



Client:

Castlefield Developments (Manchester) Ltd
1st Floor NQ Building
47 Bengal Street
Ancoats
Manchester
M4 6BB

Contractor:

Renaker Build Limited
1st Floor NQ Building
47 Bengal Street
Ancoats
Manchester
M4 6BB

Verification and Validation Report

Castle Wharf, Chester Road, Manchester, Earthworks & Soils Verification

Aug 2021

Site Ref: 5758/CRX V1.00 VVRTD

Unit 4
Sheffield Street
Heaton Norris
Stockport
Cheshire
SK4 1RU
Telephone : 0161 480 8885
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Verification and Validation Report

1. Introduction

This report has been produced in order to provide information to verify the efficacy of the very limited remediation measures as detailed within the GeoAssist Ltd. Phase II Contaminated Land Risk Assessment referenced 5758/CRX CLRA v2.00 and dated March 2016. The limited remediation measures detailed were submitted under planning permission numbers 113870/FO/2016 for the construction of two residential apartment buildings with ancillary amenity facilities for residents including a gym, landscaped terrace, new public realm and landscaping including two new pedestrian connections to the Castlefield basin from Chester Road, basement car parking and related highway, access, servicing and associated works. The report presents the verification evidence for the earthworks measures implemented across the entire site area, as demarked by the redline on the plan in Appendix A, and the validation of soils imported to site as part of the landscaping scheme for the public realm as demarked by the blue line on the plan in Appendix A to this report. The evidence provided will demonstrate that the development presents a low risk to site users in terms of ground contamination.

The approximate grid reference for the centre of the site is 383250, 397460 and the total area of the site is approximately 2900 m². The area of the site is outlined with a red line on the site plan in Appendix A1.

2. Description of the Site

2.1 Previous

The approximate grid reference for the centre of the Site is 383390, 397340 and the total area of the application site is approximately 1.6ha. The area covered by the Phase II Ground Investigation is outlined with a red line on the Site plan in Appendix A1 and extends only to the built element of the proposal.

The site was a brownfield site located on an area of land between The Bridgewater Canal and Chester Road on the south western edge of Manchester City Centre. The site was split level and roughly triangular in shape. There were no buildings on the site. A retaining wall intersected the site from west to east.

To the south of this wall the site is elevated to approximately 3m to 4m above the lower northern section and the Bridgewater Canal. The Bridgewater Canal and Towpath forms the northern boundary of the site with Chester Road and the Bridgewater Viaduct forming the south eastern boundary and residential property being present to the west.

The River Medlock has been diverted into a tunnel passing in a roughly south east to north west orientation across the northern section of the site.

2.2 Present Development

The new development has constructed two residential apartment buildings with ancillary amenity facilities for residents including a gym, landscaped terrace, new public realm and landscaping including two new pedestrian connections to the Castlefield basin from Chester Road, basement car parking and related highway, access, servicing and associated works. Construction has been achieved by removal of the all of the made ground/drift material across the site down to, and in to, competent bedrock with foundations formed directly onto the bedrock. The excavations are supported by contiguous bored piling around the majority of the Site area.

3. Background Information

3.1 History of the Site

Comprehensive information regarding the historical use of the site can be found in the GeoAssist Ltd. Phase I report referenced 5758/CRX PCLRA v1.00 and dated October 2015.

3.2 Previous Investigations

The following site investigation reports and advice notes are known to have been produced for this site and have been referenced where considered appropriate. A very brief description of the information contained within is also provided.

Author	Date	Ref	Title / description
GeoAssist Ltd	Oct 2015	5758/CRX PCLRA	Full Phase I Preliminary Contaminated Land Risk Assessment & Desk Based Study to inform intrusive works
GeoAssist Ltd	March 2016	5758/CRX PCLR	Phase II Contaminated Land Risk Assessment.

4. Remediation

4.1 Methodology

From the outset all other options were precluded in favour of a simple and controlled civil engineering removal of made ground as part of site preparation and enabling works as the Phase II soils risk assessment did not identify any risks from ground contamination at the site.

The final proposed scheme for the site involved the significant removal of near surface soils over the entire area of the site and replacement at a reduced level with standard construction materials such as crushed rock sub-base and concrete slabs, or hardstanding.

The construction methodology pursued on this site follows a relatively simple engineering approach involving the removal of significant quantity of subsoils in order to form the basement carpark levels of the site. The earthworks phase of the construction has reduced the site levels to bedrock and removed the made ground. Moreover the final landscape plan is constructed mainly of hardstanding with newly formed planters utilising imported topsoil as a growth medium.

4.2 Verification Plan

In order to ensure the site has been appropriately developed it was proposed to undertake a series of site visits by the engineer to obtain photographic and documentary evidence including legal and regulatory licenses for those contractors involved in the earthworks operation. The nature of the development has precluded the requirement for validation sampling once reduced levels were achieved, as the final scheme is constructed almost entirely of hardstanding with only very limited planting normally in raised planters or sunken beds. It is documented that approximately 17,248m³ of made ground, natural drift deposits and bedrock have been removed from site as part of the site preparation and earthworks.

