

Environmental
Geotechnical
Specialists



PHASE 4 VALIDATION REPORT

< ENVIRONMENTAL > < GEOTECHNICAL >

job number	date
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written by	checked by
issued by	

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Rogers Geotechnical Services Ltd
Offices 1 & 2 Barncliffe Business Park, Near Bank, Shelley, Huddersfield, HD8 8LU
☎ 01484 604354 Company No. 5130864

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Phase 4: Validation Report

Location:	New Townhouses, The Old Tannery, 224 Spen Lane, Cleckheaton, West Yorkshire, BD19 4PJ.		
For:	Quarters Development Ltd.	Planning Reference:	2023/92930
Report No.	C3920/24/E/5955	Report date:	September 2024

For and on behalf of **Rogers Geotechnical Services Ltd**

Imran Sakoor BEng FGS
Geo-environmental Engineer

Tobias Merry MSci (Hons), FGS
Geo-environmental Engineer

1. Introduction

The land associated with The Old Tannery, 224 Spen Lane, Cleckheaton has now been developed by the construction of a number of townhouses with rear garden areas and some strip landscaping to the front of the properties.

In order to fully discharge a planning condition relating to land contamination, a verification report has been produced to demonstrate that the required depth of cover has been achieved and that contamination levels of the soils used in the formation of the cover system are acceptable.

In accordance with your instructions we have undertaken testing of the imported material to validate that this is now suitable, and confirm that the pathway for contamination is broken. The following describes the work undertaken, presents the data obtained and discusses the findings in association with the proposed development.

This report has been produced on the understanding that a Remediation Statement has been submitted and agreed with the local planning authority.

2. Review of the Proposed Remediation Strategy

2.1 Summary of Contamination Risks

A Phase 2 Site Investigation report was undertaken by JNP Group (report no: B21783-JNP-XX-XX-RP-G-1001 P02, January 2021), it is considered that some remediation will be required at this site.

From the geo-environmental investigation, it was considered that the made ground present at the site was contaminated by the presence of elevated levels of metal and PAHs. An Options Appraisal and Remediation Strategy report was then subsequently produced by JNP Group (report no: B21783-JNP-XX-XX-RP-G-1002 P01, May 2022).

2.2 Proposed Remediation Strategy

As part of the part of a planning consent the below remediation strategy/scheme has been produced. The general layout of the site showing the proposed remediation strategy can be found within Appendix 1. In addition, the following should also be noted.

- Within garden areas, a capping layer is required. This is to comprise 600mm of clean topsoil and subsoil over a geotextile membrane.
- Within the landscaped area at the front of the townhouses, the thickness of the capping layer will be 300mm.

2.3 Source of Material

For cover and containment systems, verification will normally depend upon the provision of defensible measurements, observations and records. The following table provides information in regards to the source and characteristics of the material used within the remediation process.

Table 1: Validation Sampling and Testing			
Type of Material	Source of Material	Volume of imported Material	No. Samples Required
Topsoil	Riverside Quarry, Wetherby Road, Knaresborough, HG5 8LJ.	67.37m ³	3 (The greater of a minimum of 3 or 1 per between 50m ³ and 250m ³ - SEE YALPAG)

It should be appreciated that any fill should be subjected to validation testing to assess its suitability. Depending on the origin and nature of the material, not all fill will require the sampling frequency and testing indicated, although this should be in agreement with any regulatory bodies (such as the Local Authority).

3. Limitations

The recommendations made and opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of the laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between investigatory positions, these are for guidance only and no liability can be accepted for their accuracy.

This report has been prepared in accordance with our understanding of current best practice. However, new information or legislation, or changes to best practice may necessitate revision of the report after the date of issue.

4. Fieldworks

The fieldworks were undertaken on the 5th August 2024 and included the investigation of, six positions, shown on the site plan which is presented in Appendix 2 to this report. Appendix 3 of this report contains the photographs taken at the time of the fieldworks.

The positions were excavated employing hand digging techniques in order to reveal the nature of the near surface soils. The soils were logged on site in general accordance with BS5930: 2015 +A1:2020. Samples were taken from the trialpits for chemical testing. The chemical test specimens were retained in the appropriate air tight containers within cool boxes for onward transition to the laboratory.

Table 2: Generalised Strata Profile

Depth m below ground level to underside of layer	Strata Type	Positions Layer Revealed	Groundwater Strikes m below ground level
0.3 – 0.4	TOPSOIL (Sandy organic SILT).	ALL	None
0.4	MADE GROUND (Very gravelly SAND).	TP05, TP06	None
0.6	Very sandy gravelly SILT	TP03, TP04	None

'+' denotes that the strata extended below the termination depth of the investigated positions, thus the extent of the deposit is only proven to the depths indicated.

Subsequent to the up-filing operation within the garden and soft landscaping areas at the site, these areas were found to be capped by topsoil comprising dark brown sandy organic silt. Within TP03 to TP06, very sandy gravelly silt/very gravelly sand was revealed.

At the validation position for the landscaped area at the front of the townhouses, the topsoil was found to be 300mm thick. Within the garden areas, the topsoil was found to be between 0.3m and 0.4m thick, and underlain by subsoil to between 0.4m and 0.6m depth. It should be noted that localised brick was encountered within the subsoil.

5. Laboratory Testing - Environmental

A suite of testing was conducted on samples from across the site and the following regime was undertaken.

