 %		**<LOD**
				72918-21-9								
49	●	2,3,4,6,7,8-HxCDF				1.7	ng/kg		1.53e-06 mg/kg	1.53e-10 %	✓	
				60851-34-5								
50	●	1,2,3,4,6,7,8-HpCDF				5.4	ng/kg		4.86e-06 mg/kg	4.86e-10 %	✓	
				67562-39-4								
51	●	1,2,3,4,7,8,9-HpCDF				0.88	ng/kg		7.93e-07 mg/kg	7.93e-11 %	✓	
				55673-89-7								
52	●	OCDF				<6	ng/kg		<6.0e-06 mg/kg	<6.0e-10 %		**<LOD**
				39001-02-0								
									Total:	0.0508 %		

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
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 Soils will be dewatered prior to excavation and removal from site. Therefore it's unlikely that a flammable liquid fraction will be present. Hydrocarbon extraction will be implemented for dewatering.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.012%)

Classification of sample: F552

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
F552		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
22.620 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
16% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 16% Dry Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		8.4	mg/kg	1.32	9.561	mg/kg	0.000956 %	✓	
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		15	mg/kg	1.462	18.899	mg/kg	0.00189 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		12	mg/kg	1.126	11.647	mg/kg	0.00116 %	✓	
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	11	mg/kg	1.56	14.791	mg/kg	0.000948 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		22	mg/kg	2.976	56.446	mg/kg	0.00564 %	✓	
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
11	zinc { zinc chromate }	024-007-00-3				53	mg/kg	2.774	126.75	mg/kg	0.0127 %	✓	
12	TPH (C6 to C40) petroleum group			TPH		227	mg/kg		195.69	mg/kg	0.0196 %	✓	
13	benzene	601-020-00-8	200-753-7	71-43-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
14	toluene	601-021-00-3	203-625-9	108-88-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
17	●	pH			PH		8.4	pH		8.4	pH	8.4 pH		
18		naphthalene	601-052-00-2	202-049-5	91-20-3		0.2	mg/kg		0.172	mg/kg	0.0000172 %	✓	
19	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
20	●	acenaphthene		201-469-6	83-32-9		1.4	mg/kg		1.207	mg/kg	0.000121 %	✓	
21	●	fluorene		201-695-5	86-73-7		2.8	mg/kg		2.414	mg/kg	0.000241 %	✓	
22	●	phenanthrene		201-581-5	85-01-8		0.9	mg/kg		0.776	mg/kg	0.0000776 %	✓	
23	●	anthracene		204-371-1	120-12-7		1.1	mg/kg		0.948	mg/kg	0.0000948 %	✓	
24	●	fluoranthene		205-912-4	206-44-0		17	mg/kg		14.655	mg/kg	0.00147 %	✓	
25	●	pyrene		204-927-3	129-00-0		14	mg/kg		12.069	mg/kg	0.00121 %	✓	
26		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		4.6	mg/kg		3.966	mg/kg	0.000397 %	✓	
27		chrysene	601-048-00-0	205-923-4	218-01-9		4	mg/kg		3.448	mg/kg	0.000345 %	✓	
28		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.5	mg/kg		1.293	mg/kg	0.000129 %	✓	
29		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.6	mg/kg		1.379	mg/kg	0.000138 %	✓	
30		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.6	mg/kg		1.379	mg/kg	0.000138 %	✓	
31	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.5	mg/kg		0.431	mg/kg	0.0000431 %	✓	
32		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.2	mg/kg		0.172	mg/kg	0.0000172 %	✓	
33	●	benzo[ghi]perylene		205-883-8	191-24-2		0.5	mg/kg		0.431	mg/kg	0.0000431 %	✓	
34		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
36	●	2,3,7,8-TeCDD		217-122-7	1746-01-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		**<LOD**
37	●	1,2,3,7,8-PeCDD			40321-76-4		0.87	ng/kg		7.5e-07	mg/kg	7.5e-11 %	✓	
38	●	1,2,3,4,7,8-HxCDD			39227-28-6		0.39	ng/kg		3.36e-07	mg/kg	3.36e-11 %	✓	
39	●	1,2,3,6,7,8-HxCDD			57653-85-7		0.61	ng/kg		5.26e-07	mg/kg	5.26e-11 %	✓	
40	●	1,2,3,7,8,9-HxCDD			19408-74-3		0.75	ng/kg		6.47e-07	mg/kg	6.47e-11 %	✓	
41	●	1,2,3,4,6,7,8-HpCDD			35822-46-9		3.6	ng/kg		3.1e-06	mg/kg	3.1e-10 %	✓	
42	●	OCDD			3268-87-9		5.9	ng/kg		5.09e-06	mg/kg	5.09e-10 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
43	●	2,3,7,8-TeCDF		51207-31-9		1	ng/kg		8.62e-07	mg/kg	8.62e-11 %	✓	
44	●	1,2,3,7,8-PeCDF		57117-41-6		0.65	ng/kg		5.6e-07	mg/kg	5.6e-11 %	✓	
45	●	2,3,4,7,8-PeCDF		57117-31-4		1.1	ng/kg		9.48e-07	mg/kg	9.48e-11 %	✓	
46	●	1,2,3,4,7,8-HxCDF		70648-26-9		0.86	ng/kg		7.41e-07	mg/kg	7.41e-11 %	✓	
47	●	1,2,3,6,7,8-HxCDF		57117-44-9		0.92	ng/kg		7.93e-07	mg/kg	7.93e-11 %	✓	
48	●	1,2,3,7,8,9-HxCDF		72918-21-9		<0.3	ng/kg		<3.0e-07	mg/kg	<3.0e-11 %		**<LOD**
49	●	2,3,4,6,7,8-HxCDF		60851-34-5		1.4	ng/kg		1.21e-06	mg/kg	1.21e-10 %	✓	
50	●	1,2,3,4,6,7,8-HpCDF		67562-39-4		2.6	ng/kg		2.24e-06	mg/kg	2.24e-10 %	✓	
51	●	1,2,3,4,7,8,9-HpCDF		55673-89-7		0.49	ng/kg		4.22e-07	mg/kg	4.22e-11 %	✓	
52	●	OCDF		39001-02-0		2.5	ng/kg		2.16e-06	mg/kg	2.16e-10 %	✓	
										Total:	0.0489 %		

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
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 Soils will be dewatered prior to excavation and removal from site. Therefore it's unlikely that a flammable liquid fraction will be present. Hydrocarbon extraction will be implemented for dewatering.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0196%)

Classification of sample: F553

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
F553
Sample Depth:
22.620 m
Moisture content:
13%
(dry 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% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				9	mg/kg	1.32	10.516	mg/kg	0.00105 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
		005-008-00-8	215-125-8	1303-86-2									
3		cadmium { cadmium oxide }				<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				12	mg/kg	1.462	15.521	mg/kg	0.00155 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				35	mg/kg	1.126	34.873	mg/kg	0.00349 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { lead chromate }			1	100	mg/kg	1.56	138.037	mg/kg	0.00885 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
8		mercury { mercury dichloride }				<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		nickel { nickel chromate }				15	mg/kg	2.976	39.508	mg/kg	0.00395 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
		034-002-00-8											
11		zinc { zinc chromate }				62	mg/kg	2.774	152.21	mg/kg	0.0152 %	✓	
		024-007-00-3											
12	●	TPH (C6 to C40) petroleum group				240	mg/kg		212.389	mg/kg	0.0212 %	✓	
				TPH									
13		benzene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
14		toluene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
16		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
17	●	pH			PH		8.5	pH		8.5	pH	8.5 pH		
18		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
19	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
20	●	acenaphthene		201-469-6	83-32-9		5	mg/kg		4.425	mg/kg	0.000442 %	✓	
21	●	fluorene		201-695-5	86-73-7		4.5	mg/kg		3.982	mg/kg	0.000398 %	✓	
22	●	phenanthrene		201-581-5	85-01-8		0.9	mg/kg		0.796	mg/kg	0.0000796 %	✓	
23	●	anthracene		204-371-1	120-12-7		1.1	mg/kg		0.973	mg/kg	0.0000973 %	✓	
24	●	fluoranthene		205-912-4	206-44-0		4.6	mg/kg		4.071	mg/kg	0.000407 %	✓	
25	●	pyrene		204-927-3	129-00-0		3.2	mg/kg		2.832	mg/kg	0.000283 %	✓	
26		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.6	mg/kg		0.531	mg/kg	0.0000531 %	✓	
27		chrysene	601-048-00-0	205-923-4	218-01-9		0.5	mg/kg		0.442	mg/kg	0.0000442 %	✓	
28		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.2	mg/kg		0.177	mg/kg	0.0000177 %	✓	
29		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.2	mg/kg		0.177	mg/kg	0.0000177 %	✓	
30		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.2	mg/kg		0.177	mg/kg	0.0000177 %	✓	
31	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
32		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
33	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
34		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
35	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
36	●	2,3,7,8-TeCDD		217-122-7	1746-01-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		<LOD
37	●	1,2,3,7,8-PeCDD			40321-76-4		<0.33	ng/kg		<3.3e-07	mg/kg	<3.3e-11 %		<LOD
38	●	1,2,3,4,7,8-HxCDD			39227-28-6		<0.4	ng/kg		<4.0e-07	mg/kg	<4.0e-11 %		<LOD
39	●	1,2,3,6,7,8-HxCDD			57653-85-7		<0.9	ng/kg		<9.0e-07	mg/kg	<9.0e-11 %		<LOD
40	●	1,2,3,7,8,9-HxCDD			19408-74-3		<0.9	ng/kg		<9.0e-07	mg/kg	<9.0e-11 %		<LOD
41	●	1,2,3,4,6,7,8-HpCDD			35822-46-9		9.1	ng/kg		8.05e-06	mg/kg	8.05e-10 %	✓	
42	●	OCDD			3268-87-9		49	ng/kg		4.34e-05	mg/kg	0.000000004 %	✓	

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
43	●	2,3,7,8-TeCDF		51207-31-9		<1.4 ng/kg		<1.4e-06 mg/kg	<1.4e-10 %		<LOD
44	●	1,2,3,7,8-PeCDF		57117-41-6		<1 ng/kg		<1.0e-06 mg/kg	<1.0e-10 %		<LOD
45	●	2,3,4,7,8-PeCDF		57117-31-4		<1.1 ng/kg		<1.1e-06 mg/kg	<1.1e-10 %		<LOD
46	●	1,2,3,4,7,8-HxCDF		70648-26-9		1.8 ng/kg		1.59e-06 mg/kg	1.59e-10 %	✓	
47	●	1,2,3,6,7,8-HxCDF		57117-44-9		<1.6 ng/kg		<1.6e-06 mg/kg	<1.6e-10 %		<LOD
48	●	1,2,3,7,8,9-HxCDF		72918-21-9		<0.5 ng/kg		<5.0e-07 mg/kg	<5.0e-11 %		<LOD
49	●	2,3,4,6,7,8-HxCDF		60851-34-5		1.3 ng/kg		1.15e-06 mg/kg	1.15e-10 %	✓	
50	●	1,2,3,4,6,7,8-HpCDF		67562-39-4		6.1 ng/kg		5.4e-06 mg/kg	5.4e-10 %	✓	
51	●	1,2,3,4,7,8,9-HpCDF		55673-89-7		0.87 ng/kg		7.7e-07 mg/kg	7.7e-11 %	✓	
52	●	OCDF		39001-02-0		<6 ng/kg		<6.0e-06 mg/kg	<6.0e-10 %		<LOD
								Total:	0.0588 %		

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
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 Soils will be dewatered prior to excavation and removal from site. Therefore it's unlikely that a flammable liquid fraction will be present. Hydrocarbon extraction will be implemented for dewatering.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0212%)

Classification of sample: F554

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
F554		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
22.620 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
15% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 15% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				8	mg/kg	1.32	9.185	mg/kg	0.000918 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
		005-008-00-8	215-125-8	1303-86-2									
3		cadmium { cadmium oxide }				<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				11	mg/kg	1.462	13.98	mg/kg	0.0014 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				31	mg/kg	1.126	30.35	mg/kg	0.00304 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { lead chromate }			1	120	mg/kg	1.56	162.763	mg/kg	0.0104 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
8		mercury { mercury dichloride }				<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		nickel { nickel chromate }				15	mg/kg	2.976	38.821	mg/kg	0.00388 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
10		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
		034-002-00-8											
11		zinc { zinc chromate }				55	mg/kg	2.774	132.677	mg/kg	0.0133 %	✓	
		024-007-00-3											
12	●	TPH (C6 to C40) petroleum group				476	mg/kg		413.913	mg/kg	0.0414 %	✓	
				TPH									
13		benzene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
14		toluene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									

#		Determinand				CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			CLP index number	EC Number	CAS Number									
15	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
17	●	pH			PH		8.6	pH		8.6	pH	8.6 pH		
18		naphthalene	601-052-00-2	202-049-5	91-20-3		0.1	mg/kg		0.087	mg/kg	0.0000087 %	✓	
19	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
20	●	acenaphthene		201-469-6	83-32-9		3.6	mg/kg		3.13	mg/kg	0.000313 %	✓	
21	●	fluorene		201-695-5	86-73-7		3.2	mg/kg		2.783	mg/kg	0.000278 %	✓	
22	●	phenanthrene		201-581-5	85-01-8		1.3	mg/kg		1.13	mg/kg	0.000113 %	✓	
23	●	anthracene		204-371-1	120-12-7		1.2	mg/kg		1.043	mg/kg	0.000104 %	✓	
24	●	fluoranthene		205-912-4	206-44-0		5.2	mg/kg		4.522	mg/kg	0.000452 %	✓	
25	●	pyrene		204-927-3	129-00-0		3.7	mg/kg		3.217	mg/kg	0.000322 %	✓	
26		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.9	mg/kg		0.783	mg/kg	0.0000783 %	✓	
27		chrysene	601-048-00-0	205-923-4	218-01-9		0.8	mg/kg		0.696	mg/kg	0.0000696 %	✓	
28		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.4	mg/kg		0.348	mg/kg	0.0000348 %	✓	
29		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.4	mg/kg		0.348	mg/kg	0.0000348 %	✓	
30		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.4	mg/kg		0.348	mg/kg	0.0000348 %	✓	
31	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.2	mg/kg		0.174	mg/kg	0.0000174 %	✓	
32		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33	●	benzo[ghi]perylene		205-883-8	191-24-2		0.2	mg/kg		0.174	mg/kg	0.0000174 %	✓	
34		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
36	●	2,3,7,8-TeCDD		217-122-7	1746-01-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		**<LOD**
37	●	1,2,3,7,8-PeCDD			40321-76-4		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		**<LOD**
38	●	1,2,3,4,7,8-HxCDD			39227-28-6		<0.3	ng/kg		<3.0e-07	mg/kg	<3.0e-11 %		**<LOD**
39	●	1,2,3,6,7,8-HxCDD			57653-85-7		0.93	ng/kg		8.09e-07	mg/kg	8.09e-11 %	✓	
40	●	1,2,3,7,8,9-HxCDD			19408-74-3		0.51	ng/kg		4.43e-07	mg/kg	4.43e-11 %	✓	
41	●	1,2,3,4,6,7,8-HpCDD			35822-46-9		7	ng/kg		6.09e-06	mg/kg	6.09e-10 %	✓	
42	●	OCDD			3268-87-9		39	ng/kg		3.39e-05	mg/kg	0.000000003 %	✓	

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
43	●	2,3,7,8-TeCDF				<2.1 ng/kg		<2.1e-06 mg/kg	<2.1e-10 %		**<LOD**
				51207-31-9							
44	●	1,2,3,7,8-PeCDF				1.2 ng/kg		1.04e-06 mg/kg	1.04e-10 %	✓	
				57117-41-6							
45	●	2,3,4,7,8-PeCDF				<1.4 ng/kg		<1.4e-06 mg/kg	<1.4e-10 %		**<LOD**
				57117-31-4							
46	●	1,2,3,4,7,8-HxCDF				1.9 ng/kg		1.65e-06 mg/kg	1.65e-10 %	✓	
				70648-26-9							
47	●	1,2,3,6,7,8-HxCDF				1.4 ng/kg		1.22e-06 mg/kg	1.22e-10 %	✓	
				57117-44-9							
48	●	1,2,3,7,8,9-HxCDF				<0.45 ng/kg		<4.5e-07 mg/kg	<4.5e-11 %		**<LOD**
				72918-21-9							
49	●	2,3,4,6,7,8-HxCDF				1.3 ng/kg		1.13e-06 mg/kg	1.13e-10 %	✓	
				60851-34-5							
50	●	1,2,3,4,6,7,8-HpCDF				4.7 ng/kg		4.09e-06 mg/kg	4.09e-10 %	✓	
				67562-39-4							
51	●	1,2,3,4,7,8,9-HpCDF				0.7 ng/kg		6.09e-07 mg/kg	6.09e-11 %	✓	
				55673-89-7							
52	●	OCDF				5.1 ng/kg		4.43e-06 mg/kg	4.43e-10 %	✓	
				39001-02-0							
								Total:	0.0778 %		

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
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 Soils will be dewatered prior to excavation and removal from site. Therefore it's unlikely that a flammable liquid fraction will be present. Hydrocarbon extraction will be implemented for dewatering.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0414%)

Classification of sample: F555

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
F555		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
22.620 m			
Moisture content:			
12% (dry weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 12% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				8	mg/kg	1.32	9.431	mg/kg	0.000943 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
	005-008-00-8	215-125-8	1303-86-2									
3	cadmium { cadmium oxide }				<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
4	chromium in chromium(III) compounds { ● chromium(III) oxide }				10	mg/kg	1.462	13.05	mg/kg	0.0013 %	✓	
		215-160-9	1308-38-9									
5	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
6	copper { dicopper oxide; copper (I) oxide }				28	mg/kg	1.126	28.147	mg/kg	0.00281 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
7	lead { lead chromate }			1	94	mg/kg	1.56	130.913	mg/kg	0.00839 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
8	mercury { mercury dichloride }				<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
9	nickel { nickel chromate }				13	mg/kg	2.976	34.546	mg/kg	0.00345 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
	034-002-00-8											
11	zinc { zinc chromate }				51	mg/kg	2.774	126.323	mg/kg	0.0126 %	✓	
	024-007-00-3											
12	● TPH (C6 to C40) petroleum group				237	mg/kg		211.607	mg/kg	0.0212 %	✓	
			TPH									
13	benzene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
14	toluene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-021-00-3	203-625-9	108-88-3									

#		Determinand				CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			CLP index number	EC Number	CAS Number									
15	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
17	●	pH			PH		8.5	pH		8.5	pH	8.5 pH		
18		naphthalene	601-052-00-2	202-049-5	91-20-3		0.2	mg/kg		0.179	mg/kg	0.0000179 %	✓	
19	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
20	●	acenaphthene		201-469-6	83-32-9		1.3	mg/kg		1.161	mg/kg	0.000116 %	✓	
21	●	fluorene		201-695-5	86-73-7		2	mg/kg		1.786	mg/kg	0.000179 %	✓	
22	●	phenanthrene		201-581-5	85-01-8		0.4	mg/kg		0.357	mg/kg	0.0000357 %	✓	
23	●	anthracene		204-371-1	120-12-7		1.1	mg/kg		0.982	mg/kg	0.0000982 %	✓	
24	●	fluoranthene		205-912-4	206-44-0		4.8	mg/kg		4.286	mg/kg	0.000429 %	✓	
25	●	pyrene		204-927-3	129-00-0		3.4	mg/kg		3.036	mg/kg	0.000304 %	✓	
26		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.7	mg/kg		0.625	mg/kg	0.0000625 %	✓	
27		chrysene	601-048-00-0	205-923-4	218-01-9		0.6	mg/kg		0.536	mg/kg	0.0000536 %	✓	
28		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.2	mg/kg		0.179	mg/kg	0.0000179 %	✓	
29		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.2	mg/kg		0.179	mg/kg	0.0000179 %	✓	
30		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.2	mg/kg		0.179	mg/kg	0.0000179 %	✓	
31	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
32		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
34		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
36	●	2,3,7,8-TeCDD		217-122-7	1746-01-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		**<LOD**
37	●	1,2,3,7,8-PeCDD			40321-76-4		<0.3	ng/kg		<3.0e-07	mg/kg	<3.0e-11 %		**<LOD**
38	●	1,2,3,4,7,8-HxCDD			39227-28-6		<0.2	ng/kg		<2.0e-07	mg/kg	<2.0e-11 %		**<LOD**
39	●	1,2,3,6,7,8-HxCDD			57653-85-7		<0.8	ng/kg		<8.0e-07	mg/kg	<8.0e-11 %		**<LOD**
40	●	1,2,3,7,8,9-HxCDD			19408-74-3		0.93	ng/kg		8.3e-07	mg/kg	8.3e-11 %	✓	
41	●	1,2,3,4,6,7,8-HpCDD			35822-46-9		20	ng/kg		1.79e-05	mg/kg	0.000000001 %	✓	
42	●	OCDD			3268-87-9		120	ng/kg		0.0001	mg/kg	0.00000001 %	✓	

#		Determinand CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
43	●	2,3,7,8-TeCDF		51207-31-9		1.4 ng/kg		1.25e-06 mg/kg	1.25e-10 %	✓	
44	●	1,2,3,7,8-PeCDF		57117-41-6		1.1 ng/kg		9.82e-07 mg/kg	9.82e-11 %	✓	
45	●	2,3,4,7,8-PeCDF		57117-31-4		<1.1 ng/kg		<1.1e-06 mg/kg	<1.1e-10 %		<LOD
46	●	1,2,3,4,7,8-HxCDF		70648-26-9		<2.2 ng/kg		<2.2e-06 mg/kg	<2.2e-10 %		<LOD
47	●	1,2,3,6,7,8-HxCDF		57117-44-9		1.8 ng/kg		1.61e-06 mg/kg	1.61e-10 %	✓	
48	●	1,2,3,7,8,9-HxCDF		72918-21-9		<0.8 ng/kg		<8.0e-07 mg/kg	<8.0e-11 %		<LOD
49	●	2,3,4,6,7,8-HxCDF		60851-34-5		1.9 ng/kg		1.7e-06 mg/kg	1.7e-10 %	✓	
50	●	1,2,3,4,6,7,8-HpCDF		67562-39-4		6.1 ng/kg		5.45e-06 mg/kg	5.45e-10 %	✓	
51	●	1,2,3,4,7,8,9-HpCDF		55673-89-7		0.98 ng/kg		8.75e-07 mg/kg	8.75e-11 %	✓	
52	●	OCDF		39001-02-0		<7 ng/kg		<7.0e-06 mg/kg	<7.0e-10 %		<LOD
								Total:	0.0537 %		

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
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 Soils will be dewatered prior to excavation and removal from site. Therefore it's unlikely that a flammable liquid fraction will be present. Hydrocarbon extraction will be implemented for dewatering.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0212%)

Appendix A: Classifier defined and non CLP determinands

• **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

• **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: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

• **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

• **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

• **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: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

• **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: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

• **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 Chronic 1 H410 , Aquatic Acute 1 H400

• **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: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

• **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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **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 Chronic 1 H410 , Aquatic Acute 1 H400

- **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

- **2,3,7,8-TeCDD** (EC Number: 217-122-7, CAS Number: 1746-01-6)

Description/Comments: 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=1)

- **1,2,3,7,8-PeCDD** (CAS Number: 40321-76-4)

Description/Comments: 1,2,3,7,8-pentachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=1)

- **1,2,3,4,7,8-HxCDD** (CAS Number: 39227-28-6)

Description/Comments: 1,2,3,4,7,8-hexachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,6,7,8-HxCDD** (CAS Number: 57653-85-7)

Description/Comments: 1,2,3,6,7,8-hexachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,7,8,9-HxCDD** (CAS Number: 19408-74-3)

Description/Comments: 1,2,3,7,8,9-hexachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,4,6,7,8-HpCDD** (CAS Number: 35822-46-9)

Description/Comments: 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.01)

- **OCDD** (CAS Number: 3268-87-9)

Description/Comments: octachlorodibenzo-p-dioxin
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.0003)

- **2,3,7,8-TeCDF** (CAS Number: 51207-31-9)

Description/Comments: 2,3,7,8-tetrachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,7,8-PeCDF** (CAS Number: 57117-41-6)

Description/Comments: 1,2,3,7,8-pentachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.03)

- **2,3,4,7,8-PeCDF** (CAS Number: 57117-31-4)

Description/Comments: 2,3,4,7,8-pentachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.3)

- **1,2,3,4,7,8-HxCDF** (CAS Number: 70648-26-9)

Description/Comments: 1,2,3,4,7,8-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,6,7,8-HxCDF** (CAS Number: 57117-44-9)

Description/Comments: 1,2,3,6,7,8-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,7,8,9-HxCDF** (CAS Number: 72918-21-9)

Description/Comments: 1,2,3,7,8,9-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **2,3,4,6,7,8-HxCDF** (CAS Number: 60851-34-5)

Description/Comments: 2,3,4,6,7,8-hexachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.1)

- **1,2,3,4,6,7,8-HpCDF** (CAS Number: 67562-39-4)

Description/Comments: 1,2,3,4,6,7,8-heptachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.01)

- **1,2,3,4,7,8,9-HpCDF** (CAS Number: 55673-89-7)

Description/Comments: 1,2,3,4,7,8,9-heptachlorodibenzofuran
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.01)

● **OCDF** (CAS Number: 39001-02-0)

Description/Comments: octachlorodibenzo[b,d]furan
Data source: ATP1 (Regulation (EU) 756/2010) to POPs Regulation (Regulation (EC) 850/2004)
Data source date: 24 Aug 2010
Hazard Statements: PCDD/PCDF (TEF=0.0003)

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2019.67.3824.7797 (09 Mar 2019)
HazWasteOnline Database: 2019.67.3824.7797 (09 Mar 2019)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
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 Wastes 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
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

Appendix E

Name	Delivery Date	Description
CEMEX UK	17/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	17/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	17/10/2018	(6F5) 6F5 LIMESTONE
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
J O'Shea and Sons Limited	18/10/2018	6F2
CEMEX UK	18/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	18/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	18/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	18/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	18/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	18/10/2018	(6F5) 6F5 LIMESTONE
J O'Shea and Sons Limited	19/10/2018	6F2
J O'Shea and Sons Limited	19/10/2018	6F2
J O'Shea and Sons Limited	19/10/2018	6F2
J O'Shea and Sons Limited	19/10/2018	6F2
J O'Shea and Sons Limited	19/10/2018	6F2
J O'Shea and Sons Limited	19/10/2018	6F2
J O'Shea and Sons Limited	19/10/2018	6F2
CEMEX UK	19/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	19/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	19/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	19/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	20/10/2018	(6F5) 6F5 LIMESTONE
J O'Shea and Sons Limited	22/10/2018	6F2
J O'Shea and Sons Limited	22/10/2018	6F2
J O'Shea and Sons Limited	22/10/2018	6F2
J O'Shea and Sons Limited	22/10/2018	6F2
J O'Shea and Sons Limited	22/10/2018	6F2
J O'Shea and Sons Limited	22/10/2018	6F2
J O'Shea and Sons Limited	22/10/2018	6F2
J O'Shea and Sons Limited	22/10/2018	6F2
Cemex UK	22/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	22/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	22/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	22/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	22/10/2018	(6F5) 6F5 LIMESTONE
J O'Shea and Sons Limited	23/10/2018	6F2
J O'Shea and Sons Limited	23/10/2018	6F2
J O'Shea and Sons Limited	23/10/2018	6F2
J O'Shea and Sons Limited	23/10/2018	6F2
J O'Shea and Sons Limited	23/10/2018	6F2
J O'Shea and Sons Limited	23/10/2018	6F2

J O'Shea and Sons Limited	23/10/2018	6F2
J O'Shea and Sons Limited	23/10/2018	6F2
J O'Shea and Sons Limited	23/10/2018	6F2
J O'Shea and Sons Limited	23/10/2018	6F2
CEMEX UK	23/10/2018	(6F5) 6F5 LIMESTONE
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
J O'Shea and Sons Limited	24/10/2018	6F2
CEMEX UK	24/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	24/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	24/10/2018	(6F5) 6F5 LIMESTONE
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2
J O'Shea and Sons Limited	25/10/2018	6F2

J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	26/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
J O'Shea and Sons Limited	29/10/2018	6F2
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE

Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(T1) TYPE 1 SUB BASE LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(T1) TYPE 1 SUB BASE LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE

Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	29/10/2018	(6F5) 6F5 LIMESTONE
J O'Shea and Sons Limited	30/10/2018	6F2
J O'Shea and Sons Limited	30/10/2018	6F2
J O'Shea and Sons Limited	30/10/2018	6F2
J O'Shea and Sons Limited	30/10/2018	6F2
J O'Shea and Sons Limited	30/10/2018	6F2
J O'Shea and Sons Limited	30/10/2018	6F2
J O'Shea and Sons Limited	30/10/2018	6F2
J O'Shea and Sons Limited	30/10/2018	6F2
J O'Shea and Sons Limited	30/10/2018	6F2
J O'Shea and Sons Limited	31/10/2018	6F2
J O'Shea and Sons Limited	31/10/2018	6F2
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
Cemex UK	31/10/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	01/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	01/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	01/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	01/11/2018	(6F5) 6F5 LIMESTONE

CEMEX UK	01/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	01/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	01/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	01/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	01/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	01/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	02/11/2018	(6F5) 6F5 LIMESTONE
Cemex UK	05/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	05/11/2018	(6F5) 6F5 LIMESTONE
Cemex UK	05/11/2018	(6F5) 6F5 LIMESTONE
Cemex UK	05/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/11/2018	(6F5) 6F5 LIMESTONE
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2

J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
J O'Shea and Sons Limited	07/11/2018	6F2
CEMEX UK	07/11/2018	(6F5) 6F5 LIMESTONE
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
J O'Shea and Sons Limited	08/11/2018	6F2
CEMEX UK	08/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	08/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	08/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	08/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	08/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	08/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	08/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	08/11/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	08/11/2018	(6F5) 6F5 LIMESTONE
J O'Shea and Sons Limited	09/11/2018	6F2
J O'Shea and Sons Limited	09/11/2018	6F2
J O'Shea and Sons Limited	09/11/2018	6F2
J O'Shea and Sons Limited	09/11/2018	6F2
J O'Shea and Sons Limited	09/11/2018	6F2
J O'Shea and Sons Limited	09/11/2018	6F2
J O'Shea and Sons Limited	09/11/2018	6F2
J O'Shea and Sons Limited	09/11/2018	6F2
J O'Shea and Sons Limited	09/11/2018	6F2
J O'Shea and Sons Limited	29/11/2018	6F2
J O'Shea and Sons Limited	29/11/2018	6F2

CEMEX UK	30/11/2018	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	03/12/2018	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	03/12/2018	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	04/12/2018	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	06/12/2018	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	06/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	06/12/2018	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	07/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	07/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	07/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	07/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	07/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	07/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/12/2018	(T3) TYPE 3 REDUCED FINES
Cemex UK	10/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	10/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	10/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES

CEMEX UK	10/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
Cemex UK	10/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	10/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	10/12/2018	(6F5) 6F5 LIMESTONE
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	10/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	11/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	11/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	11/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	11/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	11/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	11/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	11/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	11/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	11/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	11/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	11/12/2018	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	12/12/2018	(T3) TYPE 3 REDUCED FINES
CEMEX UK	12/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	13/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	13/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	13/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	13/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	13/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	17/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	17/12/2018	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	04/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	04/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	04/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/01/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE

CEMEX UK	15/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	15/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	16/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	16/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/01/2019	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	24/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	25/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	25/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	25/01/2019	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	25/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	25/01/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	25/01/2019	(T3) TYPE 3 REDUCED FINES
CEMEX UK	26/01/2019	(T3) TYPE 3 REDUCED FINES
CEMEX UK	26/01/2019	(T3) TYPE 3 REDUCED FINES
CEMEX UK	05/02/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	22/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	22/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/02/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	04/03/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	04/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	05/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	05/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	05/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	05/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	05/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	05/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	05/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	06/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	06/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	06/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE

CEMEX UK	08/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	13/03/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/03/2019	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	04/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	04/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	04/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	26/04/2019	6F2
J O'Shea and Sons Limited	26/04/2019	6F2
J O'Shea and Sons Limited	26/04/2019	6F2
J O'Shea and Sons Limited	26/04/2019	6F2
J O'Shea and Sons Limited	26/04/2019	6F2
J O'Shea and Sons Limited	26/04/2019	6F2
J O'Shea and Sons Limited	26/04/2019	6F2
J O'Shea and Sons Limited	26/04/2019	6F2
J O'Shea and Sons Limited	26/04/2019	6F2
J O'Shea and Sons Limited	26/04/2019	6F2
J O'Shea and Sons Limited	26/04/2019	6F2
CEMEX UK	26/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/04/2019	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	29/04/2019	6F2
CEMEX UK	01/05/2019	(10/20) 10/20MM SINGLE SIZE LIMESTONE

CEMEX UK	03/05/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE
J O'Shea and Sons Limited	07/05/2019	6F2
J O'Shea and Sons Limited	07/05/2019	6F2
CEMEX UK	07/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/05/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	11/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	13/05/2019	6F2
CEMEX UK	13/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	16/05/2019	6F2
J O'Shea and Sons Limited	16/05/2019	6F2
CEMEX UK	16/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	16/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	16/05/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE
J O'Shea and Sons Limited	17/05/2019	6F2
J O'Shea and Sons Limited	17/05/2019	6F2
J O'Shea and Sons Limited	17/05/2019	6F2
J O'Shea and Sons Limited	17/05/2019	6F2
J O'Shea and Sons Limited	17/05/2019	6F2
CEMEX UK	17/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	17/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	20/05/2019	6F2
J O'Shea and Sons Limited	20/05/2019	6F2
J O'Shea and Sons Limited	21/05/2019	6F2
J O'Shea and Sons Limited	21/05/2019	6F2
J O'Shea and Sons Limited	21/05/2019	6F2
J O'Shea and Sons Limited	21/05/2019	6F2
J O'Shea and Sons Limited	21/05/2019	6F2
J O'Shea and Sons Limited	21/05/2019	6F2
J O'Shea and Sons Limited	21/05/2019	6F2
J O'Shea and Sons Limited	21/05/2019	6F2
J O'Shea and Sons Limited	21/05/2019	6F2
CEMEX UK	21/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	21/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	21/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	21/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	21/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	21/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	21/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	21/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	22/05/2019	6F2
J O'Shea and Sons Limited	22/05/2019	6F2
J O'Shea and Sons Limited	22/05/2019	6F2
J O'Shea and Sons Limited	22/05/2019	6F2
J O'Shea and Sons Limited	22/05/2019	6F2
J O'Shea and Sons Limited	22/05/2019	6F2
J O'Shea and Sons Limited	22/05/2019	6F2
J O'Shea and Sons Limited	22/05/2019	6F2
J O'Shea and Sons Limited	22/05/2019	6F2
J O'Shea and Sons Limited	22/05/2019	6F2
J O'Shea and Sons Limited	22/05/2019	6F2
J O'Shea and Sons Limited	22/05/2019	6F2
CEMEX UK	22/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	22/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE

J O'Shea and Sons Limited	23/05/2019	6F2
J O'Shea and Sons Limited	23/05/2019	6F2
J O'Shea and Sons Limited	23/05/2019	6F2
J O'Shea and Sons Limited	23/05/2019	6F2
CEMEX UK	23/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	29/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
Cemex UK	31/05/2019	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	31/05/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	01/06/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	03/06/2019	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	05/06/2019	6F2
CEMEX UK	05/06/2019	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	05/06/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	06/06/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE
J O'Shea and Sons Limited	25/06/2019	6F2
J O'Shea and Sons Limited	26/06/2019	6F2
J O'Shea and Sons Limited	26/06/2019	6F2
J O'Shea and Sons Limited	26/06/2019	6F2
J O'Shea and Sons Limited	26/06/2019	6F2
J O'Shea and Sons Limited	26/06/2019	6F2
J O'Shea and Sons Limited	26/06/2019	6F2
J O'Shea and Sons Limited	27/06/2019	6F2
J O'Shea and Sons Limited	27/06/2019	6F2
J O'Shea and Sons Limited	01/07/2019	6F2
J O'Shea and Sons Limited	01/07/2019	6F2
J O'Shea and Sons Limited	02/07/2019	6F2
J O'Shea and Sons Limited	03/07/2019	6F2
J O'Shea and Sons Limited	03/07/2019	6F2
J O'Shea and Sons Limited	03/07/2019	6F2
J O'Shea and Sons Limited	03/07/2019	6F2
J O'Shea and Sons Limited	03/07/2019	6F2
J O'Shea and Sons Limited	03/07/2019	6F2
J O'Shea and Sons Limited	04/07/2019	6F2
CEMEX UK	04/07/2019	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	08/07/2019	6F2
J O'Shea and Sons Limited	08/07/2019	6F2
J O'Shea and Sons Limited	08/07/2019	6F2
J O'Shea and Sons Limited	08/07/2019	6F2
J O'Shea and Sons Limited	08/07/2019	6F2
J O'Shea and Sons Limited	09/07/2019	6F2
J O'Shea and Sons Limited	09/07/2019	6F2
CEMEX UK	10/07/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	10/07/2019	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	05/08/2019	6F2
J O'Shea and Sons Limited	05/08/2019	6F2
J O'Shea and Sons Limited	05/08/2019	6F2
J O'Shea and Sons Limited	05/08/2019	6F2
J O'Shea and Sons Limited	05/08/2019	6F2
J O'Shea and Sons Limited	07/08/2019	6F2
J O'Shea and Sons Limited	07/08/2019	6F2
J O'Shea and Sons Limited	07/08/2019	6F2
J O'Shea and Sons Limited	07/08/2019	6F2
J O'Shea and Sons Limited	07/08/2019	6F2
CEMEX UK	09/08/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	21/08/2019	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	22/08/2019	6F2
J O'Shea and Sons Limited	22/08/2019	6F2
J O'Shea and Sons Limited	22/08/2019	6F2

CEMEX UK	22/08/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	28/08/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	28/08/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	30/08/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	03/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	04/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	06/09/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	06/09/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	09/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	19/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	19/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	19/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	24/09/2019	6F2
CEMEX UK	24/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	24/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	25/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	25/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/09/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	02/10/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	03/10/2019	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	03/10/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/10/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	10/10/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	31/10/2019	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	06/11/2019	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	02/12/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	04/12/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	05/12/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	05/12/2019	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	06/12/2019	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	13/01/2020	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	15/01/2020	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	23/01/2020	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	27/01/2020	(0/4) 0/4 DUST LIMESTONE

CEMEX UK	30/01/2020	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	07/02/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	07/02/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/02/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	03/03/2020	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	11/03/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/03/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	13/03/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	16/03/2020	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	18/03/2020	6F2
CEMEX UK	20/03/2020	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	20/04/2020	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	30/04/2020	(4/10) 4/10MM SINGLE SIZE LIMESTONE
Cemex UK	30/04/2020	(TARMAC 2) 6mm, 10mm or 14mm Dense SurfaceCourse Limestone & Hardstone
CEMEX UK	05/05/2020	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	15/05/2020	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	21/05/2020	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	26/05/2020	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	03/06/2020	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	16/06/2020	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	17/06/2020	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	18/06/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	19/06/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	23/06/2020	(T1) TYPE 1 SUB BASE LIMESTONE
Cemex UK	29/06/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/07/2020	(10/20) 10/20MM SINGLE SIZE LIMESTONE
Cemex UK	08/07/2020	(TARMAC 1) 20mm Dense Binder Course
CEMEX UK	10/07/2020	(T1) TYPE 1 SUB BASE LIMESTONE
Cemex UK	13/07/2020	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	20/07/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/07/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	28/07/2020	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	21/09/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	29/09/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	29/09/2020	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	26/11/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/11/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/11/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/11/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	02/12/2020	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/02/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	01/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	01/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	01/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	02/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	02/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	03/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/03/2021	(4/10) 4/10MM SINGLE SIZE LIMESTONE
CEMEX UK	10/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/03/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	17/03/2021	(TARMAC 1) 20mm Dense Binder Course
Cemex UK	22/03/2021	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	22/03/2021	(TARMAC 1) 20mm Dense Binder Course

CEMEX UK	22/03/2021	(TARMAC 1) 20mm Dense Binder Course
CEMEX UK	24/05/2021	(75/125) 75-125MM CLEAN LIMESTONE SUGAR STONE
CEMEX UK	16/07/2021	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	16/07/2021	(T1) TYPE 1 SUB BASE LIMESTONE
Cemex UK	09/08/2021	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	01/09/2021	(TARMAC 2) 6mm, 10mm or 14mm Dense SurfaceCourse Limestone & Hardstone
CEMEX UK	02/09/2021	(TARMAC 2) 6mm, 10mm or 14mm Dense SurfaceCourse Limestone & Hardstone
CEMEX UK	03/09/2021	(TARMAC 2) 6mm, 10mm or 14mm Dense SurfaceCourse Limestone & Hardstone
CEMEX UK	12/11/2021	(TARMAC 1) 20mm Dense Binder Course
Cemex UK	12/01/2022	(TARMAC 1) 20mm Dense Binder Course
CEMEX UK	19/02/2022	(TARMAC 1) 20mm Dense Binder Course
Cemex UK	19/02/2022	(TARMAC 1) 20mm Dense Binder Course
CEMEX UK	22/02/2022	(TARMAC 1) 20mm Dense Binder Course
CEMEX UK	11/05/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	19/05/2022	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	04/10/2022	20MM PIPE BEDDING
J O'Shea and Sons Limited	11/10/2022	20MM PIPE BEDDING
CEMEX UK	17/10/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/10/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/10/2022	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	20/10/2022	20MM PIPE BEDDING
CEMEX UK	20/10/2022	(T1) TYPE 1 SUB BASE LIMESTONE
J O'Shea and Sons Limited	24/10/2022	10MM PIPE BEDDING
CEMEX UK	27/10/2022	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	01/11/2022	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	01/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	04/11/2022	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	08/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	08/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/11/2022	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	11/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	11/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	14/11/2022	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	14/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	14/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	14/11/2022	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	14/11/2022	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	14/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	14/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	16/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	17/11/2022	NEOGEM R/FINES SUB BASE
CEMEX UK	17/11/2022	NEOGEM R/FINES SUB BASE
CEMEX UK	18/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/11/2022	NEOGEM R/FINES SUB BASE
CEMEX UK	21/11/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/11/2022	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	30/11/2022	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	09/12/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	09/12/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/12/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/12/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/12/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	12/12/2022	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	13/12/2022	NEOGEM R/FINES SUB BASE
CEMEX UK	15/12/2022	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	12/01/2023	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	13/01/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	16/01/2023	(10/20) 10/20MM SINGLE SIZE LIMESTONE

CEMEX UK	18/01/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	19/01/2023	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	25/01/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/01/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/01/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/01/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	30/01/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	03/02/2023	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	06/02/2023	NEOGEM THERMOSAND
CEMEX UK	08/02/2023	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	09/02/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	13/02/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	15/02/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/02/2023	(10/20) 10/20MM SINGLE SIZE LIMESTONE
CEMEX UK	21/02/2023	NEOGEM R/FINES SUB BASE
CEMEX UK	22/02/2023	NEOGEM R/FINES SUB BASE
CEMEX UK	24/02/2023	NEOGEM R/FINES SUB BASE
CEMEX UK	08/03/2023	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	09/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	10/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	10/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	14/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	15/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	16/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	16/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	18/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	20/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	27/03/2023	(0/4) 0/4 DUST LIMESTONE
CEMEX UK	28/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	28/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	28/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	28/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	28/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	29/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	31/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	31/03/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	03/04/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	03/04/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	13/04/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	21/04/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	21/04/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	26/04/2023	(T1) TYPE 1 SUB BASE LIMESTONE
CEMEX UK	30/04/2023	(T1) TYPE 1 SUB BASE LIMESTONE

memorandum

DATE: Wednesday, 7 June 2023

TO: Manchester City Council, Contaminated Lane Officer

LOCATION: The Factory Project

FROM: Tatiana Meakin

CC: Chris O’Hara, Sam Siddorn

SUBJECT: The Factory Project: Testing of Imported Material

We note that the remediation strategy includes a commitment to test imported material, including virgin material at a frequency of:

Imported fill: 1 test per 50m3

Naturally site-won or imported soils from a Greenfield source: 1 test per 200m3

Please note that all fill used on the project was virgin quarried material, and it was not believed that the requirements above applied. The material is considered low risk for any contamination, and we have included the quarry testing certificates to demonstrate this.

Whilst Manchester City Council are not part of the Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG), we cite their guidance in support of our approach, specifically the Certification Requirements for Cover Systems - Technical Guidance for Developers, Landowners and Consultants (Version 3.4 - Nov 2017).

We have included the testing certificates for each year of developments, which indicate the chemical concentrations to be significantly below the thresholds for residential (without plan for consumption of homegrown produce) and so exceed the requirements for this project (in line with the commercial thresholds). Both align with the YALPAG approach set out above.

We trust that this satisfies the requirement and that we have sufficiently demonstrated the low-risk nature of the imported material in this instance.

Cemex Material UK Ltd,
National Technical Centre,
The Old Cement Works,
Long Itchington ,
Southam,
CV47 9RA,

Date: 22nd February 2018
Test Report Ref. STR: 578235

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Chemical Analysis of a sample as per clients request.