5. Verification

5.1 Volumes of Soils Removed from Site.

In total Circa 17,248m³ of subsoils and bedrock have been removed from site by Licenced Subcontractor.

J O'Shea & Sons Ltd.

Contractor	Disposal Facility	Volume m ³	Carriers Licence	Waste Code	EPR No for Disposal Facility
J O'shea	Orchard Street, Pendleton, Salford M6 6FL	17,248	CBDU90839	17-05-04	WML50093
	Total	17,248			

Example WTNs and the Waste Carriers Licence and Permits for disposal sites, where available, form appendix B1 to this report. A photographic record of the site excavations forms appendix B2.

5.2 Volumes of Imported Soils.

At present the final landscaping scheme is incomplete however the soils to be used within the planters has been delivered to site and is awaiting use.

The soils were cleared for import based on the supplier declared certification (Appendix C1). Soils as imported were then sampled and tested. The Soils as imported were found to conform with the generic assessment criteria for residential without homegrown produce land use scenario. Photographic evidence along with a plan of the soils sampling locations are presented in appendix C2 to this report. The soils laboratory analytical results form appendix C3 and the risk assessment forms appendix C4 to this report.

5.3 Chemical & Physical Testing to Confirm Compliance with Objectives

Other than the afore mentioned soil testing certification for confirmation that the soils are low risk, no additional chemical or physical test results were required to be undertaken for the earthworks phase of the planning permission.

5.4 Ongoing Monitoring

There is no ongoing monitoring programme associated with any remedial measures for this site.

6. Final Site Conditions

At present the site is nearing completion. The final development landscape plan is included within appendix A1. Evidence provided herein demonstrates that the development has been carried out in accordance with the specification set out in 5758/CRX CLRA March 2016.

The developer and all contractors employed by the developer were required to monitor for, and report any, evidence of contamination found during construction. None was encountered or reported.

The evidence presented herein demonstrates that all reasonably practicable steps have been taken to ensure the site is fit for residential purposes and the risk to the occupiers from ground contamination and gas ingress is low to negligible in all reasonably foreseeable circumstances.