Greenfield soil Suite

- Standard metals/metalloids As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, V, Zn
- Free CN-, PAH (16 USEPA)
- Asbestos Screen
- Organic content (Soil Organic Matter)

This testing was undertaken by i2 Analytical Ltd and the results of all of the chemical testing are presented in Appendix 4 of this report.

6. Discussion of Ground Conditions - Environmental

It is understood that a site is to be developed by the construction of a number of townhouses with rear garden areas and some strip landscaping to the front of the properties. Consequently, the site may be classified as residential with plant uptake.

6.1 Discussion of Test Results

The results of the chemical testing undertaken on soil samples obtained during this investigation have been compared to the ATRISK soil screening values (SSVs) as compiled by WS Atkins plc. These values have been derived in such a way as to adhere to the principles within the revised CLEA model and include the most current release of the SGVs. A list of subscribers is provided within the website¹ and these include many local authorities.

A comparison of the results of the testing, together with the data given above, can be found within Appendix 4. These results indicate the following:

Table 3: Summary of Contamination Results		
Location	Depth (m)	Contaminants found to be exceeding SSVs (Residential with Plant Uptake)
TP01	0.0 – 0.3	PAH [Indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].
TP02	0.0 – 0.3	PAH [Benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].
TP03	0.4 – 0.6	PAH [Benzo(g,h,i)perylene].
TP04	0.4 – 0.6	PAH [Chrysene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].
TP05	0.0 – 0.3	PAH [Benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].
TP06	0.0 – 0.4	PAH [Benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(g,h,i)perylene].

¹ <http://www.atrisksoil.co.uk/pages/general/subscribers.asp>

Concentrations of chromium(VI), mercury and free cyanide were below the detection limits for the tests. Detectable levels of all other contaminants were recorded, but these fell below the associated Atrisk Soil Screening Values. In addition, the asbestos screen found no asbestos detected.

It should be appreciated that the soil screening values for PAHs and TPHs (where appropriate) represents vapour saturation limits. The inhalation of vapour pathway contributes less than 10% of total exposure, which is unlikely to significantly affect the combined assessment criterion². In view of this, the ATRISK soil SSVs notes that the users may wish to consider using a combined assessment criterion if free product is not observed, the values for which are also provided on the summary of contamination analysis. It is therefore considered that the criteria for no free product should be adopted for the PAHs and TPHs at this site. The results of the contaminants found to exceed these screening values are tabulated below:

Table 4: Summary of Areas Contaminated by PAHs & TPHs		
Location	Depth (m)	Contaminants found to be exceeding SSVs (Residential with Plant Uptake)
TP01	0.0 – 0.3	None
TP02	0.0 – 0.3	None
TP03	0.4 – 0.6	None
TP04	0.4 – 0.6	None
TP05	0.0 – 0.3	None
TP06	0.0 – 0.4	None

On the basis of the above the material tested may be considered as uncontaminated and suitable for the site end-use.

7. Discussion of Ground Conditions – Validation Requirements

7.1 Validation of Clean Cover

It is concluded that the imported material being placed as a capping at the site has been obtained from a single supplier and comprises topsoil (dark brown sandy organic silt). Whilst does comprise occasional small brick fragments is not contaminated given the results of the chemical testing.

Further to the photographic records, the excavations at the validation positions and the chemical testing, it is considered that the garden areas have been filled in generally 0.6m thickness of topsoil, although locally the thickness is 0.4m.

Therefore, the made ground and the contamination within it have been enclosed, put beyond end-users dig range and capped by a capillary break which will inhibit the down migration of root growth. As a consequence, it is considered that the risk to garden plants, end-users from dermal contact with the soil and end-users and neighbours from the inhalation of dust, ingestion of soil or dust and the ingestion of contaminated fruit and vegetables is mitigated and may be considered as low.

² Ref: ATRISK soil, SSVs derived using CLEA v1.071 for 6% SOM, Residential with home grown produce land use, 23.06.17.

On the basis of the information provided above it is concluded that a sufficient thickness of clean cover has been placed within the soft landscaped areas. It is considered that the end users will be protected from ingestion or dermal contact with contaminated soil. No further action is required.

8. Conclusion

Further to the photographic records, the excavations at the validation positions and the chemical testing, it is considered that all areas of the site have been suitably capped in order to protect end users from lead contamination at the site and no further action is required.

9. References

- Department for Environment, Food and Rural Affairs and the Environment Agency (2009) DEFRA Science Report – Final SC050021/SR2, *Human Health toxicological assessment of contaminants in soil*. Environment Agency, Bristol.
- Department for Environment, Food and Rural Affairs and the Environment Agency (2009) DEFRA Science Report – SC050021/SR3, *Updated technical background to the CLEA model*. Environment Agency, Bristol.
- WS Atkins plc, 2011, Soil Screening Values, Derived using CLEA v1.04 and January 2009 Guidance: SSVs derived using CLEA v1.04 for 6% SOM, Residential with home grown produce land use.
- YALPAG *Technical Guidance for Developers, Landowners and Consultants – Verification Requirements for Cover Systems V3.3* Appendix 1a, October 2016.