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S70896**
Client Ref. No:	**37144**
Date and Time of Sampling:	**31/01/2018**
Date of Receipt at Lab:	**02/02/2018**
Date of Start of Test.:	**07/02/2018**
Sampling Location:	**Stockpile**
Name of Source:	**Dove Holes Quarry**
Method of Sampling:	**Client**
Sampled By:	**Client**
Material Description:	**Type 1**
Target Specification:	**N/A**

RESULTS

SEE ATTACHED

Comments:	Report checked and approved by:
The work was carried out by our accredited, competent, sub contracted laboratory.	Joseph Parry Aggregate Team Co-Ordinator

Test Report Ref. STR: 578235 - Page 2 of 3

Test	Unit	Results
Metals		
Aluminium	mg/kg	**500**
Antimony	mg/kg	**< 1.0**
Arsenic	mg/kg	**1.6**
Barium	mg/kg	**24**
Beryllium	mg/kg	**< 0.2**
Boron	mg/kg	**1.9**
Cadmium	mg/kg	**1.0**
Chromium III	mg/kg	**4.8**
Chromium, Hexavalent	mg/kg	**< 1.0**
Copper	mg/kg	**3.4**
Lead	mg/kg	**21**
Mercury (Elemental)	ug/kg	**< 0.6**
Mercury (Inorganic)	ug/kg	**< 100**
Mercury (Methyl)	ug/kg	**< 100**
Molybdenum	mg/kg	**0.4**
Nickel	mg/kg	**2.1**
Selenium	mg/kg	**< 0.5**
Vanadium	mg/kg	**5.3**
Zinc	mg/kg	**15**
Inorganics		
Cyanide, Total	mg/kg	**<0.1**
Petroleum Hydrocarbons		
Aliphatic C5-C6	mg/kg	**< 0.01**
Aliphatic C6-C8	mg/kg	**< 0.01**
Aliphatic C8-C10	mg/kg	**< 0.01**
Aliphatic C10-C12	mg/kg	**< 1.5**
Aliphatic C12-C16	mg/kg	**< 1.2**
Aliphatic C16-C21	mg/kg	**< 1.5**
Aliphatic C21-C35	mg/kg	**< 3.4**
Aliphatic C5-C35	mg/kg	**< 10**
Aromatic C5-C7	mg/kg	**< 0.01**
Aromatic C7-C8	mg/kg	**< 0.01**
Aromatic C8-C10	mg/kg	**< 0.01**
Aromatic C10-C12	mg/kg	**< 0.9**
Aromatic C12-C16	mg/kg	**< 0.5**
Aromatic C16-C21	mg/kg	**< 0.6**
Aromatic C21-C35	mg/kg	**< 1.4**
Aromatic C5-C35	mg/kg	**< 10**
TPH Ali/Aro Total	mg/kg	**< 10**
Benzene	mg/kg	**< 0.01**
Ethylbenzene	mg/kg	**< 0.01**
Toluene	mg/kg	**< 0.01**
Xylene	mg/kg	**< 0.01**
MTBE	mg/kg	**< 0.01**

Test Report Ref. STR: 578235 - Page 3 of 3

PAHs		
Naphthalene	mg/kg	**< 0.1**
Acenaphthylene	mg/kg	**< 0.1**
Acenaphthene	mg/kg	**< 0.1**
Fluorene	mg/kg	**< 0.1**
Phenanthrene	mg/kg	**< 0.1**
Anthracene	mg/kg	**< 0.1**
Fluoranthene	mg/kg	**< 0.1**
Pyrene	mg/kg	**< 0.1**
Benzo(a)anthracene	mg/kg	**< 0.1**
Chrysene	mg/kg	**< 0.1**
Benzo(b)fluoranthene	mg/kg	**< 0.1**
Benzo(k)fluoranthene	mg/kg	**< 0.1**
Benzo(a)pyrene	mg/kg	**< 0.1**
Indeno(1,2,3-c,d)pyrene	mg/kg	**< 0.1**
Dibenzo(a,h)anthracene	mg/kg	**< 0.1**
Benzo(g,h,i)perylene	mg/kg	**< 0.1**
PAH Total	mg/kg	**< 1.6**
Phenols		
Phenol - Monohydric	mg/kg	**<0.3**
Organotins		
Tributyl Tin	mg/kg	**<1.0**

Cemex Materials UK Ltd
National Technical Centre
The Old Cement Works
Long Itchington
Southam
CV47 9RA

Date: 13 February 2020
Test Report Ref: TR 719925

Contract: Dove Holes

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the chemical analysis of a sample as per client request.

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S85985**
Client Ref. No:	**40335**
Date and Time of Sampling:	**30/01/2020**
Date of Receipt at Lab:	**03/02/2020**
Date of Start of Test:	**05/02/2020**
Sampling Location:	**Stock**
Name of Source:	**Dove Holes**
Method of Sampling:	**Unknown**
Sampled By:	**Client**
Tested By:	**Subcontracted Laboratory**
Material Description:	**Type 1 Sub Base**
Target Specification:	**N/A**

Results:
See Attached

This test report shall not be reproduced, except in full, without the written approval of Celtest Company Limited.

These results relate only to the items tested.

Comments: The work was carried out by our competent, sub contracted laboratory.	Report checked and approved by: Joseph Parry Aggregate Team Coordinator

STR Ref: Test Report Ref: TR 719925Page 2 of 3

Test	Units	Result
Metals		
Aluminium	mg/kg	990
Antimony	mg/kg	< 1.0
Arsenic	mg/kg	1.2
Barium	mg/kg	8.9
Beryllium	mg/kg	< 0.2
Boron, Water Soluble	mg/kg	0.6
Cadmium	mg/kg	0.6
Chromium III	mg/kg	4.2
Chromium, Hexavalent	mg/kg	< 1.0
Copper	mg/kg	5.7
Lead	mg/kg	6.4
Mercury (Elemental)	ug/kg	< 0.6
Mercury (Inorganic)	ug/kg	< 100
Mercury (Methyl)	ug/kg	< 100
Molybdenum	mg/kg	0.5
Nickel	mg/kg	1.6
Selenium	mg/kg	< 0.5
Vanadium	mg/kg	3.7
Zinc	mg/kg	10
Inorganics		
Cyanide, Total	mg/kg	0.2
Petroleum Hydrocarbons		
Aliphatic C5-C6	mg/kg	< 0.01
Aliphatic C6-C8	mg/kg	< 0.01
Aliphatic C8-C10	mg/kg	< 0.01
Aliphatic C10-C12	mg/kg	< 1.5
Aliphatic C12-C16	mg/kg	< 1.2
Aliphatic C16-C21	mg/kg	< 1.5
Aliphatic C21-C35	mg/kg	< 3.4
Aliphatic C5-C35	mg/kg	< 10
Aromatic C5-C7	mg/kg	< 0.01
Aromatic C7-C8	mg/kg	< 0.01
Aromatic C8-C10	mg/kg	< 0.01
Aromatic C10-C12	mg/kg	< 0.9
Aromatic C12-C16	mg/kg	< 0.5
Aromatic C16-C21	mg/kg	< 0.6
Aromatic C21-C35	mg/kg	< 1.4
Aromatic C5-C35	mg/kg	< 10
TPH Ali/Aro Total	mg/kg	< 10
Benzene	mg/kg	< 0.01
Ethylbenzene	mg/kg	< 0.01
Toluene	mg/kg	< 0.01
Xylene	mg/kg	< 0.01
MTBE	mg/kg	< 0.01

STR REF - Test Report Ref: TR 719925 Page 3 of 3

Test	Units	Result
PAHs		
Naphthalene	mg/kg	< 0.1
Acenaphthylene	mg/kg	< 0.1
Acenaphthene	mg/kg	< 0.1
Fluorene	mg/kg	< 0.1
Phenanthrene	mg/kg	< 0.1
Anthracene	mg/kg	< 0.1
Fluoranthene	mg/kg	< 0.1
Pyrene	mg/kg	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1
Chrysene	mg/kg	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	< 0.1
Dibenzo(a,h)anthracene	mg/kg	< 0.1
Benzo(g,h,i)perylene	mg/kg	< 0.1
PAH Total	mg/kg	< 1.6
Phenols		
Phenol - Monohydric	mg/kg	< 0.3
Organotins		
Tributyl Tin	mg/kg	< 1.0

Cemex Materials UK Ltd
National Technical Centre
The Old Cement Works
Long Itchington
Southam
CV47 9RA

Date: 07 July 2021
Test Report Ref: TR 812307

Contract: Dove Holes

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the chemical analysis of a sample as per client request.

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S95835**
Client Ref. No:	**715**
Date and Time of Sampling:	**15/06/2021**
Date of Receipt at Lab:	**22/06/2021**
Date of Start of Test:	**28/06/2021**
Sampling Location:	**Stock**
Name of Source:	**Dove Holes**
Method of Sampling:	**EN 932-1**
Sampled By:	**Client (Test results apply to sample as received)**
Tested By:	**Sub-Contracted Laboratory**
Material Description:	**Type 1/6N**
Target Specification:	**N/A**

Results:

See Attached

This test report shall not be reproduced, except in full, without the written approval of Celtest Company Limited.

These results relate only to the items tested.

Comments:	Report checked and approved by:
The work was carried out by our competent, sub contracted laboratory.	Joseph Parry Aggregate Team Coordinator

Test	Units	Result
Metals		
Aluminium	mg/kg	770
Antimony	mg/kg	< 1.0
Arsenic	mg/kg	1.1
Barium	mg/kg	16
Beryllium	mg/kg	< 0.2
Boron, Water Soluble	mg/kg	< 0.2
Cadmium	mg/kg	0.8
Chromium III	mg/kg	4.7
Chromium, Hexavalent	mg/kg	< 1.0
Copper	mg/kg	5.3
Lead	mg/kg	15
Mercury (Elemental)	ug/kg	< 0.6
Mercury (Inorganic)	ug/kg	< 100
Mercury (Methyl)	ug/kg	< 100
Molybdenum	mg/kg	< 0.4
Nickel	mg/kg	2.6
Selenium	mg/kg	< 0.5
Vanadium	mg/kg	4.3
Zinc	mg/kg	16
Inorganics		
Cyanide, Total	mg/kg	< 0.1
Petroleum Hydrocarbons		
Aliphatic C5-C6	mg/kg	< 0.01
Aliphatic C6-C8	mg/kg	< 0.01
Aliphatic C8-C10	mg/kg	< 0.01
Aliphatic C10-C12	mg/kg	< 1.5
Aliphatic C12-C16	mg/kg	< 1.2
Aliphatic C16-C21	mg/kg	< 1.5
Aliphatic C21-C35	mg/kg	< 3.4
Aliphatic C5-C35	mg/kg	< 10
Aromatic C5-C7	mg/kg	< 0.01
Aromatic C7-C8	mg/kg	< 0.01
Aromatic C8-C10	mg/kg	< 0.01
Aromatic C10-C12	mg/kg	< 0.9
Aromatic C12-C16	mg/kg	< 0.5
Aromatic C16-C21	mg/kg	< 0.6
Aromatic C21-C35	mg/kg	< 1.4
Aromatic C5-C35	mg/kg	< 10
TPH Ali/Aro Total C5-C35	mg/kg	< 10
Benzene	mg/kg	< 0.01
Ethylbenzene	mg/kg	< 0.01
Toluene	mg/kg	< 0.01
Xylene	mg/kg	< 0.01

STR Ref: Test Report Ref: TR 812307 Page 3 of 3

Test	Units	Result
PAHs		
Naphthalene	mg/kg	< 0.03
Acenaphthylene	mg/kg	< 0.03
Acenaphthene	mg/kg	< 0.03
Fluorene	mg/kg	< 0.03
Phenanthrene	mg/kg	< 0.03
Anthracene	mg/kg	< 0.03
Fluoranthene	mg/kg	< 0.03
Pyrene	mg/kg	< 0.03
Benzo(a)anthracene	mg/kg	< 0.03
Chrysene	mg/kg	< 0.03
Benzo(b)fluoranthene	mg/kg	< 0.03
Benzo(k)fluoranthene	mg/kg	< 0.03
Benzo(a)pyrene	mg/kg	< 0.03
Indeno(1,2,3-c,d)pyrene	mg/kg	< 0.03
Dibenzo(a,h)anthracene	mg/kg	< 0.03
Benzo(g,h,i)perylene	mg/kg	< 0.03
PAH - USEPA 16, Total	mg/kg	< 0.10
Phenols		
Phenol - Monohydric	mg/kg	< 0.3
Organotins		
Tributyl Tin	mg/kg	< 1.0

celtest
INDEPENDENT MATERIALS TESTING | DIAMOND DRILLING & SAWING

Cemex Materials UK Ltd
National Technical Centre
The Old Cement Works
Long Itchington
Southam
CV47 9RA

Date: 28 March 2023
Test Report Ref: TR 936628

Contract: Test List 7

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the chemical analysis of a sample as per client request.

SAMPLE DETAILS:

Certificate of sampling received:	**No**
Laboratory Ref. No:	**S108326**
Client Ref. No:	**44162**
Date and Time of Sampling:	**02/02/2023**
Date of Receipt at Lab:	**08/02/2023**
Date of Start of Test:	**17/03/2023**
Sampling Location:	**Unknown**
Name of Source:	**Doveholes**
Method of Sampling:	**Unknown**
Sampled By:	**Client (Test results apply to sample as received)**
Tested By:	**Subcontracted Laboratory**
Material Description:	**Type 1/6N**
Target Specification:	**N/A**

Results:
See Attached

This test report shall not be reproduced, except in full, without the written approval of Celtest Company Limited.

These results relate only to the items tested.

Comments:	Report checked and approved by:
The work was carried out by our competent, sub contracted laboratory.	A. Lee Annwen Lee Job Coordinator

STR Ref: Test Report Ref: TR 936628 Page 2 of 3

Test	Units	Result
Metals		
Aluminium	mg/kg	1300
Antimony	mg/kg	< 1.0
Arsenic	mg/kg	1.3
Barium	mg/kg	24
Beryllium	mg/kg	< 0.2
Boron, Water Soluble	mg/kg	< 0.2
Cadmium	mg/kg	0.6
Chromium III	mg/kg	5.7
Chromium, Hexavalent	mg/kg	< 1.0
Copper	mg/kg	5.3
Lead	mg/kg	18
Mercury (Elemental)	ug/kg	1.5
Mercury (Inorganic)	ug/kg	< 100
Mercury (Methyl)	ug/kg	< 100
Molybdenum	mg/kg	0.8
Nickel	mg/kg	5.6
Selenium	mg/kg	< 0.5
Vanadium	mg/kg	6.1
Zinc	mg/kg	15
Inorganics		
Cyanide, Total	mg/kg	<0.1
Petroleum Hydrocarbons		
Aliphatic C5-C6	mg/kg	< 0.01
Aliphatic C6-C8	mg/kg	< 0.01
Aliphatic C8-C10	mg/kg	< 0.01
Aliphatic C10-C12	mg/kg	< 1.5
Aliphatic C12-C16	mg/kg	< 1.2
Aliphatic C16-C21	mg/kg	< 1.5
Aliphatic C21-C35	mg/kg	< 3.4
Aliphatic C5-C35	mg/kg	< 10
Aromatic C5-C7	mg/kg	< 0.01
Aromatic C7-C8	mg/kg	< 0.01
Aromatic C8-C10	mg/kg	< 0.01
Aromatic C10-C12	mg/kg	< 0.9
Aromatic C12-C16	mg/kg	< 0.5
Aromatic C16-C21	mg/kg	< 0.6
Aromatic C21-C35	mg/kg	< 1.4
Aromatic C5-C35	mg/kg	< 10
TPH Ali/Aro Total C5-C35	mg/kg	< 10
Benzene	mg/kg	< 0.01
Ethylbenzene	mg/kg	< 0.01
Toluene	mg/kg	< 0.01
Xylene	mg/kg	< 0.01

Test	Units	Result
PAHs		
Naphthalene	mg/kg	< 0.03
Acenaphthylene	mg/kg	< 0.03
Acenaphthene	mg/kg	< 0.03
Fluorene	mg/kg	< 0.03
Phenanthrene	mg/kg	< 0.03
Anthracene	mg/kg	< 0.03
Fluoranthene	mg/kg	< 0.03
Pyrene	mg/kg	< 0.03
Benzo(a)anthracene	mg/kg	< 0.03
Chrysene	mg/kg	< 0.03
Benzo(b)fluoranthene	mg/kg	< 0.03
Benzo(k)fluoranthene	mg/kg	< 0.03
Benzo(a)pyrene	mg/kg	< 0.03
Indeno(1,2,3-c,d)pyrene	mg/kg	< 0.03
Dibenzo(a,h)anthracene	mg/kg	< 0.03
Benzo(g,h,i)perylene	mg/kg	< 0.03
PAH - USEPA 16, Total	mg/kg	< 0.10
Phenols		
Phenol - Monohydric	mg/kg	< 0.3
Organotins		
Tributyl Tin	mg/kg	< 1.0

Appendix F

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Mr Mark Wood
Green-tech Ltd
Rabbit Hill Park
Great North Road
Arkendale
Knaresborough
North Yorkshire HG5 0FF

11th August 2021
Our Ref: TOHA/21/7096/SS
Your Ref: PO 413466

Dear Sirs

Topsoil Analysis Report: Barnsdale Low Fertility Soil

We have completed the analysis of the soil sample recently submitted, referenced *Barnsdale Low Fertility* and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the sample for low fertility planting. In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for Topsoil – Table 1, Specific Purpose Low Fertility Topsoil)*.

This report presents the results of analysis for the sample submitted to our office, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification or validation testing, especially after the topsoil has left the Green-tech Ltd site.

SAMPLE EXAMINATION

The sample was described as a reddish brown (Munsell Colour 5YR 5/3), slightly moist, friable, non-calcareous, LOAMY SAND with a weakly developed, very fine to fine granular structure*. The sample was slightly stony and contained a low proportion of organic fines. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

*This appraisal of soil structure was made from examination of a disturbed sample(s). Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

ANALYTICAL SCHEDULE

The sample was submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- detailed particle size analysis (5 sands, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, B);
- total cyanide and total (mono) phenols;
- aromatic and aliphatic TPH (C5-C35 banding);
- speciated PAHs (US EPA16 suite);
- benzene, toluene, ethylbenzene, xylene (BTEX);
- asbestos screen.

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

RESULTS OF ANALYSIS

Particle Size Analysis and Stone Content

The sample fell into the *loamy sand* texture class. Further detailed particle size analysis found the sample to have a sufficiently narrow particle size distribution and a predominance of *medium sand* (0.25-0.50mm). This is usually ideal for topsoil in general landscape applications as reasonable porosity levels are generally maintained in a consolidated state and the risk of particle interpacking is reduced. The sample should therefore provide adequate drainage and aeration properties for general landscape applications (including low fertility landscape purposes).

The sample was slightly stony and as such, stones should not restrict the use of the soil for low fertility landscape purposes.

pH and Electrical Conductivity Values

The sample was slightly alkaline in reaction (pH 7.3), with a pH value that would be considered suitable for low fertility landscape purposes.

The electrical conductivity (salinity) value (water extract) was low, which indicates that soluble salts were not present at levels that would be harmful to plants.

The electrical conductivity value by $CaSO_4$ extract (*BS3882* requirement) fell below the maximum specified value (3300 µS/cm) given in *BS3882:2015 – Table 1*.

Organic Matter and Fertility Status

The sample contained low levels of organic matter and total nitrogen and moderately low to moderate levels of all other major plant nutrients.

The organic matter content (1.4%) fell just below the minimum acceptable range given in *BS3882:2015 – Table1 Specific Purpose Low Fertility* (2.0%). The total nitrogen level (0.05%) was low and whilst the concentration is not critical in a low fertility topsoil, a concentration of >0.15% can aid initial establishment.

The level of extractable phosphorus (17 mg/l) was low and acceptable for low fertility landscape purposes.

The C:N ratio of the sample was acceptable for low fertility landscape purposes.

Potential Contaminants

With reference to *BS3882:2015 - Table 1*: Notes 3 and 4, there is a recommendation to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with home grown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels* (C4SLs) *for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

Phytotoxic Contaminants

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in *BS3882:2015 – Table 1*.

CONCLUSION

The purpose of the analysis was to determine the suitability of the sample for low fertility landscape purposes. In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for Topsoil – Table 1, Specific Purpose Low Fertility Topsoil)*.

From the soil examination and subsequent laboratory analysis, the sample was described as a slightly alkaline, non-saline, loamy sand with a weakly-developed structure and low stone content. The sample contained a low level of organic matter and total nitrogen and low to moderately low levels of the remaining major plant nutrients. Of the potential contaminants determined, none exceeded their respective guideline values.

In relation to the requirements of *BS3882:2015 – Table 1 Specific Purpose Low Fertility*, the level of organic matter fell below the minimum requirement and may slow down the initial establishment of the new species-rich communities. If desired, to speed up the initial establishment, the overall quality of the soil could be improved for species-rich habitats, by spreading and incorporating a suitable source of bulky organic matter at a low application rate. In addition, appropriate management of the new sward, particularly during the establishment period is normally required in order to control any aggressive species, maximise species diversity and visual interest.

To conclude, based on our findings, the topsoil represented by this sample would be considered suitable for low fertility landscape purposes, provided the physical condition of the soil is satisfactory and a slow establishment rate is acceptable, or the soil is ameliorated with compost.

The topsoil was not fully compliant with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for topsoil and requirements for use – Table 1, Specific Purpose Low Fertility Topsoil)*, due to the low level of organic matter content. On this occasion, this may be considered a minor non-compliance, where a slow rate of establishment is acceptable.

RECOMMENDATIONS

Compost Application

To improve the overall quality of the topsoil to speed up the establishment of species-rich habitats, we suggest consideration is given to applying and incorporating suitable compost (e.g. PAS100:2011 /Landscape Institute/WRAP grade (10mm screened) green compost) at a rate of **10%** by volume, ensuring the soil is dry and friable.

This equates to spreading a compost layer approximately 10mm thick which should be worked into the upper 100mm.

Soil Handling Recommendations

It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. stockpiling, respreading, cultivating, planting, seeding or turfing). As a consequence, soil handling operations should be carried out when soil is reasonably dry and non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

Further details on soil handling are provided in Annex A of *BS3882:2015*.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully

mKimble-Wilde

Tilly Kimble-Wilde
BSc MSc
Graduate Soil Scientist

Tim White
BSc MSc MISoilSci CSci
Senior Associate

For & on behalf of Tim O'Hare Associates LLP

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client	Green-tech Ltd
Project	**Barnsdale Low Fertility Soil**
Job	**Topsoil Analysis - BS3882:2015**
Date	**11/08/2021**
Job Ref No	**TOHA/21/7098/SS**

Sample Reference		Accreditation	**Barnsdale Low Fertility**
Clay (<0.002mm)	%	UKAS	7
Silt (0.002-0.063mm)	%	UKAS	5
Very Fine Sand (0.05-0.15mm)	%	UKAS	14
Fine Sand (0.15-0.25mm)	%	UKAS	27
Medium Sand (0.25-0.50mm)	%	UKAS	44
Coarse Sand (0.50-1.0mm)	%	UKAS	3
Very Coarse Sand (1.0-2.0mm)	%	UKAS	0
Total Sand (0.05-2.0mm)	%	UKAS	88
Texture Class (UK Classification)	–	UKAS	LS
Stones (2-20mm)	% DW	GLP	7
Stones (20-50mm)	% DW	GLP	5
Stones (>50mm)	% DW	GLP	0
pH Value (1:2.5 water extract)	units	UKAS	7.3
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS	342
Electrical Conductivity (1:2 CaSO$_4$ extract)	uS/cm	UKAS	2271
Exchangeable Sodium Percentage	%	UKAS	1.5
Organic Matter (LOI)	%	UKAS	1.4
Total Nitrogen (Dumas)	%	UKAS	0.05
C : N Ratio	ratio	UKAS	18
Extractable Phosphorus	mg/l	UKAS	17
Extractable Potassium	mg/l	UKAS	185
Extractable Magnesium	mg/l	UKAS	102
Total Arsenic (As)	mg/kg	MCERTS	5
Total Cadmium (Cd)	mg/kg	MCERTS	< 0.2
Total Chromium (Cr)	mg/kg	MCERTS	9
Hexavalent Chromium (Cr VI)	mg/kg	MCERTS	< 4.0
Total Copper (Cu)	mg/kg	MCERTS	23
Total Lead (Pb)	mg/kg	MCERTS	7
Total Mercury (Hg)	mg/kg	MCERTS	< 0.3
Total Nickel (Ni)	mg/kg	MCERTS	8
Total Selenium (Se)	mg/kg	MCERTS	< 1.0
Total Zinc (Zn)	mg/kg	MCERTS	37
Water Soluble Boron (B)	mg/kg	MCERTS	0.4
Total Cyanide (CN)	mg/kg	MCERTS	< 1.0
Total (mono) Phenols	mg/kg	MCERTS	< 1
Naphthalene	mg/kg	MCERTS	< 0.05
Acenaphthylene	mg/kg	MCERTS	< 0.05
Acenaphthene	mg/kg	MCERTS	< 0.05
Fluorene	mg/kg	MCERTS	< 0.05
Phenanthrene	mg/kg	MCERTS	< 0.05
Anthracene	mg/kg	MCERTS	< 0.05
Fluoranthene	mg/kg	MCERTS	< 0.05
Pyrene	mg/kg	MCERTS	< 0.05
Benzo(a)anthracene	mg/kg	MCERTS	< 0.05
Chrysene	mg/kg	MCERTS	< 0.05
Benzo(b)fluoranthene	mg/kg	MCERTS	< 0.05
Benzo(k)fluoranthene	mg/kg	MCERTS	< 0.05
Benzo(a)pyrene	mg/kg	MCERTS	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS	< 0.05
Dibenzo(a,h)anthracene	mg/kg	MCERTS	< 0.05
Benzo(g,h,i)perylene	mg/kg	MCERTS	< 0.05
Total PAHs (sum USEPA16)	mg/kg	MCERTS	< 0.80
Aliphatic TPH >C5 - C6	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C6 - C8	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C8 - C10	mg/kg	MCERTS	< 0.001
Aliphatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aliphatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aliphatic TPH >C16 - C21	mg/kg	MCERTS	< 8.0
Aliphatic TPH >C21 - C35	mg/kg	MCERTS	< 8.0
Aliphatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Aromatic TPH >C5 - C7	mg/kg	MCERTS	< 0.001
Aromatic TPH >C7 - C8	mg/kg	MCERTS	< 0.001
Aromatic TPH >C8 - C10	mg/kg	MCERTS	< 0.001
Aromatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aromatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aromatic TPH >C16 - C21	mg/kg	MCERTS	< 10
Aromatic TPH >C21 - C35	mg/kg	MCERTS	< 10
Aromatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Benzene	mg/kg	MCERTS	< 0.001
Toluene	mg/kg	MCERTS	< 0.001
Ethylbenzene	mg/kg	MCERTS	< 0.001
p & m-xylene	mg/kg	MCERTS	< 0.001
o-xylene	mg/kg	MCERTS	< 0.001
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	MCERTS	< 0.001
Asbestos	ND/D	ISO 17025	Not-detected

LS = LOAMY SAND

Visual Examination

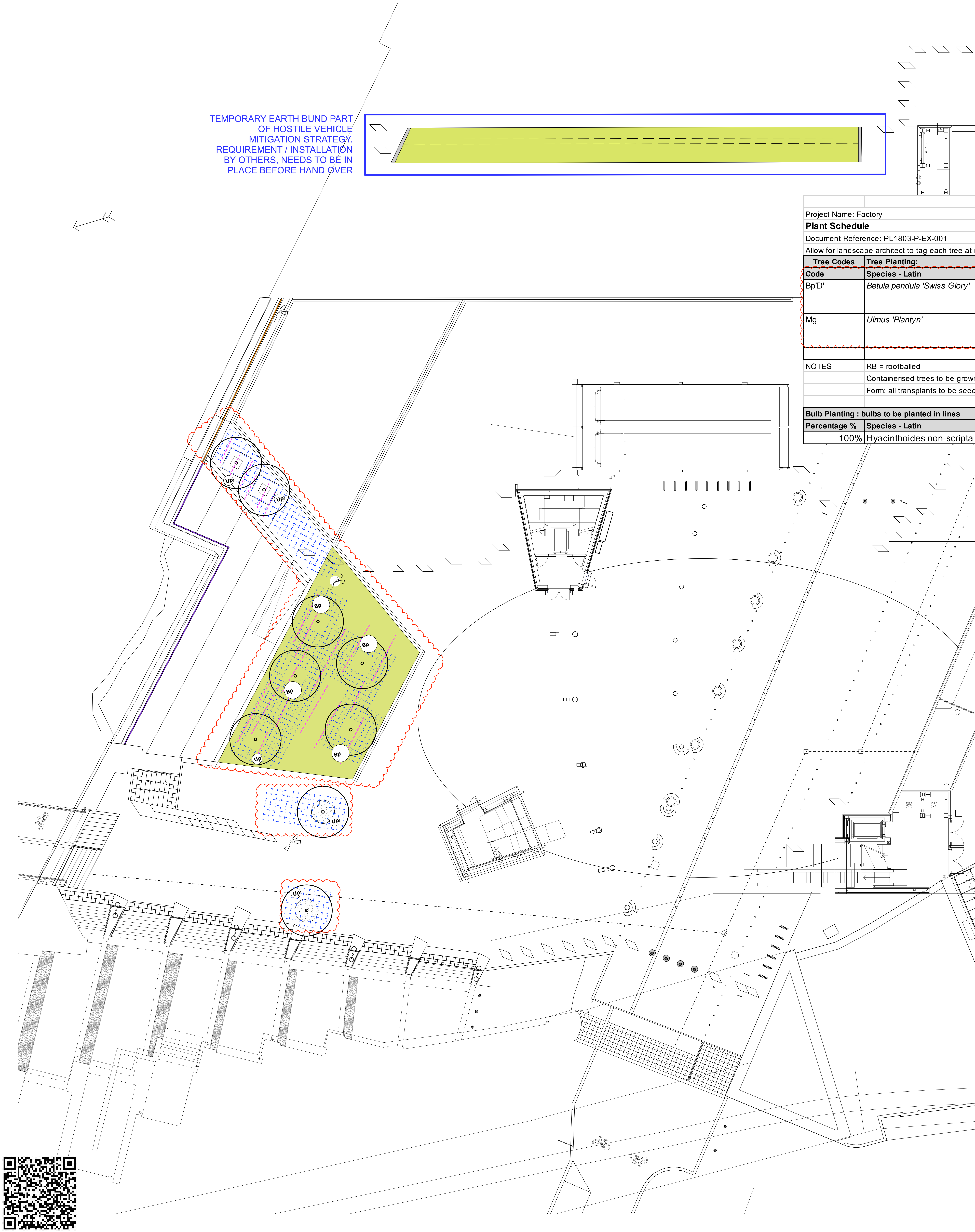
The sample was described as a reddish brown (Munsell Colour 5YR 5/3), slightly moist, friable, non-calcareous, LOAMY SAND with a weakly developed, very fine to fine granular structure. The sample was virtually stone-free and contained a low proportion of organic fines. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

mKimble-Wilde

Tilly Kimble-Wilde
BSc MSc
Graduate Soil Scientist

Results of analysis should be read in conjunction with the report they were issued with.

The contents of this certificate shall not be reproduced without the express written permission of Tim O'Hare Associates LLP



TEMPORARY EARTH BUND PART OF HOSTILE VEHICLE MITIGATION STRATEGY. REQUIREMENT / INSTALLATION BY OTHERS, NEEDS TO BE IN PLACE BEFORE HAND OVER

Project Name: Factory
Plant Schedule
Document Reference: PL1803-P-EX-001

Date (revision): 10.11.2022
Status: issue for Construction
Issue/revision: 05

Written: AM
Checked: AM/LH
Approved: LH

Allow for landscape architect to tag each tree at nursery. All samples to be approved by landscape architect prior to planting.

Tree Codes	Tree Planting:					
Code	**Species - Latin**	**Common Name**	**Number**	**Size: girth (cm)**	**Size: height (cm)**	**Rootball**
Bp'D'	*Betula pendula 'Swiss Glory'*	Silver Birch - 'Swiss Glory'	4	35-40cm girth	semi-mature, with 2.2m clear stem, underground guyed	RB or Container grown. Provide both costs
Mg	*Ulmus 'Plantyn'*	Elm - 'Plantyn'	5	35-40cm girth	semi-mature, with 2.2m clear stem, underground guyed	RB or Container grown. Provide both costs

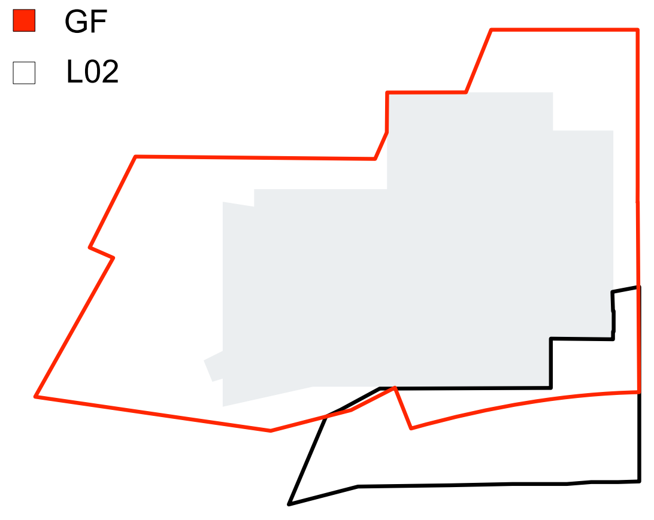
NOTES
RB = rootballed
Containerised trees to be grown in perforated air pots, or equal and approved
Form: all transplants to be seed raised

Bulb Planting : bulbs to be planted in lines						
Percentage %	**Species - Latin**	**Common Name**	**Flowering Period**	**Number per m2**	**Bulb Size**	**Number**
100%	Hyacinthoides non-scripta (British origin)	Blue Bell	April	25	8cm	1500

NOTES:
1. Do not scale from this drawing.
2. Always work to noted dimensions.
3. All dimensions are in millimetres unless otherwise stated.
4. All setting out, levels andE dimensions to be agreed on site.
5. The dimensions of all materials must be checked on site before being laid out.
6. This drawing must be read with the relevant specification clauses and detail drawings.
7. Order of construction and setting out to be agreed on site.

LOCATION PLAN

🟥 GF
☐ L02



NOTE:

The approved scheme shall be implemented prior to the proposed building being first occupied. If within a period of 5 years from the date of the planting of any tree or shrub, that tree or shrub or any tree or shrub planted in replacement for it, is removed, uprooted or destroyed or dies, or becomes, in the opinion of the local planning authority, seriously damaged or defective, another tree or shrub of the same species and size as that originally planted shall be planted at the same place.

SOFTWORKS

⊙	**Proposed Semi-mature Trees Plant Name Label** Refer to planting schedule for further detail.
Bp'd'	**Tree Name Label** Refer to planting schedule for further detail.
7no. Tp	**Plant Name Label** Refer to planting schedule for further detail.
⬚	**Tree Pit below ground extent** Refer to drawing MF-PLA-XX-GF-DR-L-10-2000, 5008, 6000 , 6001, 6002 for further detail.
⬚	**Proposed Bulb Planting** Refer to planting schedule for further detail.
E ▨	**Temporary Earthbund - E** Reinforced earthbund and turf with concrete retaining walls to both ends. Dimensions: 1250mm Height, 5300mm wide, 44000mm long. earthbund to be installed at a 50degree angle to northern side to ensure it's effectiveness as HVM. and at a 1:3 gradient to the southern side. To be installed by others as interim solution.
▥	**Proposed Lawn Planting in Gaps of Precast Concrete Permeable Paving - Green Gap P1.2** grass seed in 30mm voids of permeable paving . Refer to planting schedule for further detai.
🟩	**Reinforced Lawn** Product: BT1 Turf / ABG ATS400/B Reinforced Rootzone. To supplier's specification. Supplier: ABG Synthetics. Refer to planting schedule for further detail.

Refer to NBS section Q31 for external planting.
Refer to NBS section Q28 for top soil and growing media.

Revision	Date	Description	Drawn	Apprvd.
S4-C04	10-11-22	following tagging visit change of tree species. Reduction of size to allow purchase of 9no. instead of 7no.	AM	AM
D4-C03	04-07-22	change of revision number	AM	AM
D4-C02	24-06-22	1. root cell module layout trees updated	TF	AM
S1-P05	06-05-22	1. root cell layout for 2 top trees updated	TF	AM
S1-P04	25-04-22	1. Green gap paving substituted for reinforced lawn and extent updated. 2. 2no. trees added. 3. Tree pit extents updated. 4. Tree pit levels added	TF	AM
D4-C02	02-12-21	1. Planning conditions discharge abeyance note removed.	TF	AM
D4-C01	01-11-21	Construction	TF	AM
D2-P03	03-12-20	tree locations and bulb planting updated in line with river edge redesign.	TF	AM
S1-P02	26-10-2020	1. update to tree species and numbers	AM	AM
S1-P01	06-10-2020	for coordination	AM	AM

Planit I.E. Limited

E: info@planit-ie.com **W:** planit-ie.com

MANCHESTER
2 Back Grafton St , Altrincham, WA14 1DY
T: 0161 928 9281

LONDON
Unit 6 Waterside, 44-48 Wharf Road, London, N1 7UX
T: 0207 253 5678

LIVERPOOL
No. 8 Princes Parade, Princes Dock, Liverpool, L3 1DL
T: 0151 705 6746

Client MCC

Project Factory

Drg Title Softworks General Arrangement
Ground Floor

Created on	Created by	Approved by
13-03-19	TF	AM

Scale	Size	Workstage
1:200	A1	Stage 5

Drg No.	Suitability	Revision
MF-PLA-XX-GF-DR-L-10-2000	S4	C04

© Planit I.E. Limited

Appendix G

Ref No.	Project	Date	Waste Contractor	Total Tonnes	Total M3	% to Landfill	Quantity	Destination	UK Waste Description
57260	The Factory	09-Oct-18	J O'Shea & Sons	2,125.50	991.9	0	109	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
57263	The Factory	16-Oct-18	J O'Shea & Sons	39	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
57261	The Factory	26-Nov-18	J O'Shea & Sons	117	54.6	0	6	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112028	The Factory	28-Nov-18	J O'Shea & Sons	78	36.4	0	4	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
57262	The Factory	05-Dec-18	J O'Shea & Sons	117	54.6	0	6	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
57265	The Factory	13-Dec-18	J O'Shea & Sons	2,437.50	1,137.50	0	125	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
58244	The Factory	07-Jan-19	J O'Shea & Sons	9,418.50	4,395.30	0	483	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
58243	The Factory	09-Jan-19	J O'Shea & Sons	468	218.4	0	24	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112029	The Factory	01-Feb-19	J O'Shea & Sons	6,513.00	3,039.40	0	334	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112030	The Factory	01-Feb-19	J O'Shea & Sons	780	364	0	40	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
59458	The Factory	01-Mar-19	J O'Shea & Sons	2,831.00	1,355.90	0	149	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
59459	The Factory	04-Mar-19	J O'Shea & Sons	285	136.5	0	15	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
60019	The Factory	01-Apr-19	J O'Shea & Sons	171	81.9	0	9	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
60020	The Factory	04-Apr-19	J O'Shea & Sons	195	91	0	10	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
60678	The Factory	07-May-19	J O'Shea & Sons	57	27.3	0	3	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
60679	The Factory	13-May-19	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
61421	The Factory	03-Jun-19	J O'Shea & Sons	175.5	81.9	0	9	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
61422	The Factory	17-Jun-19	J O'Shea & Sons	39	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
62173	The Factory	08-Jul-19	J O'Shea & Sons	76	36.4	0	4	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
65508	The Factory	05-Aug-19	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
65509	The Factory	07-Aug-19	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
65774	The Factory	09-Sep-19	J O'Shea & Sons	95	45.5	0	5	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
65775	The Factory	11-Sep-19	J O'Shea & Sons	152	72.8	0	8	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
68005	The Factory	02-Oct-19	J O'Shea & Sons	152	72.8	0	8	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112032	The Factory	30-Oct-19	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
68617	The Factory	06-Nov-19	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
68618	The Factory	14-Nov-19	J O'Shea & Sons	76	36.4	0	4	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
71138	The Factory	13-Jan-20	J O'Shea & Sons	342	163.8	0	18	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
71797	The Factory	05-Feb-20	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
71798	The Factory	05-Feb-20	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
71795	The Factory	18-Mar-20	J O'Shea & Sons	95	45.5	0	5	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
71796	The Factory	30-Mar-20	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
72199	The Factory	17-Apr-20	J O'Shea & Sons	114	54.6	0	6	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
72200	The Factory	23-Apr-20	J O'Shea & Sons	133	63.7	0	7	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
73253	The Factory	04-May-20	J O'Shea & Sons	570	273	0	30	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
73252	The Factory	13-May-20	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
73751	The Factory	01-Jun-20	J O'Shea & Sons	247	118.3	0	13	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112033	The Factory	02-Jul-20	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112034	The Factory	02-Jul-20	J O'Shea & Sons	190	91	0	10	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous

80601	The Factory	12-Nov-20	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
80602	The Factory	23-Nov-20	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
80848	The Factory	03-Dec-20	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
83625	The Factory	02-Mar-21	J O'Shea & Sons	152	72.8	0	8	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
83626	The Factory	04-Mar-21	J O'Shea & Sons	95	45.5	0	5	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
84972	The Factory	19-Apr-21	J O'Shea & Sons	266	127.4	0	14	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
94052	The Factory	11-Aug-21	J O'Shea & Sons	40	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
96851	The Factory	07-Oct-21	J O'Shea & Sons	285	136.5	0	15	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
96852	The Factory	07-Oct-21	J O'Shea & Sons	551	263.9	0	29	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
97816	The Factory	04-Nov-21	J O'Shea & Sons	1,000.00	455	0	50	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
97815	The Factory	05-Nov-21	J O'Shea & Sons	180	81.9	0	9	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
98673	The Factory	07-Dec-21	J O'Shea & Sons	20	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
95908	The Factory	24-Jan-22	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
95910	The Factory	14-Feb-22	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
102895	The Factory	09-May-22	J O'Shea & Sons	20	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
104904	The Factory	27-Jul-22	J O'Shea & Sons	133	63.7	0	7	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
108039	The Factory	03-Oct-22	J O'Shea & Sons	95	45.5	0	5	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
108040	The Factory	05-Oct-22	J O'Shea & Sons	475	227.5	0	25	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
108038	The Factory	01-Nov-22	J O'Shea & Sons	684	327.6	0	36	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
108037	The Factory	18-Nov-22	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112035	The Factory	02-Dec-22	J O'Shea & Sons	228	109.2	0	12	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112038	The Factory	01-Jan-23	J O'Shea & Sons	342	163.8	0	18	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112040	The Factory	01-Feb-23	J O'Shea & Sons	76	36.4	0	4	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112041	The Factory	02-Feb-23	J O'Shea & Sons	589	282.1	0	31	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112042	The Factory	01-Mar-23	J O'Shea & Sons	551	263.9	0	29	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112043	The Factory	14-Mar-23	J O'Shea & Sons	152	72.8	0	8	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112031	The Factory	04-Apr-23	J O'Shea & Sons	133	63.7	0	7	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112044	The Factory	13-Apr-23	J O'Shea & Sons	57	27.3	0	3	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete

BETA This is a trial service – your feedback (mailto:enquiries@environment-agency.gov.uk) will help us to improve it.

Home (/public-register/view/index) / Search all (/public-register/view/search-all) / Result from Waste Carriers and Brokers Public Register for England

Registration CBDU90839 – J O'Shea & Sons Ltd

Registration number	CBDU90839
Business name	J O'Shea & Sons Ltd
Company number	03751609 (http://business.data.gov.uk/id/company/03751609)
Registered as	Carrier, Broker, Dealer - Upper Tier
Applicant type	Company
Registration date:	05/02/2019
Expiry date:	21/03/2022

Business address

Address	J O'SHEAS & SONS LTD, ORCHARD STREET, SALFORD, M6 6FL
Postcode	M6 6FL (http://data.ordnancesurvey.co.uk/id/postcodeunit/M66FL)

Back

Department
for Environment
Food & Rural Affairs

Data Services Platform (https://environment.data.gov.uk/)

Public Registers (/public-register/view/index) Menu ▼

We are currently working on improving the Public Registers Online services. You can help us identify potential areas for improvement by completing the following short survey (https://forms.office.com/r/5MHVYHpZt4). Thank you to all those who have provided their feedback so far.

BETA This is a trial service – your feedback (mailto:enquiries@environment-agency.gov.uk) will help us to improve it.

Home (/public-register/view/index) / Search all (/public-register/view/search-all) / Result from Waste Carriers and Brokers Public Register for England

Registration CBDU90839 – J O'Shea & Sons Ltd

Registration number	CBDU90839
Business name	J O'Shea & Sons Ltd
Company number	03751609 (http://business.data.gov.uk/id/company/03751609)
Registered as	Carrier, Broker, Dealer - Upper Tier ▶ Help with tier types
Applicant type	Company
Registration date:	07/02/2022
Expiry date:	21/03/2025

Business address

Address	J O'SHEA & SONS LTD, ORCHARD STREET, PENDLETON, SALFORD, M6 6FL
Postcode	M6 6FL (http://data.ordnancesurvey.co.uk/id/postcodeunit/M66FL)

⊕ Is this your registration? Click here to embed a widget on your website.

Back

Ask for support with Public Registers data (https://www.gov.uk/government/organisations/environment-agency#org-contacts)

Defra Data Services Forum (https://support.environment.data.gov.uk/hc/en-gb)
Terms and Conditions (https://support.environment.data.gov.uk/hc/en-gb/articles/360015443132-Terms-and-Conditions)
Privacy Policy (https://support.environment.data.gov.uk/hc/en-gb/articles/360015530271-Privacy-Notice)
Cookies (/cookies)
Accessibility (https://support.environment.data.gov.uk/hc/en-gb/articles/360013538897-Accessibility-Statement-For-Defra-Data-Services-Platform)

All content is available under the Environment Agency Conditional Licence (https://www.gov.uk/government/publications/environment-agency-conditional-licence/environment-agency-conditional-licence), except where otherwise stated

Maintained by Swirrl (https://www.swirrl.com/)

Support

Ask for support (https://www.gov.uk/government/organisations/environment-agency#org-contacts)

Submit feedback (https://support.environment.data.gov.uk/hc/en-gb/requests/new)

FAQs (https://support.environment.data.gov.uk/hc/en-gb/categories/360000746772-FAQs)

Announcements (https://support.environment.data.gov.uk/hc/en-gb/categories/360000745191-Announcements)

Terms and Conditions (https://support.environment.data.gov.uk/hc/en-gb/articles/360015443132-Terms-and-conditions)

Privacy Notice (https://support.environment.data.gov.uk/hc/en-gb/articles/360015530271-Privacy-Notice)

About this page

All content is available under the Environment Agency Conditional Licence (https://www.gov.uk/government/publications/environment-agency-conditional-licence/environment-agency-conditional-licence), except where otherwise stated

Maintained by Swirrl (http://www.swirrl.com).