Matthew Benson BSc

Geotechnical/Environmental Engineer

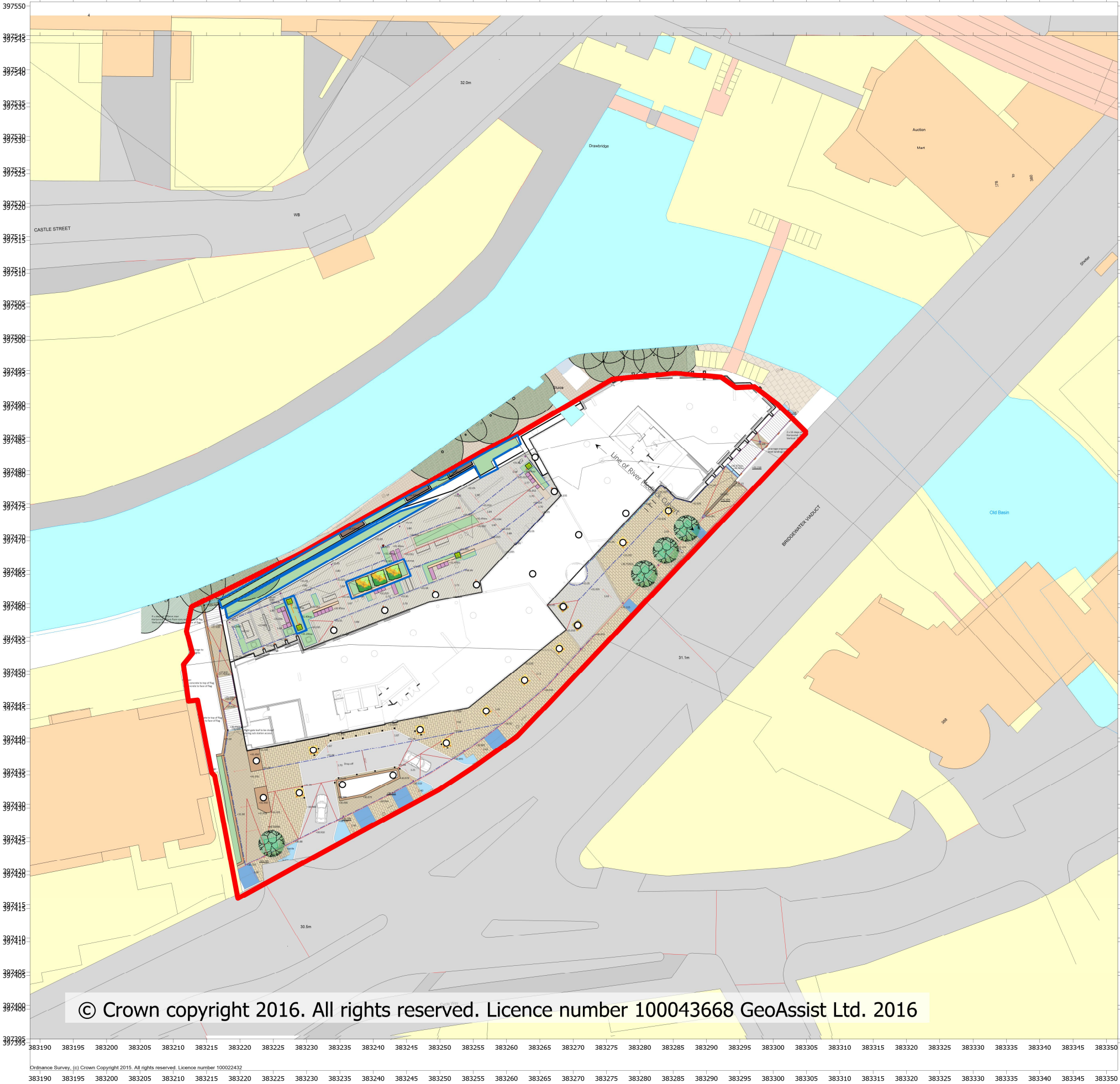


Mark Richardson MSc CEng MICE

Technical Director

This report has been prepared by GeoAssist Limited with all reasonable professional skill, care and diligence within the terms of the contract with Castlefield Developments (Manchester) Ltd. The report is confidential to Castlefield Developments (Manchester) Ltd, their/the named persons advisors and bankers, and GeoAssist Limited accepts no responsibility of whatever nature to third parties to whom this report may be divulged. GeoAssist Limited owns the copyright in this report. All rights are reserved, and unauthorised use is prohibited. Castlefield Developments (Manchester) Ltd may use the report for their/her/his own purposes.

GeoAssist are not liable for any errors, omissions or facts contained within data provided by third parties.



A1 Site Plan

Site Name	Chester Road
Location	Manchester
GeoAssist Ref	5758CRX
Client	Castlefield Developments (Manchester) Ltd
	1st Floor NQ Building 47 Bengal Street Ancoats Manchester M4 6BB
Planning Consultant	Renaker Build Limited
NGR (centre of site)	383250,397460
Production Date	Aug 2021
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36

DUTY OF CARE-CONTROLLED WASTE TRANSFER NOTE

SECTION A - DESCRIPTION OF WASTE

- 1) PLEASE DESCRIBE THE WASTE BEING TRANSFERRED NON-HAZARDOUS
- 2) EUROPEAN WASTE CODE: EWC 17.05.04, 17.01.07
- 3) WHAT IS THE QUANTITY OF WASTE (M³ / TONNES)

SECTION B - PRODUCER OF THE WASTE

- 1) FULL NAME (BLOCK CAPITALS) REMARKER BUILD LTD
- 2) ADDRESS 1ST Floor, NQ BUILDINGS, 47 BENGAL ST,
ANCOATS, MANCHESTER, M4 6BB SIC CODE 41.20/2

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)
- 2) COMPANY ADDRESS

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 CARSTEL ROAD, MANCHESTER, M15 4QCT
- 2) DATE OF TRANSFER 10.10.18 3) TIME(S) OF TRANSFER (FOR MULTIPLE TRANSFERS, GIVE BETWEEN DATES) 10.10.18 — 10.06.19
- 4) PRODUCERS REPRESENTATIVE REMARKER 5) CARRIERS REPRESENTATIVE
NAME (PRINT) DAVID MCPHERSON NAME (PRINT) PAUL O'SHEA
SIGNATURE [Signature] SIGNATURE [Signature]

SECTION F - SECOND TRANSFER (Carrier to Disposer)

- 1) ☒ DISPOSAL SITE
☒ J O'SHEA & SONS LTD. ORCHARD STREET, PENDLETON, SALFORD, MANCHESTER M6 6FL
- 2) DATE OF TRANSFER 10.10.18 3) TIME(S) OF TRANSFER (FOR MULTIPLE TRANSFERS, GIVE BETWEEN DATES) 10.10.18 — 10.06.19
- 4) CARRIERS REPRESENTATIVE 5) DISPOSERS REPRESENTATIVE
NAME (PRINT) PAUL O'SHEA NAME (PRINT) J O'SHEA
SIGNATURE [Signature] SIGNATURE [Signature]



Transfer Note Number

3178

DUTY OF CARE-CONTROLLED WASTE TRANSFER NOTE**SECTION A - DESCRIPTION OF WASTE**

- 1) PLEASE DESCRIBE THE WASTE BEING TRANSFERRED NON - HAZARDOUS
- 2) EUROPEAN WASTE CODE: EWC 17.05.04 / 17.01.07
- 3) WHAT IS THE QUANTITY OF WASTE (M³ / TONNES) 10,000

SECTION B - PRODUCER OF THE WASTE

- 1) FULL NAME (BLOCK CAPITALS) Renaker Build Ltd
- 2) ADDRESS 1st Floor, NQ Building, 47 BENGAL ST,
ANCOATS, MANCHESTER, M4 6BB SIC CODE 41.20/2

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)
- 2) COMPANY ADDRESS

WML / PERMIT NUMBER 50093 ISSUED BY E.A.