Appendix 1

Site Plan



Plants Schedule

Number	Species	Girth	Height	Specification
2	Acer campestre 'Elegant'	12-14cm	150-180cm	Heavy Standard

Plants

Number	Species	Height	Density
196	Fagus sylvatica	60-80cm	15/m ²

Shrubs

Number	Species	Pot Size	Height	Specification	Density
5	Cistus corbariensis	3L		C	4/m ²
21	Cornus alba 'Very Halo'	3L		C	3/m ²
17	Quercus fortunei 'Emerald Gaiety'	2L		C	4/m ²
26	Hebe 'Mrs Winder'	3L		C	3/m ²
6	Lavandula angustifolia 'Hidcote'	3L		C	3/m ²
1	Magnolia soulangeana	25L	125-150cm	C	No
4	Potentilla fruticosa 'Vilmoriniana'	3L		C	4/m ²
13	Prunus laurocerasus 'Otto Luyken'	2L		C	3/m ²
4	Santolina rosmarinifolia	3L		C	4/m ²
14	Viburnum davidii	3L		C	3/m ²

Herbaceous

Number	Pot Size	Species	Specification	Density
45	2L	Bergenia cordifolia 'Purpurea'	Full Pot	14/m ²
20	2L	Eriogon karvinskianus	Full Pot	No
34	2L	Geranium macrorrhizum 'Bevan's Variety'	Full Pot	5/m ²
3	2L	Geranium Rozanne	Full Pot	5/m ²
6	2L	Penstemon 'White Bedder'	Full Pot	5/m ²
8	2L	Sedum microphylla 'Maraschino'	Full Pot	4/m ²

Grasses

Number	Species	Pot Size	Density
5	Anemone pulsatilla	2L	15/m ²
7	Trifolium repens 'Lemon Yellow'	2L	15/m ²

Native Plant Specification

Turf
Any imported topsoil to comply with the British Standard BS 2822:2015 definition for Multipurpose grade topsoil, and it to be accompanied with a test certificate and horticultural analysis summary for approval by the landscape architect prior to delivery to site. Provide a minimum of one week's notice.

Existing subsoil to be broken up to 300mm depth in planting areas.
Turf depth:
Grass turf - 150mm depth
Straw planting - 450mm depth

Prior to the horticultural works the necessary quantities of approved imported topsoil will be supplied and spread by others.
Prior to topsoil preparatory works the topsoil depths will comply with the following:
Wedge lines - 450mm minimum depth
Boundary line, shrub planting - 450mm minimum depth

Shrub planting
PLANTS - GENERAL
• Condition: Mainly undamaged, sturdy, healthy and vigorous.
• Appearance: Of good shape and without damaged shoots.
• Bark: Free from pests, diseases, distortion, weeds and physiological disorders.
• Health: Free from pests, diseases, distortion, weeds and physiological disorders.

All plants shall be set out to the position shown on the drawing and to the desirable green. All stock shall comply with the specification provided on the drawing.
Plants underrated or known to be likely to be undrinkable at time of ordering. Submit alternatives, stating price, difference from specified plants/ trees. Obtain approval before making any substitution.
All shrub beds shall be topped up with good quality topsoil to ensure 450mm planting depth the base ground being 100mm broken up before placement. Tree and shrub planting compost shall be spread to a minimum depth of 150mm and is suitable evenly spread, 70-140g/m² Compost, Stable Fibre 15-5-0 + 3% MgO granular controlled release, or similar approved, thoroughly working in during cultivation.
Shrub planting pits should be 200mm wider than roots when fully spread. Backfill with composted material.
After planting thoroughly water immediately without dragging or holding plant to or soil.
Lightly firm soil around plants and fork and/or rake soil, to a fine mesh with gentle care and no hollows. Avoid dumping stones. A 100mm deep layer of Melcourt Ornamental Bark Mulch 5-25mm with 10% natural dust and fines and less than 2% wood content or similar approved spread to be spread over entire bed. The mulch shall be free of peats, stones, fungus and weeds.

Turf areas
The turf shall be free of conifer, oak leaves, the ground to even turning falls and cross ridges to form a fine mesh. Before laying turf an approved surface fertilizer shall be applied in accordance with the

Soils - turf
Rogers 'Mortimer' turf to BS 9989 (2+ equivalent approved turf)

Typical mixture

Material	Potential Progress	%
• Silt	Potential Progress	22.5%
• Sand	Potential Progress	22.5%
• Clay	Slender Creeping Red Fescue	20%
• Moss	Slender Creeping Red Fescue	15%
• Grass	Sheep's Fescue	20%
• Turf	Smooth Stalked Meadow Grass	10%
• Moss	Smooth Stalked Meadow Grass	10%

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All areas to be finished shall be irrigated to a minimum depth of 150mm over ground line of completion by cultivation. The soil shall be fine graded to even turning falls and cross ridges to form a fine mesh. Before laying an approved performing lawn turf shall be applied in accordance with the manufacturer's instructions. All edges to fresh beds will be clearly cut with an edging iron, settings removed from site.

Maintenance

Carry out the operations in the following clauses for a period of 12 months from the date of practical completion.
Plants/ trees/ shrubs that have failed to thrive (unless due to theft or malicious damage) within the 12 month period from the date of practical completion will be replaced with equivalent plants/ trees/ shrubs to match the original.
Remove soil and stumps from hard surfaces and grassed areas. Generally leave the works in a clean dry condition at Completion and after any maintenance operations.
Maintain weed free areas around each tree and shrub. Keep planting beds clear of weeds. Fork over beds as necessary to keep soil loose, with gentle care and no hollows. Take care not to reduce depth of effect of mulch.
Give a fine knotted soil around trees/ shrubs. Straighten leaning trees/ shrubs. Tighten and straighten stakes if required.
Prune to promote healthy growth and natural shape removing: Dead, dying, diseased wood and suckers. Remove stumps. Trim and shape each specimen appropriately to species, location, season, and stage of growth, leaving a well balanced natural appearance. Trim lavender after flowering. Cut back herbaceous material in autumn.
All shrub beds shall be thoroughly watered as necessary for the continued thriving of all planting. In levels of water shortage obtain instructions before proceeding.
Re-mulch at the end of the 12 month maintenance period to a depth of 50mm ensuring that the soil is thoroughly moisture prior to re-mulching.
All planting shall be maintained in good order throughout the initial establishment period.
Lawn areas are to be cut 25 times per year. Each week between the months of May and September; and

Notes:
Investigation positions approximated from site operative's notes.