THE ENVIRONMENTAL PROTECTION ACT 1990
WASTE MANAGEMENT SITE LICENCE

J. O'Shea & Sons Ltd

Recycling Centre
Orchard Street
Pendleton
Salford

SJ 8125 9990

EAWML 50093

ENVIRONMENT
AGENCY

ENVIRONMENTAL PROTECTION ACT 1990.
WASTE MANAGEMENT LICENCE.

Licence Ref No: EAWML 50093 **Facility Type:** Transfer Station

The Environment Agency, in pursuance of Part II of the Environmental Protection Act 1990, hereby grants a waste management licence authorising the Keeping/Treating of controlled waste on the land specified in schedule 1 of this licence to

J. O'Shea & Sons Ltd 03751609
32 Queenston Road Manchester M20 2NX

those persons being in occupation of the said land, the said licence being subject to the conditions specified in schedule 2 to this licence.

In this licence the words and expressions contained in schedule 2 shall have the meaning assigned to them therein.

SCHEDULE 1. – SPECIFIED LAND.

The licence relates to the land at:

Orchard Street, Pendleton, Salford.

SJ 8125 9990

(hereinafter called "the site") shown edged red on Drawing Reference Number OSL/02A attached to this licence.

For Environment Agency use only.

Signed

Name D Fleming

Team Leader Waste Licensing and Planning

Dated: 18th June 2002

YOUR ATTENTION IS DRAWN TO THE RIGHTS OF APPEAL DETAILED IN THE NOTES AT THE END OF THIS LICENCE

Schedule 2 : Conditions Relating to Licence Number EAWML 50093

1 General considerations 1

2 Site engineering for pollution prevention and control 9

3 Site infrastructure 13

4 Site operations 15

5 Pollution Control, Monitoring and Reporting 23

6 Amenity management and reporting 24

7 Site records 26

8 Interpretation 28

9 Appendices to conditions 32

1 General considerations

1.1 Specified waste management operations

1.1.1 No waste management operations shall be authorised by this licence unless:

a specified in and undertaken in accordance with the limitations in the following table; or

b otherwise required by the conditions of this licence as being an integral part of those operations;

and unless they are carried out on the site in accordance with section 1.3.3 of the working plan and with the documented information contained in the sections of the working plan referred to in the other conditions of this licence.

Table 1.1 Specified waste management operations

Specified Waste Management Operation	Permitted Waste Types which may be subject to the Specified Operation	Limits on Specified Waste Management Operations
Storage (D15 and R13) pending disposal or recovery.	All	1. The storage and treatment of waste shall only be allowed within the area delineated in red on the site plan OSL/02A 2. Maximum storage capacity shall not exceed 702 tonnes. Subject to the maximum storage of the following waste types: ▪ Mixed waste (non-Putrescible) shall not exceed 100 tonnes and shall be deposited, processed and stored in accordance with section 1.5.5 and 3.3.1 of the working plan. ▪ Inert waste shall not exceed 600 tonnes and shall be deposited, processed and stored in accordance with section 1.5.5 and 3.3.1 of the working plan. ▪ Rejected and Putrescible waste (for rejection) shall not exceed 2 tonnes and shall be deposited and stored in accordance with section 3.3.2 of the working plan. 3. The maximum throughputs of waste shall not exceed those specified in section 1.5.4 of the working plan. 4. Maximum storage times shall not exceed those specified in section 1.5.5 of the working plan. 5. Waste operations and storage shall be restricted to the areas shown on site plan drawing No.OSL/03
Recycling or reclamation of organic substances (R2)	All	Maximum Limits stated within section 1.5.4 and 1.5.5.
Recycling or reclamation of metals (R3)	All	Maximum Limits stated within section 1.5.4 and 1.5.5.
Recycling or	All	Maximum Limits stated within

Table 1.1 Specified waste management operations

Specified Waste Management Operation	Permitted Waste Types which may be subject to the Specified Operation	Limits on Specified Waste Management Operations
reclamation of other inorganic materials (R4)		section 1.5.4 and 1.5.5.
Physical treatment of waste	All	Treatment consisting only of physical sorting or separation of waste into different components, physical mixing or bulking of solid wastes of the same or different types, where there are no resulting changes in the chemical composition of the wastes or its different components. There shall be no mixing or dilution of different types of wastes in liquids or sludges.

Specified Waste Management Operations and Exempt Waste Management Operations

1.1.2 Where wastes are being brought onto the site for waste management operations which are exempt from licensing under the 1994 Regulations, then the wastes which are subject to the specified waste management operations shall be kept clearly segregated and identified from those wastes which are being kept on the site for the exempt waste management operations.

1.2 Permitted wastes

Permitted categories and types of wastes

1.2.1 No wastes shall be accepted at the site other than those which are:

a categorised below in Table 1.2; and

b specified in the list of waste types for the site provided in section 1.5 and appendix III of the working plan.

Table 1.2. Permitted quantities of waste

Permitted Waste Categories (equivalent UK Waste Classification Scheme categories given in brackets)	Maximum Permitted Quantities for each waste category (subject to maximum permitted total quantity in condition 1.2.2) (<75,000 tonnes/year)
Inert wastes (Category 21).	No limit, subject to maximum storage capacities and waste types stated within Appendix III of the working plan.
General and biodegradable wastes (Category 22; degradable industrial wastes not covered by Categories 23-32).	No limit, subject to maximum storage capacities and waste types stated within Appendix III of the working plan.
Metals and discarded (scrap) composite equipment (Category 23).	Not permitted, except as items included in household wastes under 'General and biodegradable wastes' (Category 22).
Contaminated general wastes (Category 24).	No limit, subject to maximum storage capacities.
Special wastes (in Categories 22 to 32).	Not permitted.
Other categories of waste (Categories 25 to 32).	Not permitted

Permitted quantities of wastes

1.2.2 Whilst complying with the maximum quantities in Table 1.2, the total quantity of waste accepted at the site per year shall not exceed <75,000 tonnes.

Exclusions of wastes with specified hazardous characteristics

1.2.3 Notwithstanding the specification of permitted waste types under conditions 1.2.1 above, wastes shall not be accepted at the site which consist solely or mainly of finely divided metal or of dusts, powders or loose fibres.

1.3 Amendments to working plan and supporting information

Changes to the working plan requiring prior consent by the Agency

1.3.1 The Licence Holder shall give the Agency prior notice in writing of any proposed change to the sections of the working plan listed in Table 1.3, and to any appendices, drawings and figures which are referenced in those sections.

Table 1.3 Conditions for which changes to the working plan requiring the prior consent of the Agency

Condition	Subject	Working Plan Section
1.1	Specified waste management operations	Section 1.3.3
1.2	Permitted wastes	Section 1.5.2 and Appendix III
2.1	Engineered site containment and drainage systems.	Section 2.6, 2.8 and 2.9
4.1	Control of mud and debris	Section 2.6 and 4.3
4.4	Waste acceptance and control systems and procedures	Section 3.3
4.5	Waste quantity measurement systems	Section 2.5
4.6	Storage of wastes with specified hazardous properties or forms.	Section 1.5.8, Appendix II and Appendix IV
6.1	Control, monitoring and reporting of aerial emissions of dusts, fibres, powders and particulates	Section 4.4 and Appendix II
6.2	Control of odour emissions	Section 4.5 and Appendix II
6.5	Control of litter	Section 4.6 and Appendix II
7.1	Security and availability of records	Section 3.4 and 2.4

1.3.2 The notice shall be accompanied by a copy of the proposed changes, and by a written assessment of the effect that implementing the proposed change would have on the risk posed by the site to human health and the environment.

1.3.3 The Licence Holder shall provide up to 6 additional copies of the proposed change and supporting risk assessment to the Agency, when required by the Agency in writing.

1.3.4 The proposed change shall not be implemented unless the Agency has given its written consent to it. Following consent, the Licence Holder shall give the Agency prior written notification of the implementation date of the change, and from that date the changed section shall be deemed to replace the previous version of that documentation.

Changes to the working plan requiring prior notification to the Agency

1.3.5 Except where it is specified under condition 1.3.1 above that the amendment of specified sections of the working plan requires the prior consent of the Agency, the Licence Holder shall give the Agency not less than 7 days prior written notice of any change to the working plan and to any appendices, drawings and figures which are referenced from those sections.

1.3.6 The notice shall be accompanied by a copy of the specified changes.

1.3.7 The Licence Holder shall provide up to 6 additional copies of the proposed change to the Agency, when required by the Agency in writing.

1.3.8 Such changes to the working plan shall be deemed to be incorporated in the working plan and implemented on the date specified to the Agency in the amendment notification.

1.4 Staffing and understanding of requirements of licence conditions

Minimum staffing and supervision

1.4.1 Whenever the site is open to receive or despatch waste, or is carrying out any of the specified waste management treatment or disposal operations, it shall be supervised by at least one member of staff who is suitably trained and fully conversant with the requirements of the licence and the working plan regarding:

a waste acceptance and control procedures;

b operational controls and environmental monitoring;

c maintenance;

d record-keeping;

e emergency action plans;

f notifications to the Agency.

Availability of licence and working plan

1.4.2 A copy of this licence and the working plan shall be kept available on site for reference when required by all site staff carrying out work under the requirements of the licence.

Understanding of licence and working plan

1.4.3 All site staff shall be, or shall work under the direct supervision of a member of staff who is, fully conversant with those aspects of the licence conditions and working plan which are relevant to their specific duties.

1.5 Changes in technically competent persons

1.5.1 Any changes in the technically competent management of the site and the name of any incoming person, and, where the technically competent management of the site is subject to the WAMITAB scheme of technical competence, evidence that such person has the required technical competence, shall be submitted to the Agency in writing within 5 working days of the change in management. Technically competent management and technical competence shall be as defined under section 74 of the Environmental Protection Act 1990 and Regulations 4 and 5 of the 1994 Regulations, or any subsequent amendments to the Act or Regulations.

1.6 Relevant convictions

Notification of relevant convictions

1.6.1 In the event of the Licence Holder and/or any relevant person being convicted of any relevant offence and which is in addition to any already notified to the Agency, then full details shall be provided to the Agency within 14 days following sentencing, whether or not the conviction or sentence is subsequently appealed. Such details shall include, in respect of each relevant person (as defined in section 74(7) of the Environmental Protection Act 1990 or any subsequent amendments to that section), the nature of the offence, the place and date of conviction, and any fine or other penalty imposed.

Notifications of appeals against convictions

1.6.2 In the event that the Licence Holder and/or any relevant person lodges an appeal against any such conviction or sentence, the Licence Holder shall notify the Agency of this within 14 days of the lodging. The Licence Holder shall notify the Agency of the results of that appeal, within 14 days of the appeal being decided.

1.7 Maintenance of financial provision

1.7.1 The financial provision for meeting the obligations under this Licence set out in the agreement made between the Licence Holder and the agency dated 18th June 2002 shall be maintained by the Licence Holder throughout the subsistence of this Licence and the Licence Holder shall produce evidence of such provision whenever required by the Agency.

1.8 Notification of change of operator's or holder's details

1.8.1 The following information shall be notified in writing within 5 working days to the Agency:

a where the Licence Holder is a registered company:

- **i** any change in the Licence Holder's trading name, registered name or registered office address;
- **ii** any steps taken with a view to the Licence Holder going into administration, entering into a company voluntary arrangement or being wound up;
- **iii** the operator at the time of issue of the licence and of any change in the operator or in the operator's trading name, address, registered name or registered office address (if different from the Licence Holder);

1.9 Notification of preparatory works

1.9.1 No preparatory works shall be undertaken until at least 7 days prior notice in writing has been given to the Agency of the intention to do so. The notification shall include details of what work is being done and when.

1.10 Notification of commencement, cessation and re-commencement of waste handling operations

Specified waste management operations

1.10.1 No specified waste management operation shall be carried out until at least 7 days prior notice in writing has been given to the Agency of the intention to commence carrying out the specified waste management operation.

Cessation and re-commencement of receiving wastes

1.10.2 In the event that the site ceases receiving wastes for longer than 21 days then within 7 days following the elapse of that time, the Licence Holder shall inform the Agency in writing of the date of cessation and of the planned date of re-commencement. In the event that Licence Holder intends that the site shall recommence receiving wastes sooner than the notified date then they shall give the Agency not less than 7 days prior notice in writing.

1.11 Notifications and submissions to Agency

1.11.1 Except where otherwise specified, all notifications and submissions to the Agency under the requirements of these licence conditions:

a shall be made in writing to the address specified by the Agency in writing at the time of issue of this licence, or as subsequently specified by written notification to the Licence Holder;

b shall quote the licence reference number and the name of the Licence Holder.

2 Site engineering for pollution prevention and control

2.1 Engineered site containment and drainage systems

Provision and maintenance of site containment and drainage systems

2.1.1 Waste shall only be deposited, stored, treated or otherwise handled in any area of the site, where the engineered site containment and drainage system for that area is provided in accordance with condition 2.1.2 and Table 2.1 of condition 2.1, and with section 2.8 and 2.9 of the working plan.

2.1.2 The engineered site containment and drainage systems shall be designed, constructed, inspected, validated and maintained, and shall be fully documented and recorded, to be fit for purpose, and, where provided, to meet the standards specified in Table 2.1 below.

Table 2.1 Site containment and drainage standards

Type of Site Surface and Drainage	Minimum Specified Standards of Design, Construction and Maintenance
a) Hardstanding	Areas of hardstanding shall be constructed of granular material (e.g. crushed stone, aggregate, road planings or other similar material) and maintained such that the working surface: i) shall remain even ii) shall not be subject to settlement or differential settlement iii) shall not be subject to rutting by vehicles even when wet iv) shall have sufficient durability to allow cleaning for example by scraping v) shall remain free of standing water.
b) Impermeable pavement, bunding and sills	Areas of impermeable pavement, bunding and sills shall be constructed and maintained so as to prevent fluids running off the pavement and the transmission of fluids through the pavement or joints.
c) Sealed drainage systems	i) Drainage to areas of impermeable pavement shall be provided by: • a Class 2 by-pass oil interceptor, which shall have a minimum of six minutes retention time per chamber at its maximum flow rate, shall discharge to either a foul sewer, shall be inspected no less frequently than daily and after rain, and shall be maintained so as to intercept all liquids which run off the pavement. ii) Inspections and emptying of sealed sumps and interceptor shall be recorded in the site diary. iii) Uncontaminated drainage from clean yard areas shall be kept separate and discharged a soakaway.
d) Covered buildings or roofed areas	i) All buildings shall be designed, constructed and maintained to prevent ingress of rain and surface water. ii) Roof water shall be kept separate from contaminated water and other liquids and shall be discharged to either surface water or a sewer or a water course or a soakaway.
e) Fixed bays and other fixed containers	All fixed bays and other fixed containers used for the storage and treatment of wastes must be constructed and maintained to a standard, which is fit for purpose.
f) Storage areas for skips,	All skips, drums and other mobile tanks and containers having individual capacities of greater than 10 litres

Type of Site Surface and Drainage	Minimum Specified Standards of Design, Construction and Maintenance
drums and other mobile tanks and containers	which are used for the storage and treatment of wastes shall be constructed and maintained so that they do not leak any liquids contained in them.
g) Inspection and maintenance of engineered containment	All areas of hardstanding, impermeable pavement, sealed drainage systems, covered buildings, roofed areas, fixed bays and other containers, and storage areas for skips, drums and other mobile tanks and containers: i) shall be inspected no less frequently than monthly, to ensure the continuing integrity and fitness for purpose of their construction, and the inspection and any necessary maintenance shall be recorded in the site diary; and ii) in the event of any damage occurring which breaches the integrity of the engineered containment so that it no longer meets the specified standards, the Licence Holder shall cease importing waste into or treating waste in the affected area, shall notify the Agency immediately, and shall not recommence importing waste into or treating waste in the affected area until it has been repaired to a standard at least as good as the original specification.

Construction quality assurance of new site containment and drainage systems

2.1.3 No wastes shall be deposited, stored, treated or otherwise handled in any area for which an engineered site containment and drainage system is to be newly constructed to meet the requirements of this condition unless:

a details of the identities, relevant experience and relevant qualifications of the personnel who will be providing Quality Assurance of the engineered site containment and drainage systems have been submitted in writing to the Agency and acknowledged in writing by the Agency;

b the engineered site containment and drainage system has been constructed in accordance with the other requirements of condition 2.1;

c the Validation Report on the construction of the engineered site containment and drainage system has been submitted in writing to the Agency, and the Agency has confirmed in writing that it has no objection to the placement of wastes on that containment area.

Construction quality assurance of existing site containment and drainage systems

2.1.4 No wastes shall be deposited, stored, treated or otherwise handled in any area for which a previously constructed and existing engineered site containment and drainage system is being used to meet the requirements of this condition unless:

a details of the construction and maintenance of the engineered site containment and drainage system have been submitted in writing to the Agency and acknowledged in writing by the Agency;

b the existing engineered site containment and drainage system shall be demonstrated to be fit for purpose in that:

- **i** areas of impermeable pavement are laid to take weight of relevant vehicles, plant and equipment without cracking or breaking; and
- **ii** areas of impermeable pavement are free from cracks which could reduce impermeability; and
- **iii** areas of impermeable pavement are resistant to mechanical, physical and chemical stresses to which they may be subjected; and
- **iv** areas of impermeable pavement fall towards the drainage system to prevent ponding; and
- **v** no liquid will run off areas of impermeable pavement other than via the drainage system; and
- **vi** the drainage system is sealed so that it does not leak and is capable of collecting and containing liquids draining from the impermeable pavement ; and
- **vii** liquid from the drainage system is disposed of to an approved discharge.

c the existing engineered site containment and drainage system shall be maintained in accordance with the requirements of Table 2.1.

3 Site infrastructure

3.1 Provision of site identification board

3.1.1 No wastes shall be received at the site until an identification board has been provided at or near the site entrance.

3.1.2 The identification board shall be inspected at least once per week. In the event of damage or defect, the board shall be repaired or replaced within 7 working day.

3.1.3 The board shall be easily readable from outside the site entrance in daylight hours, and shall display the following information:

a Site name and address;

b Licence Holder name (company name, not individual name unless justified as necessary);

c Operator name (company name, not individual name unless justified as necessary);

d Licence number;

e Emergency contact name and telephone number;

f Statement that the site is licensed by the Environment Agency;

g Agency national numbers, for General Enquiries (0845 933 3111) and Emergencies (0800 807060), or as subsequently notified in writing by the Agency;

h Days and hours site is open to receive waste, which information shall be in accordance with the relevant planning permission.

3.2 Site security

3.2.1 Site security systems shall be provided at all times during the subsistence of this licence, the objective of which shall be to prevent access by humans, and livestock, which is not authorised either by the Licence Holder or under legal powers of entry. These shall be installed, operated and maintained, and shall be fully documented and recorded, in accordance with the requirements specified in Table 3.2:

Table 3.2 Site security system standards

Site security system	Specified standards
Timetable of provision	Site security shall be provided prior to commencement of the specified operations.
Design standards	Unless otherwise agreed in writing by the Agency, this shall consist of a chainlink security fence at least 1.8 metres high around the perimeter of the site, which shall meet the standards specified in British Standard BS1722 or an agreed alternative, and shall have a lockable gate to at least the same height and standard at the site access.
Operational standards	The site shall be kept closed and secure at all times when unattended.
Maintenance standards	The site security shall be fully inspected at the commencement of each working day. Any defects or damage shall be made secure by temporary repair by the end of the working day, and shall be repaired within 7 working days of the damage being detected. All inspections, defects, damage and repairs shall be recorded in the site diary.

4 Site operations

4.1 Control of mud and debris

Prevention of mud and debris on road

4.1.1 Whenever the site is receiving or despatching wastes, measures shall be provided, operated and maintained in accordance with section 4.3 of the working plan, with the objective of preventing the deposit or tracking of mud or debris arising from the site onto public areas outside the site, which shall include public highways and areas of public access.

4.1.2 All vehicles leaving areas of the site which are operational or upon which engineering works are being carried out shall, before leaving the site, be cleaned as necessary using the equipment specified in section 2.6 and 4.3 of the working plan, and shall be checked to ensure that they are clear of loose waste and that their loads are secure.

Remediation of mud and debris on road

4.1.3 In the event that mud or debris arising from the site is deposited onto public areas outside the site, the following remedial measures shall be implemented immediately, in accordance with section 4.3.3 of the working plan :

a) the affected public areas outside the site shall be cleaned

b) traffic shall be isolated from sources of mud and debris within the site to prevent further tracking of mud and debris, and measures shall be taken to clear any such sources as soon as practicable.

4.2 Potentially polluting leaks and spillages of waste

Potentially polluting leaks and spillages from vehicles, plant and equipment

4.2.1 All vehicles used on the site by the operator, and all plant and all equipment used on the site in connection with specified waste management operations, shall be operated and maintained with the objective of preventing potentially polluting leaks and spillages of wastes.

Potentially polluting leaks and spillages from skips, drums and other mobile containers

4.2.2 Each skip, drum or other mobile container used to hold wastes which consist of or contain potentially polluting liquids, sludges or powders, shall be, while on the site:

a loaded and unloaded;

b filled and emptied;

c clearly and unambiguously labelled regarding its contents, unless the contents are clearly identifiable by visual inspection;

d inspected and maintained according to documented and recorded maintenance schedules and procedures;

e in the event of damage or deterioration to a container that is, or is likely to cause, a leak, that container shall be repaired or replaced immediately;

in accordance with the standards specified in Table 4.2 below.

Control and remediation of leaks and spillages

4.2.3 In the event of any potentially polluting leak or spillage occurring on site, documented control and remediation procedures shall be implemented immediately and recorded, and shall meet the standards specified in Table 4.2 below.

Table 4.2 Standards for prevention and control of leaks and spillages

Action	Specified standards
a) Loading and unloading skips, drums and other mobile containers	i) Loading and unloading of containers shall be supervised at all times by a member of staff. ii) Lids/ caps/ bungs or other closures shall be in place during loading/ unloading. iii) Loading/ unloading shall be carried out in an area provided with engineered containment of the type required for that waste under condition 4.6, and of the standard of containment specified under condition 2.1.
b) Filling and emptying drums and other mobile containers	i) Filling and emptying of containers shall be supervised at all times by a member of staff. ii) Lids/ caps/ bungs or other closures shall be in place at the end of filling iii) Containers shall not be filled beyond their operational capacity. iv) Filling and emptying shall be carried out in a bunded area maintained in accordance with condition 2.1.2. v) Measurement of level/ voidspace shall be by physical dipping prior to loading.
c) Inspection, maintenance and repair of drums and other mobile containers	i) Containers shall be inspected daily for leaks. ii) Containers found to be leaking either shall be immediately transferred to a larger over-container or shall have their contents immediately transferred to an alternative container.
d) Control and remediation of leaks and spillages	i) Minor spillages shall be cleaned up immediately, using sand or proprietary absorbent to clean up liquids. ii) Major spillages, which are causing or are likely to cause polluting emissions to the environment: • immediate action shall taken to contain the spillage and prevent liquid from entering surface water drains, water courses and unsurfaced ground; • the spillage shall be cleared immediately and placed in alternative sealed containers; • the Agency shall be informed immediately.

4.3 Fires on the site

Prohibition of fires on site

4.3.1 No wastes shall be burned on the site.

Actions to be taken in the event of a fire

4.3.2 In the event of a fire on the site, notwithstanding the implementation of actions to suppress and extinguish the fire, the following actions shall be implemented immediately and recorded in the site diary:

a the Agency shall be informed immediately of the fire; and

b so far as practicable, contaminated site drainage shall be prevented from entering any surface water drain or water course or unsurfaced ground.

4.4 Waste acceptance and control procedures

Waste acceptance procedures

4.4.1 All wastes shall be received, inspected, accepted or rejected, and recorded in accordance with section 3.1, 3.2 and 3.3 of the working plan and with the standards specified in Table 4.4 below.

Waste control procedures

4.4.2 All wastes accepted at the site shall be handled, kept and recorded in accordance with section 3.3 of the working plan and with the standards specified in Table 4.4 below.

Waste despatch procedures

4.4.3 All outgoing wastes shall be inspected, despatched and recorded in accordance with section 3.3 of the working plan and with the standards specified in Table 4.4 below.

Table 4.4 Standards for waste acceptance and control procedures

Stage of Waste Handling	Specified standards
a) Waste inspection	All wastes received at the site: i) shall be inspected on receipt to confirm their description and composition against the relevant waste transfer note and other accompanying documentation. ii) shall be kept separate from and shall not be covered by or mixed with other wastes until they have been confirmed and recorded for acceptance at the site.
b) Quarantine storage and rejection of wastes	i) Any items of non-permitted waste which are detected after acceptance at the site of the wastes in which they were included, shall be placed immediately in a designated quarantine storage area, bay or container, and, where these are or appear to be special wastes, the Agency shall be informed immediately; ii) In the quarantine area, wastes shall be kept segregated from other wastes which are or are likely to be incompatible; iii) Quarantined wastes shall be removed from site within 7 days; iv) The maximum capacity of the quarantine storage facility shall be 10 m^3. v) A record shall be kept in the site diary of all rejected wastes.
c) Identification of wastes	i) Areas and bays shall be clearly defined and labelled to identify the wastes stored within them.
d) Inspection of wastes for despatch	i) All wastes despatched from the site shall be inspected prior to despatch to confirm their description and composition.
e) Incompatible wastes	i) Incompatible wastes which are \likely, in combination with each other or with other material at the facility, to give rise to pollution of the environment or harm to human health outside the site, shall be clearly identified and kept physically separate in designated areas..

4.5 Waste quantity measurement systems

Means of measurement

4.5.1 All wastes accepted at and despatched from the site shall be measured in accordance with section 2.5 of the working plan and with the following requirements:

- the conversion of volume to weight in tonnes, using volume/weight conversion factors that are specified in appendix A of the Waste Management Licence.

4.6 Storage of wastes with specified hazardous properties or forms

4.6.1 Notwithstanding the specification of permitted waste types under condition 1.2, wastes displaying any of the hazardous properties or forms specified in Table 4.6 shall not be accepted at the site unless handled in accordance with section 1.5.8 and Appendix II and IV of the working plan so as to meet the limitations specified in Table 4.6.

Table 4.6:	Limitations on wastes with specified hazardous characteristics
a) Solid wastes which do not consist solely or mainly of dusts, powders or loose fibres, but which when handled are likely to generate significant quantities of dusts, fibres or particulates.	i) These wastes are only permitted if they are either: • received in sealed containers and stored in sealed containers and in areas provided with impermeable pavement and sealed drainage; or • stored in covered buildings providing containment of aerial emissions of dusts, fibres or particulates; or • stored in roofed areas provided with a permanent water supply and water spraying or misting equipment, and impermeable pavement and a sealed drainage system. ii) These wastes shall be subject to monitoring in accordance with condition 6.1.
b) Odorous wastes, including wastes which are likely to be odour producing during storage	i) These wastes only permitted if: • received in sealed containers and stored in sealed containers and in areas provided with impermeable pavement and sealed drainage; or • stored in covered buildings providing containment of aerial emissions.; or • stored in bays provided with an impermeable pavement and sealed drainage. ii) These wastes shall be subject to monitoring in accordance with condition 6.2., and shall in any case not be stored for longer than 48 hours.
c) Solid wastes which are likely to produce contaminated or polluting run-off.	i) Inert (Category 21) wastes only permitted if stored in areas with either: • hardstanding and drainage that prevents run-off from the waste into adjacent surface water bodies or storm water drains; or • an impermeable pavement and sealed drainage. ii) General and biodegradable (Category 22) and contaminated general (Category 24) wastes only permitted if stored in areas with impermeable pavement and sealed drainage and either: • received and stored in sealed containers; or • stored in covered shelters or roofed areas; or • stored in bays.
d) Wastes which are in a form which is either viscous/pasty, sludge or liquid.	i) These wastes only permitted if: • received and stored in liquid-retaining, covered containers; and • stored in areas provided with impermeable pavement and sealed drainage.

Table 4.6:		Limitations on wastes with specified hazardous characteristics
e) Combustible wastes	i)	These wastes only permitted if stored in areas or bays provided with an impermeable pavement and sealed drainage, and with access to fire fighting equipment.
f) Wastes which are likely to attract pests	i)	These wastes shall be subject to monitoring in accordance with condition 6.3, and shall in any case not be stored for longer than 48 hours.
g) Wastes which are likely to attract scavengers	i)	These wastes only permitted if: • stored in closed or secure containers; or • stored in covered buildings providing security against scavengers; or • stored in areas provided with netting or fencing providing security against scavengers.
	ii)	These wastes shall be subject to monitoring in accordance with condition 6.4.
h) Wastes which include light wastes or other wastes liable to give rise to litter	i)	These wastes only permitted if: • received in sealed containers and stored in sealed containers and in areas provided with impermeable pavement and sealed drainage; or • stored in covered buildings providing containment of aerial emissions of litter; or • stored in bays provided with litter control netting or fencing.

4.7 Removal of residual wastes from site

4.7.1 In the event that the specified waste management operations on the site cease and the Agency has reasonable grounds to believe that they will not be resumed within 2 months, then, notwithstanding the operational limits on storage times of wastes specified in the other conditions of this licence, the licence holder shall ensure that all wastes remaining on the site shall be removed by the date specified by the Agency in writing. This shall include, where required by the Agency, cleaning of plant, equipment and engineered containment used in the specified waste management operations, and emptying of any sealed sumps or interceptors.

5 Pollution Control, Monitoring and Reporting

Note: No conditions necessary under this section.

6 Amenity management and reporting

6.1 Monitoring and control of aerial emissions of dusts, fibres and particulates

6.1.1 Throughout the operational life of the site, measures to monitor, control and minimise the aerial emission of dusts, fibres and particulates from the site, shall be carried out in accordance with section 4.4 of the working plan to meet the standards specified in Table 6.1 below. Such measures shall prevent releases in such quantities or concentrations that are likely to cause pollution of the environment or harm to human health or serious detriment to the amenity of the locality.

Table 6.1 Standards for monitoring and control of aerial emissions of dusts, fibres and particulates

a) Monitoring of aerial emissions	i) Visual monitoring of aerial emissions shall be carried out by site staff supervising waste handling operations. • by the site manager or supervisor, at least twice per day, at the site boundary situated downwind of the waste operations, and shall be recorded in the site diary; and • by site staff supervising individual waste handling operations, during the carrying out of those operations.
b) Aerial emissions action plan	i) On detection or complaint of visible aerial emissions that are or are likely to be transported beyond the site boundary, immediate action shall be taken to stop the waste handling operations giving rise to the emission and to suppress the aerial emission from the waste. ii) The incident and the remedial action shall be recorded in the site diary.

6.1.2 All emissions to air from the specified waste management operations on the site shall be free from visible concentrations of dusts, fibres or particulates as are likely to cause pollution of the environment or harm to human health or serious detriment to the amenity of the locality outside the site boundary, as perceived by an authorised officer of the Agency.

6.2 Control of litter

6.2.1 Measures shall be implemented and maintained throughout the operational life of the site, in accordance with section 4.6 of the working plan, to prevent the escape of litter from the confines of the site.

6.2.2 In the event that litter does escape from the site, it shall be retrieved as soon as practicable and no later than 1 hour after the end of the working day.

7 Site records

7.1 Security and availability of records

Security of records

7.1.1 All records which are required to be made under the conditions of this licence and the working plan shall be maintained and kept secure from loss, damage or deterioration, and shall be kept at the location(s) specified in section 2.4 and 3.4 of the working plan and in accordance with the requirements specified in Table 7.1 below.

Availability of records

7.1.2 All records which are required to be made under the other conditions of this licence and the working plan shall be made available for inspection at the place where they are kept immediately when required by an authorised officer of the Agency.

Table 7.1 Standards for keeping of site records

Site records	**Specified standards**
Wastes accepted at the site; Wastes rejected. And/or despatched from the site; Site diaries.	1. All records shall be stored either: a) on paper in a secure cabinet or cupboard; or b) on computer disc with a back up copy. 2. Records shall be kept for a minimum of two years.

7.2 Records of waste movements

Recording of wastes accepted and removed

7.2.1 A record shall be kept of each load of waste accepted and each load of waste removed from site. This record shall include the following details:

a Loads in :- Nature (solid, sludge or liquid), waste type as specified under condition 1.2 and section 3.2.4 and 3.4.3 of the working plan, quantity (tonnes), date received, date accepted.

b Loads out :- Nature (solid, liquid or sludge), waste type as specified under condition 1.2 and section 3.4.4 of the working plan, quantity of waste removed (tonnes), date removed.

Summary records of wastes accepted and removed

7.2.2 A summary record of the waste types accepted and removed from the site shall be made for each quarter and shall be submitted to the Agency within 1 month following the end of the quarter. The summary record shall be in the format specified in Appendix B, and shall include the specified information.

7.3 Site diary

7.3.1 A site diary shall be kept secure and shall be available for inspection at the site when required by an authorised officer of the Agency. This shall include a record of the following events, in accordance with the other conditions of this licence:

a construction work

b maintenance

c breakdowns

d emergencies

e problems with waste received and action taken

f site inspections and consequent actions carried out by the operator

g technically competent management attendance on site: the date and the time onto site and the time left site

h despatch of records to the Agency

i severe weather conditions

j complaints about site operations and actions taken

k environmental problems and remedial actions

7.3.2 Each record shall be completed within 24 hours of the relevant event.

7.4 Periodic reporting of environmental performance

7.4.1 The Licence Holder shall provide the Agency on an annual basis by 1st April each year, or such other time as is agreed in writing with the Agency, a report on the environmental performance of the site, which shall include the following information:

a an analysis and review of all complaints received during the year, and of actions taken;

b an analysis and review of all events causing the implementation of actions to control and minimise emissions or releases from the site, in accordance with these conditions;

c a review of the risk assessment and risk management systems for the site, taking account of the findings under (a) and (b).

8 Interpretation

In these conditions and their interpretation, unless the context otherwise requires, the following terms have the specified meanings:

"accepted"

for waste being delivered to the site, shall mean accepted as waste input to the site for storage and/or processing and/or disposal under the specified waste management operations;

"authorised officer of the Agency"

means any person(s) authorised in writing by the Agency pursuant to section 108(1) of the 1995 Act to exercise any of the powers specified in subsection (4) of that section;

"consequences"

for **risk assessments** carried out within these conditions, means the adverse effects of harm as a result of realising a **hazard** which cause the quality of human health (other than health and safety of site staff or visitors to the site covered under the Health and Safety at Work Act 1974) or the environment to be impaired in the short or longer term;

"engineer"

for engineering works specified in these conditions, means a person who works in the relevant branch of engineering, as a qualified professional;

"engineered"

for works specified in these conditions, means carried out and completed using the relevant engineering process specified in these conditions;

"engineered site containment and drainage system"

means all elements relating to engineered containment of activities on the site, other than final disposal to land, and incorporating site surfacing, bunding and drainage systems, buildings and fixed tanks;

"engineering"

for engineering works specified in these conditions, means the relevant process of design, construction or installation, quality assurance or validation or commissioning specified in these conditions;

"environmental targets or receptors"

for **risk assessments** carried out within these conditions, shall mean identified human and environmental populations or components, as specified in these conditions or otherwise agreed by the Agency within these conditions;

"groundwater"

means any water contained in underground strata;

"hazard"

means a property or situation that in particular circumstances could lead to harm;

"immediately"

for carrying out of actions under the conditions, shall mean without delay and within a reasonable time, taking into account any more immediate direct action necessary to prevent or minimise risk to human health and the environment. For carrying out notifications to the Agency, shall also mean by the fastest effective means available (for example, telephone) and confirmed in writing within 1 working day (or such other time as may be agreed by the Agency within the conditions);

"inert waste "

means waste which when disposed of in or on land does not undergo any significant physical, chemical or biological transformation;

"maintenance"

for engineering maintenance specified in these conditions, means the process of inspection, testing, repair of the relevant engineering works specified in these conditions;

"preparatory works"

means engineering works required prior to the carrying out of the activities authorised by this licence;

"probability"

means the quantified expression of chance, denoted either as:

- the ratio or percentage of the occurrence of a particular event as one among a number of possible events;
- or as the frequency of occurrence of a particular event in a given period of time;

"received"

for waste being delivered to the site, shall mean delivered to the site and undergoing the waste acceptance procedures specified in the working plan, including storage of those wastes during those procedures prior to acceptance of the waste;

"release pathways"

for **risk assessments** carried out within these conditions, shall mean the routes by which defined **hazards** may potentially realise their **consequences**, defined in terms of releases or emissions from the site that go beyond the site containment or boundary via one or more of the following routes, either directly or indirectly: **Land; Groundwater; Surface water; Atmosphere**;

"relevant offences"

are offences within the meaning of regulation 3 of the Waste Management Licensing Regulations 1994 or any statutory provisions or regulations amending or replacing them;

"risk"

means a combination of the **probability** and **consequences** of occurrence of a defined **hazard**;

"risk assessment"

means the systematic identification, analysis, estimation and evaluation within a defined **scope** of the defined **risks** of a particular activity, operation, process or design, carried out and reported by suitably qualified or competent persons, using recognised quantified or semi-quantified methods and techniques.

Unless otherwise agreed by the Agency within these conditions, a risk assessment shall include and record the following:

- definition of the **hazards** associated with an activity, operation, process or design;
- assessment of the **probability** of those **hazards** occurring;
- determination of the potential **consequences** of those hazards for defined **environmental targets or receptors**, taking into account defined **release pathways** and defined protective measures;
- evaluation of the potential **magnitude** of those consequences and the **probability** of their occurrence;

"scope of risk assessment"

means the boundaries of the **risk assessment** and the **risks** to be assessed within those boundaries, as defined in the conditions or otherwise agreed by the Agency within the conditions;

"sealed container"

means a container which does not permit either the ingress or egress of liquids, or the escape of dusts or wastes contained within it;

"special waste"

has the meaning as defined by regulation 2 of the Special Waste Regulations 1996 or any statutory provisions or regulations amending or replacing them;

"specified waste management operations"

means the waste management operations authorised by condition 1.1 of this licence;

"surface water"

means any lake, pond, river or watercourse whether natural or artificial;

"the 1994 Regulations"

means the Waste Management Licensing Regulations 1994 and any statutory provisions or regulations amending or replacing them.

"the Agency"

means the Environment Agency;

"the Licence Holder"

means the Licence Holder specified in this licence or other person to whom the licence has been transferred in accordance with section 40 of the Environmental Protection Act 1990;

"the operator"

means a person who is in occupation of the site and has responsibility for carrying out day to day activities at the site;

"the site"

means the land, structures, plant and equipment to which this licence relates;

"time periods, e.g. annually, quarterly, monthly, per year, etc. "

Where periods are referred to in conditions, they shall be calculated in the following way:

- annually or per year: 1 April to 31 March;
- quarterly: 1 April to 30 June, 1 July to 30 September, 1 October to 31 December, 1 January to 31 March;
- monthly: calendar month;
- weekly: Monday to Sunday.

Where the issue of the licence does not coincide with the start of any of these periods, then any relevant limits for the first period shall apply pro rata;

"UK Waste Classification Scheme" or "UKCWS"

the UK Waste Classification Scheme (Draft 16) or its subsequent replacement;

"waste"

means controlled waste as defined in section 75(4) of the 1990 Act and the Controlled Waste Regulations 1992 or any statutory provisions or regulations amending or replacing them;

"working plan"

means the working plan identified in writing by the Agency at the time of issue of this licence and any subsequent amendments to it made in accordance with the conditions of this licence.

9 Appendices to conditions

Appendix A: Volume to weight conversion factors based on the Customs and Excise figures.

Appendix A

VOLUME TO WEIGHT CONVERSION FACTORS

NOTE: If the waste falls into more than one category, the higher conversion factor applies to all of the waste.

WASTE CATEGORY	TYPICAL WASTE TYPES	Cubic metres to tonnes - multiply by:	Cubic yards to tonnes - multiply by:
Inactive or inert waste	Largely water insoluble and non or very slowly biodegradable: e.g. sand, subsoil, concrete, bricks, mineral fibres, fibreglass etc.	1.5	1.15
General industrial waste - non-special, non-inert wastes - not compacted. (As compaction can significantly increase the density of this category of waste, if you accept compacted wastes, any agreement with us will need to reflect this by including an agreed percentage uplift.)	Paper and plastics.	0.15	0.11
	Card, pallets, plasterboard, canteen waste, sawdust, textiles, leather.	0.4	0.3
	Timber, building and construction wastes, factory waste and sweepings, etc.	0.6	0.46
	Foundry sands, slags, pulverised fuel ash, ashes from waste incineration.	1.5	1.15
Household waste - not compacted	Non-special, non-inert wastes from domestic premises, including collected household waste.	0.2	0.15
Household waste - compacted	Non-special, non-inert wastes from domestic premises, including collected household waste.	0.4	0.30

VOLUME TO WEIGHT CONVERSION FACTORS

NOTE: If the waste falls into more than one category, the higher conversion factor applies to all of the waste.

WASTE CATEGORY	TYPICAL WASTE TYPES	Cubic metres to tonnes - multiply by	Cubic yards to tonnes - multiply by
Commercial waste - not compacted. (As compaction can significantly increase the density of this category of waste, if you accept compacted wastes, any agreement with us will need to reflect this by including an agreed percentage uplift.)	Non-special, non-inert wastes from shops, hospitals, leisure centres, offices, etc., including civic amenity waste, parks and gardens waste, street litter; supermarket, shop and restaurant waste, general office waste.	0.2	0.15
Special waste	Defined by environmental regulations - broadly equivalent to hazardous waste.	1.0	0.76

Appendix B: Format for summary records of wastes accepted and removed (Condition 7.2.2)

Monthly Site Returns Summary.

Form WMS1: waste return

For Environment Agency use only	Date received	Date processed	Local site licence number	WML No	Original reference

ENVIRONMENT AGENCY

Waste return

Environmental Protection Act 1990

Environment Agency
Appleton House
430 birchwood Boulevard
Birchwood
Warrington WA3 7WD

- **Use this form to tell us the type and quantity of controlled waste you have processed at each licensed facility within your site**
- **Please read through the whole form and guidance notes before you start filling anything in.**
- **Please send the completed form back to us at the address on the left by the return date specified on page 2 of the notes.**

1 The period the return covers

1.1 The return period is *tick one only*

☐ Month

☐ Quarter

From ______ *to* ______

☐ Year

2 Operator and site details

2.1 Site Operator

Site name

Site address

Phone

E-mail

2.2 Type of facility *see your waste management licence*

2.3 Was a weighbridge used?

No ☐

Yes ☐ *Please tell us the proportion weighed*

Percentage

2.4 Are you operating a landfill site?

No ☐ *go to section '3' Waste received on site' on page 2*

Yes ☐ *go to section 'Landfill sites only', question 2.5*

Landfill Sites only *(as at 31 March in the current year)*

2.5 Give the remaining void space covered by the licence

cubic metres

2 Landfill sites only *continued*

2.6 Was the site fully surveyed before 31 March in the current year

No ☐ *Now go to question 2.7*

Yes ☐ *Please tell us how the void space was calculated*

Now go to question 2.8

2.7 How have you estimated the remaining void space?

For example visually or other method

2.8 Remaining life of site

Years

Now go to sections 3 and 4 on page 2

5 Declaration

Please make sure you have filled in all the sections that apply to you before signing this declaration.

I certify that the information in this return is correct to the best of my knowledge and belief.

I enclose ______ continuation sheets

Signature

Name

Position

Phone

Date

6 Disclosure and data protection

The information you provide will be used by the Environment Agency to enable it to fulfil its regulatory and waste management planning responsibilities.

For full information on how the data in this form will be used please see the waste return guidance notes that come with the form.

3 Waste material received on site

*Please read the guidance notes '**How to fill in the form**', and use the continuation sheet **WMS3** provided, or a copy of it, if you need to.*

In the last column D = final disposal U = used on site S = special waste (a consignment note is needed for special waste). F = from another facility, for example a transfer station M = municipal biodegradable waste O = other biodegradable waste

					Additional information					
Description of waste	**Waste classification code**	**Origin***	**State** *solid, powder, sludge, liquid ,gas*	**Weight** *in tonnes*	D	U	S	F	M	O
Total weight of material received on site:				*tonnes*						

4 Waste material removed from site

*Please read the guidance notes '**How to fill in the form**', and use the continuation sheet **WMS3** provided, or a copy of it, if you need to. In the last column, facility types could include 'incinerator, transfer station, landfill, treatment, reprocessing, recycling'.*

Description of waste	**Waste classification code**	**Destination***	**State** *solid, powder, sludge, liquid ,gas*	**Weight** *in tonnes*	Special Waste	**Destination facility type**
Total weight of material removed from site:				*Tonnes*		

**You may not need to give us this information. The requirements are set out in your waste management licence.*

Now go to section '5 Declaration' on page 1

3 Waste material received on site *continued*

WMS3: continuation sheet

Local site licence number ☐

EA/WML number ☐

Sheet ☐ of ☐

Please read the guidance notes ***'How to fill in the form'****. You can photocopy this sheet if you need to.*

In the last column D = final disposal U = used on site S = special waste (a consignment note is needed for special waste).
F = from another facility, for example a transfer station M = municipal biodegradable waste O = other biodegradable waste

Description of waste	**Waste classification code**	**Origin***	**State** *solid, powder, sludge, liquid, gas*	**Weight** *in tonnes*	Additional information					
					D	U	S	F	M	O
Total weight of material received on site:										*tonnes*

**You may not need to give us this information. The requirements are set out in your waste management licence*

4 Waste material removed from site *continued*

WMS3: continuation sheet

Local site licence number ☐

EA/WML number ☐

Sheet ☐ of ☐

*Please read the guidance notes **'How to fill in the form'**. You can photocopy this sheet if you need to.*

Description of waste	**Waste classification code**	**Destination***	**State** *solid, powder, sludge, liquid, gas*	**Weight** *in tonnes*	**Special Waste**	**Destination facility type**
Total weight of material removed from site:				*Tonnes*		

**You may not need to give us this information. The requirements are set out in your waste management licence*

ENVIRONMENT
AGENCY

Waste Return
Guidance Notes

Environmental Protection Act 1990
Please read these guidance notes and the whole form carefully before you start to fill it in.