- ☒ 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 CHESTER RD, MANCHESTER, M15 4QG.
- 2) DATE OF TRANSFER 11-6-19 3) TIME(S) OF TRANSFER (FOR MULTIPLE TRANSFERS, GIVE BETWEEN DATES) 11-6-19 to 31/12/19
- 4) PRODUCERS REPRESENTATIVE RENAKER 5) CARRIERS REPRESENTATIVE
NAME (PRINT) RORY MURPHY NAME (PRINT) JO'SHEA
SIGNATURE [Signature] SIGNATURE [Signature]

SECTION F - SECOND TRANSFER (Carrier to Disposer)

- 1) DISPOSAL SITE
- ☒ J O'SHEA & SONS LTD, ORCHARD STREET, PENDLETON, SALFORD, MANCHESTER M6 6FL
- 2) DATE OF TRANSFER 11-6-19 3) TIME(S) OF TRANSFER (FOR MULTIPLE TRANSFERS, GIVE BETWEEN DATES) 11-6-19 to 31/12/19
- 4) CARRIERS REPRESENTATIVE 5) DISPOSERS REPRESENTATIVE
NAME (PRINT) JO'SHEA NAME (PRINT) JO'SHEA
SIGNATURE [Signature] SIGNATURE [Signature]

[Back \(https://admin.wastecarriersregistration.service.gov.uk/registrations?utf8=%E2%9C%93&q=CBDU90839&commit=Search&searchWithin=any\)](https://admin.wastecarriersregistration.service.gov.uk/registrations?utf8=%E2%9C%93&q=CBDU90839&commit=Search&searchWithin=any)

Certificate of Registration under the Waste (England and Wales) Regulations 2011

Regulation authority

Name



Address

National Customer Service Centre
99 Parkway Avenue
Sheffield
S9 4WF

Telephone number

03708 506506

The Environment Agency certify that the following information is entered in the register which they maintain under regulation 28 of the Waste (England and Wales) Regulations 2011.

Carriers details

Name of registered carrier

J O'Shea & Sons Ltd

Registered as

an upper tier waste carrier

Registration number

CBDU90839

Address of place of business

J O'Shea & Sons Ltd
J O'SHEAS & SONS LTD
ORCHARD STREET
SALFORD
M6 6FL

Telephone number

0161 925 9800

Date of registration

Wednesday 2nd March 2016

Expiry date of registration (unless revoked)

Thursday 21st March 2019

Certificate of Registration under the Waste (England and Wales) Regulations 2011

Regulation authority

Name



Address

National Customer Service Centre
99 Parkway Avenue
Sheffield
S9 4WF

Telephone number

03708 506506

The Environment Agency certify that the following information is entered in the register which they maintain under regulation 28 of the Waste (England and Wales) Regulations 2011.

Carriers details

Name of registered carrier

J O'Shea & Sons Ltd

Registered as

An upper tier waste carrier, broker and dealer

Registration number

CBDU90839

Address of place of business

J O'SHEAS & SONS LTD
ORCHARD STREET
SALFORD
M6 6FL

Telephone number

0161 925 9800

Date of registration

5 February 2019

Expiry date of

registration (unless
revoked)

21 March 2022

Making changes to your registration

Your registration will last 3 years and will need to be renewed after this period. If any of your details change, you must notify us within 28 days of the change.

You can do this by calling the Environment Agency.



B2 Photographs

Site Name	Crown Street - Zone 1
Location	Silvercroft Street, Manchester
GeoAssist Ref	5890CRK
Client	DQ Developments Ltd
	1st Floor, NQ Building 47 Bengal Street Ancoats Manchester M4 6BB
Planning Consultant	Renaker Build Limited
NGR (centre of site)	383130,397300
Production Date	Aug 2021
Survey Method	Photographic Record
Surveyor	Others
Status	Final v1.00
Base Survey	na