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Telephone: 0843 50 66 87
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Client:
Quarters Construction Ltd

Job Number:
C3920/24/E/5955

Project Details:
New Townhouses, 224 Spen Lane, Cleckheaton

Scale: Not to scale - reference only





Appendix 2

Trial Pit Records



Trial Pit Log

Trialpit No

TP03

Sheet 1 of 1

Project Name: The Old Tannery - Townhouses

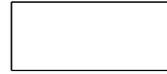
Project No.
C3920/24/E/5955

Co-ords: -
Level:

Date
05/08/2024

Location: Spen Lane, Cleckheaton

Dimensions (m):



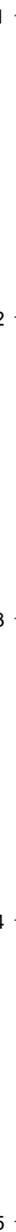
Scale
1:25

Client: Quarters Development Ltd

Depth
0.60

Logged
IMY

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.40	D					TOPSOIL (Dark brown sandy organic SAND with rootlets).
	0.40 - 0.60	D		0.40			Dark brown very sandy gravelly SILT. Sand is fine. Gravel is sub-angular to sub-rounded, fine to coarse of sandstone.
				0.60			----- End of pit at 0.60 m



Remarks:

Stability:





Trial Pit Log

Trialpit No
TP04
Sheet 1 of 1

Project Name: The Old Tannery - Townhouses

Project No.
C3920/24/E/5955

Co-ords: -
Level:

Date
05/08/2024

Location: Spen Lane, Cleckheaton

Dimensions (m):



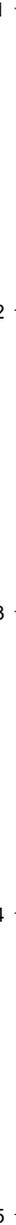
Scale
1:25

Client: Quarters Development Ltd

Depth
0.60

Logged
IMY

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.40	D					TOPSOIL (Dark brown sandy organic SAND with rootlets).
	0.40 - 0.60	D		0.40			Dark brown very sandy gravelly SILT. Sand is fine. Gravel is sub-angular to sub-rounded, fine to medium of sandstone.
				0.60			----- End of pit at 0.60 m



Remarks:

Stability:





Trial Pit Log

Trialpit No

TP06

Sheet 1 of 1

Project Name: The Old Tannery - Townhouses

Project No. C3920/24/E/5955

Co-ords: -
Level:

Date 05/08/2024

Location: Spen Lane, Cleckheaton

Dimensions (m):

Scale 1:25

Client: Quarters Development Ltd

Depth 0.60

Logged IMY

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.40	D					TOPSOIL (Dark brown sandy slightly gravelly organic SAND with rootlets. gravel is sub-angular to sub-rounded, fine of sandstone).
	0.40 - 0.60	D		0.40 0.60			MADE GROUND (Dark brown very sandy gravelly SILT. Sand is fine. Gravel is sub-angular to sub-rounded, fine to coarse of sandstone and occasional concrete) End of pit at 0.60 m

1
2
3
4
5

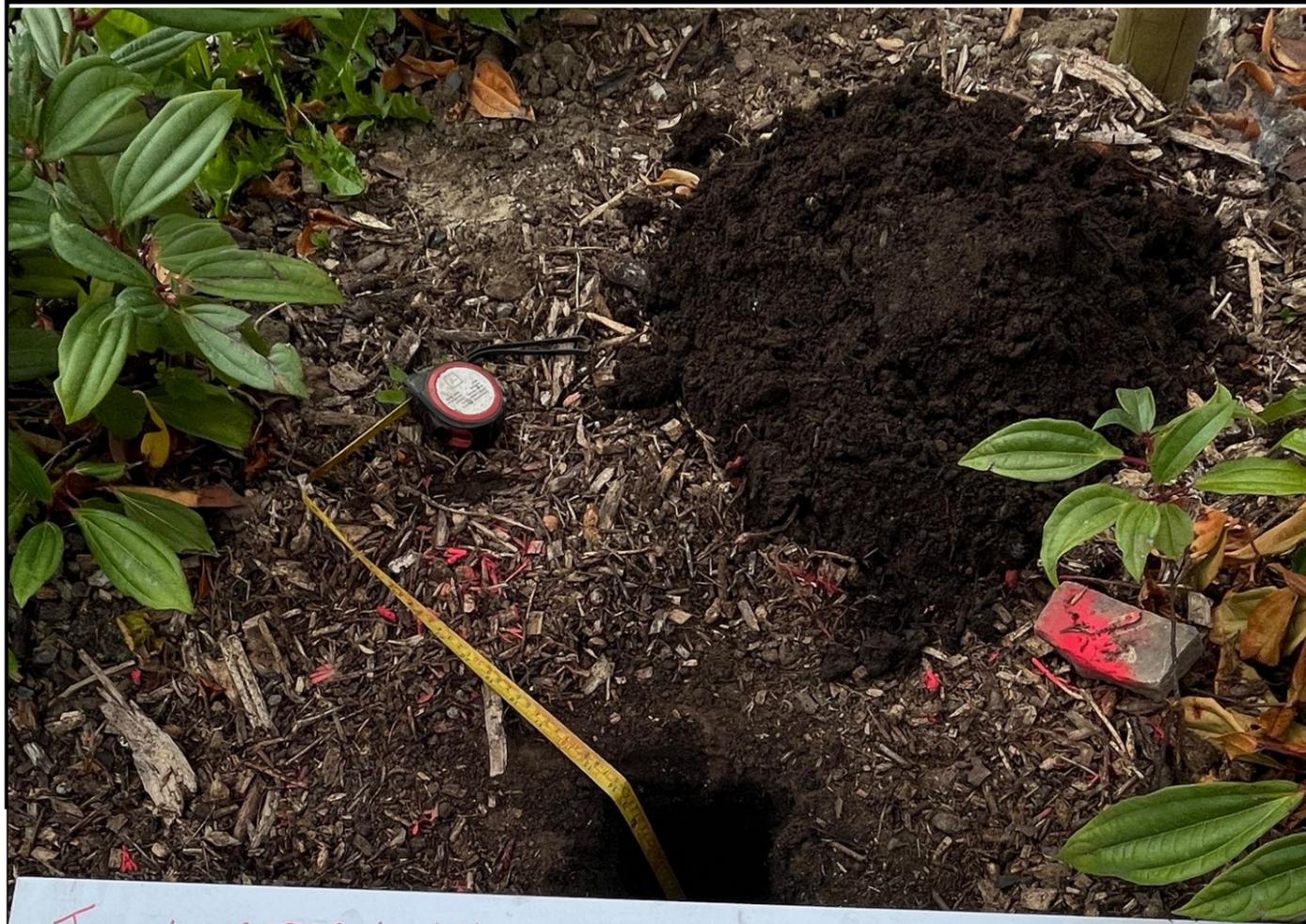
Remarks:

Stability:



Appendix 3

Photographs



JOB No: C3920 /24/E/
 DATE: 05/08/2024
 HOLE No: HDTPO1-
 SITE: THE OLD TANNERY
 224 SPEN LANE
 CLIENT: QUARTERS CONSTRUCTION LTD
 DEPTH: FROM: 0.0 TO: 0.3

Photo 1: TP01, 0m to 0.3m



JOB No: C3920 /24/E/
 DATE: 05/08/2024
 HOLE No: HDTPO2
 SITE: THE OLD TANNERY
 224 SPEN LANE
 CLIENT: QUARTERS CONSTRUCTION LTD
 DEPTH: FROM: 0.0 TO: 0.3

Photo 2: TP02, 0m to 0.3m



Rogers Geotechnical Services Ltd

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 Near Bank, Shelley,
 Huddersfield,

Job No:

CXXX/20/E/XXX

Site:

20 Example Way,
 Example Road,
 Example City
 Antarctica

Client:

Antarctica Housing Developments
 Ltd.

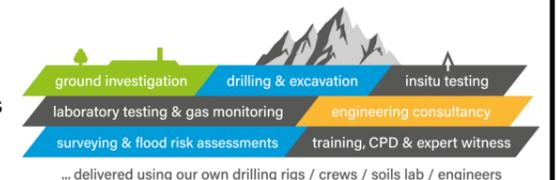




Photo 3: TP03, 0m to 0.6m



Photo 4: TP04. 0m to 0.4m



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Near Bank, Shelley,
Huddersfield,

Job No:

CXXX/20/E/XXX

Site:

20 Example Way,
Example Road,
Example City
Antarctica

Client:

Antarctica Housing Developments
Ltd.