Introduction

We need to know about the types and quantities of controlled waste you have handled at each licensed facility within your site.

Please fill in a copy of the form every
- month
- quarter (i.e. three months) or
- year

as agreed with us.

If you are not sure about this, please contact us.

How to use this form

Please read through the whole form and these guidance notes before you start filling anything in. When you fill in the form, you will also need a copy of the

- waste classification scheme
- a list of district/county councils within your region.

You can get copies of these from your local Environment Agency office if you do not have them.

Continuation sheet, form WMS3

We have sent you a continuation sheet in case you need it. If you need more space for answers to sections 3 and 4, please use another continuation sheet. But make sure that you label each sheet clearly with the

- local site licence number (you can find this on the top right of page 1 of your application form) or
- waste management licence number (EA/WML number)
- number of the sheet, *for example 3 of 5.*

You should also tell us how many continuation sheets you are using when you fill in section 5 'Declaration' of the form.

You can photocopy the form or the continuation sheet if you need another copy.

If you need help and advice

We have made the form as straightforward as possible, but please get in touch with us if you

- need any advice on how to set out the information we need
- have any other questions about the waste returns scheme.

Please get in touch with the officer handling your site returns. You will find their name and telephone number at the bottom of the letter that came with these notes and form.

How to fill in the form

Section 2 Operator and site details

Q 2.1 Site operator and details
If the site details have been pre-printed please check that they are correct. If they are not correct or not printed please copy the details from your waste management licence.

Q 2.2 Type of facility
If the type of facility has been pre-printed please check that it is correct. If it is not correct or not printed please copy the details from your waste management licence.

Q 2.3 Was a weighbridge used?
Please say whether you used a weighbridge (either at your facility or a public weighbridge) before deposit. Enter the weighed proportion of waste accepted as a percentage.

Landfill sites only
This section applies to landfill facilities only.
Landfill operators should complete this section as at 31 March in the current year. Please complete question 2.5 even if you are making a 'nil return' which means no waste has been received or removed from the site during the return period.

Q 2.5 Remaining void space covered by the licence
Please enter the remaining landfill void space covered by your licence in cubic metres as at 31 March in the current year. 'Void space' is the licensed capacity remaining at your site and this should only include areas that are covered by a waste management licence and a planning consent.

Section 3 Waste received on site

Before you fill in this section make sure you have a copy of the

- waste classification scheme and
- a list of district/county councils within your region.

Please use the continuation sheet WMS3 provided, or a copy of it, if you need to.

Description of waste and waste classification code
Please enter the waste or material description as agreed with your local area office.

Origin
Please enter the district where the waste originated. *See separate sheet for list of district/county councils in your region.*
If the district is not known, enter the county where the waste originated. If this is not known enter 'other'.
You may not need to give us this information. The requirements are set out in your waste management licence.

Waste return

State
Please enter the physical state of the waste (whether it is solid, powder, sludge, liquid or gas). Please do not use other terms to describe the waste.

Weight
Please give the amount in tonnes of each specific waste type received from each district of origin.

Additional information
For landfill sites

- tick 'D' if this is the final disposal site for the waste or
- tick 'U' if the waste was used on site *(for example bunding, capping or levelling purposes).*

For any site

- tick 'S' for waste that is 'special waste' as defined by the Special Waste Regulations 1996. *This waste type should have a consignment note with it when it enters the facility.*
- tick 'F' for waste that has come from another facility *forexample, a transfer station.*
- tick 'M' for biodegradable municipal waste.
- tick 'O' for other biodegradable waste.

Section 4 Waste material removed from site

Before you fill in this section make sure you have a copy of the

- waste classification scheme to be used and
- a list of district/county councils within your region.

We need to know about each type of waste received at your site.
Please use the continuation sheet WMS3 provided, or a copy of it, if you need to.

Description of waste and classification code
Please enter the waste or material description as agreed with your local area office.

Destination
Please enter the district that the waste is going to.
See the list of district/county councils within your region.
If the district is not known then enter the county of destination. If this is not known enter 'other'.
You may not need to give us this information. The requirements are set out in your waste management licence.

State
Please enter the physical state of the waste (whether it is solid, powder, sludge, liquid or gas).

Weight
Please give the amount of each specific waste type removed to each district in tonnes.

Special waste
Tick this box for waste defined as 'special' by the Special Waste Regulations 1996. A consignment note should be raised for this type of waste if it is being transferred to another facility.

You can find more information about special waste at www.environment-agency.gov.uk /business/wasteman/swens/

Destination facility type
Please enter the type of facility where the waste will be sent *(for example incinerator, transfer station, landfill, treatment, reprocessing, recycling).*

Sending the form back to us

Send your waste return back in a window envelope to display the address printed at the top of page 1 of the form.

We need it no later than shown in the table, depending on the returns period.

month	quarter	year
2 weeks after period	*1 January – 31 March* *1 April – 30 June* *1 July – 30 September* *1 October – 31 December* 1 month after period	1 month after period

Further information

For general enquiries please contact your local Environment Agency office or call our general enquiry number 0845 9333111 between 9.00am and 5.00pm.

Data protection notice

The Environment Agency is responsible for regulating environmental protection, flood defence, water resources and fisheries. It has a duty to discharge its functions to protect and enhance the environment and to promote conservation and recreation.

The information provided will be processed by the Environment Agency to enable it to fulfil its enforcement and planning responsibilities.

Some of the information requested is required to fulfil the Conditions of your licence. This information will be processed to monitor compliance with licence conditions, to process renewals and to maintain the public register.

We may also use and/or disclose it in connection with

- offering/providing you with our literature/services relating to environmental matters
- consulting with the public, public bodies and other organisations (for example Heath and Safety Executive, local authorities, emergency services on environmental issues)
- carrying out statistical analysis, research and development on environmental issues
- providing public register information to enquirers
- investigating possible breaches of environmental law and taking any resultant action
- preventing breaches of environmental law
- assessing customer service satisfaction and improving our service.

We may pass the information on to our agents/ representatives to do these things on our behalf.

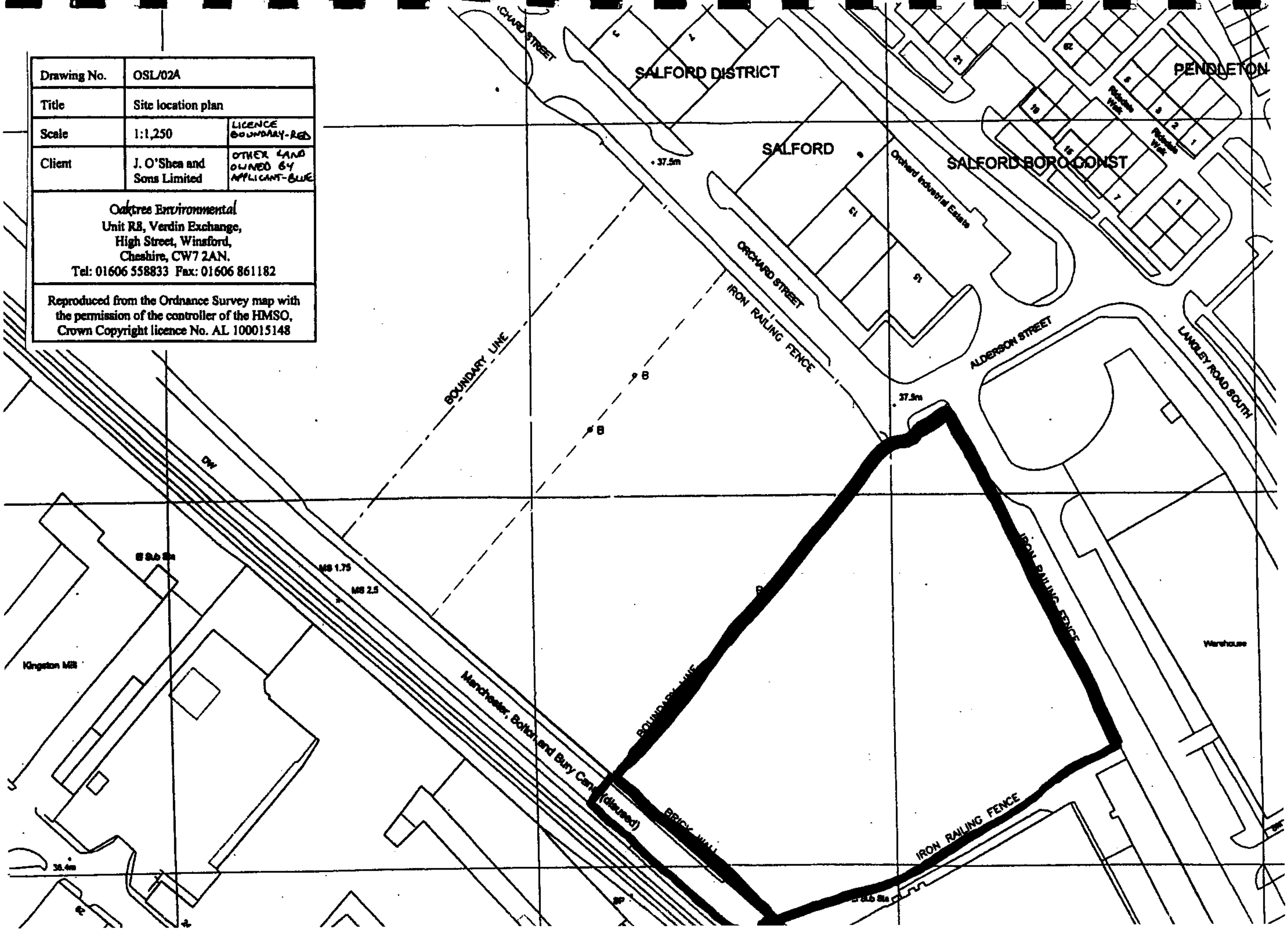
Some of the information requested may be voluntary and will be used to provide us with more detailed information for planning purposes. Information supplied will not be put onto the public register if we agree it is commercially confidential. It may however be used in an aggregated format.

You should ensure that any persons named on the waste return are informed of the contents of this data protection notice.

Drawing No.	OSL/02A	
Title	Site location plan	
Scale	1:1,250	LICENCE BOUNDARY-RED
Client	J. O'Shea and Sons Limited	OTHER LAND OWNED BY APPLICANT-BLUE

Oaktree Environmental
Unit R8, Verdin Exchange,
High Street, Winsford,
Cheshire, CW7 2AN.
Tel: 01606 558833 Fax: 01606 861182

Reproduced from the Ordnance Survey map with the permission of the controller of the HMSO, Crown Copyright licence No. AL 100015148


SALFORD DISTRICT
SALFORD
SALFORD BORO CONST
PENDLETON
Ribbesdale Walk
Orchard Industrial Estate
ORCHARD STREET
IRON RAILING FENCE
ALDERSON STREET
LANGLEY ROAD SOUTH
37.5m
BOUNDARY LINE
B
DW
MS 1.75
MS 2.5
El Sub Sta
Kingston Mill
Manchester, Bolton and Bury Canal (disused)
BRICK WALL
IRON RAILING FENCE
Warehouse
38.4m

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

WTN Number e.g. KHP/0001	FACTORY/003

SECTION A – PRODUCER / CURRENT HOLDER OF WASTE - TRANSFEROR (e.g. Laing O'Rourke)

1	FULL COMPANY NAME AND ADDRESS (Block Capitals):	LAING O'ROURKE BRIDGE PLACE, ANCHOR BOULEVARD, CROSSWAYS, DARTFORD, KENT DA2 6SN		
2	Address of Transfer / Collection:	LOR Site Office, Water Street, Manchester, M3 4JQ		
	Date of Transfer:	From: 01/09/2018	To: 31/08/2019	
3	Status of Transferor (Please tick one or more boxes as appropriate)			
	Holder of an environmental permit (Waste Mgmt or Carrier)		Permit Number(s):	
	Waste Producer	✓	Permit(s) Issued by:	
	Disposer of the Waste		(Only applicable if LOR disposing of waste on someone else's behalf e.g. client)	
4	Name and address of broker who arranged this waste transfer (if applicable – may only need carrier details):			
5	Standard Industry Code (SIC 2007) for producers business:	41.2		
6	Signed for Holder/Producer (e.g. LOR/Select/Expanded)		*I confirm that I have fulfilledmy duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England & Wales) Regulations 2011*	
7	Full Name			

SECTION B – DESCRIPTION OF THE WASTE

1	Waste Description:	Mixtures of concrete, bricks, tiles + ceramics			2	European Waste Code	17.01.07			
3	Storage/Packaging Method (please tick relevant method -)									
	Loose		Sacks		Skip		Drum		Other	✓
4	Quantity of waste (tonnage, No. of sacks/skips etc):	Up to 10,000 tonnes					8-wheeler			

SECTION C – WASTE CARRIER - TRANSFEREE

1	Full Name (Block Capitals):	J O'SHEA + SONS LTD.		
2	Address:	Orchard Street, Salford, M6 6FL		
3	Status of Waste Carrier (Please tick one or more):			
	Registered waste carrier:	✓	Permit Number(s):	CBDU 90839
	Waste Collection Authority		Issued by:	Environment Agency
	Exempt from requirement to register		Give reason: (Exemption)	
4	Signed for Carrier	Paul O'Shea		
	Full Name:	PAUL OSHEA		

See over for disposal:

⑩

Revision: May 2015

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

SECTION D – DISPOSAL					
1	Name and Address of transfer or collect point (e.g. materials recycling facility)	The Recycling Centre, Orchard Street, Pendleton, M6 6FL			
2	Status of Waste Disposer (Please tick one box):				
	Holder of Environmental Permit (e.g. Waste Management Licence)	✓	Permit Number(s):	EPR|AP3098CK	
			Issued by:	Environment Agency	
	Exemptions		Give Reason: (exemption)		
3	Date of Transfer (for multiple consignments give 'between' dates)	From:	01|09|2018	To:	31|08|2019
4	Name and Address of Address of Broker who arranged this transfer (if applicable):				
5	Signed for Disposer	James O Shea.	Full Name:	JAMES O'SHEA.	

Revision: May 2015

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

WTN Number e.g. KHP/0001 FACTORY|002

SECTION A – PRODUCER / CURRENT HOLDER OF WASTE - TRANSFEROR (e.g. Laing O'Rourke)

1	FULL COMPANY NAME AND ADDRESS (Block Capitals):	LAING O'ROURKE BRIDGE PLACE, ANCHOR BOULEVARD, CROSSWAYS, DARTFORD, KENT DA2 6SN		
2	Address of Transfer / Collection:	LOR Site Office, Museum of Science + Industry, Water St. entrance, Manchester, M3 4PU		
	Date of Transfer:	From: 01/09/2018	To: 31/08/2019	
3	Status of Transferor (Please tick one or more boxes as appropriate)			
	Holder of an environmental permit (Waste Mgmt or Carrier)		Permit Number(s):	
	Waste Producer	✓	Permit(s) Issued by:	
	Disposer of the Waste		(Only applicable if LOR disposing of waste on someone else's behalf e.g. client)	
4	Name and address of broker who arranged this waste transfer (if applicable – may only need carrier details):			
5	Standard Industry Code (SIC 2007) for producers business:	41.2		
6	Signed for Holder/Producer (e.g. LOR/Select/Expanded)		*I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England & Wales) Regulations 2011*	
7	Full Name	DAVID RYAN		

SECTION B – DESCRIPTION OF THE WASTE

1	Waste Description:	Soils and Stones			2	European Waste Code	17.05.04			
3	Storage/Packaging Method (please tick relevant method -)									
	Loose		Sacks		Skip		Drum		Other	✓
4	Quantity of waste (tonnage, No. of sacks/skips etc):	Up to 10,000 tn							8-wheeler	

SECTION C – WASTE CARRIER - TRANSFEREE

1	Full Name (Block Capitals):	J O'SHEA + SONS LTD.		
2	Address:	ORCHARD STREET, SALFORD, M6 6FL		
3	Status of Waste Carrier (Please tick one or more):			
	Registered waste carrier:	✓	Permit Number(s):	CBDU90839
	Waste Collection Authority		Issued by:	Environment Agency
	Exempt from requirement to register		Give reason: (Exemption)	
4	Signed for Carrier	Paul O'Shea.		
	Full Name:	PAUL O'SHEA		

See over for disposal:

Revision: May 2015

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

SECTION D – DISPOSAL

1 Name and Address of transfer or collect point (e.g. materials recycling facility): THE RECYCLING CENTRE
ORCHARD STREET, PENDLETON,
SALFORD, M5 6FL.

2 Status of Waste Disposer (Please tick one box):

Holder of Environmental Permit (e.g. Waste Management Licence) ☑ **Permit Number(s):** WML 50093.

Issued by: ENVIRONMENT AGENCY.

Exemptions ☐ **Give Reason:** (exemption)

3 Date of Transfer (for multiple consignments give 'between' dates) **From:** 01|09|2018 **To:** 31|08|2019

4 Name and Address of Address of Broker who arranged this transfer (if applicable):

5 Signed for Disposer James O Shea. **Full Name:** JAMES O'SHEA.

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

WTN Number e.g. KHP/0001 FACTORY|009

SECTION A – PRODUCER / CURRENT HOLDER OF WASTE - TRANSFEROR (e.g. Laing O'Rourke)

1 FULL COMPANY NAME AND ADDRESS (Block Capitals): LAING O'ROURKE
BRIDGE PLACE, ANCHOR BOULEVARD, CROSSWAYS, DARTFORD, KENT DA2 6SN

2 Address of Transfer / Collection: LOR Site, 161 [illegible], Water Street, Manchester, M3 4JQ

Date of Transfer: From: 01|09|19 To: 31|08|2020

3 Status of Transferor (Please tick one or more boxes as appropriate)

Holder of an environmental permit (Waste Mgmt or Carrier) ☐ Permit Number(s):

Waste Producer ✓ Permit(s) Issued by:

Disposer of the Waste ☐ (Only applicable if LOR disposing of waste on someone else's behalf e.g. client)

4 Name and address of broker who arranged this waste transfer (if applicable – may only need carrier details): N|A

5 Standard Industry Code (SIC 2007) for producers business: 41.2

6 Signed for Holder/Producer (e.g. LOR/Select/Expanded)

7 Full Name

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

SECTION B – DESCRIPTION OF THE WASTE

1 Waste Description: Soils
Hardcore

2 European Waste Code 17.05.04
17.01.07

3 Storage/Packaging Method (please tick relevant method -)

Loose ☐ Sacks ☐ Skip ☐ Drum ☐ Other ✓

4 Quantity of waste (tonnage, No. of sacks/skips etc): Up to 5000 tonnes Tipper

SECTION C – WASTE CARRIER - TRANSFEREE

1 Full Name (Block Capitals): J O'SHEA AND SONS LTD.

2 Address: Orchard Street, Salford, M6 6FL

3 Status of Waste Carrier (Please tick one or more):

Registered waste carrier: ✓ Permit Number(s): CBDU 90839

Waste Collection Authority ☐ Issued by: Environment Agency

Exempt from requirement to register ☐ Give reason: (Exemption)

4 Signed for Carrier Paul O'Shea

Full Name: PAUL O'SHEA.

See over for disposal:

Revision: May 2015

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

SECTION D – DISPOSAL					
1	Name and Address of transfer or collect point (e.g. materials recycling facility)	Orchard Street, Pendleton, Salford, M6 6FL			
2	Status of Waste Disposer (Please tick one box):				
	Holder of Environmental Permit (e.g. Waste Management Licence)	✓	Permit Number(s):	WML 50093	
			Issued by:	Environment Agency	
	Exemptions		Give Reason: (exemption)		
3	Date of Transfer (for multiple consignments give 'between' dates)	From:	01/09/2019	To:	31/08/2020
4	Name and Address of Address of Broker who arranged this transfer (if applicable):				
5	Signed for Disposer	James O'Shea.	Full Name:	JAMES O'SHEA.	

Revision: May 2015

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

WTN Number e.g. KHP/0001	FACTORY/0013

SECTION A – PRODUCER / CURRENT HOLDER OF WASTE - TRANSFEROR (e.g. Laing O'Rourke)

1	FULL COMPANY NAME AND ADDRESS (Block Capitals):	LAING O'ROURKE BRIDGE PLACE, ANCHOR BOULEVARD, CROSSWAYS, DARTFORD, KENT DA2 6SN			
2	Address of Transfer / Collection:	LOR SITE OFFICE, WATER STREET, MANCHESTER, M3 4JQ			
	Date of Transfer:	From:	01/09/2020	To:	30/08/2021
3	Status of Transferor (Please **tick** one or more boxes as appropriate)				
	Holder of an environmental permit (Waste Mgmt or Carrier)	✓	Permit Number(s):		
	Waste Producer	✓	Permit(s) Issued by:		
	Disposer of the Waste	✓	(Only applicable if LOR disposing of waste on someone else's behalf e.g. client)		
4	Name and address of broker who arranged this waste transfer (if applicable – may only need carrier details):	n/a			
5	Standard Industry Code (SIC 2007) for producers business:	41.2			
6	Signed for Holder/Producer (e.g. LOR/Select/Expanded)		*I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England & Wales) Regulations 2011*		
7	Full Name	Tatiana Meakin			

SECTION B – DESCRIPTION OF THE WASTE

1	Waste Description:	Hardcore Concrete Soils	2	European Waste Code	17.01.07 17.01.01 17.05.04

3 Storage/Packaging Method (please **tick** relevant method -)

Loose		Sacks		Skip		Drum		Other	✓
								[illegible]	

4	Quantity of waste (tonnage, No. of sacks/skips etc):	Up to 10,000 tonnes

SECTION C – WASTE CARRIER - TRANSFEREE

1	Full Name (Block Capitals):	J O'Shea & Sons Ltd		
2	Address:	Orchard Street, Salford, M6 6FL		
3	Status of Waste Carrier (Please tick one or more):			
	Registered waste carrier:	✓	Permit Number(s):	CBDU90839
	Waste Collection Authority i.e. Local Council Waste Collections	✓	Issued by:	Environment Agency
	Exempt from requirement to register	✓	Give reason: (Exemption)	

Revision: May 2017

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

4	Signed for Carrier	Paul O'Shea	
	Full Name:	PAUL O'SHEA	

See over for disposal:

SECTION D – DISPOSAL

1	Name and Address of transfer or collect point (e.g. materials recycling facility)	The Recycling Centre, Orchard Street, Pendleton, Salford, M6 6FL				
2	Status of Waste Disposer (Please tick one box):					
	Holder of Environmental Permit (e.g. Waste Management Licence)	✓	Permit Number(s):	WML 50093		
			Issued by:	Environment Agency		
	Exemptions		Give Reason: (exemption)			
3	Date of Transfer (for multiple consignments give 'between' dates)	From:	01/09/2020	To:	31/08/2021	
4	Name and Address of Address of Broker who arranged this transfer (if applicable):					
5	Signed for Disposer	J. OShea	Full Name:	JAMES O'SHEA		

LAING O'ROURKE

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

WTN Number e.g. KHP/0001	FACTORY/0016

SECTION A – PRODUCER / CURRENT HOLDER OF WASTE - TRANSFEROR (e.g. Laing O'Rourke)

1	FULL COMPANY NAME AND ADDRESS (Block Capitals):	LAING O'ROURKE BRIDGE PLACE, ANCHOR BOULEVARD, CROSSWAYS, DARTFORD, KENT DA2 6SN			
2	Address of Transfer / Collection:	LOR SITE OFFICE, WATER STREET, MANCHESTER, M3 4JQ			
	Date of Transfer:	From:	01/09/2021	To:	30/08/2022
3	Status of Transferor (Please **tick** one or more boxes as appropriate)				
	Holder of an environmental permit (Waste Mgmt or Carrier)	✓	Permit Number(s):		
	Waste Producer	✓	Permit(s) Issued by:		
	Disposer of the Waste	✓	(Only applicable if LOR disposing of waste on someone else's behalf e.g. client)		
4	Name and address of broker who arranged this waste transfer (if applicable – may only need carrier details):	n/a			
5	Standard Industry Code (SIC 2007) for producers business:	41.2			
6	Signed for Holder/Producer (e.g. LOR/Select/Expanded)	MJeal	*I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England & Wales) Regulations 2011*		
7	Full Name	Tatiana Meakin			

SECTION B – DESCRIPTION OF THE WASTE

1	Waste Description:	Hardcore Concrete Soils	2	European Waste Code	17.01.07 17.01.01 17.05.04

3 Storage/Packaging Method (please **tick** relevant method -)

Loose		Sacks		Skip		Drum		Other	✓
								[illegible]	

4	Quantity of waste (tonnage, No. of sacks/skips etc):	Up to 10,000 tonnes

SECTION C – WASTE CARRIER - TRANSFEREE

1	Full Name (Block Capitals):	J O'Shea & Sons Ltd
2	Address:	Orchard Street, Salford, M6 6FL

3 Status of Waste Carrier (Please tick one or more):

Registered waste carrier:	✓	Permit Number(s):	CBDU90839
Waste Collection Authority i.e. Local Council Waste Collections	✓	Issued by:	Environment Agency
Exempt from requirement to register	✓	Give reason: (Exemption)	

Revision: May 2017

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

4	Signed for Carrier		
	Full Name:	PAUL O'SHEA	

See over for disposal:

SECTION D – DISPOSAL						
1	Name and Address of transfer or collect point (e.g. materials recycling facility)	The Recycling Centre, Orchard Street, Pendleton, Salford, M6 6FL				
2	Status of Waste Disposer (Please tick one box):					
	Holder of Environmental Permit (e.g. Waste Management Licence)	✓	Permit Number(s):	WML 50093		
			Issued by:	Environment Agency		
	Exemptions		Give Reason: (exemption)			
3	Date of Transfer (for multiple consignments give 'between' dates)	From:	01/09/2021	To:	31/08/2022	
4	Name and Address of Address of Broker who arranged this transfer (if applicable):					
5	Signed for Disposer		Full Name:	JAMES O'SHEA.		

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

WTN Number **e.g. KHP/0001**	FACTORY/0019

SECTION A – PRODUCER / CURRENT HOLDER OF WASTE - TRANSFEROR (e.g. Laing O'Rourke)

1	FULL COMPANY NAME AND ADDRESS (Block Capitals):	LAING O'ROURKE BRIDGE PLACE, ANCHOR BOULEVARD, CROSSWAYS, DARTFORD, KENT DA2 6SN			
2	Address of Transfer / Collection:	LOR SITE OFFICE, WATER STREET, MANCHESTER, M3 4JQ			
	Date of Transfer:	From:	01/09/2022	To:	30/08/2023
3	Status of Transferor (Please **tick** one or more boxes as appropriate)				
	Holder of an environmental permit (Waste Mgmt or Carrier)	✓	Permit Number(s):		
	Waste Producer	✓	Permit(s) Issued by:		
	Disposer of the Waste	✓	(Only applicable if LOR disposing of waste on someone else's behalf e.g. client)		
4	Name and address of broker who arranged this waste transfer (if applicable – may only need carrier details):	n/a			
5	Standard Industry Code (SIC 2007) for producers business:	41.2			
6	Signed for Holder/Producer (e.g. LOR/Select/Expanded)		*I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England & Wales) Regulations 2011*		
7	Full Name	Tatiana Meakin			

SECTION B – DESCRIPTION OF THE WASTE

1	Waste Description:	Hardcore Concrete Soils	2	European Waste Code	17.01.07 17.01.01 17.05.04

3	Storage/Packaging Method (please **tick** relevant method -)									
	Loose		Sacks		Skip		Drum		Other	✓
									[illegible]	
4	Quantity of waste (tonnage, No. of sacks/skips etc):			Up to 10,000 tonnes						

SECTION C – WASTE CARRIER - TRANSFEREE

1	Full Name (Block Capitals):	J O'Shea & Sons Ltd		
2	Address:	Orchard Street, Salford, M6 6FL		
3	Status of Waste Carrier (Please tick one or more):			
	Registered waste carrier:	✓	Permit Number(s):	CBDU90839
	Waste Collection Authority i.e. Local Council Waste Collections	✓	Issued by:	Environment Agency
	Exempt from requirement to register	✓	Give reason: (Exemption)	

Revision: May 2017

LAING O'ROURKE
ANNUAL WASTE TRANSFER NOTE

4	Signed for Carrier		
	Full Name:	PAUL O'SHEA	

See over for disposal:

SECTION D – DISPOSAL

1	Name and Address of transfer or collect point (e.g. materials recycling facility)	The Recycling Centre, Orchard Street, Pendleton, Salford, M6 6FL			
2	Status of Waste Disposer (Please tick one box):				
	Holder of Environmental Permit (e.g. Waste Management Licence)	✓	Permit Number(s):	WML 50093	
			Issued by:	Environment Agency	
	Exemptions		Give Reason: (exemption)		
3	Date of Transfer (for multiple consignments give 'between' dates)	From:	01/09/2022	To:	31/08/2023
4	Name and Address of Address of Broker who arranged this transfer (if applicable):				
5	Signed for Disposer		Full Name:	JAMES O'SHEA	

Ref No.	Project	Date	Waste Contractor	Total Tonnes	Total M3	% to Landfill	Quantity	Destination	UK Waste Description
57260	The Factory	09-Oct-18	J O'Shea & Sons	2,125.50	991.9	0	109	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
57263	The Factory	16-Oct-18	J O'Shea & Sons	39	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
57261	The Factory	26-Nov-18	J O'Shea & Sons	117	54.6	0	6	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112028	The Factory	28-Nov-18	J O'Shea & Sons	78	36.4	0	4	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
57262	The Factory	05-Dec-18	J O'Shea & Sons	117	54.6	0	6	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
57265	The Factory	13-Dec-18	J O'Shea & Sons	2,437.50	1,137.50	0	125	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
58244	The Factory	07-Jan-19	J O'Shea & Sons	9,418.50	4,395.30	0	483	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
58243	The Factory	09-Jan-19	J O'Shea & Sons	468	218.4	0	24	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112029	The Factory	01-Feb-19	J O'Shea & Sons	6,513.00	3,039.40	0	334	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112030	The Factory	01-Feb-19	J O'Shea & Sons	780	364	0	40	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
59458	The Factory	01-Mar-19	J O'Shea & Sons	2,831.00	1,355.90	0	149	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
59459	The Factory	04-Mar-19	J O'Shea & Sons	285	136.5	0	15	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
60019	The Factory	01-Apr-19	J O'Shea & Sons	171	81.9	0	9	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
60020	The Factory	04-Apr-19	J O'Shea & Sons	195	91	0	10	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
60678	The Factory	07-May-19	J O'Shea & Sons	57	27.3	0	3	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
60679	The Factory	13-May-19	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
61421	The Factory	03-Jun-19	J O'Shea & Sons	175.5	81.9	0	9	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
61422	The Factory	17-Jun-19	J O'Shea & Sons	39	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
62173	The Factory	08-Jul-19	J O'Shea & Sons	76	36.4	0	4	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
65508	The Factory	05-Aug-19	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
65509	The Factory	07-Aug-19	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
65774	The Factory	09-Sep-19	J O'Shea & Sons	95	45.5	0	5	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
65775	The Factory	11-Sep-19	J O'Shea & Sons	152	72.8	0	8	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
68005	The Factory	02-Oct-19	J O'Shea & Sons	152	72.8	0	8	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112032	The Factory	30-Oct-19	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
68617	The Factory	06-Nov-19	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
68618	The Factory	14-Nov-19	J O'Shea & Sons	76	36.4	0	4	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
71138	The Factory	13-Jan-20	J O'Shea & Sons	342	163.8	0	18	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
71797	The Factory	05-Feb-20	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
71798	The Factory	05-Feb-20	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
71795	The Factory	18-Mar-20	J O'Shea & Sons	95	45.5	0	5	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
71796	The Factory	30-Mar-20	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
72199	The Factory	17-Apr-20	J O'Shea & Sons	114	54.6	0	6	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
72200	The Factory	23-Apr-20	J O'Shea & Sons	133	63.7	0	7	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
73253	The Factory	04-May-20	J O'Shea & Sons	570	273	0	30	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
73252	The Factory	13-May-20	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
73751	The Factory	01-Jun-20	J O'Shea & Sons	247	118.3	0	13	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112033	The Factory	02-Jul-20	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112034	The Factory	02-Jul-20	J O'Shea & Sons	190	91	0	10	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous

80601	The Factory	12-Nov-20	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
80602	The Factory	23-Nov-20	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
80848	The Factory	03-Dec-20	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
83625	The Factory	02-Mar-21	J O'Shea & Sons	152	72.8	0	8	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
83626	The Factory	04-Mar-21	J O'Shea & Sons	95	45.5	0	5	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
84972	The Factory	19-Apr-21	J O'Shea & Sons	266	127.4	0	14	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
94052	The Factory	11-Aug-21	J O'Shea & Sons	40	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
96851	The Factory	07-Oct-21	J O'Shea & Sons	285	136.5	0	15	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
96852	The Factory	07-Oct-21	J O'Shea & Sons	551	263.9	0	29	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
97816	The Factory	04-Nov-21	J O'Shea & Sons	1,000.00	455	0	50	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
97815	The Factory	05-Nov-21	J O'Shea & Sons	180	81.9	0	9	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
98673	The Factory	07-Dec-21	J O'Shea & Sons	20	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
95908	The Factory	24-Jan-22	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
95910	The Factory	14-Feb-22	J O'Shea & Sons	38	18.2	0	2	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
102895	The Factory	09-May-22	J O'Shea & Sons	20	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
104904	The Factory	27-Jul-22	J O'Shea & Sons	133	63.7	0	7	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
108039	The Factory	03-Oct-22	J O'Shea & Sons	95	45.5	0	5	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
108040	The Factory	05-Oct-22	J O'Shea & Sons	475	227.5	0	25	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
108038	The Factory	01-Nov-22	J O'Shea & Sons	684	327.6	0	36	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
108037	The Factory	18-Nov-22	J O'Shea & Sons	19	9.1	0	1	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112035	The Factory	02-Dec-22	J O'Shea & Sons	228	109.2	0	12	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112038	The Factory	01-Jan-23	J O'Shea & Sons	342	163.8	0	18	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112040	The Factory	01-Feb-23	J O'Shea & Sons	76	36.4	0	4	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112041	The Factory	02-Feb-23	J O'Shea & Sons	589	282.1	0	31	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112042	The Factory	01-Mar-23	J O'Shea & Sons	551	263.9	0	29	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112043	The Factory	14-Mar-23	J O'Shea & Sons	152	72.8	0	8	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete
112031	The Factory	04-Apr-23	J O'Shea & Sons	133	63.7	0	7	Permitted Recycling Facility - Orchard Street	17 05 04 Soils & Stones Non-Hazardous
112044	The Factory	13-Apr-23	J O'Shea & Sons	57	27.3	0	3	Permitted Recycling Facility - Orchard Street	17 01 07 Brick/Block/Concrete

③

SHEA&SONS

laing orourke
Water St
Salford

5.04 ☒ 17.01.07 ☐ ☐

3 ☐ ☐

Vehicle Size: 8W ☒ ☐

g: MW65 UCM No. of Loads: 1

M/A

info:
: 41.2

Date: 13/2/19

458630

Carriers Licence: CBDU 90839

avation & Recycling 0161 925 9800

---

②

J.O.SHEA&SONS
WASTE MANAGEMENT

Customer: LAING ORourk
Address: WATER ST
M/C.

EWC:17.05.04 ☑ 17.01.07 ☐ ☐

WML50093 ☐ ☐

Grab: ☐ Vehicle Size: 8W ☑ ☐

Vehicle Reg: MV65UCL No. of Loads: 1

Material: M/A.

Additional info: SIC 41.2

Date: 8.2.19

459309

Signed:

Carriers Licence: CBDU 90839

Excavation & Recycling 0161 925 9800

---

④

J.O.SHEA&SONS
WASTE MANAGEMENT

Customer: laing orourke
Address: Water St
Salford

EWC:17.05.04 ☒ 17.01.07 ☐ ☐

WML50093 ☐ ☐

Grab: ☐ Vehicle Size: 8W ☒ ☐

Vehicle Reg: MW65 UCM No. of Loads: 1

Material: M/A

Additional info: SIC 41.2

Date: 13/2/19

458631

Signed:

J O'SHEA & SONS
WASTE MANAGEMENT

Transfer Note Number
3218

DUTY OF CARE-CONTROLLED WASTE TRANSFER NOTE

SECTION A - DESCRIPTION OF WASTE

1) PLEASE DESCRIBE THE WASTE BEING TRANSFERRED NON-HAZARDOUS SOIL + STONES. HOGWEED.

2) EUROPEAN WASTE CODE: EWC 17.05.04.

3) WHAT IS THE QUANTITY OF WASTE ~~(M³~~ / TONNES) 100 TONNES.

SECTION B - PRODUCER OF THE WASTE

1) FULL NAME (BLOCK CAPITALS) LAING O'ROURKE

2) ADDRESS BRIDGE PLACE 1&2 ANCHOR BOULEVARD, CROSSWAYS DARTFORD, KENT, DA2 6SN SIC CODE 41201.

By signing in SECTION E below 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 ☑ YES

SECTION C - CARRIER OF THE WASTE

FULL NAME: J O'SHEA & SONS LTD. ORCHARD STREET, PENDLETON, SALFORD, MANCHESTER M6 6FL

REGISTERED WASTE CARRIER NUMBER: CBDU90839 - ISSUED BY ENVIRONMENT AGENCY

SECTION D - DISPOSER OF THE WASTE

1) COMPANY NAME (BLOCK CAPITALS) Booth Ventures

2) COMPANY ADDRESS Booth Ventures, Harwood, Bolton

WML / PERMIT NUMBER ISSUED BY

☐ J O'SHEA & SONS LTD, ORCHARD STREET, PENDLETON, SALFORD, MANCHESTER M6 6FL
WASTE MANAGEMENT LICENCE NUMBER: EAWML50093

SECTION E - FIRST TRANSFER (Producer to Carrier)

1) SITE ADDRESS THE FACTORY, MANCHESTER.

2) DATE OF TRANSFER 16.11.21.

3) TIME(S) OF TRANSFER (FOR MULTIPLE TRANSFERS, GIVE BETWEEN DATES)

4) PRODUCERS REPRESENTATIVE LO'R.
NAME (PRINT) Paul Maguire
SIGNATURE

5) CARRIERS REPRESENTATIVE
NAME (PRINT) PAUL O'SHEA
SIGNATURE Paul O'Shea

SECTION F - SECOND TRANSFER (Carrier to Disposer)

1) DISPOSAL SITE HARWOOD QUARRY, BOLTON, GTR M/CR, BL2 4LT.

☐ J O'SHEA & SONS LTD. ORCHARD STREET, PENDLETON, SALFORD, MANCHESTER M6 6FL

2) DATE OF TRANSFER 16.11.21.

3) TIME(S) OF TRANSFER (FOR MULTIPLE TRANSFERS, GIVE BETWEEN DATES)

4) CARRIERS REPRESENTATIVE
NAME (PRINT) PAUL O'SHEA
SIGNATURE Paul O'Shea

5) DISPOSERS REPRESENTATIVE
NAME (PRINT)
SIGNATURE

White Sheet - Producer's Copy **Yellow** - Disposer's Copy **Pink** - Carrier's Copy **Green** - Producer's Copy

②

J O'SHEA & SONS

Customer: laing orourke

Address: Water St

McL

EWC:17.05.04 ☑ 17. 01.07 ☐ ☐

WML50093 ☑ ☐

Grab: ☐ Vehicle Size: 8W ☑ ☐

Vehicle Reg: MW69mhy No. of Loads: 1

Material: M/A

Additional info: SIC 47.2

Date: 23/4/20

№ 483255

Signed: IAN

Carriers Licence: CBDU 90839

Excavation & Recycling 0161 925 9800

---

①

J O'SHEA & SONS

Customer: laing orourke

Address: Water St

McR

EWC:17.05.04 ☑ 17. 01.07 ☐ ☐

WML50093 ☑ ☐

Grab: ☐ Vehicle Size: 8W ☑ ☐

Vehicle Reg: MW69 mhy No. of Loads: 1

Material: M/A

Additional info: SIC 47.2

Date: 24/4/20

№ 483256

Signed: IAN.

Carriers Licence: CBDU 90839

Excavation & Recycling 0161 925 9800

J O'SHEA & SONS
WASTE MANAGEMENT

Transfer Note Number
3218

DUTY OF CARE-CONTROLLED WASTE TRANSFER NOTE

SECTION A - DESCRIPTION OF WASTE

1) PLEASE DESCRIBE THE WASTE BEING TRANSFERRED NON-HAZARDOUS SOIL + STONES. HOGWEED.

2) EUROPEAN WASTE CODE: EWC 17.05.04.

3) WHAT IS THE QUANTITY OF WASTE ~~(M³~~ / TONNES) 100 TONNES.

SECTION B - PRODUCER OF THE WASTE

1) FULL NAME (BLOCK CAPITALS) LAING O'ROURKE

2) ADDRESS BRIDGE PLACE 1&2 ANCHOR BOULEVARD, CROSSWAYS DARTFORD, KENT, DA2 6SN SIC CODE 41201.

By signing in **SECTION E** below 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 ☑ YES

SECTION C - CARRIER OF THE WASTE

FULL NAME: J O'SHEA & SONS LTD. ORCHARD STREET. PENDLETON, SALFORD, MANCHESTER M6 6FL

REGISTERED WASTE CARRIER NUMBER: CBDU90839 - ISSUED BY ENVIRONMENT AGENCY

SECTION D - DISPOSER OF THE WASTE

1) COMPANY NAME (BLOCK CAPITALS) Booth Ventures

2) COMPANY ADDRESS Booth Ventures, Harwood, Bolton

WML / PERMIT NUMBER ISSUED BY

☐ J O'SHEA & SONS LTD, ORCHARD STREET, PENDLETON, SALFORD, MANCHESTER M6 6FL
WASTE MANAGEMENT LICENCE NUMBER: EAWML50093

SECTION E - FIRST TRANSFER (Producer to Carrier)

1) SITE ADDRESS THE FACTORY, MANCHESTER.

2) DATE OF TRANSFER 16.11.21. 3) TIME(S) OF TRANSFER (FOR MULTIPLE TRANSFERS, GIVE BETWEEN DATES)

4) PRODUCERS REPRESENTATIVE L O'R.
NAME (PRINT) + Paul Maguire
SIGNATURE +

5) CARRIERS REPRESENTATIVE
NAME (PRINT) PAUL O'SHEA
SIGNATURE Paul O'Shea

SECTION F - SECOND TRANSFER (Carrier to Disposer)

1) DISPOSAL SITE HARWOOD QUARRY, BOLTON, GTR M/CR, BL2 4LT.
☐ J O'SHEA & SONS LTD. ORCHARD STREET, PENDLETON, SALFORD, MANCHESTER M6 6FL

2) DATE OF TRANSFER 16.11.21. 3) TIME(S) OF TRANSFER (FOR MULTIPLE TRANSFERS, GIVE BETWEEN DATES)

4) CARRIERS REPRESENTATIVE
NAME (PRINT) PAUL O'SHEA
SIGNATURE Paul O'Shea

5) DISPOSERS REPRESENTATIVE
NAME (PRINT)
SIGNATURE

White Sheet - Producer's Copy **Yellow** - Disposer's Copy **Pink** - Carrier's Copy **Green** - Producer's Copy

③

O'SHEA&SONS
WASTE MANAGEMENT

ustomer: Laing orourke
ddress: Water ST
MCR

WC:17.05.04 ☑ 17. 01.07 ☐ ☐
ˉ1L50093 ☑ ☐
rab: ☐ Vehicle Size: 8W ☑ ☐
ehicle Reg: mv69 mhj No. of Loads: 1
laterial: MA
dditional info:
Date: 13/12/22

SIC . 41.2

Nº 538959

Signed:

Carriers Licence: CBDU 90839

Excavation & Recycling 0161 925 9800

J O'SHEA&SONS
WASTE MANAGEMENT

stomer: LOR
Address: WATER ST
M/C.