Certificate of Analysis

Client: STUART BALDWIN
(T283) SED SERVICES LTD
LANDGATE FARM
LANDGATE LANE
BRYN
WIGAN WN4 0EJ

Originator: SOIL

Lab ID: 34750 - 58265
Sample ID: SAMPLE 3
Sample Weight: 552g

Date Received: 16/12/2020
Date Reported: 11/01/2021

BS 3882 : 2015 SPECIFICATION FOR TOPSOIL Multipurpose Grade

				Compliant with range (Y/N)					
				Multi-P	Acid	Calc	Low-F	Low-F	Low-F
								Acid	Calc
		Unit	Result						
Texture:	Clay	% w/w	9						
	Silt	% w/w	8						
	Sand	% w/w	83						
	Textural Class		Loamy Sand	Y	Y	Y	Y	Y	Y
Organic Matter:		% w/w	8.7	Y	Y	Y	Y	Y	Y
Coarse	>2 mm	% w/w	10.8	Y	Y	Y	Y	Y	Y
Fragment	>20 mm	% w/w	0.0	Y	Y	Y	Y	Y	Y
Content:	>50 mm	% w/w	0.0	Y	Y	Y	Y	Y	Y
Soil pH:			8.1	Y	N	Y	Y	N	Y
Carbonate:		% w/w	2.9			Y			Y
Available	Nitrogen	% w/w	0.412	Y	Y	Y			
Plant	Phosphorus	mg/l	72.0 (5)*	Y	Y	Y	N	N	N
Nutrients:	Potassium	mg/l	1375.4 (6)*	Y	Y	Y			
	Magnesium	mg/l	174.3 (3)*	Y	Y	Y			
Carbon:Nitrogen Ratio:		:1	12.3	Y	Y	Y	Y	Y	Y
Exchangeable Sodium Percentage:		%	8.0						
Phytotoxic	Total Zinc	mg/kg	104	Y	Y	Y	Y	Y	Y
Contaminants:	Total Copper	mg/kg	30.1	Y	Y	Y	Y	Y	Y
	Total Nickel	mg/kg	10.0	Y	Y	Y	Y	Y	Y
Visible	> 2mm	% w/w	0.00	Y	Y	Y	Y	Y	Y
Contaminants:	Plastics	% w/w	0.00	Y	Y	Y	Y	Y	Y
	Number of Sharps		0	Y	Y	Y	Y	Y	Y
Additional	Available Sodium	mg/l	251.0						
Analysis:	Available Calcium	mg/l	1535.0						
	Conductivity	uS/cm	3231	Y					
Compliance:				Y	N	Y	N	N	N

Results are expressed on a dry matter basis.

* Soil indices from RB209

Released by:

Myles Nicholson

Date: 11/01/2021

DECLARATION:

I certify that this sample has been analysed by NRM in accordance with BS 3882 Specification for Topsoil (2015).

NRM Coopers Bridge, Braziers Lane, Bracknell, Berkshire RG42 6NS
Tel: +44 (0) 1344 886338 **Fax:** +44 (0) 1344 890972 **Email:** enquiries@nrm.uk.com **www:** nrm.uk.com



Analytical Report

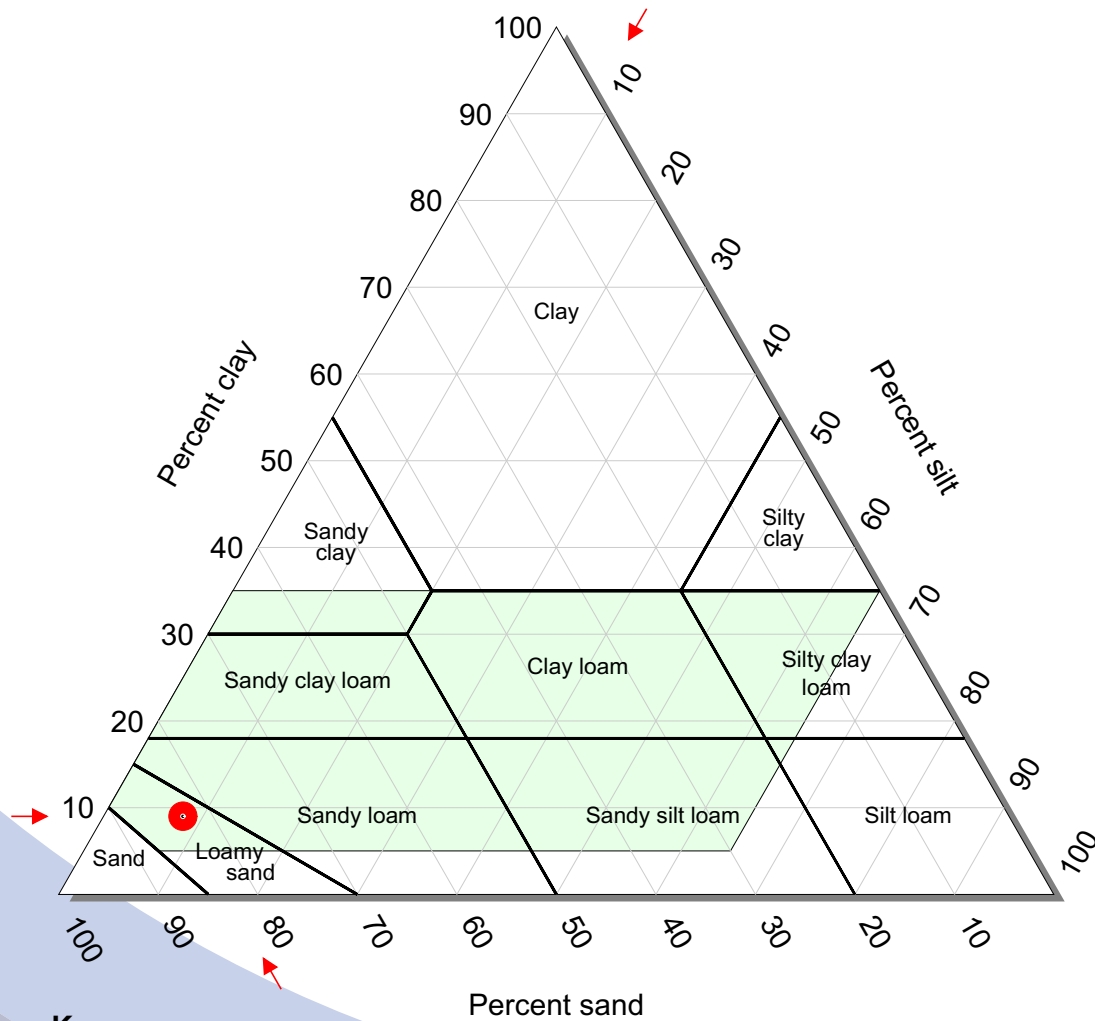
Client: STUART BALDWIN
(T283) SED SERVICES LTD
LANDGATE FARM
LANDGATE LANE
BRYN
WIGAN WN4 0EJ