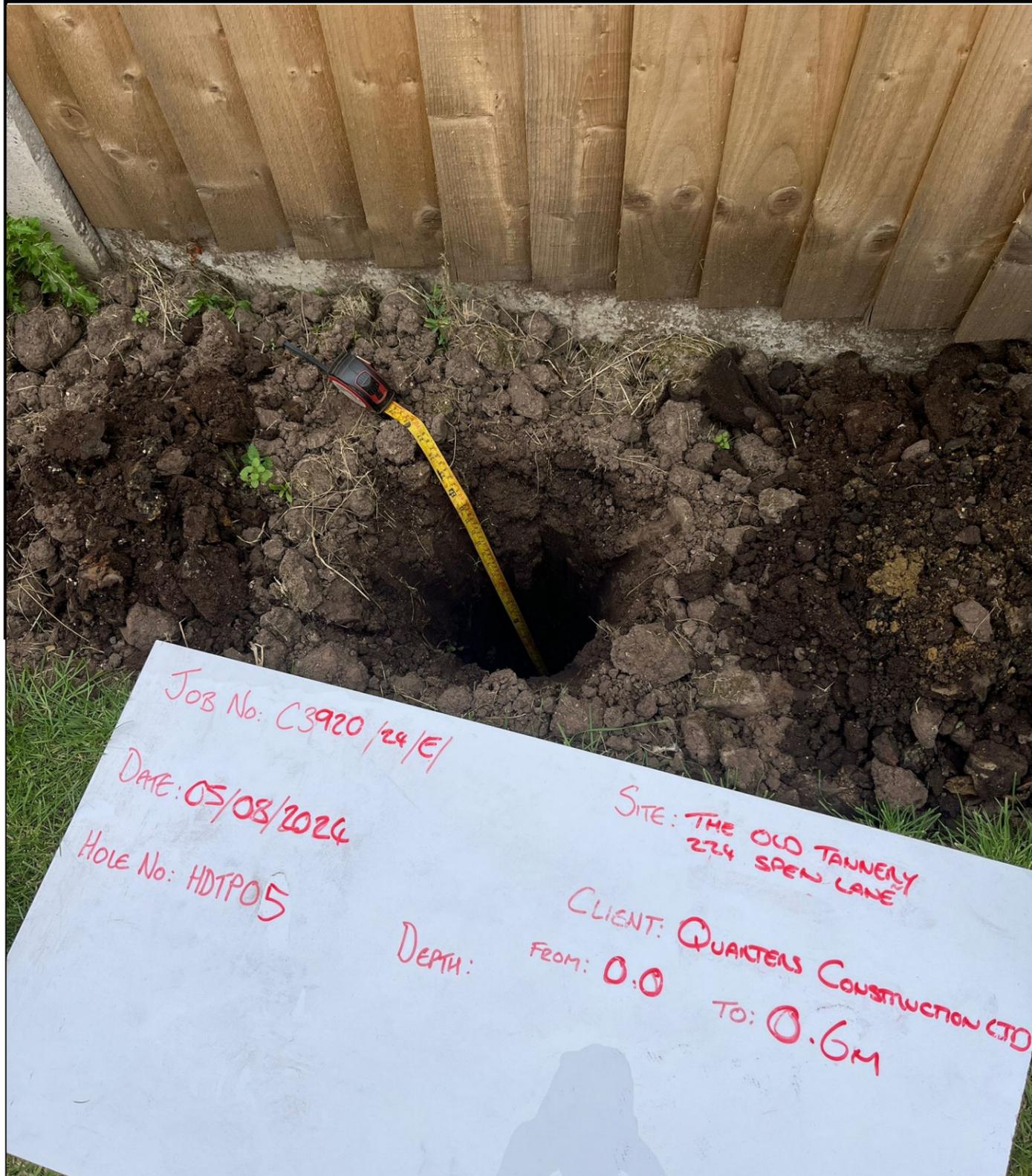


Photo 3: TP05, 0m to 0.6m

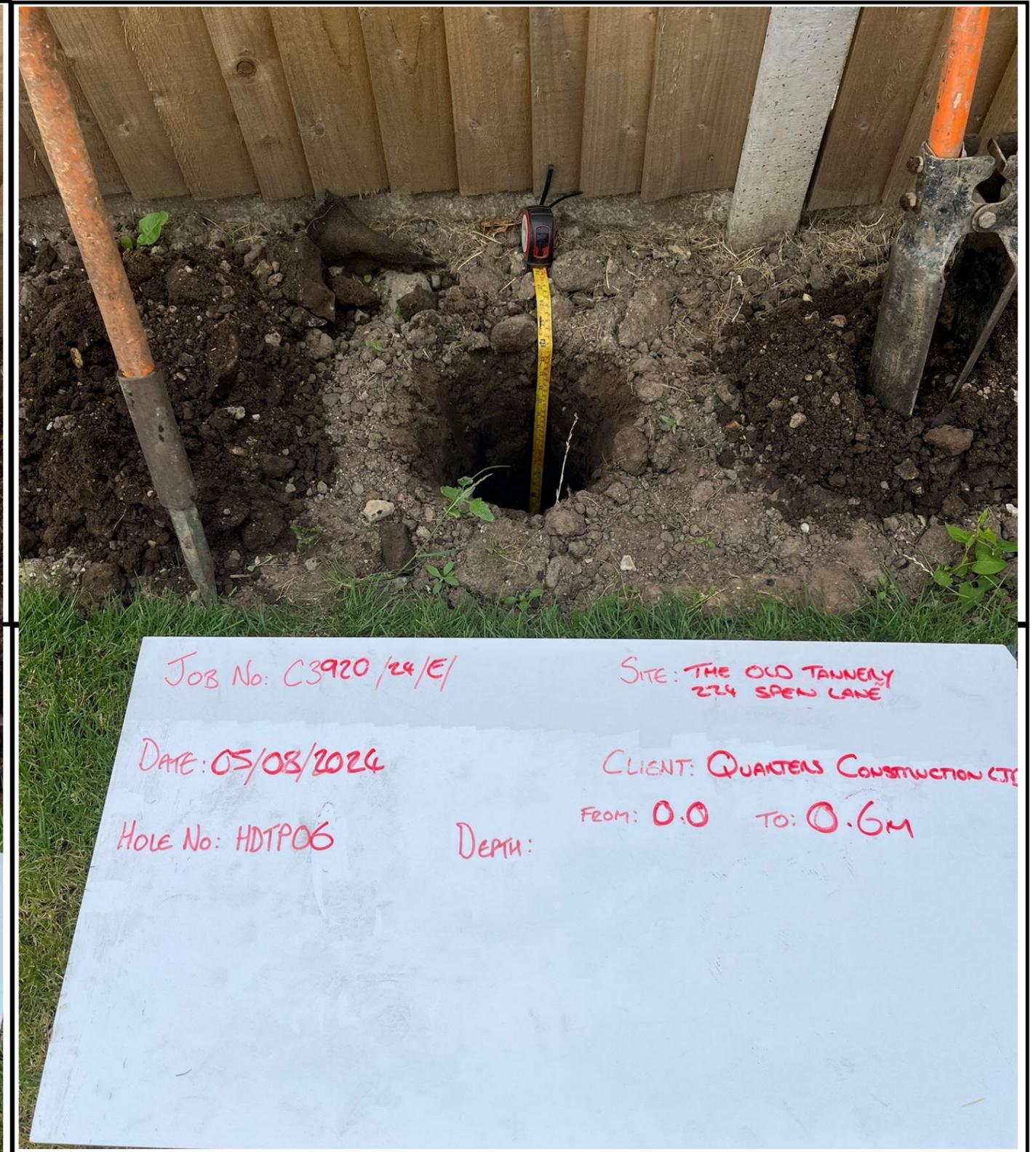


Photo 4: TP04. 0m to 0.4m



Rogers Geotechnical Services Ltd

Offices 1 & 2, Barncliffe Business Park,
 Near Bank, Shelley,
 Huddersfield,

Job No:

CXXX/20/E/XXX

Site:

20 Example Way,
 Example Road,
 Example City
 Antarctica

Client:

Antarctica Housing Developments
 Ltd.