EWC:17.05.04 ☑ 17. 01.07 ☐ ☐
WML50093 ☐ ☐
Grab: ☐ Vehicle Size: 8W ☑ ☐
Vehicle Reg: MV19UZM No. of Loads: 1
Material: M/A
Additional info:
Date: 8/11/22

41.2

Nº 537881

Signed:

Carriers Licence: CBDU 90839

Excavation & Recycling 0161 925 9800

Appendix H

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

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

Concept Life Sciences

Certificate of Analysis

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

Report Number: Supplement to 785341-2

Date of Report: 08-Jan-2019

Customer: Laing O'Rourke
The Factory
Water Street
M3 4JQ

Customer Contact: . Sam Siddon

Customer Job Reference: N3844
Customer Purchase Order: The Factory
Date Job Received at Concept: 26-Nov-2018
Date Analysis Started: 27-Nov-2018
Date Analysis Completed: 14-Dec-2018

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

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

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

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

UKAS TESTING
1549

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked
and authorised by :
Zoe Gunter
Customer Service Advisor

Issued by :
Zoe Gunter
Customer Service Advisor

Waste Acceptance Criteria

Customer Sample Reference : PMC1
Our Sample Reference : 785341 001
Customer Reference : N3844
Test Portion Mass (g) : 175
Sample in Dish @ 105C : 80.2
Wet Sample in Dish Weight : 100
Empty Dish Weight : 0
Top Depth : 10
Hole ID : FA01
Comments : Stockpile Piles Arising
Date Sampled : 26-NOV-2018
Matrix Class : Clay

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **180**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**0.4**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**1.9**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.70	mg/kg	M	(100, 9) <0.70	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
pH	Probe			M	**10.2**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.027**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.21**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**34**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.11**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.098**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**45**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	<0.50	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	**0.0012**	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.10**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	**0.013**	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0079**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**140**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**4000**	**4000.0**	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : PMC2
Our Sample Reference : 785341 002
Customer Reference : N3844
Wet Sample in Dish Weight : 100
Top Depth : 10
Empty Dish Weight : 0
Sample in Dish @ 105C : 87.3
Test Portion Mass (g) : 175
Hole ID : FA02
Comments : Stockpile Piles Arising
Date Sampled : 26-NOV-2018
Matrix Class : Clay

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) <1	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**0.2**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**1.4**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
pH	Probe			M	**7.5**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.0025**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.088**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**16**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.039**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0058**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**22**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**1.2**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0049**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**9**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	<1000	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	**0.054**	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : PMC3
Our Sample Reference : 785341 003
Customer Reference : N3844
Wet Sample in Dish Weight : 100
Test Portion Mass (g) : 175
Empty Dish Weight : 0
Hole ID : FA03
Sample in Dish @ 105C : 96.6
Comments : Stockpile Bethels 1
Date Sampled : 26-NOV-2018
Matrix Class : Clay

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) <1	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**1.1**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**2.8**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
pH	Probe			M	**7.4**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.0045**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.079**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	<10	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.022**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0085**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**24**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**2.4**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0050**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	**0.010**	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	<5	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	<1000	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	**0.053**	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : PMC4
Our Sample Reference : 785341 004
Customer Reference : N3844
Wet Sample in Dish Weight : 100
Empty Dish Weight : 0
Sample in Dish @ 105C : 88.1
Hole ID : FA04
Test Portion Mass (g) : 175
Comments : Stockpile Bethels 2
Date Sampled : 26-NOV-2018
Matrix Class : Clay

Soil					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **48**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**1.3**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**3.5**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**4.4**	100.0		
pH	Probe			M	**8.1**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.022**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.049**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.11**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**18**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.023**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.029**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**31**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**4.7**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0068**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.12**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.011**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**290**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**1100**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	**0.028**	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : PMC5
Our Sample Reference : 785341 005
Customer Reference : N3844
Wet Sample in Dish Weight : 100
Sample in Dish @ 105C : 84.3
Hole ID : FA05
Top Depth : 0.5
Empty Dish Weight : 0
Test Portion Mass (g) : 175
Comments : Arches
Date Sampled : 26-NOV-2018
Matrix Class : Clay

Soil					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **240**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**3.4**	**3.0**	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**5.0**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.070	mg/kg	M	(9) <0.070	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**12**	100.0		
pH	Probe			M	**7.8**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					Result	Inert Waste Landfill	Stable non reactive	Hazardous Waste Landfill
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.013**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.038**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.15**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**30**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.025**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.065**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**82**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**1.4**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.037**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.060**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	**0.011**	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.014**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**1600**	**1000.0**	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**3200**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	**0.026**	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : PMC6
Our Sample Reference : 785341 006
Customer Reference : N3844
Wet Sample in Dish Weight : 100
Empty Dish Weight : 0
Sample in Dish @ 105C : 78.2
Test Portion Mass (g) : 175
Hole ID : FA06
Comments : Dewatering West 1
Date Sampled : 26-NOV-2018
Matrix Class : Clay

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) <1	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**0.3**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**2.4**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
pH	Probe			M	**7.2**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	<0.0020	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.038**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**14**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.039**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	<0.0050	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**26**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**0.92**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.017**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**550**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**2200**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	**0.027**	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : PMC7
Our Sample Reference : 785341 007
Customer Reference : N3844
Test Portion Mass (g) : 175
Empty Dish Weight : 0
Sample in Dish @ 105C : 90.2
Wet Sample in Dish Weight : 100
Hole ID : FA07
Comments : Dewatering West 2
Date Sampled : 26-NOV-2018
Matrix Class : Clay

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **47**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**0.7**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**3.0**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**12**	100.0		
pH	Probe			M	**10.2**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	**0.014**	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.025**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.023**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	**0.00073**	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**22**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.032**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.089**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**48**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	<0.50	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.18**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.027**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**270**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**1500**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	<0.020	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference :	PMC8
Our Sample Reference :	785341 008
Customer Reference :	N3844
Hole ID :	FA08
Sample in Dish @ 105C :	79.5
Wet Sample in Dish Weight :	100
Empty Dish Weight :	0
Top Depth :	3
Test Portion Mass (g) :	175
Comments :	Dewatering East 1
Date Sampled :	26-NOV-2018
Matrix Class :	Clay

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **650**	**500.0**		
Total Organic Carbon	OX/IR	0.1	%	N	**0.6**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**2.6**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
pH	Probe			M	**8.0**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.0078**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.061**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**82**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.021**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.021**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**56**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**2.6**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0030**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.057**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0055**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**170**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	**1200**	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	**0.037**	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference :	PMC9
Our Sample Reference :	785341 009
Customer Reference :	N3844
Wet Sample in Dish Weight :	100
Empty Dish Weight :	0
Test Portion Mass (g) :	175
Top Depth :	4
Hole ID :	FA09
Sample in Dish @ 105C :	75.7
Comments :	Dewatering East 2
Date Sampled :	26-NOV-2018
Matrix Class :	Clay

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **2**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**0.4**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**4.4**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	<1.6	100.0		
pH	Probe			M	**7.2**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.0022**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.084**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**27**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.026**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0055**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**24**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**2.9**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	**0.0039**	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.019**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	<0.0050	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**440**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	<1000	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	**0.050**	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Waste Acceptance Criteria

Customer Sample Reference : PMC10
Our Sample Reference : 785341 010
Customer Reference : N3844
Wet Sample in Dish Weight : 100
Hole ID : FA10
Empty Dish Weight : 0
Sample in Dish @ 105C : 84.8
Test Portion Mass (g) : 175
Comments : Dewatering West 3
Date Sampled : 26-NOV-2018
Matrix Class : Clay

Soil					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Total Petroleum Hydrocarbons C10-C40 (Sum)	Calc	1	mg/kg	N	(13) **10**	500.0		
Total Organic Carbon	OX/IR	0.1	%	N	**0.5**	3.0	5.0	6.0
Loss on Ignition	Grav	0.1	%	N	**3.7**			10.0
BTEX (Sum)	Calc	0.040	mg/kg	U	(13) <0.040	6.0		
PCB EC7 (Sum)	Calc	0.007	mg/kg	M	<0.007	1.0		
PAH (Sum)	Calc	1.6	mg/kg	N	**1.7**	100.0		
pH	Probe			M	**7.6**		> 6.0	
Acid Neutralising Capacity (pH 4)	Titration	2	Mol/kg	N	<2			
Acid Neutralising Capacity (pH 7)	Titration	2	Mol/kg	N	<2			

Data for BS EN 12457-2 (10:1)					**Result**	**Inert Waste Landfill**	**Stable non reactive**	**Hazardous Waste Landfill**
Determinand	**Technique**	**LOD**	**Units**	**Symbol**				
Antimony	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.06	0.7	5.0
Arsenic	Calc WAC ICP/MS	0.0020	mg/kg	N	**0.0029**	0.5	2.0	25.0
Barium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.12**	20.0	100.0	300.0
Cadmium	Calc WAC ICP/MS	0.00020	mg/kg	N	<0.00020	0.04	1.0	5.0
Chloride	Calc (W)	10	mg/kg	N	**19**	800.0	15000.0	25000.0
Chromium	Calc WAC ICP/MS	0.010	mg/kg	N	**0.017**	0.5	10.0	70.0
Copper	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0072**	2.0	50.0	100.0
Dissolved Organic Carbon	Calc	10	mg/kg	N	**32**	500.0	800.0	1000.0
Fluoride	Calc (W)	0.50	mg/kg	N	**3.5**	10.0	150.0	500.0
Lead	Calc WAC ICP/MS	0.0030	mg/kg	N	<0.0030	0.5	10.0	50.0
Mercury	Calc WAC ICP/MS	0.00050	mg/kg	N	<0.00050	0.01	0.2	2.0
Molybdenum	Calc WAC ICP/MS	0.010	mg/kg	N	**0.045**	0.5	10.0	30.0
Nickel	Calc WAC ICP/MS	0.010	mg/kg	N	<0.010	0.4	10.0	40.0
Phenols (Total-Mono)	Calc	1.0	mg/kg	N	<1.0	1.0		
Selenium	Calc WAC ICP/MS	0.0050	mg/kg	N	**0.0074**	0.1	0.5	7.0
Sulphate	Calc (W)	5	mg/kg	N	**54**	1000.0	20000.0	50000.0
Total Dissolved Solids	Calc	1000	mg/kg	N	<1000	4000.0	60000.0	100000.0
Zinc	Calc WAC ICP/MS	0.020	mg/kg	N	**0.029**	4.0	50.0	200.0

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

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

Further testing may be required if :

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

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

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

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

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

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

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
MCERTS Preparation

Concept Reference					**785341 001**	**785341 002**	**785341 003**	**785341 004**	**785341 005**
Customer Sample Reference					**PMC1**	**PMC2**	**PMC3**	**PMC4**	**PMC5**
Test Sample					**AR**	**AR**	**AR**	**AR**	**AR**
Top Depth					**10**	**10**			**0.5**
Hole ID					**FA01**	**FA02**	**FA03**	**FA04**	**FA05**
Comments					**Stockpile Piles Arising**	**Stockpile Piles Arising**	**Stockpile Bethels 1**	**Stockpile Bethels 2**	**Arches**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	**25**	**14**	**8.0**	**13**	**8.0**

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
MCERTS Preparation

Concept Reference					**785341 006**	**785341 007**	**785341 008**	**785341 009**	**785341 010**
Customer Sample Reference					**PMC6**	**PMC7**	**PMC8**	**PMC9**	**PMC10**
Test Sample					**AR**	**AR**	**AR**	**AR**	**AR**
Top Depth							**3**	**4**	
Hole ID					**FA06**	**FA07**	**FA08**	**FA09**	**FA10**
Comments					**Dewatering West 1**	**Dewatering West 2**	**Dewatering East 1**	**Dewatering East 2**	**Dewatering West 3**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Moisture @105C	Grav (1 Dec) (105 C)	0.1	%	N	**21**	**13**	**17**	**27**	**18**

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
MCERTS Preparation

Concept Reference					**785341 001**	**785341 002**	**785341 003**	**785341 004**	**785341 005**
Customer Sample Reference					**PMC1**	**PMC2**	**PMC3**	**PMC4**	**PMC5**
Test Sample					**M40**	**M40**	**M40**	**M40**	**M40**
Top Depth					**10**	**10**			**0.5**
Hole ID					**FA01**	**FA02**	**FA03**	**FA04**	**FA05**
Comments					**Stockpile Piles Arising**	**Stockpile Piles Arising**	**Stockpile Bethels 1**	**Stockpile Bethels 2**	**Arches**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Retained on 10mm sieve	Grav	0.1	%	N	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
MCERTS Preparation

Concept Reference					**785341 006**	**785341 007**	**785341 008**	**785341 009**	**785341 010**
Customer Sample Reference					**PMC6**	**PMC7**	**PMC8**	**PMC9**	**PMC10**
Test Sample					**M40**	**M40**	**M40**	**M40**	**M40**
Top Depth							**3**	**4**	
Hole ID					**FA06**	**FA07**	**FA08**	**FA09**	**FA10**
Comments					**Dewatering West 1**	**Dewatering West 2**	**Dewatering East 1**	**Dewatering East 2**	**Dewatering West 3**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Retained on 10mm sieve	Grav	0.1	%	N	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
Combined Suite - Testing Suite 2 plus leachate suite and full WAC

Concept Reference					**785341 001**	**785341 002**	**785341 003**	**785341 004**	**785341 005**
Customer Sample Reference					**PMC1**	**PMC2**	**PMC3**	**PMC4**	**PMC5**
Test Sample					**A40**	**A40**	**A40**	**A40**	**A40**
Top Depth					**10**	**10**			**0.5**
Hole ID					**FA01**	**FA02**	**FA03**	**FA04**	**FA05**
Comments					**Stockpile Piles Arising**	**Stockpile Piles Arising**	**Stockpile Bethels 1**	**Stockpile Bethels 2**	**Arches**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Asbestos ID	PLM			SU	N.D.	N.D.	N.D.	N.D.	N.D.
Boron (water-soluble)	ICP/OES	1	mg/kg	N	<1	<1	<1	<1	<1

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
Combined Suite - Testing Suite 2 plus leachate suite and full WAC

Concept Reference					**785341 006**	**785341 007**	**785341 008**	**785341 009**	**785341 010**
Customer Sample Reference					**PMC6**	**PMC7**	**PMC8**	**PMC9**	**PMC10**
Test Sample					**A40**	**A40**	**A40**	**A40**	**A40**
Top Depth							**3**	**4**	
Hole ID					**FA06**	**FA07**	**FA08**	**FA09**	**FA10**
Comments					**Dewatering West 1**	**Dewatering West 2**	**Dewatering East 1**	**Dewatering East 2**	**Dewatering West 3**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Asbestos ID	PLM			SU	N.D.	N.D.	N.D.	N.D.	N.D.
Boron (water-soluble)	ICP/OES	1	mg/kg	N	<1	<1	<1	<1	<1

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
Combined Suite - Testing Suite 2 plus leachate suite and full WAC

Concept Reference					**785341 001**	**785341 002**	**785341 003**	**785341 004**	**785341 005**
Customer Sample Reference					**PMC1**	**PMC2**	**PMC3**	**PMC4**	**PMC5**
Test Sample					**AR**	**AR**	**AR**	**AR**	**AR**
Top Depth					**10**	**10**			**0.5**
Hole ID					**FA01**	**FA02**	**FA03**	**FA04**	**FA05**
Comments					**Stockpile Piles Arising**	**Stockpile Piles Arising**	**Stockpile Bethels 1**	**Stockpile Bethels 2**	**Arches**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Mercury (Inorganic)	ICP/OES (Inorganic Mercury)	1	mg/kg	N	<1	<1	<1	<1	<1
Acenaphthylene	GC/MS (MCERTS)	0.1	mg/kg	U	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	GC/MS (MCERTS)	0.1	mg/kg	U	<0.1	<0.1	<0.1	**0.2**	**0.4**
Coronene	GC/MS	0.1	mg/kg	N	<0.1	<0.1	<0.1	<0.1	**0.2**
Polyaromatic Hydrocarbons (Total)	GC/MS (MCERTS)	0.1	mg/kg	U	<0.1	<0.1	<0.1	**4.4**	**12**
Polychlorinated biphenyl BZ#28	GC/MS (SIR)	1	µg/kg	M	(100,9) <100	<1	<1	<1	(9) <10
Polychlorinated biphenyl BZ#52	GC/MS (SIR)	1	µg/kg	M	(100,9) <100	<1	<1	<1	(9) <10
Polychlorinated biphenyl BZ#101	GC/MS (SIR)	1	µg/kg	M	(100,9) <100	<1	<1	<1	(9) <10
Polychlorinated biphenyl BZ#118	GC/MS (SIR)	1	µg/kg	M	(100,9) <100	<1	<1	<1	(9) <10
Polychlorinated biphenyl BZ#153	GC/MS (SIR)	1	µg/kg	M	(9,100) <100	<1	<1	<1	(9) <10
Polychlorinated biphenyl BZ#138	GC/MS (SIR)	1	µg/kg	M	(100,9) <100	<1	<1	<1	(9) <10
Polychlorinated biphenyl BZ#180	GC/MS (SIR)	1	µg/kg	M	(100,9) <100	<1	<1	<1	(9) <10

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil

Combined Suite - Testing Suite 2 plus leachate suite and full WAC

				Concept Reference	**785341 006**	**785341 007**	**785341 008**	**785341 009**	**785341 010**
				Customer Sample Reference	**PMC6**	**PMC7**	**PMC8**	**PMC9**	**PMC10**
				Test Sample	**AR**	**AR**	**AR**	**AR**	**AR**
				Top Depth			**3**	**4**	
				Hole ID	**FA06**	**FA07**	**FA08**	**FA09**	**FA10**
				Comments	**Dewatering West 1**	**Dewatering West 2**	**Dewatering East 1**	**Dewatering East 2**	**Dewatering West 3**
				Date Sampled	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
				Matrix Class	**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Mercury (Inorganic)	ICP/OES (Inorganic Mercury)	1	mg/kg	N	<1	<1	<1	<1	<1
Acenaphthylene	GC/MS (MCERTS)	0.1	mg/kg	U	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	GC/MS (MCERTS)	0.1	mg/kg	U	<0.1	**0.5**	<0.1	<0.1	<0.1
Coronene	GC/MS	0.1	mg/kg	N	<0.1	<0.1	<0.1	<0.1	<0.1
Polyaromatic Hydrocarbons (Total)	GC/MS (MCERTS)	0.1	mg/kg	U	<0.1	**12**	**1.3**	<0.1	**1.7**
Polychlorinated biphenyl BZ#28	GC/MS (SIR)	1	µg/kg	M	<1	<1	<1	<1	<1
Polychlorinated biphenyl BZ#52	GC/MS (SIR)	1	µg/kg	M	<1	<1	<1	<1	<1
Polychlorinated biphenyl BZ#101	GC/MS (SIR)	1	µg/kg	M	<1	<1	<1	<1	<1
Polychlorinated biphenyl BZ#118	GC/MS (SIR)	1	µg/kg	M	<1	<1	<1	<1	<1
Polychlorinated biphenyl BZ#153	GC/MS (SIR)	1	µg/kg	M	<1	<1	<1	<1	<1
Polychlorinated biphenyl BZ#138	GC/MS (SIR)	1	µg/kg	M	<1	<1	<1	<1	<1
Polychlorinated biphenyl BZ#180	GC/MS (SIR)	1	µg/kg	M	<1	<1	<1	<1	<1

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil

Combined Suite - Testing Suite 2 plus leachate suite and full WAC

				Concept Reference	**785341 001**	**785341 002**	**785341 003**	**785341 004**	**785341 005**
				Customer Sample Reference	**PMC1**	**PMC2**	**PMC3**	**PMC4**	**PMC5**
				Test Sample	**M105**	**M105**	**M105**	**M105**	**M105**
				Top Depth	**10**	**10**			**0.5**
				Hole ID	**FA01**	**FA02**	**FA03**	**FA04**	**FA05**
				Comments	**Stockpile Piles Arising**	**Stockpile Piles Arising**	**Stockpile Bethels 1**	**Stockpile Bethels 2**	**Arches**
				Date Sampled	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
				Matrix Class	**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Total Petroleum Hydrocarbons (C10-C35)	GC/FID	1	mg/kg	M	**(13) 130**	(13) <1	(13) <1	**(13) 44**	**(13) 230**
Total Petroleum Hydrocarbons (C35-C40)	GC/FID	1	mg/kg	N	**(13) 48**	(13) <1	(13) <1	**(13) 4**	**(13) 13**
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	(13) <10	(13) <10	(13) <10	(13) <10	(13) <10
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Naphthalene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.1**	<0.1
Fluorene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.6**	**0.6**
Fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.6**	**0.9**
Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.7**	**1.2**
Benzo(a)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.3**	**1.0**
Chrysene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.4**	**0.9**
Benzo(b)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.4**	**1.2**
Benzo(k)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.2**	**0.9**
Benzo(a)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.3**	**1.6**
Indeno(123-cd)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.2**	**1.1**
Dibenzo(ah)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	<0.1	**0.4**
Benzo(ghi)Perylene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	**0.3**	**1.6**
Phenol	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil

Combined Suite - Testing Suite 2 plus leachate suite and full WAC

				Concept Reference	785341 006	785341 007	785341 008	785341 009	785341 010
				Customer Sample Reference	PMC6	PMC7	PMC8	PMC9	PMC10
				Test Sample	M105	M105	M105	M105	M105
				Top Depth			3	4	
				Hole ID	FA06	FA07	FA08	FA09	FA10
				Comments	Dewatering West 1	Dewatering West 2	Dewatering East 1	Dewatering East 2	Dewatering West 3
				Date Sampled	26-NOV-2018	26-NOV-2018	26-NOV-2018	26-NOV-2018	26-NOV-2018
				Matrix Class	Clay	Clay	Clay	Clay	Clay
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Total Petroleum Hydrocarbons (C10-C35)	GC/FID	1	mg/kg	M	(13) <1	(13) 38	(13) 550	(13) 2	(13) 9
Total Petroleum Hydrocarbons (C35-C40)	GC/FID	1	mg/kg	N	(13) <1	(13) 9	(13) 100	(13) <1	(13) 1
Benzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	(13) <10	(13) <10	(13) <10	(13) <10	(13) <10
Toluene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
EthylBenzene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Meta/Para-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Ortho-Xylene	GC/MS (Head Space)(MCERTS)	10	µg/kg	M	<10	<10	<10	<10	<10
Naphthalene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	0.2	<0.1	<0.1	<0.1
Acenaphthene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	0.3	<0.1	<0.1	<0.1
Fluorene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	0.2	<0.1	<0.1	<0.1
Phenanthrene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	2.1	0.2	<0.1	0.3
Fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	1.8	0.3	<0.1	0.3
Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	1.8	0.3	<0.1	0.4
Benzo(a)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	0.8	0.1	<0.1	0.2
Chrysene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	0.8	0.1	<0.1	0.2
Benzo(b)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	0.8	<0.1	<0.1	0.2
Benzo(k)fluoranthene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	0.5	0.1	<0.1	0.1
Benzo(a)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	0.7	0.1	<0.1	0.1
Indeno(123-cd)Pyrene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	0.3	<0.1	<0.1	<0.1
Dibenzo(ah)Anthracene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	0.1	<0.1	<0.1	<0.1
Benzo(ghi)Perylene	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	0.4	<0.1	<0.1	<0.1
Phenol	GC/MS (MCERTS)	0.1	mg/kg	M	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil

Combined Suite - Testing Suite 2 plus leachate suite and full WAC

				Concept Reference	785341 001	785341 002	785341 003	785341 004	785341 005
				Customer Sample Reference	PMC1	PMC2	PMC3	PMC4	PMC5
				Test Sample	M40	M40	M40	M40	M40
				Top Depth	10	10			0.5
				Hole ID	FA01	FA02	FA03	FA04	FA05
				Comments	Stockpile Piles Arising	Stockpile Piles Arising	Stockpile Bethels 1	Stockpile Bethels 2	Arches
				Date Sampled	26-NOV-2018	26-NOV-2018	26-NOV-2018	26-NOV-2018	26-NOV-2018
				Matrix Class	Clay	Clay	Clay	Clay	Clay
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Arsenic	ICP/OES	2	mg/kg	M	7	<2	6	14	13
Cadmium	ICP/OES	1	mg/kg	M	<1	<1	<1	<1	<1
Chromium	ICP/OES	1	mg/kg	M	13	9	10	16	12
Lead	ICP/OES	1	mg/kg	M	29	9	11	140	520
Nickel	ICP/OES	1	mg/kg	M	12	9	16	19	17
Selenium	ICP/OES	3	mg/kg	M	<3	<3	<3	<3	<3
Copper	ICP/OES	1	mg/kg	M	15	10	13	57	44
Zinc	ICP/OES	1	mg/kg	M	37	22	42	120	54

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
Combined Suite - Testing Suite 2 plus leachate suite and full WAC

Concept Reference					**785341 006**	**785341 007**	**785341 008**	**785341 009**	**785341 010**
Customer Sample Reference					**PMC6**	**PMC7**	**PMC8**	**PMC9**	**PMC10**
Test Sample					**M40**	**M40**	**M40**	**M40**	**M40**
Top Depth							**3**	**4**	
Hole ID					**FA06**	**FA07**	**FA08**	**FA09**	**FA10**
Comments					**Dewatering West 1**	**Dewatering West 2**	**Dewatering East 1**	**Dewatering East 2**	**Dewatering West 3**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Arsenic	ICP/OES	2	mg/kg	M	**4**	**9**	**9**	**4**	**8**
Cadmium	ICP/OES	1	mg/kg	M	<1	<1	<1	<1	<1
Chromium	ICP/OES	1	mg/kg	M	**14**	**14**	**16**	**22**	**19**
Lead	ICP/OES	1	mg/kg	M	**22**	**54**	**60**	**20**	**38**
Nickel	ICP/OES	1	mg/kg	M	**19**	**14**	**16**	**10**	**17**
Selenium	ICP/OES	3	mg/kg	M	<3	<3	<3	<3	<3
Copper	ICP/OES	1	mg/kg	M	**16**	**27**	**28**	**11**	**22**
Zinc	ICP/OES	1	mg/kg	M	**51**	**66**	**56**	**45**	**63**

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
Asbestos screen and ID

Concept Reference					**785341 001**	**785341 002**	**785341 003**	**785341 004**	**785341 005**
Customer Sample Reference					**PMC1**	**PMC2**	**PMC3**	**PMC4**	**PMC5**
Test Sample					**A40**	**A40**	**A40**	**A40**	**A40**
Top Depth					**10**	**10**			**0.5**
Hole ID					**FA01**	**FA02**	**FA03**	**FA04**	**FA05**
Comments					**Stockpile Piles Arising**	**Stockpile Piles Arising**	**Stockpile Bethels 1**	**Stockpile Bethels 2**	**Arches**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Asbestos ID	PLM			SU	N.D.	N.D.	N.D.	N.D.	N.D.

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
Asbestos screen and ID

Concept Reference					**785341 006**	**785341 007**	**785341 008**	**785341 009**	**785341 010**
Customer Sample Reference					**PMC6**	**PMC7**	**PMC8**	**PMC9**	**PMC10**
Test Sample					**A40**	**A40**	**A40**	**A40**	**A40**
Top Depth							**3**	**4**	
Hole ID					**FA06**	**FA07**	**FA08**	**FA09**	**FA10**
Comments					**Dewatering West 1**	**Dewatering West 2**	**Dewatering East 1**	**Dewatering East 2**	**Dewatering West 3**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Asbestos ID	PLM			SU	N.D.	N.D.	N.D.	N.D.	N.D.

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
Miscellaneous Extras

Concept Reference					**785341 001**	**785341 002**	**785341 003**	**785341 004**	**785341 005**
Customer Sample Reference					**PMC1**	**PMC2**	**PMC3**	**PMC4**	**PMC5**
Test Sample					**AR**	**AR**	**AR**	**AR**	**AR**
Top Depth					**10**	**10**			**0.5**
Hole ID					**FA01**	**FA02**	**FA03**	**FA04**	**FA05**
Comments					**Stockpile Piles Arising**	**Stockpile Piles Arising**	**Stockpile Bethels 1**	**Stockpile Bethels 2**	**Arches**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Total Petroleum Hydrocarbons (C6 - C10)	GC/MS (Headspace)	10	µg/kg	N	(100) <100	(100) <100	(100) <100	(100) <100	(100) <100
Moisture @40C	Grav (1 Dec) (40 C)	0.1	%	N	**15**	**14**	**8.0**	**13**	**8.0**

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
Miscellaneous Extras

Concept Reference					**785341 006**	**785341 007**	**785341 008**	**785341 009**	**785341 010**
Customer Sample Reference					**PMC6**	**PMC7**	**PMC8**	**PMC9**	**PMC10**
Test Sample					**AR**	**AR**	**AR**	**AR**	**AR**
Top Depth							**3**	**4**	
Hole ID					**FA06**	**FA07**	**FA08**	**FA09**	**FA10**
Comments					**Dewatering West 1**	**Dewatering West 2**	**Dewatering East 1**	**Dewatering East 2**	**Dewatering West 3**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Total Petroleum Hydrocarbons (C6 - C10)	GC/MS (Headspace)	10	µg/kg	N	(100) <100	(100) <100	(100) <100	(100) <100	(100) <100
Moisture @40C	Grav (1 Dec) (40 C)	0.1	%	N	**20**	**8.8**	**17**	**23**	**18**

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
Miscellaneous Extras

Concept Reference					**785341 001**	**785341 002**	**785341 003**	**785341 004**	**785341 005**
Customer Sample Reference					**PMC1**	**PMC2**	**PMC3**	**PMC4**	**PMC5**
Test Sample					**M105**	**M105**	**M105**	**M105**	**M105**
Top Depth					**10**	**10**			**0.5**
Hole ID					**FA01**	**FA02**	**FA03**	**FA04**	**FA05**
Comments					**Stockpile Piles Arising**	**Stockpile Piles Arising**	**Stockpile Bethels 1**	**Stockpile Bethels 2**	**Arches**
Date Sampled					**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
Matrix Class					**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	**(13) 180**	(13) <10	(13) <10	**(13) 48**	**(13) 240**

Concept Reference: 785341
Customer Reference: N3844

Soil Analysed as Soil
Miscellaneous Extras

Concept Reference					785341 006	785341 007	785341 008	785341 009	785341 010
Customer Sample Reference					PMC6	PMC7	PMC8	PMC9	PMC10
Test Sample					M105	M105	M105	M105	M105
Top Depth							3	4	
Hole ID					FA06	FA07	FA08	FA09	FA10
Comments					Dewatering West 1	Dewatering West 2	Dewatering East 1	Dewatering East 2	Dewatering West 3
Date Sampled					26-NOV-2018	26-NOV-2018	26-NOV-2018	26-NOV-2018	26-NOV-2018
Matrix Class					Clay	Clay	Clay	Clay	Clay
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
Total Petroleum Hydrocarbons C6-C40 (Sum)	Calc	10	mg/kg	N	(13) <10	**(13) 47**	**(13) 650**	(13) <10	**(13) 10**

Concept Reference: 785341
Customer Reference: N3844

Leachate to BS EN 12457-2 (10:1) Analysed as Water
Combined Leachate and WAC Leachate Suite

Concept Reference					785341 001	785341 002	785341 003	785341 004	785341 005
Customer Sample Reference					PMC1	PMC2	PMC3	PMC4	PMC5
Test Sample					10:1	10:1	10:1	10:1	10:1
Top Depth					10	10			0.5
Hole ID					FA01	FA02	FA03	FA04	FA05
Comments					Stockpile Piles Arising	Stockpile Piles Arising	Stockpile Bethels 1	Stockpile Bethels 2	Arches
Date Sampled					26-NOV-2018	26-NOV-2018	26-NOV-2018	26-NOV-2018	26-NOV-2018
Matrix Class					Clay	Clay	Clay	Clay	Clay
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
pH	Probe			U	**11.4**	**8.11**	**7.47**	**7.57**	**8.35**
Boron (Dissolved)	ICP/OES (Filtered)	0.01	mg/l	N	**0.02**	**0.05**	**0.03**	**0.07**	**0.08**
Arsenic (Dissolved)	ICP/MS (Filtered)	0.2	µg/l	U	**2.7**	**0.3**	**0.4**	**4.9**	**3.8**
Cadmium (Dissolved)	ICP/MS (Filtered)	0.02	µg/l	U	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**11**	**4**	**2**	**2**	**3**
Lead (Dissolved)	ICP/MS (Filtered)	0.3	µg/l	U	<0.3	**0.5**	**0.5**	**0.7**	**3.7**
Mercury (Dissolved)	ICP/MS (Filtered)	0.05	µg/l	U	**0.12**	<0.05	<0.05	<0.05	<0.05
Nickel (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**1**	<1	**1**	<1	**1**
Copper (Dissolved)	ICP/MS (Filtered)	0.5	µg/l	U	**9.8**	**0.6**	**0.9**	**2.9**	**6.5**
Zinc (Dissolved)	ICP/MS (Filtered)	2	µg/l	U	<2	**5**	**5**	**3**	**3**
Total Petroleum Hydrocarbons	GC/FID	0.1	mg/l	U	**(13) 0.4**	**(13) 0.4**	**(13) 1.2**	**(13) 0.3**	**(13) 1.2**
PAH (sum of 4)	Calc		µg/l	N	<0.01	<0.01	<0.01	**0.85**	**0.29**
Benzo(b)fluoranthene	GC/MS (SIR)	0.01	µg/l	U	(13) <0.01	(13) <0.01	(13) <0.01	**(13) 0.25**	**(13) 0.05**
Benzo(ghi)Perylene	GC/MS (SIR)	0.01	µg/l	U	(13) <0.01	(13) <0.01	(13) <0.01	**(13) 0.22**	**(13) 0.14**
Benzo(k)fluoranthene	GC/MS (SIR)	0.01	µg/l	U	(13) <0.01	(13) <0.01	(13) <0.01	**(13) 0.21**	**(13) 0.04**
Indeno(123-cd)Pyrene	GC/MS (SIR)	0.01	µg/l	U	(13) <0.01	(13) <0.01	(13) <0.01	**(13) 0.17**	**(13) 0.06**
Barium (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**21**	**9**	**8**	**11**	**15**
Molybdenum (Dissolved)	ICP/MS (Filtered)	1	µg/l	N	**10**	<1	<1	**12**	**6**
Total Dissolved Solids	Grav	100	mg/l	N	**400**	<100	<100	**110**	**320**
Phenols (Total-Mono)	Colorimetry	0.1	mg/l	U	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Organic Carbon	OX/IR	1	mg/l	N	**4**	**2**	**2**	**3**	**8**
Electrical Conductivity	Probe	10	µS/cm	N	**670**	**59**	**27**	**180**	**540**
Antimony (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	<1	<1	<1	**2**	**1**
Selenium (Dissolved)	ICP/MS (Filtered)	0.5	µg/l	U	**0.8**	<0.5	<0.5	**1.1**	**1.4**
Chloride	Discrete Analyser	1	mg/l	U	**3**	**2**	<1	**2**	**3**
Fluoride	Discrete Analyser	0.05	mg/l	U	<0.05	**0.12**	**0.24**	**0.47**	**0.14**
Sulphate	Discrete Analyser	0.5	mg/l	U	**14**	**0.9**	<0.5	**29**	**160**

Concept Reference: 785341
Customer Reference: N3844

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

Combined Leachate and WAC Leachate Suite

				Concept Reference	**785341 006**	**785341 007**	**785341 008**	**785341 009**	**785341 010**
				Customer Sample Reference	**PMC6**	**PMC7**	**PMC8**	**PMC9**	**PMC10**
				Test Sample	**10:1**	**10:1**	**10:1**	**10:1**	**10:1**
				Top Depth			**3**	**4**	
				Hole ID	**FA06**	**FA07**	**FA08**	**FA09**	**FA10**
				Comments	**Dewatering West 1**	**Dewatering West 2**	**Dewatering East 1**	**Dewatering East 2**	**Dewatering West 3**
				Date Sampled	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**	**26-NOV-2018**
				Matrix Class	**Clay**	**Clay**	**Clay**	**Clay**	**Clay**
Determinand	**Method**	**LOD**	**Units**	**Symbol**					
pH	Probe			U	**8.19**	**10.6**	**8.44**	**8.02**	**7.96**
Boron (Dissolved)	ICP/OES (Filtered)	0.01	mg/l	N	**0.06**	**0.06**	**0.05**	**0.06**	**0.05**
Arsenic (Dissolved)	ICP/MS (Filtered)	0.2	µg/l	U	<0.2	**2.5**	**0.8**	**0.2**	**0.3**
Cadmium (Dissolved)	ICP/MS (Filtered)	0.02	µg/l	U	<0.02	**0.07**	<0.02	<0.02	<0.02
Chromium (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**4**	**3**	**2**	**3**	**2**
Lead (Dissolved)	ICP/MS (Filtered)	0.3	µg/l	U	<0.3	<0.3	**0.3**	**0.4**	<0.3
Mercury (Dissolved)	ICP/MS (Filtered)	0.05	µg/l	U	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	<1	<1	<1	<1	<1
Copper (Dissolved)	ICP/MS (Filtered)	0.5	µg/l	U	<0.5	**8.9**	**2.1**	**0.6**	**0.7**
Zinc (Dissolved)	ICP/MS (Filtered)	2	µg/l	U	**3**	<2	**4**	**5**	**3**
Total Petroleum Hydrocarbons	GC/FID	0.1	mg/l	U	**(13) 0.8**	**(13) 0.7**	(13) <0.1	(13,100) <0.2	**(13) 0.3**
PAH (sum of 4)	Calc		µg/l	N	<0.01	**0.34**	**0.12**	<0.01	**0.03**
Benzo(b)fluoranthene	GC/MS (SIR)	0.01	µg/l	U	(13) <0.01	**(13) 0.10**	**(13) 0.03**	(13) <0.01	**(13) 0.01**
Benzo(ghi)Perylene	GC/MS (SIR)	0.01	µg/l	U	(13) <0.01	**(13) 0.09**	**(13) 0.04**	(13) <0.01	**(13) 0.01**
Benzo(k)fluoranthene	GC/MS (SIR)	0.01	µg/l	U	(13) <0.01	**(13) 0.08**	**(13) 0.02**	(13) <0.01	**(13) 0.01**
Indeno(123-cd)Pyrene	GC/MS (SIR)	0.01	µg/l	U	(13) <0.01	**(13) 0.07**	**(13) 0.03**	(13) <0.01	(13) <0.01
Barium (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	**4**	**2**	**6**	**8**	**12**
Molybdenum (Dissolved)	ICP/MS (Filtered)	1	µg/l	N	<1	**18**	**6**	**2**	**5**
Total Dissolved Solids	Grav	100	mg/l	N	**220**	**150**	**120**	<100	<100
Phenols (Total-Mono)	Colorimetry	0.1	mg/l	U	<0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Organic Carbon	OX/IR	1	mg/l	N	**3**	**5**	**6**	**2**	**3**
Electrical Conductivity	Probe	10	µS/cm	N	**370**	**250**	**210**	**160**	**140**
Antimony (Dissolved)	ICP/MS (Filtered)	1	µg/l	U	<1	**1**	<1	<1	<1
Selenium (Dissolved)	ICP/MS (Filtered)	0.5	µg/l	U	**1.7**	**2.7**	**0.6**	<0.5	**0.7**
Chloride	Discrete Analyser	1	mg/l	U	**1**	**2**	**8**	**3**	**2**
Fluoride	Discrete Analyser	0.05	mg/l	U	**0.09**	<0.05	**0.26**	**0.29**	**0.35**
Sulphate	Discrete Analyser	0.5	mg/l	U	**55**	**27**	**17**	**44**	**5.4**

Index to symbols used in Supplement to 785341-2

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

Notes

Asbestos testing was sbucontracted to REC Asbestos
Supplemental report to amend the address as per client's request from 'Saint Ambrose Extension, Manchester Road, Swinton, Salford. M27 9QL' to 'The Factory, Water Street, M3 4JQ'

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

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

Concept Life Sciences

Certificate of Analysis

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

Report Number: Report B 798987-1

Date of Report: 04-Mar-2019

Customer: Forshaw Demolition LTD
King House
Stotts Park
James Street
Westhoughton
Bolton
BL5 3QR

Customer Contact: Mr Chris Forshaw

Customer Job Reference:
Customer Purchase Order: PO10837PT10105
Customer Site Reference: THE FACTORY
Date Job Received at Concept: 30-Jan-2019
Date Analysis Started: 05-Feb-2019
Date Analysis Completed: 04-Mar-2019

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

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

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

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

UKAS
TESTING
1549

Report checked
and authorised by :
Toni Morris
Customer Service Advisor

Issued by :
Toni Morris
Customer Service Advisor
TMorris

Summary Of Results

Soil

Dioxins

				WHO2005 Toxic Equivalents ng/kg		WHO Toxic Equivalents ng/kg	
Concept Reference	**Customer Sample Reference**	**Analysis**	**Symbol**	**Lower Bound**	**Upper Bound**	**Lower Bound**	**Upper Bound**
798987 001	SAMPLE 1	Dioxins and Furans (Based on US EPA 1613)	U	2.0	**3.7**	1.8	**3.6**

Soil

Customer Sample Reference : SAMPLE 1
Our Sample Reference : 798987 001
Test Portion Mass (g) : 175
Sample in Dish @ 105C : 82.6
Empty Dish Weight : 0
Wet Sample in Dish Weight : 100
Date Sampled : 01-FEB-2019

Dioxins and Furans (Based on US EPA 1613)

Technique : GC/MS (HR)

				WHO2005 Toxic Equivalents ng/kg		WHO Toxic Equivalents ng/kg	
Determinand	**Symbol**	**LOD ng/kg**	**Result ng/kg**	**Lower Bound**	**Upper Bound**	**Lower Bound**	**Upper Bound**
2,3,7,8-TCDD	U	0.40	<0.40	0.0	**0.40**	0.0	**0.40**
1,2,3,7,8-PeCDD	U	0.40	<0.40	0.0	**0.40**	0.0	**0.40**
1,2,3,4,7,8-HxCDD	U	0.40	<0.40	0.0	**0.040**	0.0	**0.040**
1,2,3,6,7,8-HxCDD	U	0.40	**2.0**	0.20	**0.20**	0.20	**0.20**
1,2,3,7,8,9-HxCDD	U	0.40	**0.80**	0.080	**0.080**	0.080	**0.080**
1,2,3,4,6,7,8-HpCDD	U	0.39	**120**	1.2	**1.2**	1.2	**1.2**
OCDD	U	0.45	**1000**	0.31	**0.31**	0.10	**0.10**
			Dioxins Totals :	1.7	**2.6**	1.5	**2.4**
2,3,7,8-TCDF	U	0.23	**1.4**	0.14	**0.14**	0.14	**0.14**
1,2,3,7,8-PeCDF	U	0.95	<0.95	0.0	**0.028**	0.0	**0.048**
2,3,4,7,8-PeCDF	U	0.80	<0.80	0.0	**0.24**	0.0	**0.40**
1,2,3,4,7,8-HxCDF	U	1.6	<1.6	0.0	**0.16**	0.0	**0.16**
1,2,3,6,7,8-HxCDF	U	1.4	<1.4	0.0	**0.14**	0.0	**0.14**
2,3,4,6,7,8-HxCDF	U	1.6	<1.6	0.0	**0.16**	0.0	**0.16**
1,2,3,7,8,9-HxCDF	U	0.60	<0.60	0.0	**0.060**	0.0	**0.060**
1,2,3,4,6,7,8-HpCDF	U	0.15	**14**	0.14	**0.14**	0.14	**0.14**
1,2,3,4,7,8,9-HpCDF	U	1.8	<1.8	0.0	**0.018**	0.0	**0.018**
OCDF	U	0.53	**57**	0.017	**0.017**	0.0057	**0.0057**
			Furans Totals :	0.29	**1.1**	0.28	**1.3**
			Totals :	**2.0**	**3.7**	**1.8**	**3.6**

Concept Reference: 798987
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
WM3 POPs screen suite

				Concept Reference	**798987 001**
				Customer Sample Reference	**SAMPLE 1**
				Test Sample	**AR**
				Date Sampled	**01-FEB-2019**
Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Aldrin	GC/MS (Scanning)	5.0	mg/kg	N	<5.0
Chlordane (sum of cis and trans isomers)	GC/MS (Scanning)	5.0	mg/kg	N	<5.0
Chlordecone	GC/MS	50	mg/kg	N	<50
DDT	GC/MS (Scanning)	5.0	mg/kg	N	<5.0
Dieldrin	GC/MS (Scanning)	5.0	mg/kg	N	<5.0
Endrin	GC/MS (Scanning)	5.0	mg/kg	N	<5.0
Heptachlor	GC/MS (Scanning)	5.0	mg/kg	N	<5.0
Hexabromobiphenyl	GC/MS (Scanning)	5.0	mg/kg	N	<5.0
Hexachlorobenzene	GC/MS (Scanning)	5.0	mg/kg	N	<5.0
Hexachlorocyclohexane (sum of alpha, beta and gamma)	GC/MS (Scanning)	5.0	mg/kg	N	<5.0
Mirex	GC/MS (Scanning)	5.0	mg/kg	N	<5.0
Pentachlorobenzene	GC/MS (Scanning)	5.0	mg/kg	N	<5.0
Poly-Chlorinated Biphenyls (Total Tri-Hepta)	GC/MS (HR)	0.05	µg/kg	U	**6.1**
Toxaphene	GC/MS (Scanning)	5.0	mg/kg	N	<5.0

Concept Reference: 798987
Project Site: THE FACTORY
Customer Reference:

Soil Analysed as Soil
Metals

				Concept Reference	**798987 001**
				Customer Sample Reference	**SAMPLE 1**
				Test Sample	**A40**
				Date Sampled	**01-FEB-2019**
Determinand	**Method**	**LOD**	**Units**	**Symbol**	
Chromium VI	ICP/OES	1	mg/kg	N	<1

Index to symbols used in Report B 798987-1

Value	Description
AR	As Received
A40	Assisted dried < 40C
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Report B to include Dioxins results only.