Originator: SOIL

Lab ID: 34750 - 58265
Sample ID: SAMPLE 3
Sample Weight: 552g

Date Received: 16/12/2020
Date Reported: 11/01/2021

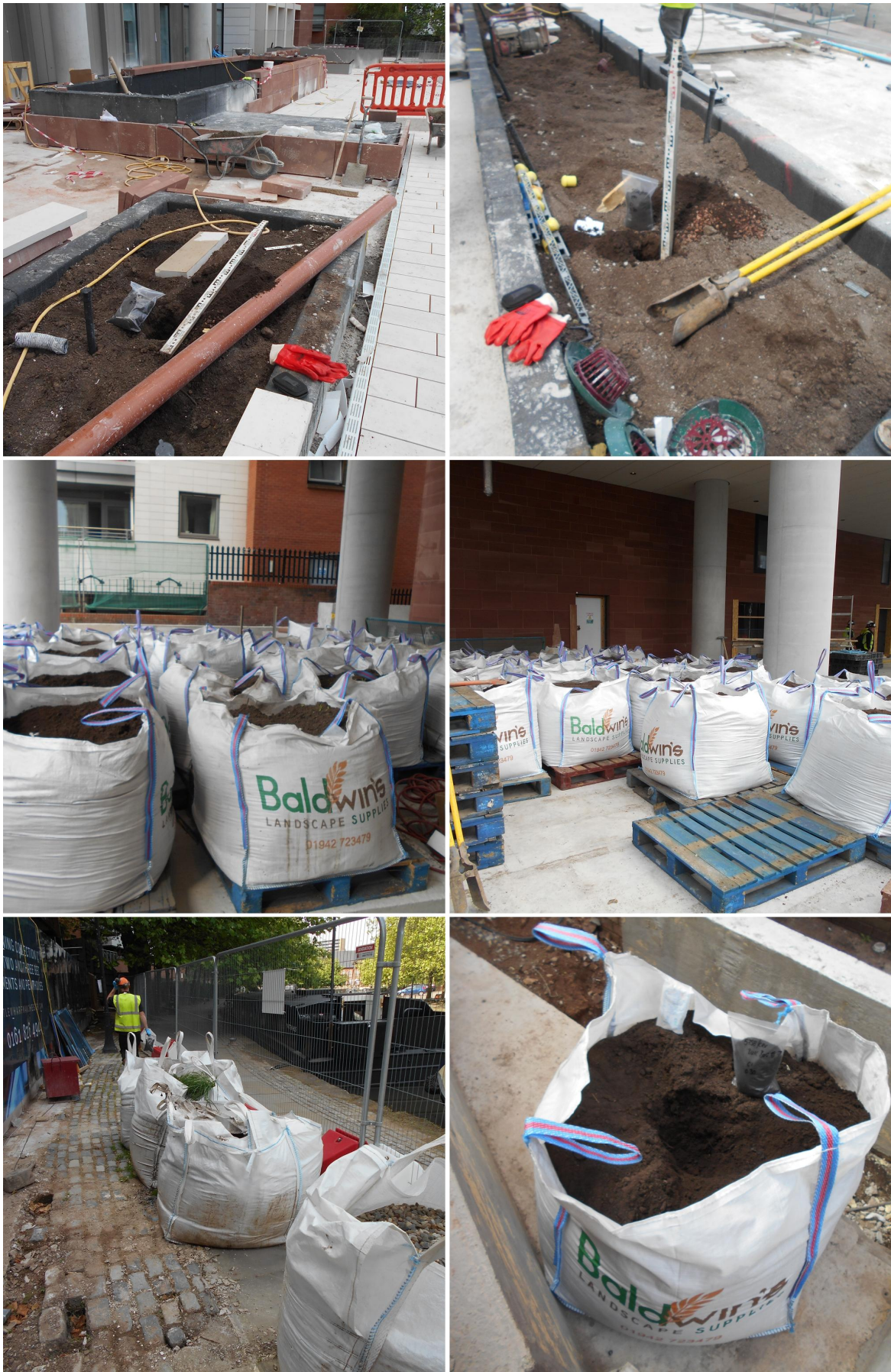
Fig. 1. Textural Class: Loamy Sand (compliant)



Key



Area within which texture of topsoil is required to fall.