Appendix 4

Laboratory Testing - Environmental



Rogers Geotechnical Services Ltd
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t: 01484 604354

e: harry.letch@rogersgeotech.co.uk

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7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 24-036452

Project / Site name:	The Old Tannery, Spen Lane	Samples received on:	14/08/2024
Your job number:	C3920-23-E-5955	Samples instructed on/ Analysis started on:	14/08/2024
Your order number:		Analysis completed by:	20/08/2024
Report Issue Number:	1	Report issued on:	20/08/2024
Samples Analysed:	6 soil samples		

Signed:

Rafał Szczepańczyk
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 24-036452
Project / Site name: The Old Tannery, Spen Lane

Lab Sample Number	287190	287191	287192	287193	287194
Sample Reference	TP01	TP02	TP03	TP04	TP05
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.00-0.30	0.00-0.30	0.40-0.60	0.40-0.60	0.00-0.30
Date Sampled	09/08/2024	09/08/2024	09/08/2024	09/08/2024	09/08/2024
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	< 0.1	63.1	17.8	< 0.1
Moisture Content	%	0.01	NONE	30	28	11	13	16
Total mass of sample received	kg	0.1	NONE	1.1	1.1	1	1.1	1.1

Asbestos

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

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.4	8.4	7.5	7.9	7.8
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	280	250	1100	180	250
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	142	123	572	91.3	124
Organic Matter (automated)	%	0.1	MCERTS	8.2	9.8	6.5	6.4	6.8

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.08	0.35	1.6	0.27
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.26	0.06
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.15	0.27	0.77	0.42
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.19	0.45	0.91	0.54
Phenanthrene	mg/kg	0.05	MCERTS	0.27	1.2	2.4	5.5	3.3
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.38	0.56	1.4	0.95
Fluoranthene	mg/kg	0.05	MCERTS	0.91	2.5	1.7	6.9	4.4
Pyrene	mg/kg	0.05	MCERTS	0.8	2.1	1.4	6.2	3.9
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.55	1.3	0.63	3.2	2
Chrysene	mg/kg	0.05	MCERTS	0.58	1.3	0.64	3.4	2
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.86	1.7	0.69	3.6	2.7
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.33	0.7	0.29	1.6	1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.66	1.4	0.59	3.1	2.4
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.37	0.72	0.29	1.5	1.2
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.15	< 0.05	< 0.05	0.22
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.43	0.82	0.38	1.7	1.3

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	5.75	14.5	10.7	41.7	26.6
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.9	5.4	7.4	7	9.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.3	< 0.2	0.3	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	14	12	13	30	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	19	19	13	12	21
Lead (aqua regia extractable)	mg/kg	1	MCERTS	30	30	15	23	40
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	9.2	8.3	15	12	14
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	1.4	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	12	12	19	18	21
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	70	68	58	60	63

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-036452
Project / Site name: The Old Tannery, Spen Lane

Lab Sample Number	287195			
Sample Reference	TP06			
Sample Number	None Supplied			
Depth (m)	0.00-0.40			
Date Sampled	09/08/2024			
Time Taken	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status	

Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	15
Total mass of sample received	kg	0.1	NONE	0.7

Asbestos

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

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7.7
Free Cyanide	mg/kg	1	MCERTS	< 1.0
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	130
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	67.4
Organic Matter (automated)	%	0.1	MCERTS	7.5

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.14
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.12
Fluorene	mg/kg	0.05	MCERTS	0.13
Phenanthrene	mg/kg	0.05	MCERTS	1.2
Anthracene	mg/kg	0.05	MCERTS	0.4
Fluoranthene	mg/kg	0.05	MCERTS	3.1
Pyrene	mg/kg	0.05	MCERTS	2.9
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.5
Chrysene	mg/kg	0.05	MCERTS	1.6
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2.3
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.78
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.9
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.96
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.18
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	18.3
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	15
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15
Lead (aqua regia extractable)	mg/kg	1	MCERTS	23
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	12
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	15
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	39

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 24-036452

Project / Site name: The Old Tannery, Spen Lane

* 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 *
287190	TP01	None Supplied	0.00-0.30	Brown loam with gravel and vegetation
287191	TP02	None Supplied	0.00-0.30	Brown loam with gravel and vegetation
287192	TP03	None Supplied	0.40-0.60	Brown loam and clay with vegetation and stones
287193	TP04	None Supplied	0.40-0.60	Brown loam and clay with gravel and vegetation
287194	TP05	None Supplied	0.00-0.30	Brown loam and clay with gravel and vegetation
287195	TP06	None Supplied	0.00-0.40	Brown loam and clay with gravel and vegetation

Analytical Report Number : 24-036452

Project / Site name: The Old Tannery, Spen Lane

Water matrix abbreviations:

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
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	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	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	L080	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

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

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

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

Quality control parameter failure associated with individual result applies to calculated sum of individuals.