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

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

Concept Life Sciences

Certificate of Analysis

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

Report Number: 807719-3

Date of Report: 18-Mar-2019

Customer: Forshaw Demolition LTD
King House
Stotts Park
James Street
Westhoughton
Bolton
BL5 3QR

Customer Contact: Mr Chris Forshaw

Customer Job Reference:
Customer Purchase Order: PO10989PT10105
Customer Site Reference: The Factory
Date Job Received at Concept: 07-Mar-2019
Date Analysis Started: 11-Mar-2019
Date Analysis Completed: 18-Mar-2019

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

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

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

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

UKAS TESTING
1549

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked
and authorised by :
Toni Morris
Customer Service Advisor

Issued by :
Toni Morris
Customer Service Advisor
TMorris

Concept Reference: 807719
Project Site: The Factory
Customer Reference:

Soil Analysed as Soil
MCERTS Preparation

Concept Reference	**807719 001**
Customer Sample Reference	**Factory Sample**
Date Sampled	**07-MAR-2019**
Matrix Class	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units	
Moisture @105C	T162	AR	0.1	%	**11**
Retained on 10mm sieve	T2	M40	0.1	%	<0.1

Concept Reference: 807719
Project Site: The Factory
Customer Reference:

Soil Analysed as Soil
Metals

Concept Reference	**807719 001**
Customer Sample Reference	**Factory Sample**
Date Sampled	**07-MAR-2019**
Matrix Class	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units	
Chromium VI	T6	A40	1	mg/kg	<1
Chromium (trivalent)	T85	A40	2	mg/kg	**28**

Concept Reference: 807719
Project Site: The Factory
Customer Reference:

Soil Analysed as Soil
Metals Suite 2

Concept Reference	**807719 001**
Customer Sample Reference	**Factory Sample**
Date Sampled	**07-MAR-2019**
Matrix Class	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units	
Arsenic	T6	A40	2.0	mg/kg	**4.8**
Boron	T6	A40	0.5	mg/kg	**26**
Barium	T6	A40	1	mg/kg	**84**
Beryllium	T6	A40	2	mg/kg	<2
Cadmium	T6	A40	1	mg/kg	<1
Copper	T6	A40	1	mg/kg	**19**
Mercury	T6	A40	1	mg/kg	<1
Molybdenum	T6	A40	2	mg/kg	**2**
Nickel	T6	A40	1	mg/kg	**28**
Lead	T6	A40	1	mg/kg	**8**
Antimony	T6	A40	1	mg/kg	**1**
Selenium	T6	A40	3	mg/kg	<3
Zinc	T6	A40	1	mg/kg	**74**

Concept Reference: 807719
Project Site: The Factory
Customer Reference:

Soil Analysed as Soil
TPH CWG C5-C40 inc MTBE, BTEX

Concept Reference	**807719 001**
Customer Sample Reference	**Factory Sample**
Date Sampled	**07-MAR-2019**
Matrix Class	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units	
Benzene	T209	M105	10	µg/kg	<10(13)
Toluene	T209	M105	10	µg/kg	<10
EthylBenzene	T209	M105	10	µg/kg	<10
M/P Xylene	T209	M105	10	µg/kg	<10
O Xylene	T209	M105	10	µg/kg	<10
Methyl tert-Butyl Ether	T209	M105	10	µg/kg	<10
TPH (C5-C6 aliphatic)	T209	AR	0.100	mg/kg	<0.100
TPH (C6-C8 aliphatic)	T209	AR	0.10	mg/kg	<0.10
TPH (C8-C10 aliphatic)	T209	AR	0.10	mg/kg	**4.7**
TPH (C10-C12 aliphatic)	T909	M105	1	mg/kg	<1(13)
TPH (C12-C16 aliphatic)	T909	M105	1	mg/kg	**3(13)**
TPH (C16-C21 aliphatic)	T909	M105	1	mg/kg	**36(13)**
TPH (C21-C35 aliphatic)	T909	M105	2	mg/kg	**44(13)**
TPH (C35-C40 aliphatic)	T909	M105	1	mg/kg	**9(13)**
TPH (Aliphatic) total	T85	M105			**110(13)**
TPH (C6-C7 aromatic)	T209	AR	0.10	mg/kg	<0.10
TPH (C7-C8 aromatic)	T209	AR	0.10	mg/kg	<0.10
TPH (C8-C10 aromatic)	T209	AR	0.10	mg/kg	<0.10
TPH (C10-C12 aromatic)	T909	M105	2	mg/kg	<2(13)
TPH (C12-C16 aromatic)	T909	M105	1	mg/kg	**6(13)**
TPH (C16-C21 aromatic)	T909	M105	1	mg/kg	**46(13)**
TPH (C21-C35 aromatic)	T909	M105	1	mg/kg	**60(13)**
TPH (C35-C40 aromatic)	T909	M105	1	mg/kg	<1(13)
TPH (Aromatic) total	T85	M105			**92(13)**
TPH (Aliphatic+Aromatic) (sum)	T85	M105			**200(13)**

Concept Reference: 807719
Project Site: The Factory
Customer Reference:

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

Concept Reference	**807719 001**
Customer Sample Reference	**Factory Sample**
Date Sampled	**07-MAR-2019**
Matrix Class	**Sandy Soil**

Determinand	Method	Test Sample	LOD	Units	
Naphthalene	T207	M105	0.1	mg/kg	<0.1
Acenaphthylene	T207	M105	0.1	mg/kg	<0.1
Acenaphthene	T207	M105	0.1	mg/kg	**0.2**
Fluorene	T207	M105	0.1	mg/kg	<0.1
Phenanthrene	T207	M105	0.1	mg/kg	**1.3**
Anthracene	T207	M105	0.1	mg/kg	**0.3**
Fluoranthene	T207	M105	0.1	mg/kg	**1.7**
Pyrene	T207	M105	0.1	mg/kg	**1.4**
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	**0.8**
Chrysene	T207	M105	0.1	mg/kg	**0.9**
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	**0.6**
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	**0.4**
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	**0.6**
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	**0.4**
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	**0.2**
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	**0.4**
PAH(total)	T207	M105	0.1	mg/kg	**9.1**

Concept Reference: 807719
Project Site: The Factory
Customer Reference:

Soil Analysed as Soil
Inorganics

				Concept Reference	**807719 001**
				Customer Sample Reference	**Factory Sample**
				Date Sampled	**07-MAR-2019**
				Matrix Class	**Sandy Soil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**	
Cyanide(Complex)	T85	AR	1	mg/kg	<1
Cyanide(free)	T4	AR	1	mg/kg	<1
Cyanide(Total)	T4	AR	1	mg/kg	<1
pH	T7	A40			**7.4**

Index to symbols used in 807719-3

Value	Description
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
AR	As Received
A40	Assisted dried < 40C
13	Results have been blank corrected.
M	Analysis is MCERTS accredited
U	Analysis is UKAS accredited
N	Analysis is not UKAS accredited

Notes

Samples submitted for GC/MS (Headspace) analysis were submitted in inappropriate containers. It is possible therefore that the results provided may be compromised.

Method Index

Value	Description
T6	ICP/OES
T209	GC/MS (Head Space)(MCERTS)
T909	GCxGC
T7	Probe
T207	GC/MS (MCERTS)
T2	Grav
T4	Colorimetry
T85	Calc
T162	Grav (1 Dec) (105 C)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Cyanide(Complex)	T85	AR	1	mg/kg	N	001
Cyanide(free)	T4	AR	1	mg/kg	M	001
Cyanide(Total)	T4	AR	1	mg/kg	M	001
pH	T7	A40			M	001
Naphthalene	T207	M105	0.1	mg/kg	M	001
Acenaphthylene	T207	M105	0.1	mg/kg	U	001
Acenaphthene	T207	M105	0.1	mg/kg	M	001
Fluorene	T207	M105	0.1	mg/kg	M	001
Phenanthrene	T207	M105	0.1	mg/kg	M	001
Anthracene	T207	M105	0.1	mg/kg	U	001
Fluoranthene	T207	M105	0.1	mg/kg	M	001
Pyrene	T207	M105	0.1	mg/kg	M	001
Benzo(a)Anthracene	T207	M105	0.1	mg/kg	M	001
Chrysene	T207	M105	0.1	mg/kg	M	001

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Benzo(b)fluoranthene	T207	M105	0.1	mg/kg	M	001
Benzo(k)fluoranthene	T207	M105	0.1	mg/kg	M	001
Benzo(a)Pyrene	T207	M105	0.1	mg/kg	M	001
Indeno(123-cd)Pyrene	T207	M105	0.1	mg/kg	M	001
Dibenzo(ah)Anthracene	T207	M105	0.1	mg/kg	M	001
Benzo(ghi)Perylene	T207	M105	0.1	mg/kg	M	001
PAH(total)	T207	M105	0.1	mg/kg	U	001
Arsenic	T6	A40	2.0	mg/kg	U	001
Boron	T6	A40	0.5	mg/kg	N	001
Barium	T6	A40	1	mg/kg	U	001
Beryllium	T6	A40	2	mg/kg	U	001
Cadmium	T6	A40	1	mg/kg	U	001
Copper	T6	A40	1	mg/kg	U	001
Mercury	T6	A40	1	mg/kg	U	001
Molybdenum	T6	A40	2	mg/kg	U	001
Nickel	T6	A40	1	mg/kg	U	001
Lead	T6	A40	1	mg/kg	U	001
Antimony	T6	A40	1	mg/kg	U	001
Selenium	T6	A40	3	mg/kg	U	001
Zinc	T6	A40	1	mg/kg	U	001
Chromium VI	T6	A40	1	mg/kg	N	001
Chromium (trivalent)	T85	A40	2	mg/kg	N	001
Moisture @105C	T162	AR	0.1	%	N	001
Retained on 10mm sieve	T2	M40	0.1	%	N	001
Benzene	T209	M105	10	µg/kg	M	001
Toluene	T209	M105	10	µg/kg	M	001
EthylBenzene	T209	M105	10	µg/kg	M	001
M/P Xylene	T209	M105	10	µg/kg	M	001
O Xylene	T209	M105	10	µg/kg	M	001
Methyl tert-Butyl Ether	T209	M105	10	µg/kg	M	001
TPH (C5-C6 aliphatic)	T209	AR	0.100	mg/kg	N	001
TPH (C6-C8 aliphatic)	T209	AR	0.10	mg/kg	N	001
TPH (C8-C10 aliphatic)	T209	AR	0.10	mg/kg	N	001
TPH (C10-C12 aliphatic)	T909	M105	1	mg/kg	M	001
TPH (C12-C16 aliphatic)	T909	M105	1	mg/kg	M	001
TPH (C16-C21 aliphatic)	T909	M105	1	mg/kg	M	001
TPH (C21-C35 aliphatic)	T909	M105	2	mg/kg	M	001
TPH (C35-C40 aliphatic)	T909	M105	1	mg/kg	N	001
TPH (Aliphatic) total	T85	M105			N	001
TPH (C6-C7 aromatic)	T209	AR	0.10	mg/kg	N	001
TPH (C7-C8 aromatic)	T209	AR	0.10	mg/kg	N	001
TPH (C8-C10 aromatic)	T209	AR	0.10	mg/kg	N	001
TPH (C10-C12 aromatic)	T909	M105	2	mg/kg	M	001
TPH (C12-C16 aromatic)	T909	M105	1	mg/kg	M	001
TPH (C16-C21 aromatic)	T909	M105	1	mg/kg	M	001
TPH (C21-C35 aromatic)	T909	M105	1	mg/kg	M	001
TPH (C35-C40 aromatic)	T909	M105	1	mg/kg	N	001
TPH (Aromatic) total	T85	M105			N	001
TPH (Aliphatic+Aromatic) (sum)	T85	M105			N	001

Waste Classification Report

Z7GK7-2F8FQ-8MDSE

Job name

Factory 23.04.2020

Description/Comments

Waste from outtfall installation works. Area known to have treated Giant Knotweed. Sample total chromium only, not speciated.

Project

The Factory

Site

The Factory outfall works

Related Documents

#	Name	Description
None		

Waste Stream Template

Factory outfall suite

Classified by

Name: **Nadia Bidzinska** Date: **23 Apr 2020 11:59 GMT** Telephone: **01322 296200**	Company: **Laing O'Rourke** **Bridge Place** **Anchor Boulevard** **Crossings** **DA2 6SN**	HazWasteOnline™ Training Record:	

Course	**Date**
Hazardous Waste Classification	11 Sep 2017
Advanced Hazardous Waste Classification	12 Sep 2017

Report

Created by: Nadia Bidzinska
Created date: 23 Apr 2020 11:59 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	Sample 1		Non Hazardous		2
2	Sample 2		Non Hazardous		4
3	Sample 3		Non Hazardous		6

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	8
Appendix B: Rationale for selection of metal species	9
Appendix C: Version	10

Classification of sample: Sample 1

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
Sample 1		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: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				10	mg/kg	1.32	13.203	mg/kg	0.00132 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		barium { ● barium oxide }				175	mg/kg	1.117	195.389	mg/kg	0.0195 %	✓	
			215-127-9	1304-28-5									
3		cadmium { cadmium oxide }				0.6	mg/kg	1.142	0.685	mg/kg	0.0000685 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
4		chromium { ● chromium(III) oxide }				17	mg/kg	1.462	24.846	mg/kg	0.00248 %	✓	
			215-160-9	1308-38-9									
5		copper { dicopper oxide; copper (I) oxide }				31	mg/kg	1.126	34.903	mg/kg	0.00349 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	230	mg/kg	1.56	358.757	mg/kg	0.023 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				0.77	mg/kg	1.353	1.042	mg/kg	0.000104 %	✓	
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				33	mg/kg	2.976	98.217	mg/kg	0.00982 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		**<LOD**
		034-002-00-8											
10		zinc { zinc chromate }				84	mg/kg	2.774	233.028	mg/kg	0.0233 %	✓	
		024-007-00-3											
11	●	TPH (C6 to C40) petroleum group				376	mg/kg		376	mg/kg	0.0376 %	✓	
				TPH									
12		benzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
13		toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
14	●	ethylbenzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
15		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
				203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
16		naphthalene	601-052-00-2	202-049-5	91-20-3		2.61 mg/kg		2.61 mg/kg	0.000261 %	✓	
17	●	acenaphthylene		205-917-1	208-96-8		0.04 mg/kg		0.04 mg/kg	0.000004 %	✓	
18	●	acenaphthene		201-469-6	83-32-9		1.1 mg/kg		1.1 mg/kg	0.00011 %	✓	
19	●	fluorene		201-695-5	86-73-7		1.2 mg/kg		1.2 mg/kg	0.00012 %	✓	
20	●	phenanthrene		201-581-5	85-01-8		7.6 mg/kg		7.6 mg/kg	0.00076 %	✓	
21	●	anthracene		204-371-1	120-12-7		1.9 mg/kg		1.9 mg/kg	0.00019 %	✓	
22	●	fluoranthene		205-912-4	206-44-0		5.37 mg/kg		5.37 mg/kg	0.000537 %	✓	
23	●	pyrene		204-927-3	129-00-0		5.38 mg/kg		5.38 mg/kg	0.000538 %	✓	
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		2.5 mg/kg		2.5 mg/kg	0.00025 %	✓	
25		chrysene	601-048-00-0	205-923-4	218-01-9		2.54 mg/kg		2.54 mg/kg	0.000254 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.82 mg/kg		1.82 mg/kg	0.000182 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.53 mg/kg		0.53 mg/kg	0.000053 %	✓	
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.81 mg/kg		1.81 mg/kg	0.000181 %	✓	
29	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.89 mg/kg		0.89 mg/kg	0.000089 %	✓	
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.16 mg/kg		0.16 mg/kg	0.000016 %	✓	
31	●	benzo[ghi]perylene		205-883-8	191-24-2		0.81 mg/kg		0.81 mg/kg	0.000081 %	✓	
32	●	carbazole		201-696-0	86-74-8		0.163 mg/kg		0.163 mg/kg	0.0000163 %	✓	
									Total:	0.125 %		

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

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 Soil sample unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0376%)

Classification of sample: Sample 2

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
Sample 2		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: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		6	mg/kg	1.32	7.922	mg/kg	0.000792 %	✓	
2		barium { ● barium oxide }		215-127-9	1304-28-5		68	mg/kg	1.117	75.922	mg/kg	0.00759 %	✓	
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.5	mg/kg	1.142	<0.571	mg/kg	<0.0000571 %		<LOD
4		chromium { ● chromium(III) oxide }		215-160-9	1308-38-9		9	mg/kg	1.462	13.154	mg/kg	0.00132 %	✓	
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		20	mg/kg	1.126	22.518	mg/kg	0.00225 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	47	mg/kg	1.56	73.311	mg/kg	0.0047 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.27	mg/kg	1.353	0.365	mg/kg	0.0000365 %	✓	
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		14	mg/kg	2.976	41.668	mg/kg	0.00417 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10		zinc { zinc chromate }	024-007-00-3				55	mg/kg	2.774	152.578	mg/kg	0.0153 %	✓	
11	●	TPH (C6 to C40) petroleum group			TPH		121	mg/kg		121	mg/kg	0.0121 %	✓	
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
15		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
			203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
16		naphthalene									
		601-052-00-2	202-049-5	91-20-3		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
17	●	acenaphthylene									
			205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
18	●	acenaphthene									
			201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
19	●	fluorene									
			201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
20	●	phenanthrene									
			201-581-5	85-01-8		0.1 mg/kg		0.1 mg/kg	0.00001 %	✓	
21	●	anthracene									
			204-371-1	120-12-7		0.03 mg/kg		0.03 mg/kg	0.000003 %	✓	
22	●	fluoranthene									
			205-912-4	206-44-0		0.14 mg/kg		0.14 mg/kg	0.000014 %	✓	
23	●	pyrene									
			204-927-3	129-00-0		0.15 mg/kg		0.15 mg/kg	0.000015 %	✓	
24		benzo[a]anthracene									
		601-033-00-9	200-280-6	56-55-3		0.1 mg/kg		0.1 mg/kg	0.00001 %	✓	
25		chrysene									
		601-048-00-0	205-923-4	218-01-9		0.13 mg/kg		0.13 mg/kg	0.000013 %	✓	
26		benzo[b]fluoranthene									
		601-034-00-4	205-911-9	205-99-2		0.11 mg/kg		0.11 mg/kg	0.000011 %	✓	
27		benzo[k]fluoranthene									
		601-036-00-5	205-916-6	207-08-9		<0.07 mg/kg		<0.07 mg/kg	<0.000007 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene									
		601-032-00-3	200-028-5	50-32-8		0.07 mg/kg		0.07 mg/kg	0.000007 %	✓	
29	●	indeno[123-cd]pyrene									
			205-893-2	193-39-5		0.06 mg/kg		0.06 mg/kg	0.000006 %	✓	
30		dibenz[a,h]anthracene									
		601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
31	●	benzo[ghi]perylene									
			205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
								Total:	0.0486 %		

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

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 Soil sample unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0121%)

Classification of sample: Sample 3

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
Sample 3		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: 0% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		7	mg/kg	1.32	9.242	mg/kg	0.000924 %	✓	
2		barium { ● barium oxide }		215-127-9	1304-28-5		56	mg/kg	1.117	62.524	mg/kg	0.00625 %	✓	
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.5	mg/kg	1.142	<0.571	mg/kg	<0.0000571 %		<LOD
4		chromium { ● chromium(III) oxide }		215-160-9	1308-38-9		9	mg/kg	1.462	13.154	mg/kg	0.00132 %	✓	
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		19	mg/kg	1.126	21.392	mg/kg	0.00214 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	46	mg/kg	1.56	71.751	mg/kg	0.0046 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.19	mg/kg	1.353	0.257	mg/kg	0.0000257 %	✓	
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		10	mg/kg	2.976	29.763	mg/kg	0.00298 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10		zinc { zinc chromate }	024-007-00-3				33	mg/kg	2.774	91.547	mg/kg	0.00915 %	✓	
11	●	TPH (C6 to C40) petroleum group			TPH		42	mg/kg		42	mg/kg	0.0042 %	✓	
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
15		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
				203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]									
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
17	●	acenaphthylene		205-917-1	208-96-8		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
18	●	acenaphthene		201-469-6	83-32-9		0.05	mg/kg		0.05	mg/kg	0.000005 %	✓	
19	●	fluorene		201-695-5	86-73-7		0.03	mg/kg		0.03	mg/kg	0.000003 %	✓	
20	●	phenanthrene		201-581-5	85-01-8		0.35	mg/kg		0.35	mg/kg	0.000035 %	✓	
21	●	anthracene		204-371-1	120-12-7		0.09	mg/kg		0.09	mg/kg	0.000009 %	✓	
22	●	fluoranthene		205-912-4	206-44-0		0.67	mg/kg		0.67	mg/kg	0.000067 %	✓	
23	●	pyrene		204-927-3	129-00-0		0.66	mg/kg		0.66	mg/kg	0.000066 %	✓	
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.42	mg/kg		0.42	mg/kg	0.000042 %	✓	
25		chrysene	601-048-00-0	205-923-4	218-01-9		0.42	mg/kg		0.42	mg/kg	0.000042 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.42	mg/kg		0.42	mg/kg	0.000042 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.13	mg/kg		0.13	mg/kg	0.000013 %	✓	
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.42	mg/kg		0.42	mg/kg	0.000042 %	✓	
29	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.36	mg/kg		0.36	mg/kg	0.000036 %	✓	
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.06	mg/kg		0.06	mg/kg	0.000006 %	✓	
31	●	benzo[ghi]perylene		205-883-8	191-24-2		0.33	mg/kg		0.33	mg/kg	0.000033 %	✓	
											Total:	0.0323 %		

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

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 Soil sample unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0042%)

Appendix A: Classifier defined and non CLP determinands

barium oxide (EC Number: 215-127-9, CAS Number: 1304-28-5)

Conversion factor: 1.117
Description/Comments: Data from ECHA's C&L Inventory Database, Sigma Aldrich SDS dated 6/2/20
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/88825
Data source date: 02 Apr 2020
Hazard Statements: Acute Tox. 3 H301 , Skin Corr. 1B H314 , Eye Dam. 1 H318 , Acute Tox. 1 H332

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

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: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

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: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

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: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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 Chronic 1 H410 , Aquatic Acute 1 H400

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: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **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 Chronic 1 H410 , Aquatic Acute 1 H400

- **carbazole** (EC Number: 201-696-0, CAS Number: 86-74-8)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;
Data source: https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 3 H301 , Acute Tox. 3 H311 , Acute Tox. 3 H331 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Carc. 2 H351 , Muta. 2 H341 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315 , Acute Tox. 4 H302

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

barium {barium oxide}

Most likely selection

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium {chromium(III) oxide}

Most likely compound present

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2020.113.4250.8416 (22 Apr 2020)
HazWasteOnline Database: 2020.113.4250.8416 (22 Apr 2020)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
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 Wastes 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
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

Waste Classification Report

WVWQ8-7GLJV-PGVGP

Job name

Factory pile arisings and excavation

Description/Comments

Final results; no asbestos detected in any of the samples tested. Chromium results inputted as chromium (III) as site history and sample characteristics make it unlikely to contain chromium (VI)

Project

The Factory additional samples

Site

The Factory

Related Documents

#	Name	Description
1	785341-N3844-WacLeachate.pdf	Original test results Also includes WAC results

Waste Stream Template

Factory template

Classified by

Name:
Nadia Bidzinska
Date:
09 Jan 2019 11:45 GMT
Telephone:
01322 296200

Company:
Laing O'Rourke
Bridge Place
Anchor Boulevard
Crossings
DA2 6SN

Report

Created by: Nadia Bidzinska
Created date: 09 Jan 2019 11:45 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	PMC1	10	Non Hazardous		3
2	PMC2	10	Non Hazardous		6
3	PMC3		Non Hazardous		8
4	PMC4		Non Hazardous		10
5	PMC5	0.5	Non Hazardous		12
6	PMC6		Non Hazardous		15
7	PMC7		Non Hazardous		17
8	PMC8	3	Non Hazardous		19
9	PMC9	4	Non Hazardous		22
10	PMC10		Non Hazardous		25

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	27
Appendix B: Rationale for selection of metal species	28
Appendix C: Version	29

Classification of sample: PMC1

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
PMC1		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
10 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
15% (wet weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	**User entered data**	Conv. Factor	Compound conc.	**Classification value**	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		7 mg/kg	1.32	7.856 mg/kg	0.000786 %	✓	
2		boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1 mg/kg	3.22	<3.22 mg/kg	<0.000322 %		**<LOD**
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<1 mg/kg	1.142	<1.142 mg/kg	<0.000114 %		**<LOD**
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		13 mg/kg	1.462	16.15 mg/kg	0.00162 %	✓	
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		15 mg/kg	1.126	14.355 mg/kg	0.00144 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	29 mg/kg	1.56	38.449 mg/kg	0.00246 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1 mg/kg	1.353	<1.353 mg/kg	<0.000135 %		**<LOD**
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		12 mg/kg	2.976	30.358 mg/kg	0.00304 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3 mg/kg	2.554	<7.661 mg/kg	<0.000766 %		**<LOD**
10		zinc { zinc chromate }	024-007-00-3				37 mg/kg	2.774	87.247 mg/kg	0.00872 %	✓	
11	●	TPH (C6 to C40) petroleum group			TPH		178 mg/kg		151.3 mg/kg	0.0151 %	✓	
12		benzene	601-020-00-8	200-753-7	71-43-2		<10 mg/kg		<10 mg/kg	<0.001 %		**<LOD**
13		toluene	601-021-00-3	203-625-9	108-88-3		<10 mg/kg		<10 mg/kg	<0.001 %		**<LOD**
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<10 mg/kg		<10 mg/kg	<0.001 %		**<LOD**

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
17	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
18	●	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
19	●	fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
20	●	phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
21	●	anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
22	●	fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
23	●	pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
29	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
31	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
32		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		**<LOD**
											Total:	0.0387 %		

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
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 No liquid fraction present; unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0151%)

Classification of sample: PMC2

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
PMC2		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
10 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
0.5% (wet weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 0.5% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				<2	mg/kg	1.32	<2.641	mg/kg	<0.000264 %		**<LOD**
		033-003-00-0	215-481-4	1327-53-3									
2		boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		**<LOD**
		005-008-00-8	215-125-8	1303-86-2									
3		cadmium { cadmium oxide }				<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		**<LOD**
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				9	mg/kg	1.462	13.088	mg/kg	0.00131 %	✓	
			215-160-9	1308-38-9									
5		copper { dicopper oxide; copper (I) oxide }				10	mg/kg	1.126	11.203	mg/kg	0.00112 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	9	mg/kg	1.56	13.968	mg/kg	0.000896 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		**<LOD**
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				9	mg/kg	2.976	26.652	mg/kg	0.00267 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		**<LOD**
		034-002-00-8											
10		zinc { zinc chromate }				22	mg/kg	2.774	60.726	mg/kg	0.00607 %	✓	
		024-007-00-3											
11	●	TPH (C6 to C40) petroleum group				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
				TPH									
12		benzene				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
13		toluene				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
14	●	ethylbenzene				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		xylene				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
16		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
17	●	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-917-1	208-96-8									
18	●	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-469-6	83-32-9									
19	●	fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-695-5	86-73-7									
20	●	phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-581-5	85-01-8									
21	●	anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-371-1	120-12-7									
22	●	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
23	●	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
29	●	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
31	●	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
32		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		604-001-00-2	203-632-7	108-95-2									
33	●	polychlorobiphenyls; PCB				<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0179 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: PMC3

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
PMC3		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
12% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				6	mg/kg	1.32	6.971	mg/kg	0.000697 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
		005-008-00-8	215-125-8	1303-86-2									
3		cadmium { cadmium oxide }				<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				10	mg/kg	1.462	12.862	mg/kg	0.00129 %	✓	
			215-160-9	1308-38-9									
5		copper { dicopper oxide; copper (I) oxide }				13	mg/kg	1.126	12.88	mg/kg	0.00129 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	11	mg/kg	1.56	15.099	mg/kg	0.000968 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				16	mg/kg	2.976	41.906	mg/kg	0.00419 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
		034-002-00-8											
10		zinc { zinc chromate }				42	mg/kg	2.774	102.532	mg/kg	0.0103 %	✓	
		024-007-00-3											
11	●	TPH (C6 to C40) petroleum group				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
				TPH									
12		benzene				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
13		toluene				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
14	●	ethylbenzene				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
15		xylene				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
				203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
17	●	acenaphthylene		205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
18	●	acenaphthene		201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
19	●	fluorene		201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
20	●	phenanthrene		201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
21	●	anthracene		204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
22	●	fluoranthene		205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
23	●	pyrene		204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
29	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
31	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
32		phenol	604-001-00-2	203-632-7	108-95-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
33	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		**<LOD**
									Total:	0.0243 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: PMC4

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
PMC4		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
12% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				14	mg/kg	1.32	16.266	mg/kg	0.00163 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		**<LOD**
		005-008-00-8	215-125-8	1303-86-2									
3		cadmium { cadmium oxide }				<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		**<LOD**
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { chromium(III) oxide }				16	mg/kg	1.462	20.579	mg/kg	0.00206 %	✓	
			215-160-9	1308-38-9									
5		copper { dicopper oxide; copper (I) oxide }				57	mg/kg	1.126	56.475	mg/kg	0.00565 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	140	mg/kg	1.56	192.169	mg/kg	0.0123 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		**<LOD**
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				19	mg/kg	2.976	49.763	mg/kg	0.00498 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		**<LOD**
		034-002-00-8											
10		zinc { zinc chromate }				120	mg/kg	2.774	292.95	mg/kg	0.0293 %	✓	
		024-007-00-3											
11		TPH (C6 to C40) petroleum group				48	mg/kg		42.24	mg/kg	0.00422 %	✓	
				TPH									
12		benzene				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
13		toluene				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
14		ethylbenzene				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
15		xylene				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
				203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]							
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
17	●	acenaphthylene		205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
18	●	acenaphthene		201-469-6	83-32-9		0.1 mg/kg		0.088 mg/kg	0.0000088 %	✓	
19	●	fluorene		201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
20	●	phenanthrene		201-581-5	85-01-8		0.6 mg/kg		0.528 mg/kg	0.0000528 %	✓	
21	●	anthracene		204-371-1	120-12-7		0.2 mg/kg		0.176 mg/kg	0.0000176 %	✓	
22	●	fluoranthene		205-912-4	206-44-0		0.6 mg/kg		0.528 mg/kg	0.0000528 %	✓	
23	●	pyrene		204-927-3	129-00-0		0.7 mg/kg		0.616 mg/kg	0.0000616 %	✓	
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.3 mg/kg		0.264 mg/kg	0.0000264 %	✓	
25		chrysene	601-048-00-0	205-923-4	218-01-9		0.4 mg/kg		0.352 mg/kg	0.0000352 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.4 mg/kg		0.352 mg/kg	0.0000352 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.2 mg/kg		0.176 mg/kg	0.0000176 %	✓	
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.3 mg/kg		0.264 mg/kg	0.0000264 %	✓	
29	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.2 mg/kg		0.176 mg/kg	0.0000176 %	✓	
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
31	●	benzo[ghi]perylene		205-883-8	191-24-2		0.3 mg/kg		0.264 mg/kg	0.0000264 %	✓	
32		phenol	604-001-00-2	203-632-7	108-95-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
33	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		**<LOD**
									Total:	0.0659 %		

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
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 No liquid fraction present; unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00422%)

Classification of sample: PMC5

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
PMC5		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.5 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
9.5% (wet weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 9.5% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide } 033-003-00-0	215-481-4	1327-53-3		13	mg/kg	1.32	15.534	mg/kg	0.00155 %	✓	
2		boron { diboron trioxide; boric oxide } 005-008-00-8	215-125-8	1303-86-2		<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
3		cadmium { cadmium oxide } 048-002-00-0	215-146-2	1306-19-0		<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
4		chromium in chromium(III) compounds { ● chromium(III) oxide }	215-160-9	1308-38-9		12	mg/kg	1.462	15.872	mg/kg	0.00159 %	✓	
5		copper { dicopper oxide; copper (I) oxide } 029-002-00-X	215-270-7	1317-39-1		44	mg/kg	1.126	44.833	mg/kg	0.00448 %	✓	
6		lead { lead chromate } 082-004-00-2	231-846-0	7758-97-6	1	520	mg/kg	1.56	734.049	mg/kg	0.0471 %	✓	
7		mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
8		nickel { nickel chromate } 028-035-00-7	238-766-5	14721-18-7		17	mg/kg	2.976	45.79	mg/kg	0.00458 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
10		zinc { zinc chromate } 024-007-00-3				54	mg/kg	2.774	135.573	mg/kg	0.0136 %	✓	
11	●	TPH (C6 to C40) petroleum group		TPH		243	mg/kg		219.915	mg/kg	0.022 %	✓	
12		benzene 601-020-00-8	200-753-7	71-43-2		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
13		toluene 601-021-00-3	203-625-9	108-88-3		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
14	●	ethylbenzene 601-023-00-4	202-849-4	100-41-4		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
17	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
18	●	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
19	●	fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
20	●	phenanthrene		201-581-5	85-01-8		0.6	mg/kg		0.543	mg/kg	0.0000543 %	✓	
21	●	anthracene		204-371-1	120-12-7		0.4	mg/kg		0.362	mg/kg	0.0000362 %	✓	
22	●	fluoranthene		205-912-4	206-44-0		0.9	mg/kg		0.815	mg/kg	0.0000815 %	✓	
23	●	pyrene		204-927-3	129-00-0		1.2	mg/kg		1.086	mg/kg	0.000109 %	✓	
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1	mg/kg		0.905	mg/kg	0.0000905 %	✓	
25		chrysene	601-048-00-0	205-923-4	218-01-9		0.9	mg/kg		0.815	mg/kg	0.0000815 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.2	mg/kg		1.086	mg/kg	0.000109 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.9	mg/kg		0.815	mg/kg	0.0000815 %	✓	
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.6	mg/kg		1.448	mg/kg	0.000145 %	✓	
29	●	indeno[123-cd]pyrene		205-893-2	193-39-5		1.1	mg/kg		0.996	mg/kg	0.0000996 %	✓	
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.4	mg/kg		0.362	mg/kg	0.0000362 %	✓	
31	●	benzo[ghi]perylene		205-883-8	191-24-2		1.6	mg/kg		1.448	mg/kg	0.000145 %	✓	
32		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		**<LOD**
											Total:	0.101 %		

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
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 No liquid fraction present; unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.022%)

Classification of sample: PMC6

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
PMC6		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
19% (wet weight correction)		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	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		4	mg/kg	1.32	4.278	mg/kg	0.000428 %	✓	
2		boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		14	mg/kg	1.462	16.574	mg/kg	0.00166 %	✓	
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		16	mg/kg	1.126	14.592	mg/kg	0.00146 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	22	mg/kg	1.56	27.796	mg/kg	0.00178 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		19	mg/kg	2.976	45.805	mg/kg	0.00458 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
10		zinc { zinc chromate }	024-007-00-3				51	mg/kg	2.774	114.6	mg/kg	0.0115 %	✓	
11	●	TPH (C6 to C40) petroleum group			TPH		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
12		benzene	601-020-00-8	200-753-7	71-43-2		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
15		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
			203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]									
16		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
17	●	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-917-1	208-96-8									
18	●	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-469-6	83-32-9									
19	●	fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-695-5	86-73-7									
20	●	phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			201-581-5	85-01-8									
21	●	anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-371-1	120-12-7									
22	●	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
23	●	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
29	●	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
31	●	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
32		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		604-001-00-2	203-632-7	108-95-2									
33	●	polychlorobiphenyls; PCB				<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.027 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: PMC7

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
PMC7		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
9.3% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9.3% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9	mg/kg	1.32	10.778	mg/kg	0.00108 %	✓	
2		boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		14	mg/kg	1.462	18.559	mg/kg	0.00186 %	✓	
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		27	mg/kg	1.126	27.572	mg/kg	0.00276 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	54	mg/kg	1.56	76.397	mg/kg	0.0049 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		14	mg/kg	2.976	37.793	mg/kg	0.00378 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
10		zinc { zinc chromate }	024-007-00-3				66	mg/kg	2.774	166.066	mg/kg	0.0166 %	✓	
11	●	TPH (C6 to C40) petroleum group			TPH		47	mg/kg		42.629	mg/kg	0.00426 %	✓	
12		benzene	601-020-00-8	200-753-7	71-43-2		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
15		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
			203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]									
16		naphthalene				0.2	mg/kg		0.181	mg/kg	0.0000181 %	✓	
		601-052-00-2	202-049-5	91-20-3									
17	●	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-917-1	208-96-8									
18	●	acenaphthene				0.3	mg/kg		0.272	mg/kg	0.0000272 %	✓	
			201-469-6	83-32-9									
19	●	fluorene				0.2	mg/kg		0.181	mg/kg	0.0000181 %	✓	
			201-695-5	86-73-7									
20	●	phenanthrene				2.1	mg/kg		1.905	mg/kg	0.00019 %	✓	
			201-581-5	85-01-8									
21	●	anthracene				0.5	mg/kg		0.454	mg/kg	0.0000454 %	✓	
			204-371-1	120-12-7									
22	●	fluoranthene				1.8	mg/kg		1.633	mg/kg	0.000163 %	✓	
			205-912-4	206-44-0									
23	●	pyrene				1.8	mg/kg		1.633	mg/kg	0.000163 %	✓	
			204-927-3	129-00-0									
24		benzo[a]anthracene				0.8	mg/kg		0.726	mg/kg	0.0000726 %	✓	
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				0.8	mg/kg		0.726	mg/kg	0.0000726 %	✓	
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				0.8	mg/kg		0.726	mg/kg	0.0000726 %	✓	
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				0.5	mg/kg		0.454	mg/kg	0.0000454 %	✓	
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				0.7	mg/kg		0.635	mg/kg	0.0000635 %	✓	
		601-032-00-3	200-028-5	50-32-8									
29	●	indeno[123-cd]pyrene				0.3	mg/kg		0.272	mg/kg	0.0000272 %	✓	
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				0.1	mg/kg		0.0907	mg/kg	0.00000907 %	✓	
		601-041-00-2	200-181-8	53-70-3									
31	●	benzo[ghi]perylene				0.4	mg/kg		0.363	mg/kg	0.0000363 %	✓	
			205-883-8	191-24-2									
32		phenol				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		604-001-00-2	203-632-7	108-95-2									
33	●	polychlorobiphenyls; PCB				<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0416 %		

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
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 No liquid fraction present; unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00426%)

Classification of sample: PMC8

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
PMC8		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
3 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
14% (wet weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9	mg/kg	1.32	10.219	mg/kg	0.00102 %	✓	
2		boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		16	mg/kg	1.462	20.111	mg/kg	0.00201 %	✓	
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		28	mg/kg	1.126	27.111	mg/kg	0.00271 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	60	mg/kg	1.56	80.486	mg/kg	0.00516 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		16	mg/kg	2.976	40.953	mg/kg	0.0041 %	✓	
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
10		zinc { zinc chromate }	024-007-00-3				56	mg/kg	2.774	133.603	mg/kg	0.0134 %	✓	
11	●	TPH (C6 to C40) petroleum group			TPH		650	mg/kg		559	mg/kg	0.0559 %	✓	
12		benzene	601-020-00-8	200-753-7	71-43-2		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
15		xylene				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
16		naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3							
17	●	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-917-1	208-96-8							
18	●	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			201-469-6	83-32-9							
19	●	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			201-695-5	86-73-7							
20	●	phenanthrene				0.2 mg/kg		0.172 mg/kg	0.0000172 %	✓	
			201-581-5	85-01-8							
21	●	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			204-371-1	120-12-7							
22	●	fluoranthene				0.3 mg/kg		0.258 mg/kg	0.0000258 %	✓	
			205-912-4	206-44-0							
23	●	pyrene				0.3 mg/kg		0.258 mg/kg	0.0000258 %	✓	
			204-927-3	129-00-0							
24		benzo[a]anthracene				0.1 mg/kg		0.086 mg/kg	0.0000086 %	✓	
		601-033-00-9	200-280-6	56-55-3							
25		chrysene				0.1 mg/kg		0.086 mg/kg	0.0000086 %	✓	
		601-048-00-0	205-923-4	218-01-9							
26		benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-034-00-4	205-911-9	205-99-2							
27		benzo[k]fluoranthene				0.1 mg/kg		0.086 mg/kg	0.0000086 %	✓	
		601-036-00-5	205-916-6	207-08-9							
28		benzo[a]pyrene; benzo[def]chrysene				0.1 mg/kg		0.086 mg/kg	0.0000086 %	✓	
		601-032-00-3	200-028-5	50-32-8							
29	●	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-893-2	193-39-5							
30		dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		601-041-00-2	200-181-8	53-70-3							
31	●	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2							
32		phenol				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		604-001-00-2	203-632-7	108-95-2							
33	●	polychlorobiphenyls; PCB				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
		602-039-00-4	215-648-1	1336-36-3							
								Total:	0.0898 %		

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
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 No liquid fraction present; unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0559%)

Classification of sample: PMC9

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
PMC9		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
4 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
23% (wet weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 23% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				4	mg/kg	1.32	4.067	mg/kg	0.000407 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		boron { diboron trioxide; boric oxide }				<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		**<LOD**
		005-008-00-8	215-125-8	1303-86-2									
3		cadmium { cadmium oxide }				<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		**<LOD**
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				22	mg/kg	1.462	24.759	mg/kg	0.00248 %	✓	
			215-160-9	1308-38-9									
5		copper { dicopper oxide; copper (I) oxide }				11	mg/kg	1.126	9.536	mg/kg	0.000954 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	20	mg/kg	1.56	24.021	mg/kg	0.00154 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		**<LOD**
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				10	mg/kg	2.976	22.917	mg/kg	0.00229 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		**<LOD**
		034-002-00-8											
10		zinc { zinc chromate }				45	mg/kg	2.774	96.124	mg/kg	0.00961 %	✓	
		024-007-00-3											
11	●	TPH (C6 to C40) petroleum group				2	mg/kg		1.54	mg/kg	0.000154 %	✓	
				TPH									
12		benzene				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
13		toluene				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
14	●	ethylbenzene				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
15		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
17	●	acenaphthylene		205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
18	●	acenaphthene		201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
19	●	fluorene		201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
20	●	phenanthrene		201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
21	●	anthracene		204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
22	●	fluoranthene		205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
23	●	pyrene		204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
31	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
32		phenol	604-001-00-2	203-632-7	108-95-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
33	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
									Total:	0.0229 %		

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
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 No liquid fraction present; unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00015%)

Classification of sample: PMC10

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
PMC10		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
21% (wet weight correction)		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	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		8	mg/kg	1.32	8.344	mg/kg	0.000834 %	✓	
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<1	mg/kg	3.22	<3.22	mg/kg	<0.000322 %		<LOD
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<1	mg/kg	1.142	<1.142	mg/kg	<0.000114 %		<LOD
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		19	mg/kg	1.462	21.938	mg/kg	0.00219 %	✓	
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		22	mg/kg	1.126	19.568	mg/kg	0.00196 %	✓	
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	38	mg/kg	1.56	46.826	mg/kg	0.003 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<1	mg/kg	1.353	<1.353	mg/kg	<0.000135 %		<LOD
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		17	mg/kg	2.976	39.971	mg/kg	0.004 %	✓	
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<3	mg/kg	2.554	<7.661	mg/kg	<0.000766 %		<LOD
10	zinc { zinc chromate }	024-007-00-3				63	mg/kg	2.774	138.069	mg/kg	0.0138 %	✓	
11	TPH (C6 to C40) petroleum group			TPH		10	mg/kg		7.9	mg/kg	0.00079 %	✓	
12	benzene	601-020-00-8	200-753-7	71-43-2		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
13	toluene	601-021-00-3	203-625-9	108-88-3		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
14	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
15	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2]	95-47-6 [1] 106-42-3 [2]		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
				203-576-3 [3] 215-535-7 [4]	108-38-3 [3] 1330-20-7 [4]									
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
17	●	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
18	●	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
19	●	fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
20	●	phenanthrene		201-581-5	85-01-8		0.3	mg/kg		0.237	mg/kg	0.0000237 %	✓	
21	●	anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
22	●	fluoranthene		205-912-4	206-44-0		0.3	mg/kg		0.237	mg/kg	0.0000237 %	✓	
23	●	pyrene		204-927-3	129-00-0		0.4	mg/kg		0.316	mg/kg	0.0000316 %	✓	
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.2	mg/kg		0.158	mg/kg	0.0000158 %	✓	
25		chrysene	601-048-00-0	205-923-4	218-01-9		0.2	mg/kg		0.158	mg/kg	0.0000158 %	✓	
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.2	mg/kg		0.158	mg/kg	0.0000158 %	✓	
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.1	mg/kg		0.079	mg/kg	0.0000079 %	✓	
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.1	mg/kg		0.079	mg/kg	0.0000079 %	✓	
29	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
31	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
32		phenol	604-001-00-2	203-632-7	108-95-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		**<LOD**
											Total:	0.0322 %		

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
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 No liquid fraction present; unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00079%)

Appendix A: Classifier defined and non CLP determinands

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

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: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

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: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

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: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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 Chronic 1 H410 , Aquatic Acute 1 H400

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: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **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 Chronic 1 H410 , Aquatic Acute 1 H400

- **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2019.3.3745.7658 (03 Jan 2019)
HazWasteOnline Database: 2019.3.3745.7658 (03 Jan 2019)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
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 Wastes 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
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

A7064-17 THE FACTORY, MANCHESTER

SOCOTEC
Askern Road
Carcroft
Doncaster
DN6 8DG
Tel: 01302 723456

geo.doncaster@esg.co.uk

Your Ref:
Our Ref: A7064-17

Monday, 12 March 2018

Manchester City Council
Finance Shared Service Centre
Manchester City Council
Corporate Services Department
PO Box 532
Town Hall

Dear Sirs

FACTUAL LETTER REPORT FOR ADDITIONAL WORKS AT THE FACTORY, MANCHESTER

Introduction

SOCOTEC UK Ltd (SOCOTEC) were instructed by Buro Happold Ltd (BHL), on behalf of Manchester City Council (MCC) to complete a series of trial holes and to retrieve samples for chemical analysis at The Factory, Quay Street, Manchester.

Fieldwork

The fieldwork was carried out in general accordance with BS 5930:2015, BS EN 1997-2 (2007) and BS EN ISO 22475-1 (2006). The additional site investigation was completed on 19 and 20 December 2017. The exploratory hole locations were determined and set out by BHL.

Four machine dug trial pits were excavated on site to a maximum depth of 2.40 m bgl. The concrete at each location was broken out using a diamond corer to minimise the impact of any vibration to the structure.