C2 Photographs

Site Name	Crown Street - Zone 1
Location	Silvercroft Street, Manchester
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Survey Method	Photographic Record
Surveyor	Others
Status	Final v1.00
Base Survey	na



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Stockport
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SK4 1RU

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

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

e: info@geoassist.co.uk

Analytical Report Number : 21-84072

Project / Site name:	Chester Road, Manchester	Samples received on:	29/06/2021
Your job number:	5758-CRX	Samples instructed on/ Analysis started on:	29/06/2021
Your order number:	2210629	Analysis completed by:	08/07/2021
Report Issue Number:	1	Report issued on:	08/07/2021
Samples Analysed:	10 soil samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 21-84072

Project / Site name: Chester Road, Manchester

Your Order No: 2210629

Lab Sample Number				1921623	1921624	1921625	1921626	1921627
Sample Reference				TP1-C1	TP2-C1	B1	B2	B3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.30	None Supplied	None Supplied	None Supplied
Date Sampled				28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	12	8.2	8.5	8.1
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.40	0.40

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.5	8.4	7.7	7.7	7.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Thiocyanate as SCN	mg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Sulphate as SO ₄	%	0.005	MCERTS	0.038	0.047	0.044	0.060	0.054
Sulphide	mg/kg	1	MCERTS	3.9	< 1.0	11	13	29
Total Sulphur	%	0.005	MCERTS	0.074	0.067	0.060	0.093	0.061

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
----------------------------	-------	---	--------	-------	-------	-------	-------	-------

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.27	0.39	0.29	0.70	0.23
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.18	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.49	0.50	0.60	1.3	0.45
Pyrene	mg/kg	0.05	MCERTS	0.51	0.54	0.65	1.2	0.46
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.35	0.32	0.43	0.72	0.28
Chrysene	mg/kg	0.05	MCERTS	0.32	0.39	0.33	0.60	0.22
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.37	0.44	0.38	0.78	0.30
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.23	0.28	0.19	0.29	0.14
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.35	0.42	0.36	0.68	0.25
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.22	0.24	0.20	0.41	0.17
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.27	0.32	0.28	0.51	0.21

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	3.38	3.84	3.71	7.34	2.71
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Analytical Report Number: 21-84072

Project / Site name: Chester Road, Manchester

Your Order No: 2210629

Lab Sample Number	1921623	1921624	1921625	1921626	1921627
Sample Reference	TP1-C1	TP2-C1	B1	B2	B3
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.30	0.30	None Supplied	None Supplied	None Supplied
Date Sampled	28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.5	7.5	5.6	6.9	5.3
Barium (aqua regia extractable)	mg/kg	1	MCERTS	58	68	55	74	53
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.40	0.38	0.42	0.49	0.41
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	1.9	1.6	1.7	1.1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.3	0.2	0.3	0.3
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	10	9.8	9.0	11	8.8
Copper (aqua regia extractable)	mg/kg	1	MCERTS	23	21	21	34	21
Lead (aqua regia extractable)	mg/kg	1	MCERTS	46	40	42	63	58
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	0.5	< 0.3	0.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	9.1	9.4	8.4	11	8.2
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	13	13	12	16	11
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	85	75	70	98	72

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

Analytical Report Number: 21-84072
Project / Site name: Chester Road, Manchester
Your Order No: 2210629

Lab Sample Number				1921628	1921629	1921630	1921631	1921632
Sample Reference				B4	B5	B6	B7	B8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	8.7	8.9	8.0	9.2	21
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.40	0.50

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.6	7.6	7.5	7.5	8.4
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Thiocyanate as SCN	mg/kg	5	NONE	5.1	5.2	< 5.0	< 5.0	6.0
Total Sulphate as SO ₄	%	0.005	MCERTS	0.050	0.043	0.056	0.056	0.042
Sulphide	mg/kg	1	MCERTS	5.7	6.9	28	4.6	39
Total Sulphur	%	0.005	MCERTS	0.058	0.065	0.066	0.071	0.078

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.26	0.63	0.22	0.86	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.17	< 0.05	0.19	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.93	1.1	0.43	1.8	0.46
Pyrene	mg/kg	0.05	MCERTS	0.89	1.1	0.41	1.7	0.48
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.63	0.47	0.26	1.0	0.39
Chrysene	mg/kg	0.05	MCERTS	0.45	0.60	0.24	0.69	0.29
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.63	0.63	0.31	1.1	0.45
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.29	0.19	0.09	0.30	0.11
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.55	0.49	0.22	0.88	0.34
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.31	0.29	0.17	0.45	0.21
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.36	0.34	0.18	0.53	0.26

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	5.30	5.92	2.53	9.50	2.99
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Analytical Report Number: 21-84072

Project / Site name: Chester Road, Manchester

Your Order No: 2210629

Lab Sample Number				1921628	1921629	1921630	1921631	1921632
Sample Reference				B4	B5	B6	B7	B8
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.3	5.4	5.3	5.7	5.4
Barium (aqua regia extractable)	mg/kg	1	MCERTS	54	62	57	67	59
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.43	0.45	0.44	0.44	0.33
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3	1.3	1.6	2.0	2.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.4	0.3	0.3	0.3
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	10	10	15	9.5	8.6
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	25	22	29	23
Lead (aqua regia extractable)	mg/kg	1	MCERTS	38	51	44	56	44
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	9.0	9.7	9.0	9.6	7.7
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	13	13	13	13	10
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	74	88	78	85	83

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

Analytical Report Number : 21-84072

Project / Site name: Chester Road, Manchester

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1921623	TP1-C1	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
1921624	TP2-C1	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
1921625	B1	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1921626	B2	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1921627	B3	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1921628	B4	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1921629	B5	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1921630	B6	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1921631	B7	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1921632	B8	None Supplied	None Supplied	Brown loam with gravel and vegetation.