The result for sum should be interpreted with caution



Rogers Geotechnical Services: Soil Screening Values Comparison Sheet



Rogers Geotechnical Services Ltd: Soil Screening Value (SSV) Comparison Sheet														
Job Number	C3920/24/E/5955			A = WS Atkins PLC, Atrisk Soil Screening Values. A+ = Values updated June 2017. A* = Atrisk's SSV is lower than i2's detectable limit for this compound. B = health criterion values, which are available from toxicological reviews published in the C4SL project methodology report. C = Category 4 Screening Levels (C4SLs) based on 6% soil organic matter. D = Value provided is based on Methyl Mercury. Should elemental mercury be observed or a source be known then a limit of 102 should be used.								KEY		
Job Name	The Old Tannery, Townhouse Validation											<div style="display: inline-block; width: 15px; height: 15px; background-color: #f08080; border: 1px solid black; margin-right: 5px;"></div> Exceeds SSV <div style="display: inline-block; width: 15px; height: 15px; background-color: #ffff00; border: 1px solid black; margin-right: 5px; margin-top: 5px;"></div> Exceeds 2017, Below 2015 <div style="display: inline-block; width: 15px; height: 15px; background-color: #c8e6c9; border: 1px solid black; margin-right: 5px; margin-top: 5px;"></div> Below limit of detection (LOD)		
Date	29/08/24			Sample Location	TP01	TP02	TP03	TP04	TP05	TP06				
Client	Quarters Construction Ltd			Depth Top	0	0	0.4	0.4	0	0				
				Depth Base	0.3	0.3	0.6	0.6	0.3	0.4				
Determinand	Units	Ref	LOD	Residential With Plant Uptake 6%										
				Atrisk 2015 (No Free Product)	Atrisk 2017									
Cadmium	mg/kg	C	0.2		22.1	0.3	0.3	< 0.2	0.3	< 0.2	< 0.2			
Chromium (Hexavalent)	mg/kg	B/C	1.8	20.5	3.62	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8			
Copper	mg/kg	A+	1.0		4790	19	19	13	12	21	15			
Mercury	mg/kg	A/D	0.3		15.8	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3			
Nickel	mg/kg	A+	1.0		136	9.2	8.3	15	12	14	12			
Lead	mg/kg	C	1.0		200	30	30	15	23	40	23			
Zinc	mg/kg	A+	1.0		20300	70	68	58	60	63	39			
Vanadium	mg/kg	A+	1.0		138	12	12	19	18	21	15			
Arsenic	mg/kg	C	1.0		37	4.9	5.4	7.4	7	9.3	8.2			
Selenium	mg/kg	A	1.0		375	< 1.0	< 1.0	1.4	< 1.0	< 1.0	< 1.0			
Cyanide (Free)	mg/kg	A	1.0		34	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0			
Total Phenols	mg/kg	A	1.0		1200									
Naphthalene	mg/kg	A+	0.05		12.2	< 0.05	0.08	0.35	1.6	0.27	0.14			
Acenaphthylene	mg/kg		0.05			< 0.05	< 0.05	< 0.05	0.26	0.06	< 0.05			
Acenaphthene	mg/kg	A+	0.05		2760	< 0.05	0.15	0.27	0.77	0.42	0.12			
Fluorene	mg/kg	A+	0.05		2610	< 0.05	0.19	0.45	0.91	0.54	0.13			
Phenanthrene	mg/kg		0.05			0.27	1.2	2.4	5.5	3.3	1.2			
Anthracene	mg/kg	A+	0.05		26200	< 0.05	0.38	0.56	1.4	0.95	0.4			
Fluoranthene	mg/kg	A+	0.05		2980	0.91	2.5	1.7	6.9	4.4	3.1			
Pyrene	mg/kg	A+	0.05		2120	0.8	2.1	1.4	6.2	3.9	2.9			
Benzo[a]anthracene	mg/kg	A	0.05		8.54	0.55	1.3	0.63	3.2	2	1.5			
Chrysene	mg/kg	A	0.05	927	2.64	0.58	1.3	0.64	3.4	2	1.6			
Benzo[b]fluoranthene	mg/kg	A	0.05	9.86	7.29	0.86	1.7	0.69	3.6	2.7	2.3			
Benzo[k]fluoranthene	mg/kg	A	0.05	100	4.12	0.33	0.7	0.29	1.6	1	0.78			
Benzo[a]pyrene	mg/kg	B/C	0.05	5	0.998	0.66	1.4	0.59	3.1	2.4	1.9			
Indeno(1,2,3-c,d)Pyrene	mg/kg	A*	0.05	9.75	0.368	0.37	0.72	0.29	1.5	1.2	0.96			
Dibenz(a,h)Anthracene	mg/kg	A	0.05	4.95	2.05	< 0.05	0.15	< 0.05	< 0.05	0.22	0.18			
Benzo[g,h,i]perylene	mg/kg	A	0.05	103	0.112	0.43	0.82	0.38	1.7	1.3	1.1			
Total Of 16 PAH's	mg/kg		0.8			5.75	14.5	10.7	41.7	26.6	18.3			
pH			N/A			8.4	8.4	7.5	7.9	7.8	7.7			
Sulphate (2:1 Water Soluble) as SO4	mg/l		0.00125			142	123	572	91.3	124	67.4			
Asbestos Identification	%					Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected			
Organic Matter	%		0.1			8.2	9.8	6.5	6.4	6.8	7.5			