Two trial pits were completed on the lower level of The Factory to inspect the existing foundations. Two pits were excavated on the upper level, one of which was to measure the crown of the arch. Soil samples were retrieved for contamination analysis.

Summary of Ground Conditions

Made ground was identified to full depth in each of the trial holes. The made ground generally comprised a thin mantle of concrete, overlying sandy gravel and gravelly sand or clay. Clay was recorded to be soft.

Gravel of made ground included brick, slag and slate. No visual or olfactory evidence of contamination was identified on site. Groundwater was not encountered at any of the locations during excavation.

Two samples were obtained during the site investigation for chemical analysis. Geoenvironmental samples were transported from site directly to the Bretby laboratory of SOCOTEC.

Please find enclosed the updated site plan, trial pit logs, sketches, chemical testing results and associated photographs, should you have any queries please do not hesitate to contact us.

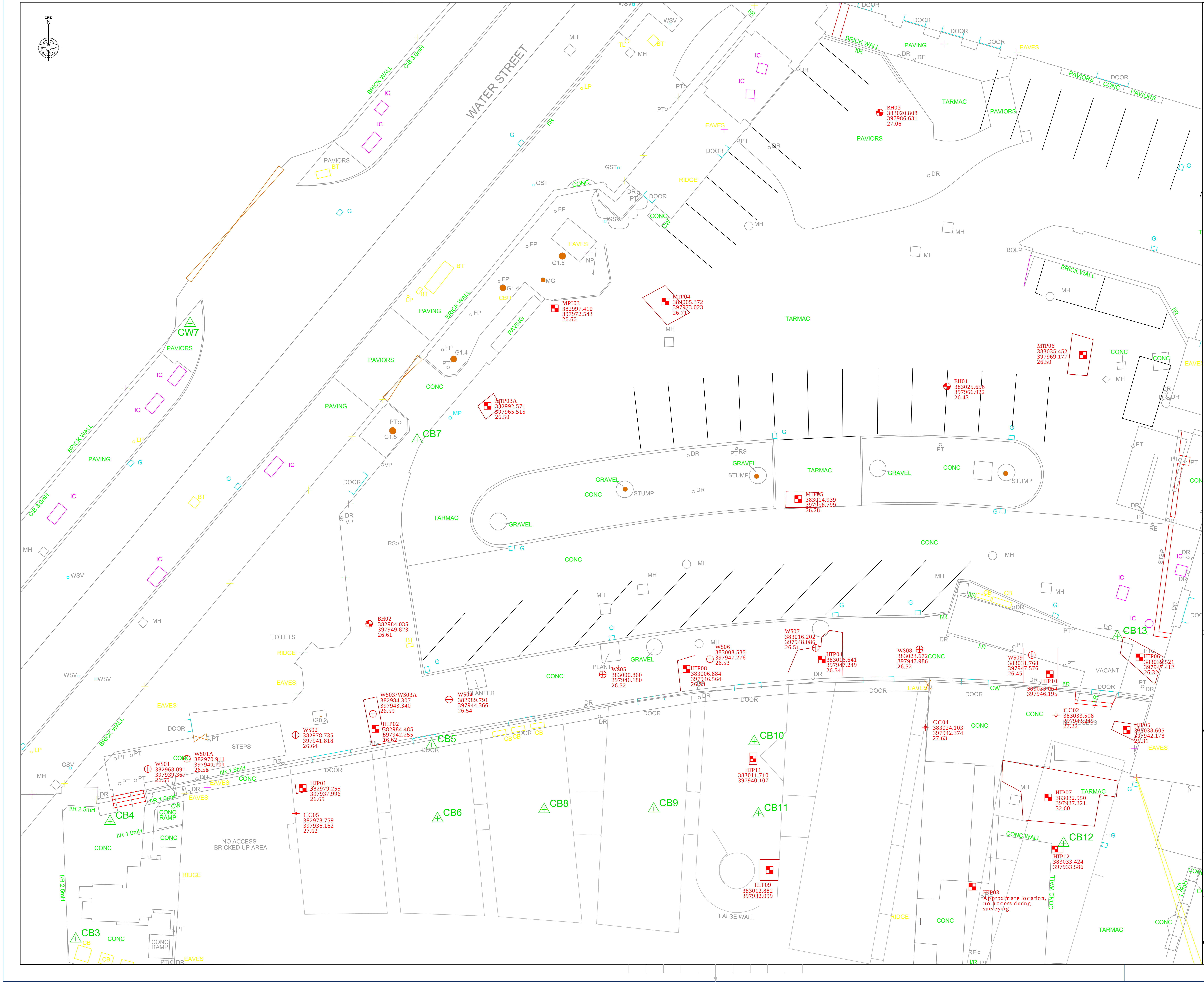
Yours faithfully,
For SOCOTEC

A Ward
Senior Engineer

SOCOTEC

M: +44 (0) 7973 664077
T: +44 (0)1302 723456
E: amy.ward@esg.co.uk

Encls.
Site Plan
Trial Hole Logs
Trial Hole Sketches
Chemical Testing Results
Photographs


GRID
N
WATER STREET
BRICK WALL
CB 3.0mH
PAVIORS
PAVING
TARMAC
CONC
GRAVEL
STUMP
CW7
CB7
CB13
CB5
CB10
CB11
CB6
CB8
CB9
CB12
CB4
CB3
TOILETS
STEPS
PLANTER
VACANT
FALSE WALL
NO ACCESS
BRICKED UP AREA
CONC RAMP
CONC WALL
BH01 383025.656 397966.922 26.43
BH02 382984.035 397949.823 26.61
BH03 383020.808 397986.631 27.06
MPT03 382997.410 397972.543 26.66
MTP03A 382992.571 397965.515 26.50
MTP04 383005.372 397973.023 26.71
MTP05 383014.939 397958.799 26.28
MTP06 383035.452 397969.177 26.50
WS01 382968.091 397939.367 26.55
WS01A 382970.911 397940.101 26.58
WS02 382978.735 397941.818 26.64
WS03/WS03A 382984.307 397943.340 26.59
WS04 382989.791 397944.366 26.54
WS05 383000.860 397946.180 26.52
WS06 383008.585 397947.276 26.53
WS07 383016.202 397948.086 26.51
WS08 383023.672 397947.986 26.52
WS09 383031.768 397947.576 26.45
HTP01 382979.255 397937.996 26.65
HTP02 382984.485 397942.255 26.62
HTP03 Approximate location, no access during surveying
HTP04 383016.641 397947.249 26.54
HTP05 383038.605 397942.178 26.31
HTP06 383039.521 397947.412 26.32
HTP07 383032.950 397937.321 32.60
HTP08 383006.884 397946.564 26.53
HTP09 383012.882 397932.099
HTP10 383033.064 397946.195
HTP11 383011.710 397940.107
HTP12 383033.424 397933.586
CC02 383033.508 397943.245 27.22
CC04 383024.103 397942.374 27.63
CC05 382978.759 397936.162 27.62
I/R 2.5mH
I/R 1.0mH
I/R 1.5mH
C/L 1.0mH

CONTROL & DATUM INFORMATION

Co-ordinates and levels are based upon OSGB 1936 National Grid (OSGB36) and Ordnance Survey Datum Newlyn (ODN).

They are derived using realtime on site GPS survey, that utilises the National Grid Transformation OSTN15GB and the National Geoid Model OSGM15GB.

The data obtained for use in this drawing involved the use of realtime GPS survey and total station survey.

COODINATES

Ground Investigation Co-ordinates (OSGM15GB-OSTN15GB)

Reference	East	North	Elevation	Description
BH01	383025.656	397966.922	26.43	Borehole
BH02	382984.035	397949.823	26.61	Borehole
BH03	383020.808	397986.631	27.06	Borehole
CC02	383033.508	397943.245	27.22	Wall Core
CC04	383024.103	397942.374	27.63	Wall Core
CC05	382978.759	397936.162	27.62	Wall Core
HTP01	382979.255	397937.996	26.65	Trial Pit
HTP02	382984.485	397942.255	26.62	Trial Pit
HTP03	Unable to suvery			
HTP04	383006.884	397946.564	26.53	Trial Pit
HTP05	383038.605	397942.178	26.31	Trial Pit
HTP06	383039.521	397947.412	26.32	Trial Pit
HTP07	383032.950	397937.321	32.60	Trial Pit
HTP08	383016.641	397947.249	26.54	Trial Pit
HTP09	383012.882	397932.099		
HTP10	383033.064	397946.195		
HTP11	383011.710	397940.107		
HTP12	383033.424	397933.586		
MPT03	382997.410	397972.543	26.66	Trial Pit
MTP03A	382992.571	397965.515	26.50	Trial Pit
MTP04	383005.372	397973.023	26.71	Trial Pit
MTP05	383014.939	397958.799	26.28	Trial Pit
MTP06	383035.452	397969.177	26.50	Trial Pit
WS01	382968.091	397939.367	26.55	Window Sample
WS01A	382970.911	397940.101	26.58	Window Sample
WS02	382978.735	397941.818	26.64	Window Sample
WS03/WS03A	382984.307	397943.340	26.59	Window Sample
WS04	382989.791	397944.366	26.54	Window Sample
WS05	383000.860	397946.180	26.52	Window Sample
WS06	383008.585	397947.276	26.53	Window Sample
WS07	383016.202	397948.086	26.51	Window Sample
WS08	383023.672	397947.986	26.52	Window Sample
WS09	383031.768	397947.576	26.45	Window Sample

LEGEND TO SYMBOLS

◐	Denotes Borehole Location
▣	Denotes Trial Pit Location
⌖	Denotes Wall Core Location
⊕	Denotes Window Sample Location

Scale: 1:125

0 12.5m 25 50 75 100

Rev.	Drawn	Date	Checked	Approved	Details
R1	BS	JAN 2018	MS	MS	Issued

Survey Date:	Surveyor:	Drawn By:
-	SOCOTEC	BS

Client:

MANCHESTER CITY COUNCIL

Contractor:

SOCOTEC

Infrastructure & Energy
Askern Road, Carcroft
Doncaster DN6 8DG
United Kingdom

www.socotec.co.uk
Tel: +44(0)01302 723456

Contract:

THE FACTORY
MANCHESTER

DWG:

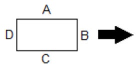
SITE PLAN
A7064-17

Original Sheet Size:	Scale:	Rev.:
A1	Horiz.1:125 Vert.:	R1

Trial Pit Log

SOCOTEC

Logged MS **Checked** AW **Approved** TC	**Start** 19/12/2017 **End** 19/12/2017	**Equipment, Methods and Remarks** 1.5T Tracked Excavator. Machine excavated.	**Dimension and Orientation** Width 1.40 m Length 1.50 m 170 (Deg)	**Ground Level** **Coordinates (m)** **National Grid**



Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
		19/12/17	CONCRETE. (MADE GROUND).		(0.20) 0.20	▨	▨
			Yellowish brown, very sandy, angular to subangular, fine to coarse GRAVEL of sandstone and limestone. (MADE GROUND).		(0.15) 0.35	▨	▨
			CONCRETE. (MADE GROUND).		(0.15) 0.50	▨	▨
			COBBLES of sandstone. (Possible paving). (MADE GROUND).		(0.15) 0.65	▨	▨
		19/12/17	Dark brown, very gravelly, fine to coarse SAND. Gravel is subangular to subrounded, fine to coarse of concrete, brick and sandstone. (MADE GROUND).	0.80 170mm OD Clay pipe against face A.	(1.25) 1.90	▨	▨
			Soft yellowish brown and brown very slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of sandstone. (POSSIBLE MADE GROUND).		(0.10) 2.00	▨	▨
			END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depth (m)	Remarks
0.00 - 2.00	No groundwater encountered during excavation.
2.00 - 2.00	Trial pit terminated at base of foundation.

Stability	Stable.
Shoring	None
Weather	Light Rain

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

© Copyright SOCOTEC UK Limited

AGS

Scale 1:25

08/03/2018 16:15:35

Project	**THE FACTORY, MANCHESTER**
Project No.	**A7064-17**
Carried out for	**Manchester City Council**

Trial Pit

HTP09

Sheet 1 of 1

Trial Pit Log

SOCOTEC

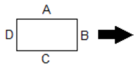
Logged	MS	**Start**	19/12/2017
Checked	AW	**End**	19/12/2017
Approved	TC		

Equipment, Methods and Remarks

1.5T Tracked excavator.
Machine excavated.

Dimension and Orientation

Width 1.50 m
Length 2.50 m



160 (Deg)

Ground Level

Coordinates (m)

National Grid

Samples and Tests / Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
		19/12/17	CONCRETE. (MADE GROUND).		(0.15) 0.15	▨	▦
			Yellowish brown very sandy angular to subangular fine to coarse GRAVEL of sandstone and limestone. (MADE GROUND).		(0.25) 0.40	▨	░
			Dark brown very gravelly clayey fine to coarse SAND. Gravel is angular to subrounded fine to coarse of various lithologies including sandstone mudstone coal and slate. (MADE GROUND).	0.70-0.90 Pea shingle filter around clay pipe. 0.80 170mm OD clay pipe along face C.	(1.40) 1.80	▨	░
		19/12/17	Soft yellowish brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to medium of sandstone and mudstone. (POSSIBLE GROUND).		(0.60) 2.40	▨	░
			END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depth (m)	Remarks
0.00 - 2.40	No groundwater encountered during excavation.
2.40 - 2.40	Trial pit terminated at maximum reach of excavator.

Stability	Stable.
Shoring	None.
Weather	Cloudy.

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

© Copyright SOCOTEC UK Limited

AGS

Scale 1:25

08/03/2018 16:15:35

Project	**THE FACTORY, MANCHESTER**
Project No.	**A7064-17**
Carried out for	**Manchester City Council**

Trial Pit

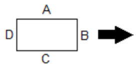
HTP10

Sheet 1 of 1

Trial Pit Log

SOCOTEC

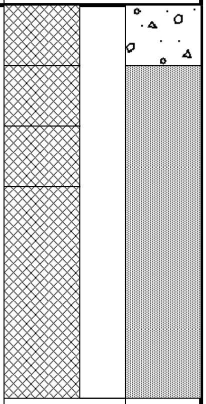
Logged MS **Checked** AW **Approved** TC	**Start** 20/12/2017 **End** 20/12/2017	**Equipment, Methods and Remarks** 1.5T Tracked excavator. Machine excavated.	**Dimension and Orientation** Width 0.55 m Length 0.85 m 12 (Deg)	**Ground Level** **Coordinates (m)** **National Grid**



Samples and Tests

Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)
		20/12/17	CONCRETE. (MADE GROUND).		(0.20) 0.20
			Grey and yellowish brown sandy angular to subangular fine to coarse GRAVEL of limestone and sandstone. (MADE GROUND).		(0.20) 0.40
			COBBLES of granite. (Possible paving). (MADE GROUND).		(0.20) 0.60
1.00	ES1	20/12/17	Dark brown very gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse of sandstone brick slag coal and slate. (MADE GROUND).		(0.70) 1.30
			END OF EXPLORATORY HOLE	1.30 Brick top of the arch.	



Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depth (m)	Remarks
0.00 - 1.30	No groundwater encountered during excavation.
1.30 - 1.30	Trial pit terminated at the top of the arch.

Stability Stable.

Shoring None.

Weather Light Rain.

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

© Copyright SOCOTEC UK Limited

AGS

Scale 1:25

08/03/2018 16:15:35

Project **THE FACTORY, MANCHESTER**

Project No. **A7064-17**

Carried out for **Manchester City Council**

Trial Pit

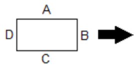
HTP11

Sheet 1 of 1

Trial Pit Log

SOCOTEC

Logged MS **Checked** AW **Approved** TC	**Start** 20/12/2017 **End** 20/12/2017	**Equipment, Methods and Remarks** 1.5T Tracked excavator. Machine excavated.	**Dimension and Orientation** Width 0.50 m Length 0.80 m 88 (Deg)



Ground Level

Coordinates (m)

National Grid

Samples and Tests / Strata Description

Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)
		20/12/17	MACADAM. (MADE GROUND).		(0.15) 0.15
			CONCRETE. (MADE GROUND).		(0.30) 0.45
0.80	ES1	20/12/17	Dark brown and dark grey very sandy subangular to subrounded fine to coarse GRAVEL of sandstone mudstone slag and coal. (MADE GROUND).		(0.60) 1.05
			END OF EXPLORATORY HOLE	1.05 Bitumin cap on top of the arch.	

Groundwater Entries

No.	Depth Strike (m)	Remarks

Remarks

Depth (m)	Remarks
0.00 - 1.05	No groundwater encountered during excavation.
1.05 - 1.05	Trial pit terminated at the top of the arch.

Stability Stable.

Shoring None.

Weather Light Rain.

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

© Copyright SOCOTEC UK Limited

Scale 1:25

08/03/2018 16:15:36

AGS

Project **THE FACTORY, MANCHESTER**

Project No. **A7064-17**

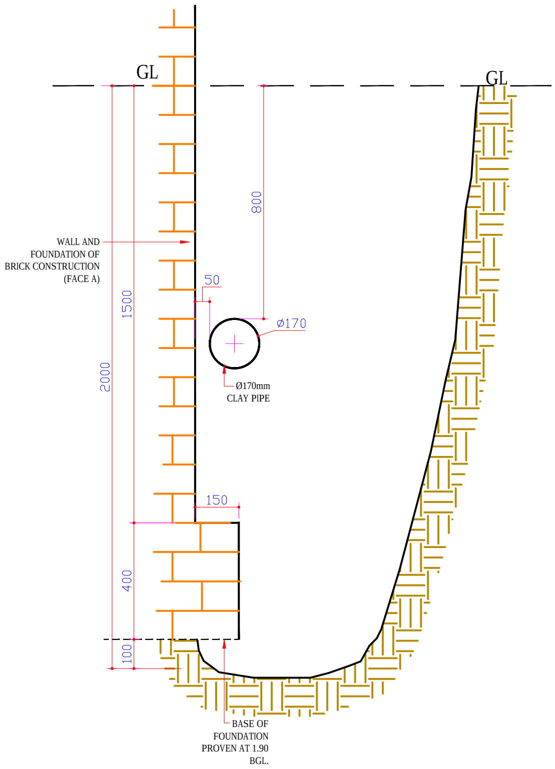
Carried out for **Manchester City Council**

Trial Pit

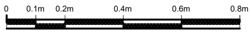
HTP12

Sheet 1 of 1

TRIAL PIT DETAIL


GL
GL
WALL AND
FOUNDATION OF
BRICK CONSTRUCTION
(FACE A)
800
50
Ø170
1500
2000
Ø170mm
CLAY PIPE
150
400
100
BASE OF
FOUNDATION
PROVEN AT 1.90
BGL.

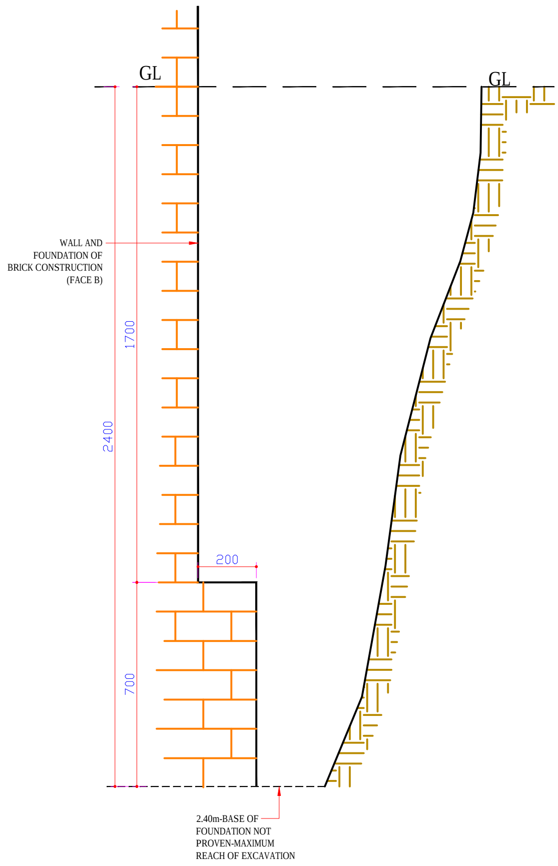
Scale: 1:20


0
0.1m
0.2m
0.4m
0.6m
0.8m

Project: THE FACTORY
MANCHESTER
Project No: A7064-17
Carried out for: MANCHESTER CITY COUNCIL

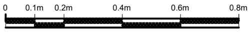
Figure
HTP09

TRIAL PIT DETAIL



GL
GL
WALL AND FOUNDATION OF BRICK CONSTRUCTION (FACE B)
1700
2400
200
700
2.40m-BASE OF FOUNDATION NOT PROVEN-MAXIMUM REACH OF EXCAVATION

Scale: 1:20



0
0.1m
0.2m
0.4m
0.6m
0.8m

Project: THE FACTORY
MANCHESTER

Project No: A7064-17

Carried out for: MANCHESTER CITY COUNCIL

Figure

HTP10

TEST REPORT

1252

Report No. EFS/181857 (Ver. 1)

SOCOTEC UK Limited Doncaster
SOCOTEC UK Ltd Doncaster
Askern Road
Carcroft
Doncaster
South Yorkshire
DN6 8DG

Site: A7064-17 The Factory Arches Additional Gorund Inve

The 2 samples described in this report were registered for analysis by SOCOTEC UK Limited on 29-Dec-2017. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 15-Jan-2018

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (80) Results (Pages 5 to 6)
Table of PCB Congener Results (Page 7)
Table of WAC Analysis Results (Pages 8 to 9)
Subcontracted Analysis Reports (Pages 10 to 11)
The accreditation status of subcontracted analysis is displayed on the appended subcontracted analysis reports.
Analytical and Deviating Sample Overview (Pages 12 to 13)
Table of Method Descriptions (Pages 14 to 15)
Table of Report Notes (Page 16)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
SOCOTEC UK Lim Barnes
Tim Barnes Operations Director
Energy & Waste Services

Date of Issue: 15-Jan-2018

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.
SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

LAB ID Number CL/	Client Sample Description	Sample Date	GRO	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	SO4-- (H2O sol) mg/l	PCB-7 Congeners Analysis	pH units (AR)	Cyanide(Free) (AR)	Cyanide(Total) (AR)
		Units :	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	µg/kg	pH Units	mg/kg	mg/kg
		Method Codes :	GROHSA	ICPBOR	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPWSS	PCBECD	PHSOIL	SFAPI	SFAPI
		Method Reporting Limits :	0.2	0.5	0.3	0.1	0.5	0.5	0.5	0.1	0.5	0.5	3	10	5		0.5	0.5
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1788660	HTP12 ES 1 0.80	20-Dec-17	<0.2	1.5	31.8	0.42	18.2	249	577.2	1.92	36.4	0.6	177	116	Req	8.5	<0.5	1.5
1788661	HTP11 ES 1 1.00	20-Dec-17	<0.2	1.4	49	1.15	31.8	735.1	234.9	0.33	46	1	340.4	358	Req	8.1	<0.5	<0.5

SOCOTEC

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name SOCOTEC UK Limited Doncaster

Contact Richard Hardwick/Richard Messenger

Sample Analysis

A7064-17 The Factory Arches Additional Gorund Inve

Date Printed	**15-Jan-2018**
Report Number	**EFS/181857**
Table Number	**1**

Where individual results are flagged see report notes for status.

LAB ID Number CL/	Client Sample Description	Sample Date	Phenol Index.(AR)	^Asbestos ID (Stage 1)	Tot.Moisture @ 105C	TPH Band (>C10-C40)	TPH by GCFID (AR)	Total Organic Carbon	Acid Neut. Capacity	S.O.M. % (Calc)	Chromium vi:	L.O.I. % @ 450C	Stone Content %	Benzene	Toluene	Ethyl Benzene	MTBE	Xylenes
		Units :	mg/kg		%	mg/kg	mg/kg	% M/M	Mol/kg	% M/M	mg/kg	%	%	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
		Method Codes :	SFAPI	Sub020	TMSS	TPHFIDUS	TPHFIDUS	WSLM59	ANC	FOCS	KONECR	LOI(%MM)	SSP3	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA
		Method Reporting Limits :	0.5		0.1	10	10	0.02	0.04	0.04	0.1	0.2	0.1	10	10	10	20	30
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
1788660	HTP12 ES 1 0.80	**20-Dec-17**	<0.5	NAIIS	21.9	385	387	15.0	2.08	25.9	<0.1	12.9	8.7	<10	<10	<10	<20	<30
1788661	HTP11 ES 1 1.00	**20-Dec-17**	<0.5	NAIIS	12.8	1910	1920	14.6	2.32	25.2	<0.1	10.8	12.3	<10	<10	<10	<20	<30

SOCOTEC

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

Client Name	**SOCOTEC UK Limited Doncaster**
Contact	Richard Hardwick/Richard Messenger

A7064-17 The Factory Arches Additional Gorund Inve

Sample Analysis

Date Printed	**15-Jan-2018**
Report Number	**EFS/181857**
Table Number	**1**

Where individual results are flagged see report notes for status.

		Units :	µg/kg	µg/kg	mg/kg
		Method Codes :	BTEXHSA	BTEXHSA	PAHMSUS
		Method Reporting Limits :	20	10	
		UKAS Accredited :	Yes	Yes	Yes
LAB ID Number CL/	**Client Sample Description**	**Sample Date**	**m/p Xylenes**	**o Xylene**	**PAH (17) by GCMS**
1788660	HTP12 ES 1 0.80	**20-Dec-17**	<20	<10	Req
1788661	HTP11 ES 1 1.00	**20-Dec-17**	<20	<10	Req

SOCOTEC

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name **SOCOTEC UK Limited Doncaster**

Contact Richard Hardwick/Richard Messenger

A7064-17 The Factory Arches Additional Gorund Inve

Sample Analysis

Date Printed	**15-Jan-2018**
Report Number	**EFS/181857**
Table Number	**1**

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	SOCOTEC UK Limited Doncaster: A7064-17 The Factory Arches Additional Gorund Inve		
Sample Details:	HTP12 ES 1 0.80	**Job Number:**	S18_1857
LIMS ID Number:	CL1788660	**Date Booked in:**	29-Dec-17
QC Batch Number:	180015	**Date Extracted:**	04-Jan-18
Quantitation File:	Initial Calibration	**Date Analysed:**	04-Jan-18
Directory:	010418.MS17\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	2.67	1.11	99
Acenaphthylene	208-96-8	3.71	0.43	95
Acenaphthene	83-32-9	3.82	0.74	92
Fluorene	86-73-7	4.15	0.82	93
Phenanthrene	85-01-8	4.85	8.29	99
Anthracene	120-12-7	4.90	2.01	99
Fluoranthene	206-44-0	6.03	9.44	91
Pyrene	129-00-0	6.28	9.68	91
Benzo[a]anthracene	56-55-3	7.87	5.68	94
Chrysene	218-01-9	7.91	4.40	97
Benzo[b]fluoranthene	205-99-2	9.34	5.10	97
Benzo[k]fluoranthene	207-08-9	9.37	1.76	97
Benzo[a]pyrene	50-32-8	9.74	5.35	94
Indeno[1,2,3-cd]pyrene	193-39-5	11.09	2.98	88
Dibenzo[a,h]anthracene	53-70-3	11.14	0.64	94
Benzo[g,h,i]perylene	191-24-2	11.37	2.15	91
Coronene	191-07-1 *	12.96	0.43	57
Total (USEPA16) PAHs	-	-	60.58	-

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	102
Acenaphthene-d10	106
Phenanthrene-d10	108
Chrysene-d12	142
Perylene-d12	216

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	97
Terphenyl-d14	80

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	SOCOTEC UK Limited Doncaster: A7064-17 The Factory Arches Additional Gorund Inve		
Sample Details:	HTP11 ES 1 1.00	**Job Number:**	s18_1857
LIMS ID Number:	CL1788661	**Date Booked in:**	29-Dec-17
QC Batch Number:	180015	**Date Extracted:**	04-Jan-18
Quantitation File:	Initial Calibration	**Date Analysed:**	04-Jan-18
Directory:	010418.MS17\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	2.67	0.87	98
Acenaphthylene	208-96-8	3.71	0.32	61
Acenaphthene	83-32-9	3.82	6.20	93
Fluorene	86-73-7	4.15	3.58	94
Phenanthrene	85-01-8	4.86	33.50	99
Anthracene	120-12-7	4.90	8.57	91
Fluoranthene	206-44-0	6.03	52.60	91
Pyrene	129-00-0	6.28	45.90	91
Benzo[a]anthracene	56-55-3	7.87	27.70	93
Chrysene	218-01-9	7.91	22.90	99
Benzo[b]fluoranthene	205-99-2	9.35	25.70	96
Benzo[k]fluoranthene	207-08-9	9.38	8.57	97
Benzo[a]pyrene	50-32-8	9.75	23.00	95
Indeno[1,2,3-cd]pyrene	193-39-5	11.10	16.60	90
Dibenzo[a,h]anthracene	53-70-3	11.14	3.10	96
Benzo[g,h,i]perylene	191-24-2	11.38	10.80	91
Coronene	191-07-1 *	12.96	2.09	70
Total (USEPA16) PAHs	-	-	289.91	-

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	104
Acenaphthene-d10	110
Phenanthrene-d10	114
Chrysene-d12	165
Perylene-d12	288

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	97
Terphenyl-d14	83

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polychlorinated Biphenyls (congeners)

Customer and Site Details:	SOCOTEC UK Limited Doncaster: A7064-17 The Factory Arches Additional Gorund	**Matrix:**	Soil
Job Number:	S18_1857	**Date Booked in:**	29-Dec-17
QC Batch Number:	180015	**Date Extracted:**	04-Jan-18
Directory:	010818PCB.GC22	**Date Analysed:**	08-Jan-18
Method:	Ultrasonic		

Compounds marked * are not UKAS or MCerts accredited

		Concentration, (µg/kg)						
Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
CL1788660	HTP12 ES 1 0.80	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CL1788661	HTP11 ES 1 1.00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Where individual results are flagged see report notes for status.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	SOCOTEC UK Limited Doncaster
Contact	Richard Hardwick/Richard Messenger
Site	A7064-17 The Factory Arches Additional Gorund Inve

Sample Description	Report No	Sample No	Issue Date
HTP12 ES 1 0.80	s18_1857	CL/1788660	15-Jan-18

Leaching Data	
Weight of sample (kg)	0.285
Moisture content @ 105°C (% of Wet Weight)	21.9
Equivalent Weight based on drying at 105°C (kg)	0.225
Volume of water required to carry out 2:1 stage (litres)	0.390
Fraction of sample above 4 mm %	47.700
Fraction of non-crushable material %	0.000
Volume to undertake analysis (2:1 Stage) (litres)	0.300
Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
U	WSLM59	Total Organic Carbon (% M/M)	15.3	3	5	6
N	LOI450	Loss on Ignition (%)	13.2			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.07	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.042	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	493	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	78.12	100		
U	PHSOIL	pH (pH units)	8.5		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	2.13		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	7.5	8.1	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	395	220					
U	ICPMSW	Arsenic	0.004	0.003	0.008	0.03	0.5	2	25
U	ICPWATVAR	Barium	0.02	0.02	0.04	0.2	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.001	<0.002	<0.01	0.5	10	70
U	ICPMSW	Copper	0.013	0.005	0.026	0.06	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.016	0.018	0.032	0.18	0.5	10	30
U	ICPMSW	Nickel	0.001	<0.001	0.002	<0.01	0.4	10	40
U	ICPMSW	Lead	0.018	0.002	0.036	0.04	0.5	10	50
U	ICPMSW	Antimony	0.001	0.001	0.002	0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	<0.001	0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.012	<0.002	0.024	<0.03	4	50	200
U	KONENS	Chloride	5	<1	10	<15	800	15000	25000
U	ISEF	Fluoride	0.5	0.6	1	6	10	150	500
U	ICPWATVAR	Sulphate as SO4	73	27	146	331	1000	20000	50000
N	WSLM27	Total Dissolved Solids	308	172	616	1901	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	2.5	1.4	5	15	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

Client	SOCOTEC UK Limited Doncaster		
Contact	Richard Hardwick/Richard Messenger		
Site	A7064-17 The Factory Arches Additional Gorund Inve		
Sample Description	**Report No**	**Sample No**	**Issue Date**
HTP11 ES 1 1.00	s18_1857	CL/1788661	15-Jan-18

Leaching Data	
Weight of sample (kg)	0.262
Moisture content @ 105°C (% of Wet Weight)	12.8
Equivalent Weight based on drying at 105°C (kg)	0.225
Volume of water required to carry out 2:1 stage (litres)	0.413
Fraction of sample above 4 mm %	36.500
Fraction of non-crushable material %	0.000
Volume to undertake analysis (2:1 Stage) (litres)	0.300
Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
U	WSLM59	Total Organic Carbon (% M/M)	14.9	3	5	6
N	LOI450	Loss on Ignition (%)	11			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.042	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	2190	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	335	100		
U	PHSOIL	pH (pH units)	8.1		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	2.37		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	7.4	7.7	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	532	240					
U	ICPMSW	Arsenic	0.002	0.002	0.004	0.02	0.5	2	25
U	ICPWATVAR	Barium	0.02	0.03	0.04	0.3	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	<0.001	<0.001	<0.002	<0.01	0.5	10	70
U	ICPMSW	Copper	0.003	0.004	0.006	0.04	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.011	0.018	0.022	0.17	0.5	10	30
U	ICPMSW	Nickel	0.001	<0.001	0.002	<0.01	0.4	10	40
U	ICPMSW	Lead	<0.001	<0.001	<0.002	<0.01	0.5	10	50
U	ICPMSW	Antimony	0.004	0.005	0.008	0.05	0.06	0.7	5
U	ICPMSW	Selenium	<0.001	<0.001	<0.002	<0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.004	0.003	0.008	0.03	4	50	200
U	KONENS	Chloride	6	2	12	25	800	15000	25000
U	ISEF	Fluoride	0.7	0.9	1.4	9	10	150	500
U	ICPWATVAR	Sulphate as SO4	134	41	268	534	1000	20000	50000
N	WSLM27	Total Dissolved Solids	415	187	830	2174	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	2.8	1.6	5.6	18	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

IOM
WORKING FOR A HEALTHIER FUTURE

CERTIFICATE OF ANALYSIS

ANALYSIS REQUESTED BY:
SOCOTEC UK Ltd
Environmental Chemistry
PO Box 100
Burton upon Trent
Staffordshire
DE15 0XD

CONTRACT NO: 56507-16

PROJECT NO: 610

DATE OF ISSUE: 15.01.18

DATE SAMPLES RECEIVED: 03.01.18

DATE SAMPLES ANALYSED: 15.01.18

SAMPLE DESCRIPTION: Two soil/loose aggregate samples.

ANALYSIS REQUESTED: Qualitative analysis of samples for determination of presence/type of asbestos.

METHODS:

Our method involves initial examination of entire samples followed by detailed analysis of representative sub-samples. The sub samples are analysed qualitatively for asbestos by polarised light and dispersion staining as described by the Health and Safety Executive in HSG 248.

RESULTS:

Initial Screening

No asbestos was detected in either of the soil samples by stereo-binocular and polarised light microscopy.

A summary of the results is given in Table 1.

RESULTS: (cont.)

Table 1: Qualitative Results

SOCOTEC Job I.D: S181857

IOM sample number	Client sample number	ACM type detected	PLM result
S53684	S1788660 HTP12 0.80	-	No Asbestos Detected
S53685	S1788661 HTP11 1.00	-	No Asbestos Detected

Our detection limit for this method is 0.001%.

COMMENTS:

IOM Consulting cannot accept responsibility for samples that have been incorrectly collected or despatched by external clients.

Any opinions and interpretations expressed herein are outwith the scope of our UKAS accreditation.

AUTHORISED BY: ....
D Third
Scientific Technician

Sample Analysis

SOCOTEC UK Ltd Environmental Chemistry
Analytical and Deviating Sample Overview

S181857

Customer **SOCOTEC UK Limited Doncaster**
Consignment No S71486

Site **A7064-17 The Factory Arches Additional Gorund Inv**
Date Logged 29-Dec-2017

Report No **S181857**
In-House Report Due 05-Jan-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

		MethodID	ANC	BTEXHSA		CEN Leachate		CustServ	FOCS	GROHSA	ICPBOR	ICPMSS									ICPWSS	KONECR	LOI(%MM)	PAHMSUS	PCBECD	PHSOIL	SFAPI
ID Number	**Description**	**Sampled**	Acid Neut. Capacity	BTEX-HSA + MTBE analysis	MTBE (μg/kg)	CEN Leac(P)1	CEN Leac(P)2	REPORT A	S.O.M. % (Calc)	GRO	Boron (H20 Soluble)	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	SO4-- (H2O sol) mg/l	Chromium vi:	L.O.I. % @ 450C	PAH (17) by GCMS	PCB-7 Congeners Analysis	pH units (AR)	Cyanide(Free) (AR)
				✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
CL/1788660	HTP12 0.80	20/12/17	🟩	E	E	🟩	🟩	🟩	🟩	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	E
CL/1788661	HTP11 1.00	20/12/17	🟩	E	E	🟩	🟩	🟩	🟩	E	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩	E	E

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key	
🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
⬜	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Analytical and Deviating Sample Overview

Customer	**SOCOTEC UK Limited Doncaster**	Consignment No S71486
Site	**A7064-17 The Factory Arches Additional Gorund Inv**	Date Logged 29-Dec-2017
Report No	**S181857**	In-House Report Due 05-Jan-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	**Description**	**MethodID**	**SFAPI**		**SSP3**	**Sub020**	**TMSS**	**TPHFIDUS**		**WSLM59**
		Sampled	**Cyanide(Total) (AR)**	**Phenol Index.(AR)**	**Stone Content %**	**^Asbestos ID (Stage 1)**	**Tot.Moisture @ 105C**	**TPH Band (>C10-C40)**	**TPH by GCFID (AR)**	**Total Organic Carbon**
			✓	✓		✓	✓	✓	✓	✓
CL/1788660	HTP12 0.80	20/12/17	E	E	🟩	🟩	🟩	🟩	🟩	🟩
CL/1788661	HTP11 1.00	20/12/17	E	E	🟩	🟩	🟩	🟩	🟩	🟩

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

🟩	Analysis Required
🟨	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
☐	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.

Method Descriptions

Matrix	**MethodID**	**Analysis Basis**	**Method Description**
Soil	ANC	Oven Dried @ < 35°C	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	FOCS	Oven Dried @ < 35°C	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	ICPWSS	Oven Dried @ < 35°C	Determination of Water Soluble Sulphate in soil samples by water extraction followed by ICPOES detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	LOI(%MM)	Oven Dried @ < 35°C	Determination of loss on ignition for soil samples at specified temperature by gravimetry
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBECD	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SSP3	As Received	Determination of stones content by dry sieving at the required particle size
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105ºC by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	**MethodID**	**Analysis Basis**	**Method Description**
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile	**TR** Denotes Tremolite
CR Denotes Crocidolite	**AC** Denotes Actinolite
AM Denotes Amosite	**AN** Denotes Anthophylite

NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.
This may have resulted in deterioration of the sample(s) during transit to the laboratory.
Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

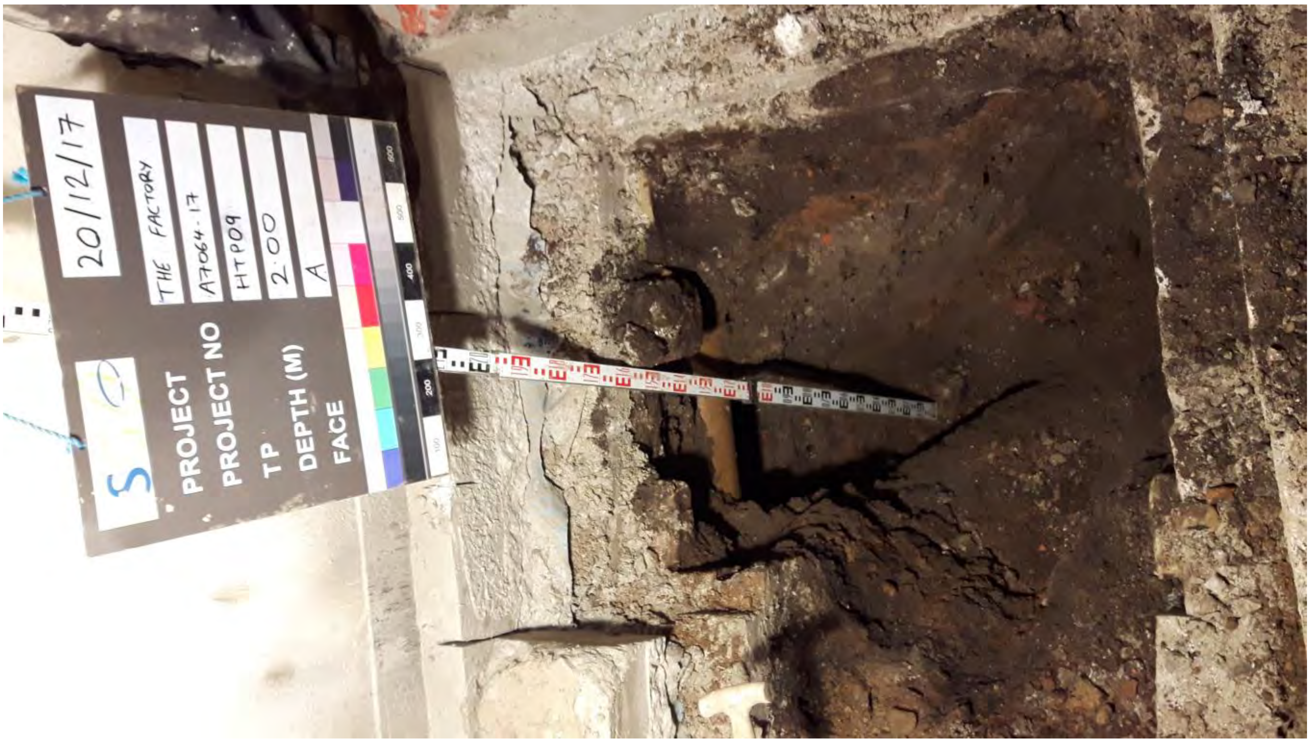
Sample Descriptions

Client : SOCOTEC UK Limited Doncaster
Site : A7064-17 The Factory Arches Additional Gorund Inve
Report Number : S18_1857

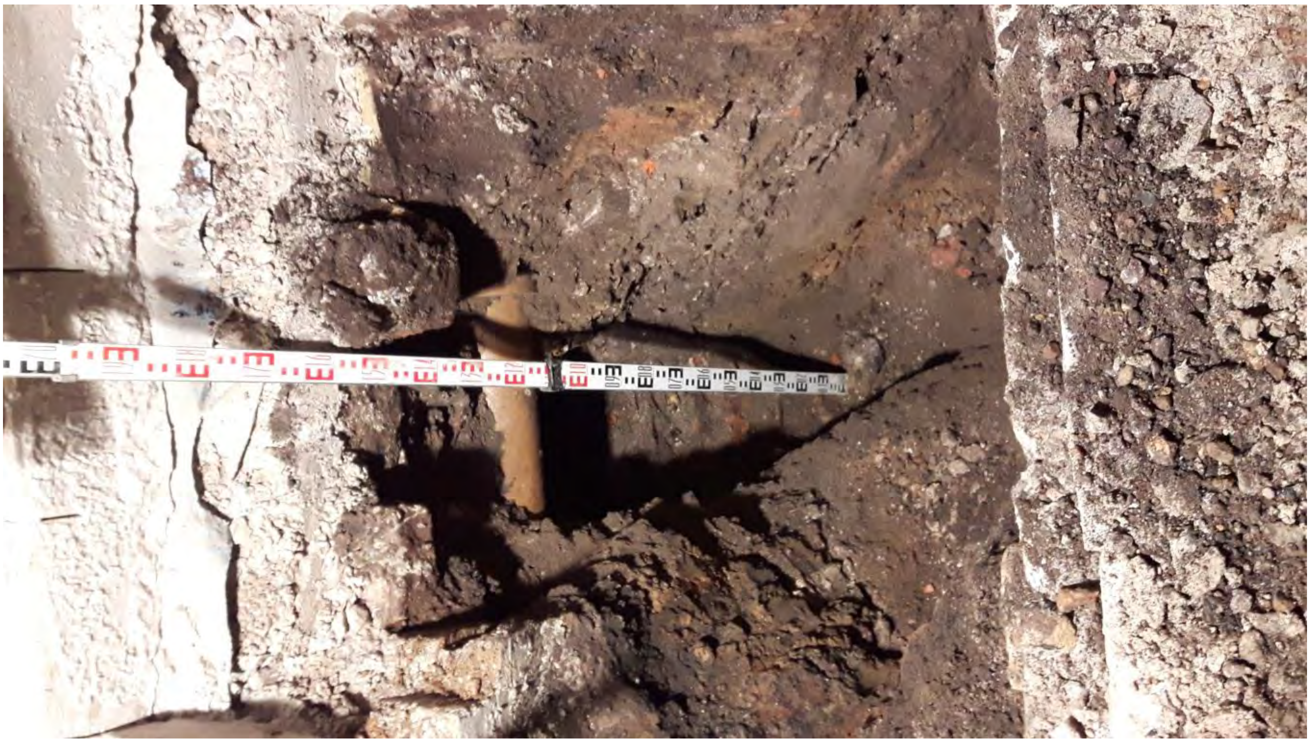
Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1788660	HTP12 ES 1 0.80	Brown MADE GROUND
CL/1788661	HTP11 ES 1 1.00	Brown MADE GROUND