Analytical Report Number : 21-84072

Project / Site name: Chester Road, Manchester

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Thiocyanate in soil	Determination of thiocyanate in soil by extraction in water followed by acidification followed by addition of ferric nitrate followed by discrete analyser (spectrophotometer).	In-house method	L082-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS

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

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

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

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Soils Risk Assessment

Site Reference: 5758 CRX
 Project Site: Chester Road
 Project Location: Manchester
 Client: Castlefield Developments (Manchester) Ltd

i2 Reference	Residential	TP1-C1	TP2-C1	B1	B2	B3	B4	B5	B6	B7	B8
Customer Sample Ref:	C4SL / S4UL	0.3	0.3	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
	SOM 1% GAC	28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021	28/06/2021
Determinand	LQM II	Planter	Planter	Bulk bag	Bulk bag	Bulk bag	Bulk bag	Bulk bag	Bulk bag	Bulk bag	Bulk bag
Arsenic	27	6.5	7.5	5.6	6.9	5.3	5.3	5.4	5.3	5.7	5.4
Boron (water-soluble)	290	0.8	1.9	1.6	1.7	1.1	1.3	1.3	1.6	2	2.4
Cadmium	22	0.3	0.3	0.2	0.3	0.3	0.2	0.4	0.3	0.3	0.3
Chromium*	910	10	9.8	9	11	8.8	10	10	15	9.5	8.6
Chromium VI	21	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Copper	2400	23	21	21	34	21	22	25	22	29	23
Cyanide(Total)	-	1	1	1	1	1	1	1	1	1	1
Cyanide(free)**	34	1	1	1	1	1	1	1	1	1	1
Lead	200	46	40	42	63	58	38	51	44	56	44
Mercury	1.2	0.3	0.3	0.5	0.3	0.5	0.3	0.3	0.3	0.3	0.3
Nickel	130	9.1	9.4	8.4	11	8.2	9	9.7	9	9.6	7.7
pH	-	8.5	8.4	7.7	7.7	7.5	7.6	7.6	7.5	7.5	8.4
Phenols(Mono)	1100	1	1	1	1	1	1	1	1	1	1
Selenium	250	1	1	1	1	1	1	1	1	1	1
SO4(Total)	-	0.038	0.047	0.044	0.06	0.054	0.05	0.043	0.056	0.056	0.042
Sulphide	-	3.9	1	11	13	29	5.7	6.9	28	4.6	39
Sulphur(Free)	-	0.074	0.067	0.06	0.093	0.061	0.058	0.065	0.066	0.071	0.078
Thiocyanate	-	5	5	5	5	5	5.1	5.2	5	5	6
Zinc	3700	85	75	70	98	72	74	88	78	85	83
Acenaphthene	1100	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Acenaphthylene	920	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Anthracene	11000	0.05	0.05	0.05	0.18	0.05	0.05	0.17	0.05	0.19	0.05
Benzo(a)Anthracene	-	0.35	0.32	0.43	0.72	0.28	0.63	0.47	0.26	1	0.39
Benzo(a)Pyrene SM	5	0.35	0.42	0.36	0.68	0.25	0.55	0.49	0.22	0.88	0.34
Benzo(b)Fluoranthene	-	0.37	0.44	0.38	0.78	0.3	0.63	0.63	0.31	1.1	0.45
Benzo(ghi)Perylene	-	0.27	0.32	0.28	0.51	0.21	0.36	0.34	0.18	0.53	0.26
Benzo(k)Fluoranthene	-	0.23	0.28	0.19	0.29	0.14	0.29	0.19	0.09	0.3	0.11
Chrysene	-	0.32	0.39	0.33	0.6	0.22	0.45	0.6	0.24	0.69	0.29
Dibenzo(ah)Anthracene	-	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Fluoranthene	890	0.49	0.5	0.6	1.3	0.45	0.93	1.1	0.43	1.8	0.46
Fluorene	860	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Indeno(123-cd)Pyrene	-	0.22	0.24	0.2	0.41	0.17	0.31	0.29	0.17	0.45	0.21
Naphthalene	13	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Phenanthrene	440	0.27	0.39	0.29	0.7	0.23	0.26	0.63	0.22	0.86	0.05
Pyrene	2000	0.51	0.54	0.65	1.2	0.46	0.89	1.1	0.41	1.7	0.48
PAH(total)	500	3.38	3.84	3.71	7.34	2.71	5.3	5.92	2.53	9.5	2.99

All Units mg/kg unless otherwise stated

*Criteria Assumes Chromium III

**Criteria is derived considering acute effects on 1-2yo Female Receptor ingesting a single dose of 3g of soil

**Criteria is derived considering Total TPH (C10 to C35) is formed entirely of a 50:50 Aliphatic and Aromatic Split C8-C10 range

Basis of Assessment Criteria:	EA 2005 WAC (Human Health Value)	C4SL
	LQM S4UL	Atrisk 06