Photographs


PROJECT
THE FACTORY
PROJECT NO
A7064.17
TP
HTP09
DEPTH (M)
2.00
FACE
A
20/12/17

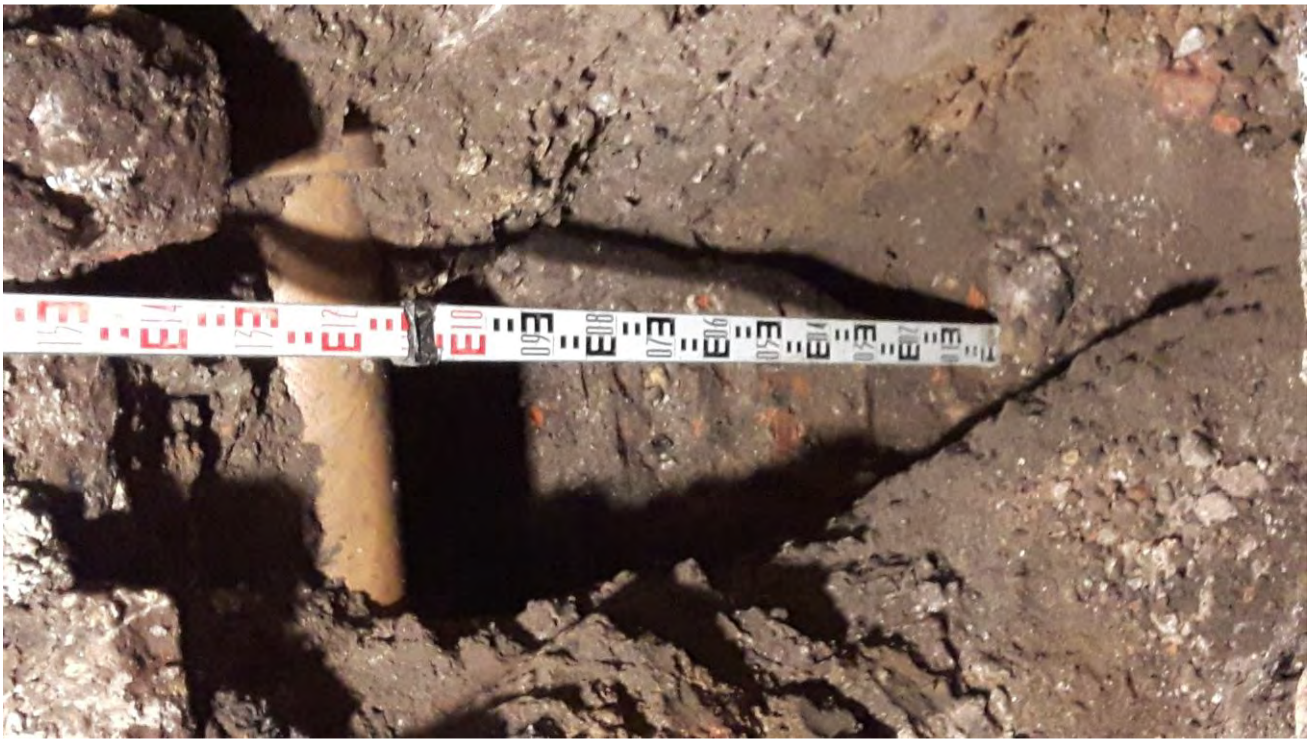
HTP09 FACE A



HTP09 FACE A2

Notes:	Project	The Factory, Manchester	Plate
	Project No.	A7064-17	1
	Carried out for	Manchester City Council	

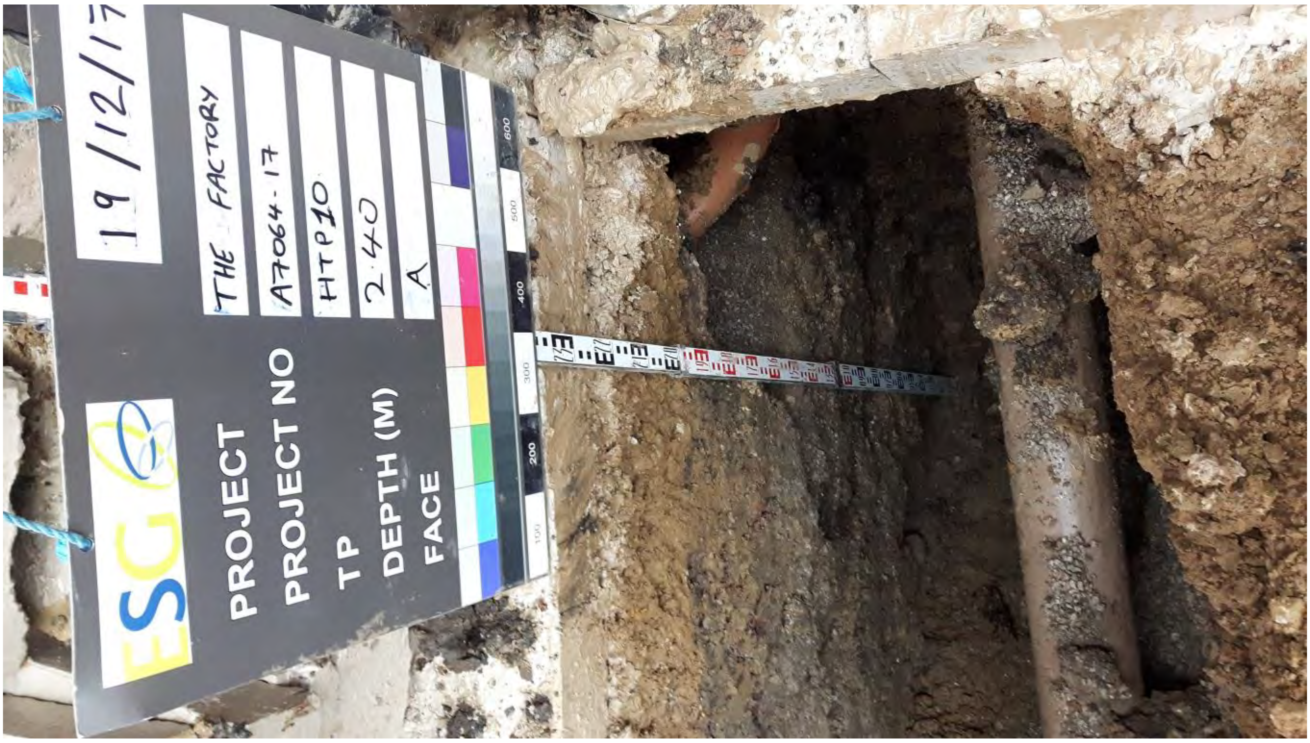
Photographs


HTP09 FACE A3

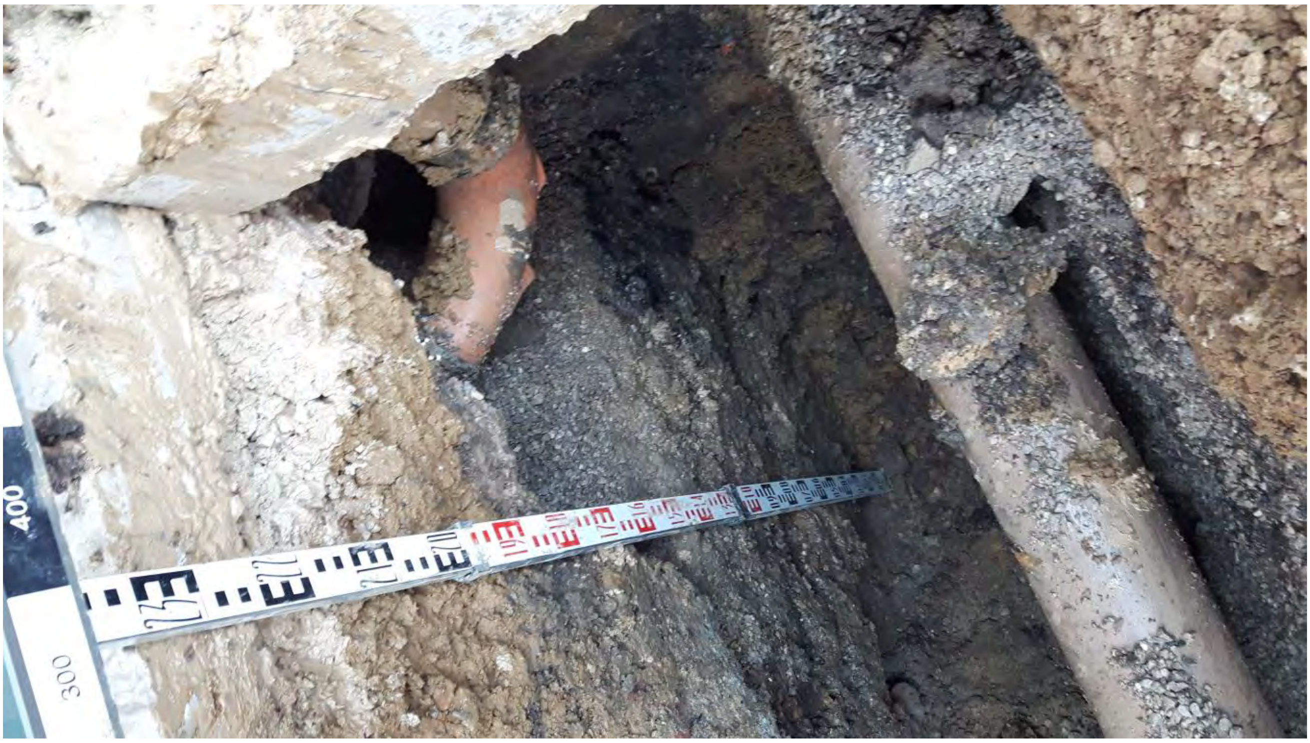
20/1/17
PROJECT THE FACTORY
PROJECT NO A7064-17
TP HTP09
DEPTH (M) 2.00
FACE SPOIL
HTP09 SPOIL

Notes:	**Project**	**The Factory, Manchester**	**Plate**
	Project No.	**A7064-17**	**2**
	Carried out for	**Manchester City Council**	

Photographs


19/12/17
PROJECT THE FACTORY
PROJECT NO A7064-17
TP HTP10
DEPTH (M) 2.40
FACE A
ESG

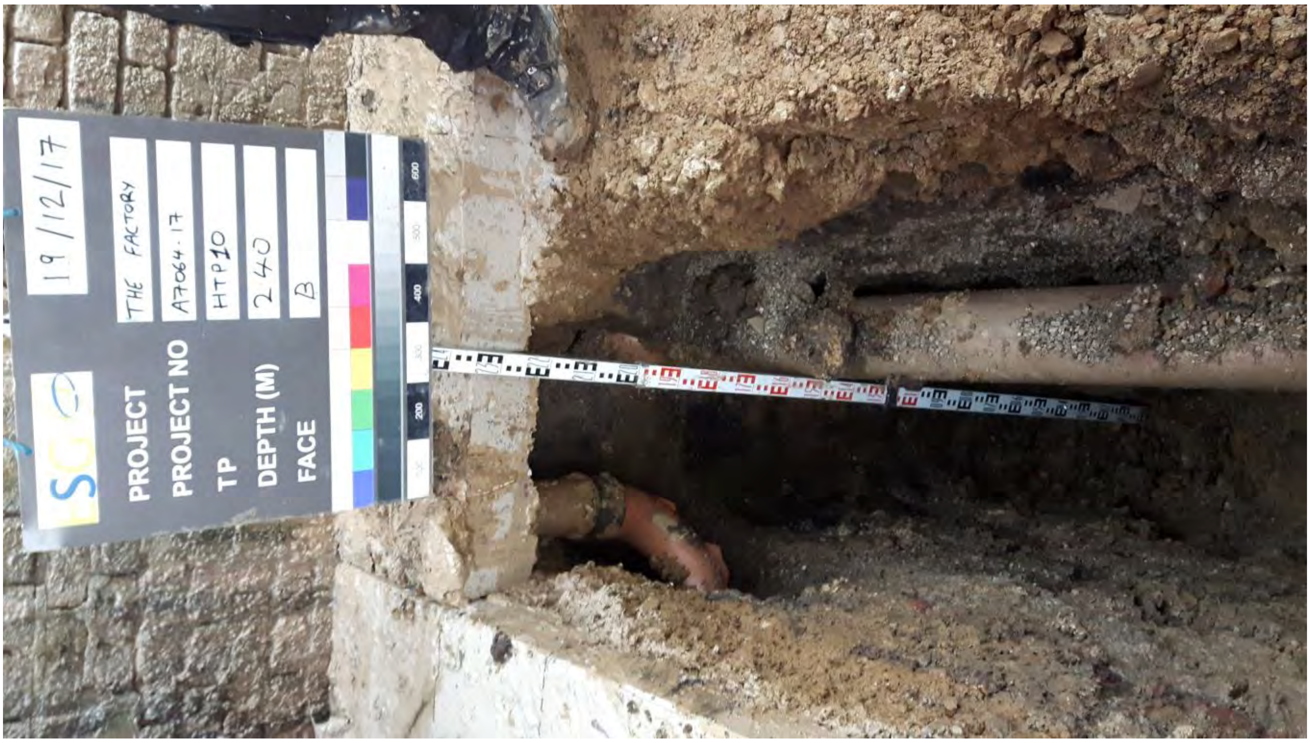
HTP10 FACE A



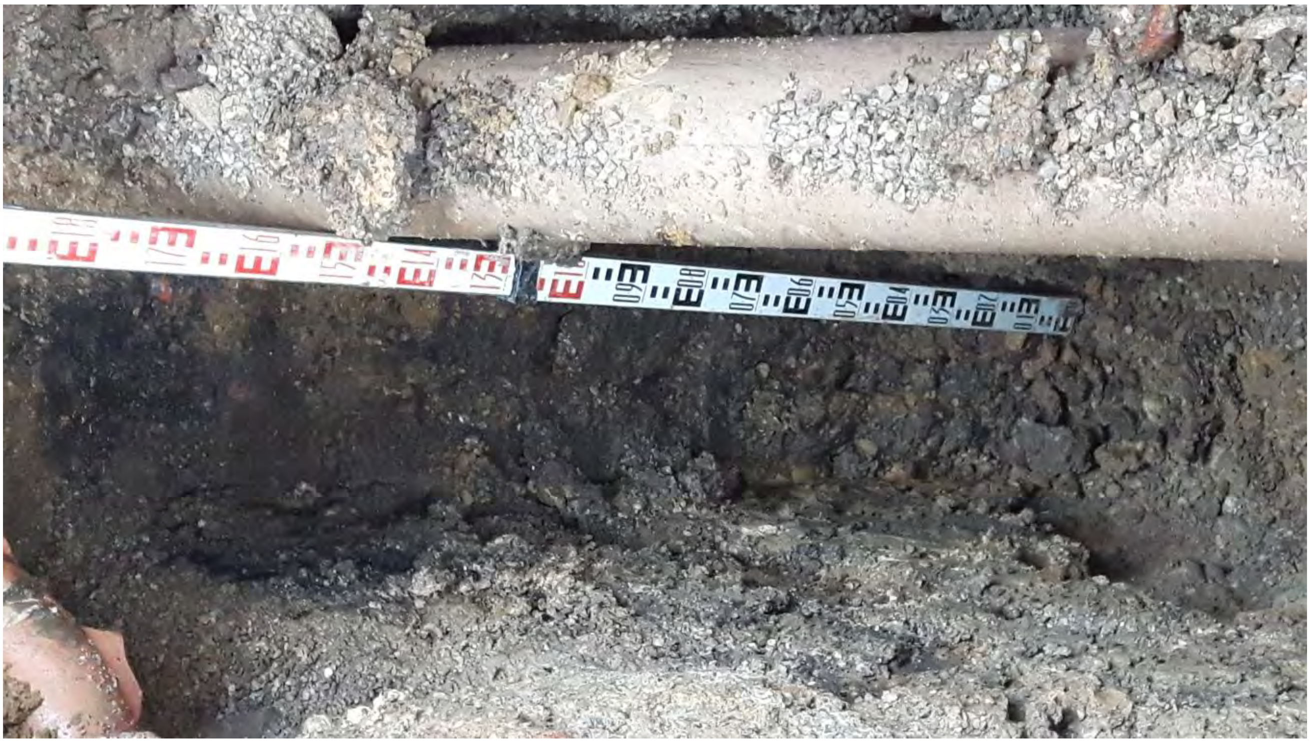
HTP10 FACE A2

Notes:	Project	The Factory, Manchester	Plate
	Project No.	A7064-17	3
	Carried out for	Manchester City Council	

Photographs


19/12/17
PROJECT THE FACTORY
PROJECT NO A7064-17
TP HTP10
DEPTH (M) 2.40
FACE B

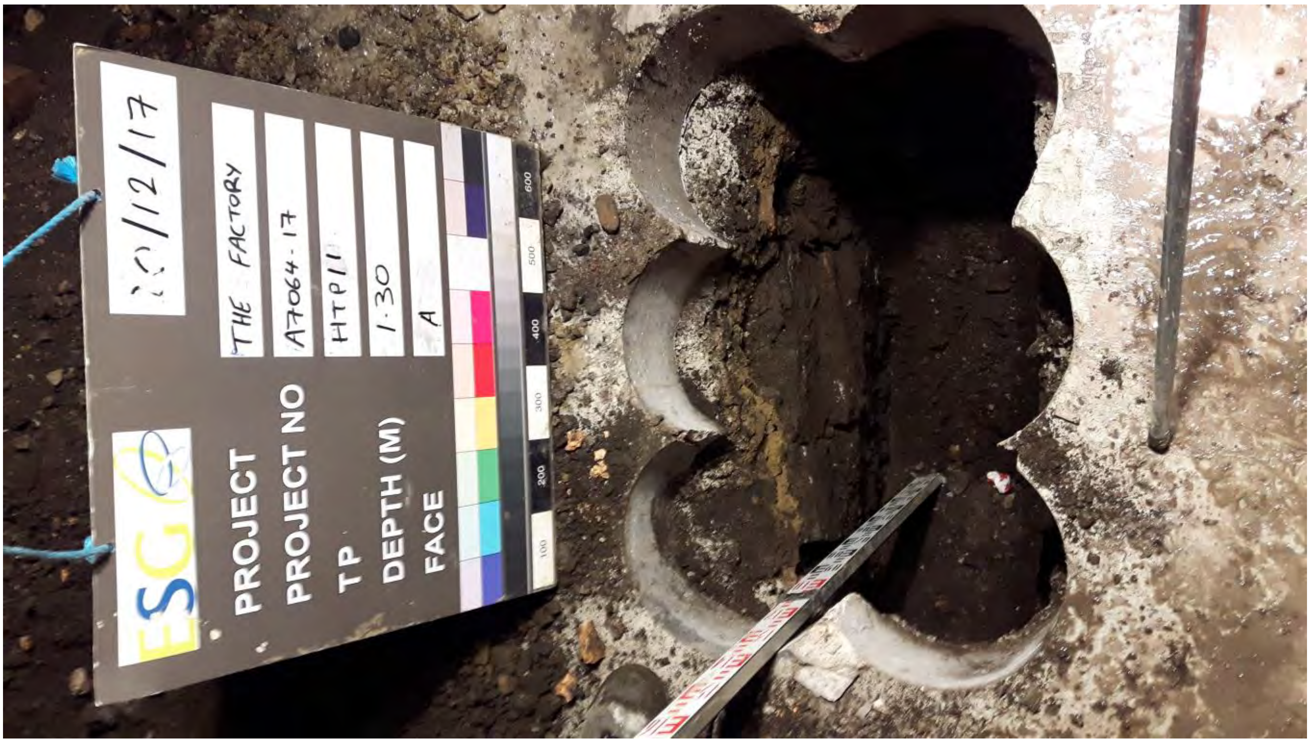
HTP10 FACE B



HTP10 FACE B2

Notes:	Project	The Factory, Manchester	Plate
	Project No.	A7064-17	4
	Carried out for	Manchester City Council	

Photographs



ESG
100
200
300
400
500
600

20/12/17

PROJECT THE FACTORY

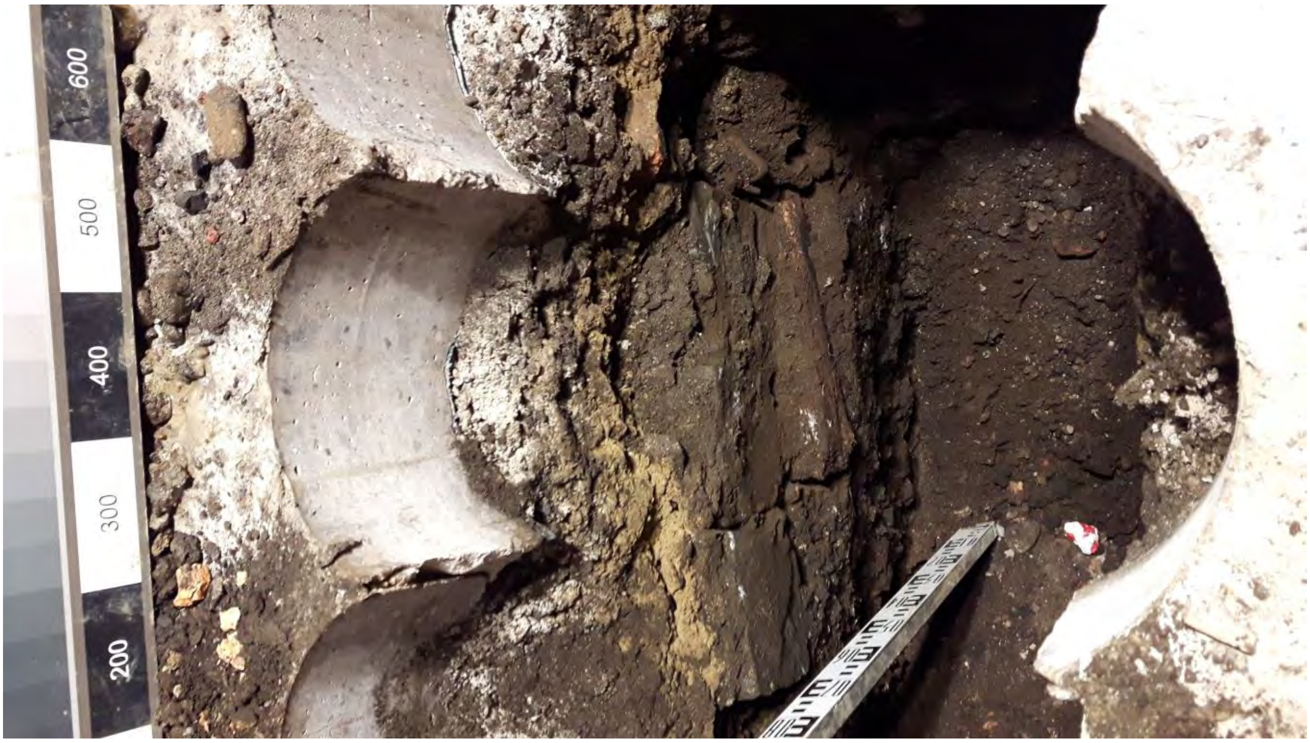
PROJECT NO A7064-17

TP HTP11

DEPTH (M) 1.30

FACE A

HTP11 FACE A

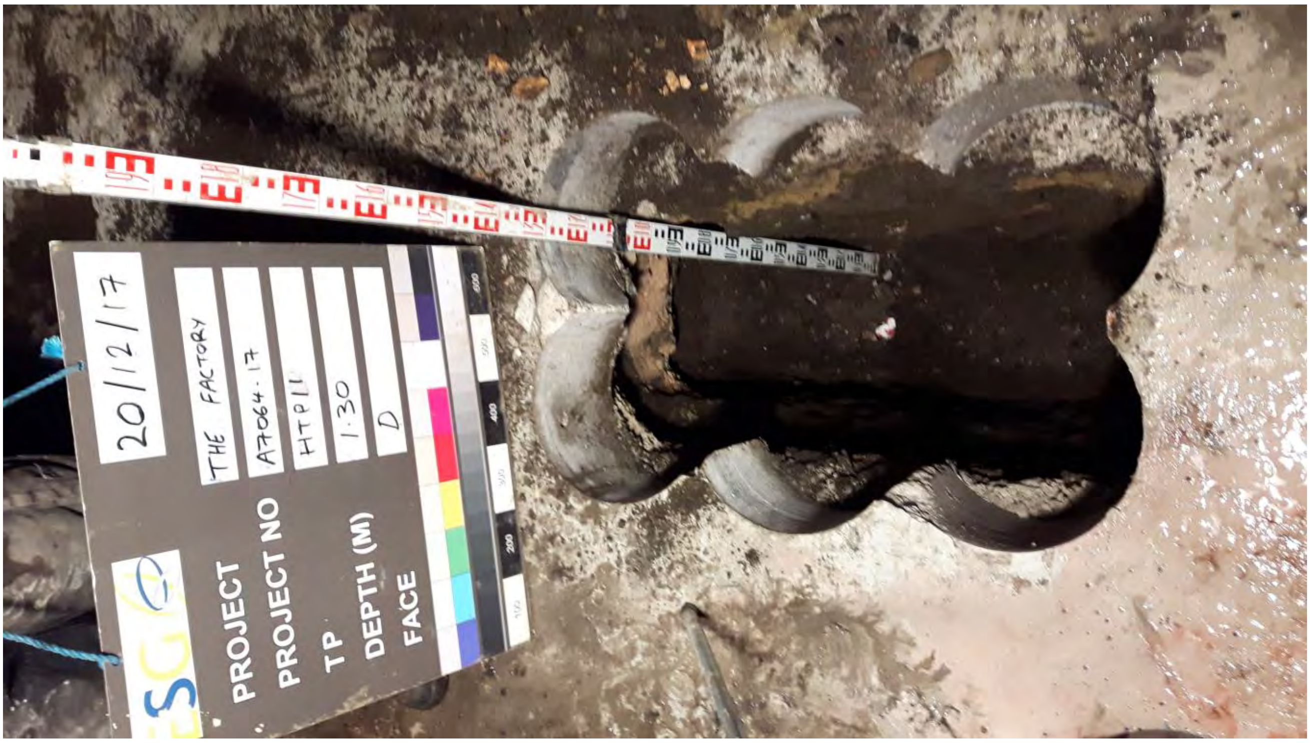


600
500
400
300
200

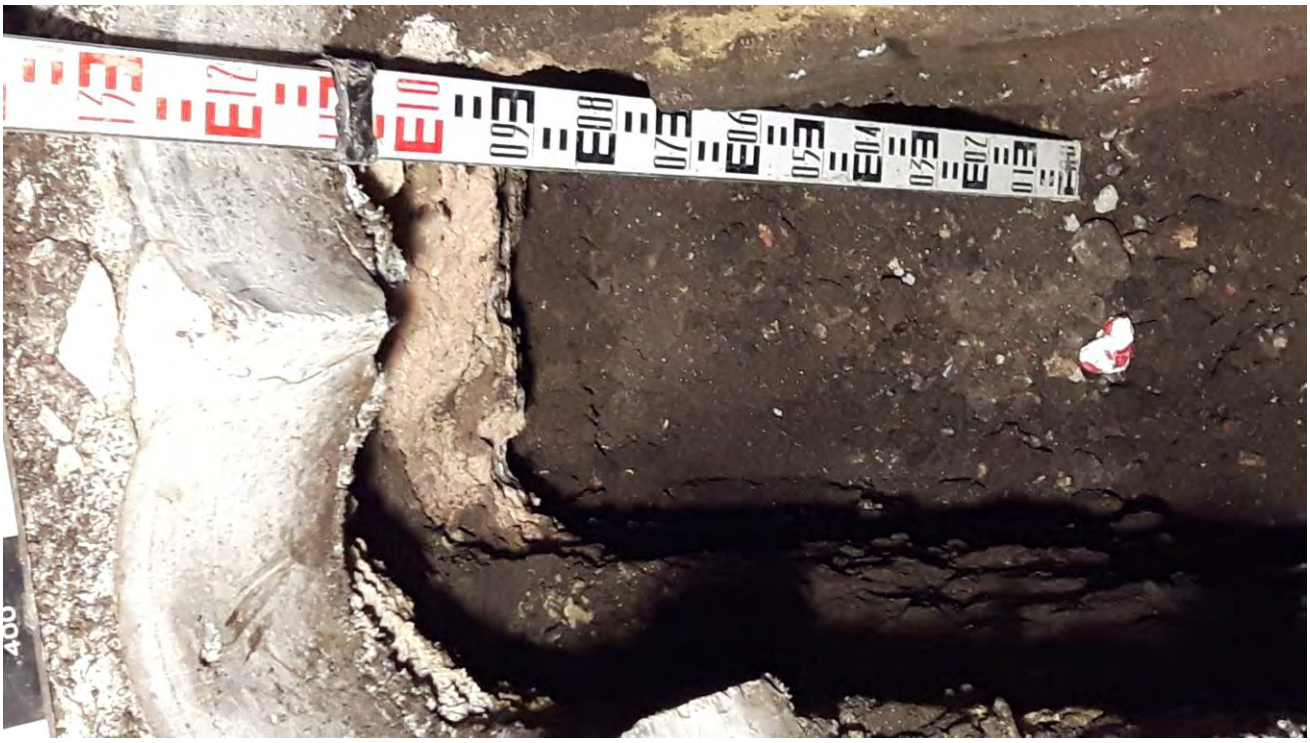
HTP11 FACE A2

Notes:	Project Project No. Carried out for	The Factory, Manchester A7064-17 Manchester City Council	Plate 5

Photographs


20/12/17
PROJECT THE FACTORY
PROJECT NO A7064.17
TP HTP11
DEPTH (M) 1.30
FACE D

HTP11 FACE D

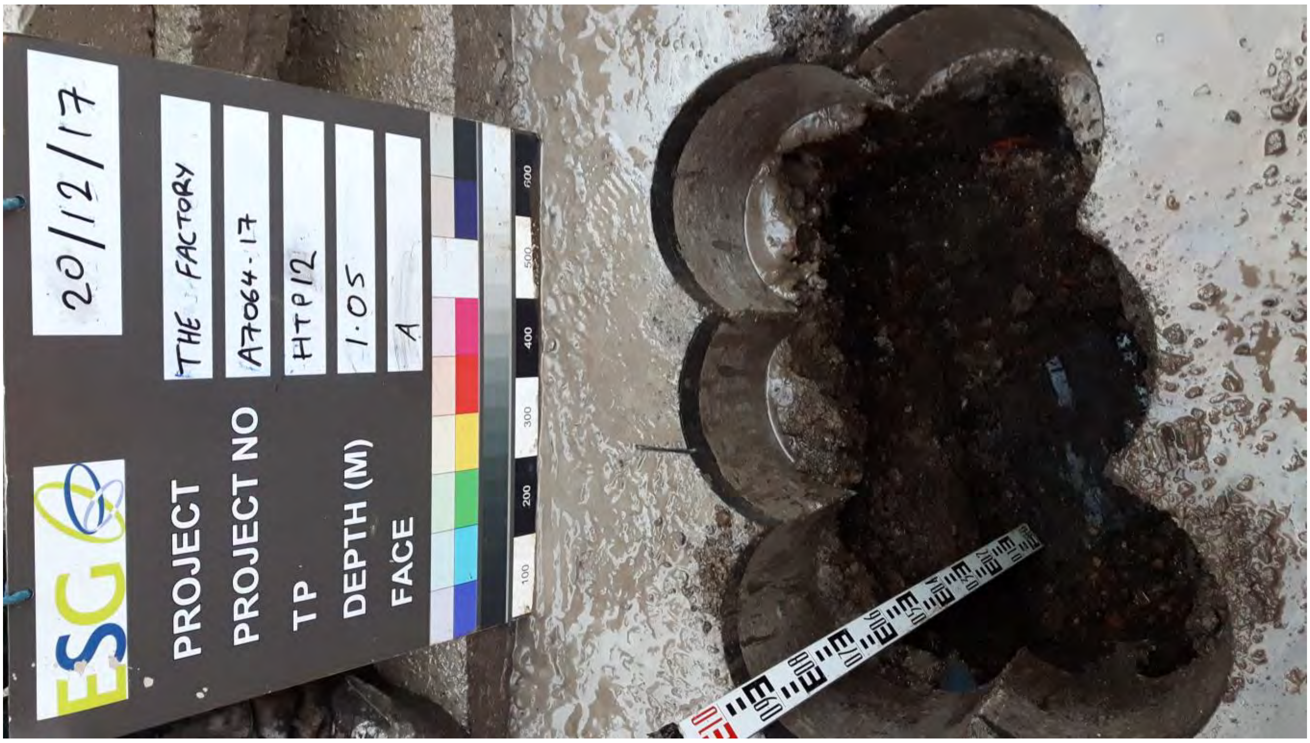


HTP11 FACE D2

Notes:	Project	The Factory, Manchester	Plate
	Project No.	A7064-17	6
	Carried out for	Manchester City Council	

Photographs

HTP11 SPOIL

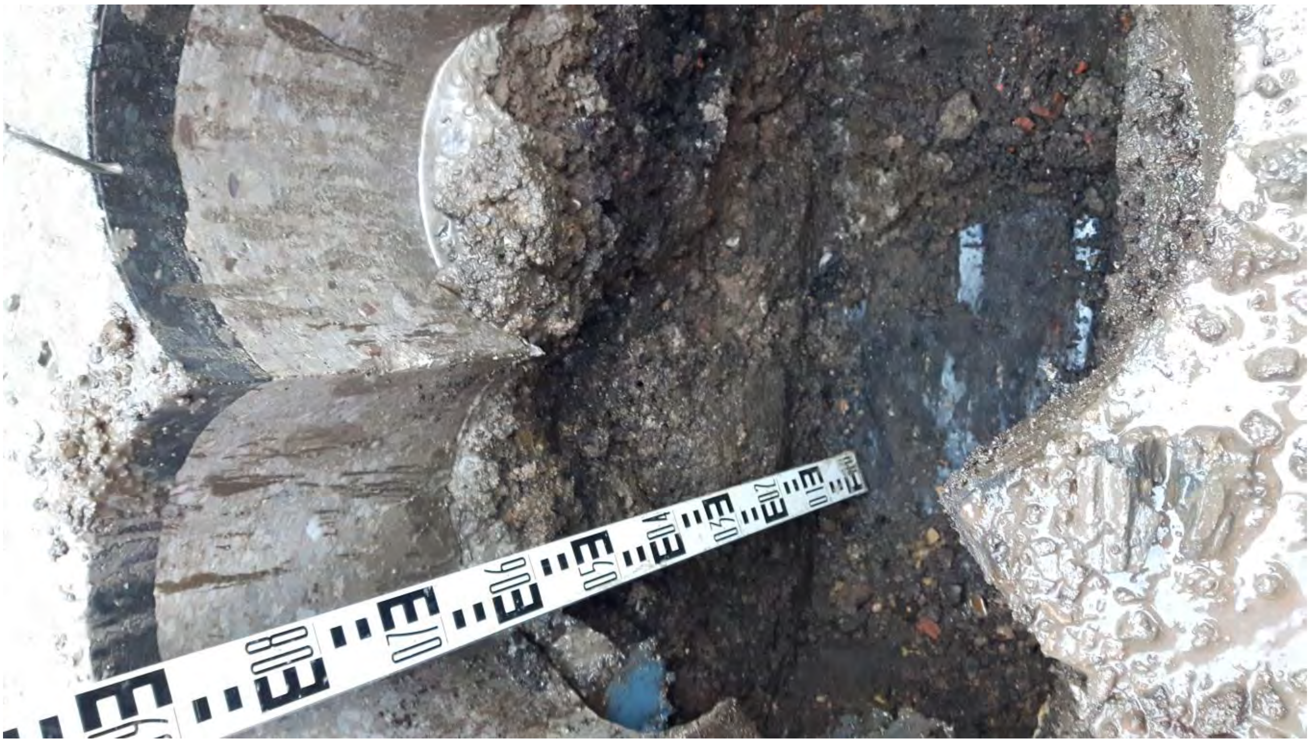


20/12/17
PROJECT THE FACTORY
PROJECT NO A7064.17
TP HTP12
DEPTH (M) 1.05
FACE A

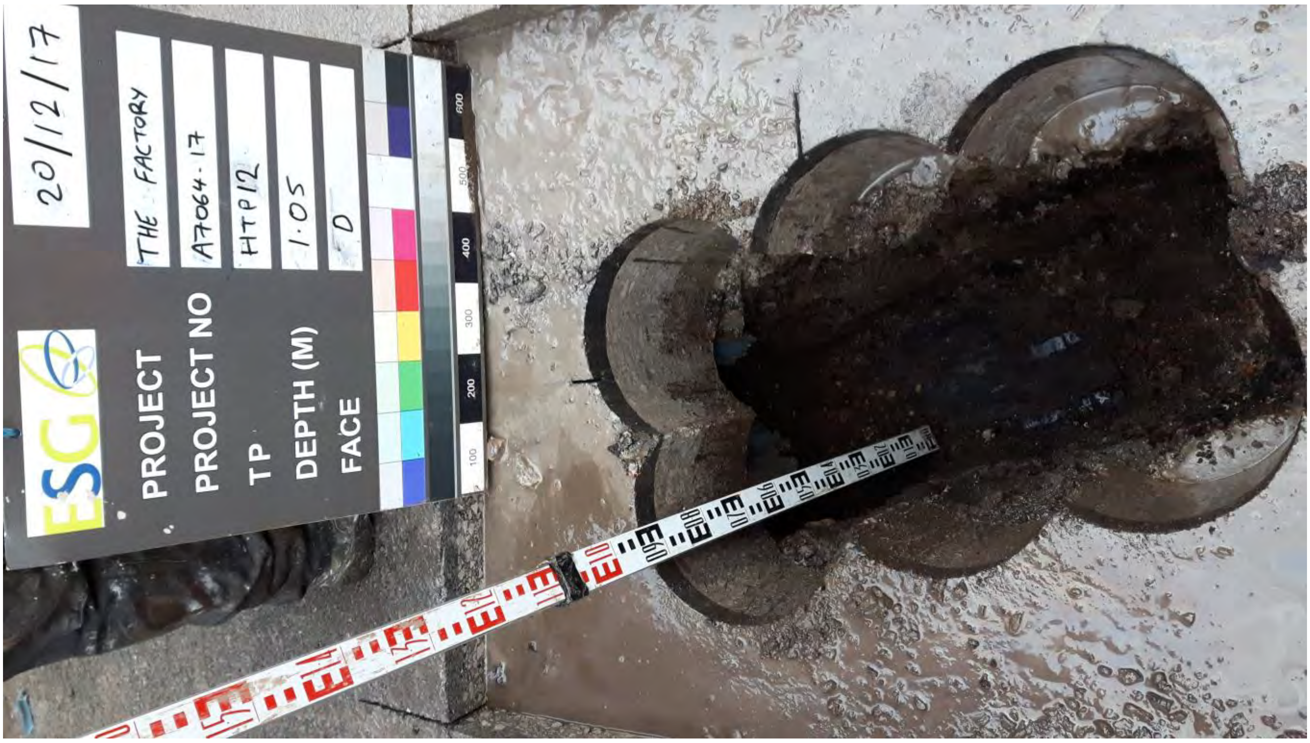
HTP12 FACE A

Notes:	Project	The Factory, Manchester	Plate
	Project No.	A7064-17	7
	Carried out for	Manchester City Council	

Photographs



HTP12 FACE A2

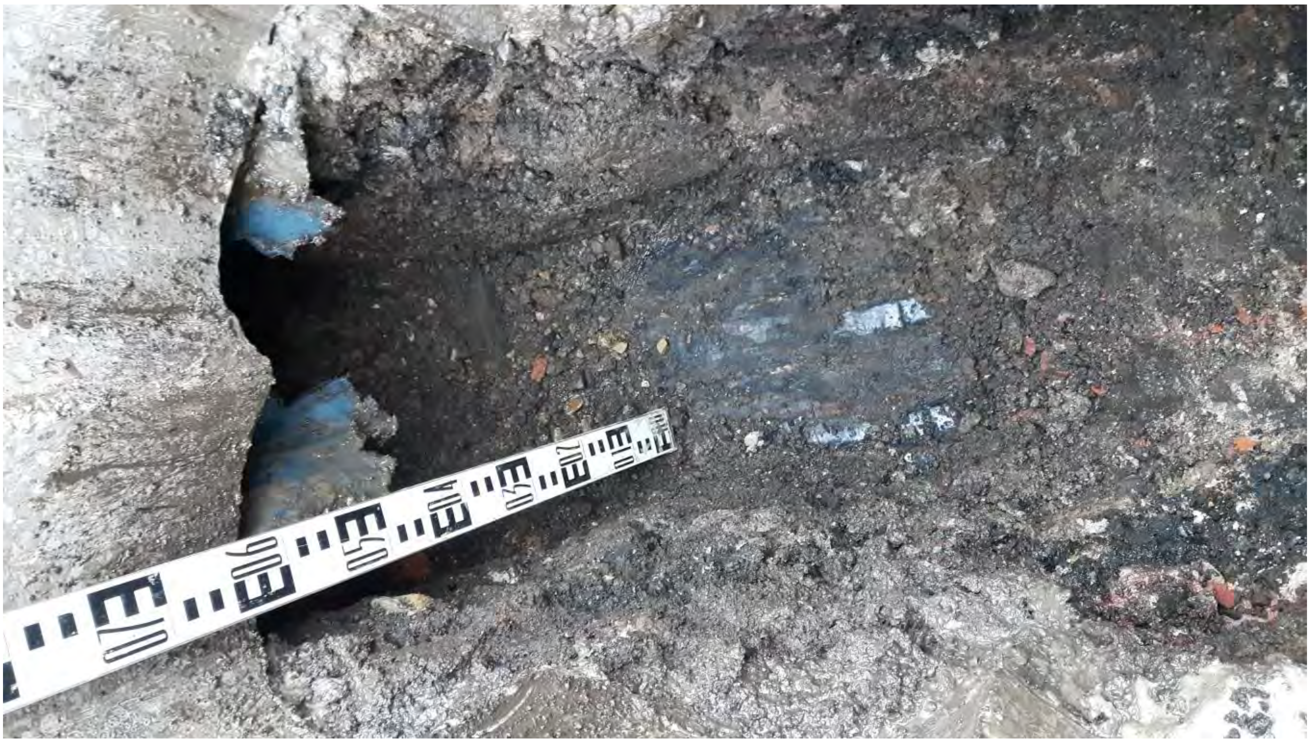

20/12/17
ESG
PROJECT THE FACTORY
PROJECT NO A7064-17
TP HTP12
DEPTH (M) 1.05
FACE D

HTP12 FACE D

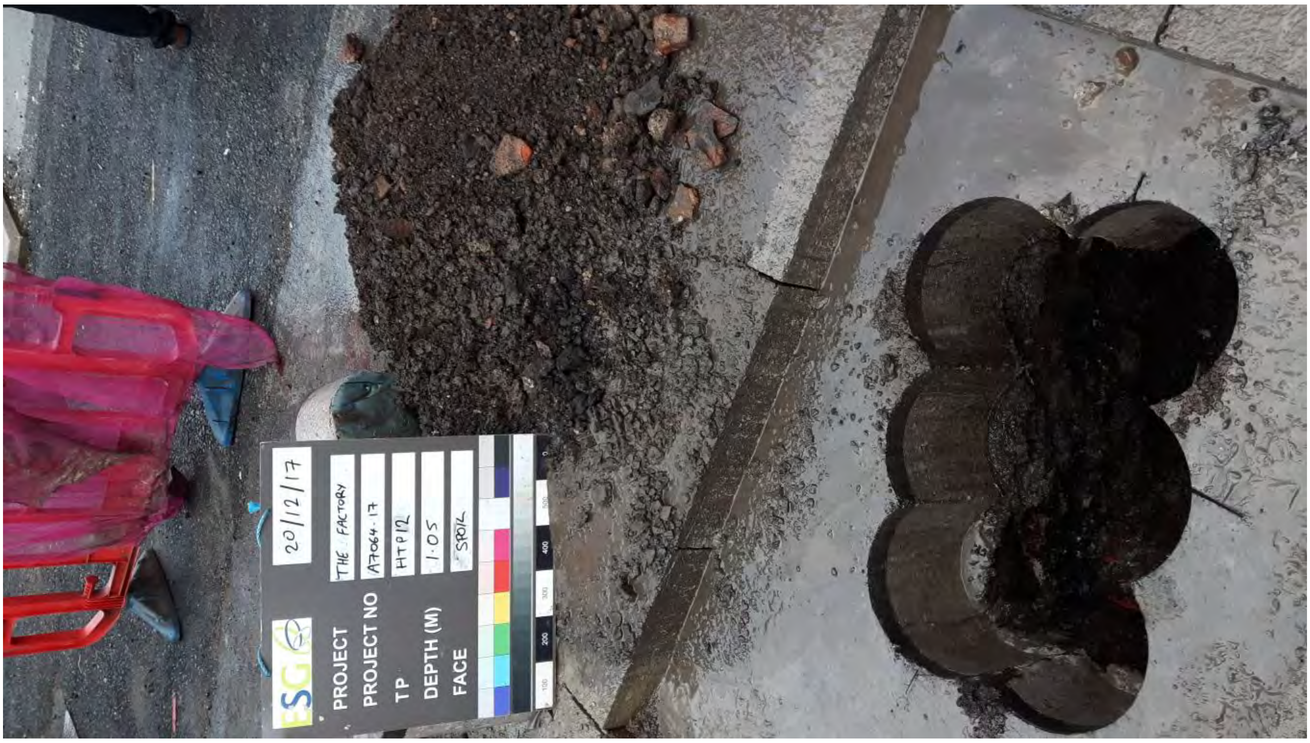
Notes:	**Project**	**The Factory, Manchester**	**Plate**
	Project No.	**A7064-17**	**8**
	Carried out for	**Manchester City Council**	

Photographs

SOCOTEC



HTP12 FACE D2



20/12/17

PROJECT THE FACTORY

PROJECT NO A7064-17

TP HTP12

DEPTH (M) 1.05

FACE SPOIL

HTP12 SPOIL

Notes:	Project	The Factory, Manchester	Plate
	Project No.	A7064-17	9
	Carried out for	Manchester City Council	