

1 INTRODUCTION

LK Consult (LKC) has been appointed by Watson Construction Ltd to validate the depth of the soft landscaping cover system laid down at the development at Former Chatsworth Mill, Gorton.

The development comprised residential apartments, with areas of shared soft landscaping. A development plan provided by Watson Construction Ltd is appended.

The requirement for remedial works across the site are outlined in the Remediation Strategy carried out by LKC (ref. LKC 21 1152-01, dated February 2022).

The Remediation Strategy identified the following remedial works specific to the placement of the capping layer material:

- i) **Shared Soft Landscaping:** Provision of a minimum 450mm thick 'clean' cover system within shared soft landscaping areas, nominally comprising 150mm of subsoil plus 150mm of topsoil underlain by a suitable geotextile membrane.
- ii) Chemical analysis of any site won or imported material for use in landscaped areas.

LKC note that it would be acceptable to use all topsoil within the capping layer.

Chemical validation of all imported materials to be used on site is required. Imported soils are to be accompanied by a certificate of analysis and source details. A summary of the required imported material sampling requirements are presented in Table 1-1.

Material Type	Source	Suite of Analysis	Sampling Rate (min. 3 per source) *		
			Garden	Landscape	Other **
Topsoil / subsoil / Fill material	Greenfield	Suite A	200m3	200m3	200m3
	Remediated	Suite A / B dependent upon original SI	100m3	150m3	200m3
	Brownfield / Unknown	Suite B	50m3	150m3	200m3
Quarried Fill	First Generation i.e. quarried sand (subsoil) or stone (break layer)	No testing is required. Certification of material provenance is required.			

Table 1-1: Sampling requirements for imported soils.

Notes:

Suite A - Heavy metals, pH, water soluble sulphate, speciated PAH, soil organic matter and asbestos screen.

Suite B - Heavy metals, pH, water soluble sulphate, speciated PAH, phenol, total and free cyanide, soil organic matter, asbestos screen, banded petroleum hydrocarbons (TPH CWG), BTEX, MTBE.

*Minimum sampling rate of 3 samples per source.

2 CAPPING LAYER MATERIAL VALIDATION

Topsoil

Approximately 70m³ of topsoil has been imported to site from Halewood, Cheshire. The topsoil was sampled in line with the remedial requirements and in total 3no. samples were collected from site for testing (Sample refs: TS001-TS003). The supplier certificates are provided in Appendix A, and testing certificates are provided in Appendix B.

Subsoil

Approximately 120m³ of subsoil was imported to site from Charcoal Lane, Dunham. The subsoil was sampled in line with the remedial requirements and in total 3no. samples were collected from site for testing (Sample refs: SS001-SS003). The supplier certificates are provided in Appendix A, and testing certificates are provided in Appendix B.

Geotextile Membrane

The geotextile membrane used at the base of the soil capping layer is TNW1100 by TCS Geotechnics. The specification is provided in Appendix C.

Soil Risk Assessment

With regards to the soil risk assessment LKC will use the following hierarchy:

- Category 4 Screening Levels (C4SLs).
- LQM Suitable 4 Use Levels (S4ULs).

C4SLs were published in 2013^{1,2}. The change to the contaminated land guidance has changed the evaluation of risk from 'minimal' (referred to as Health Criteria values (HCVs))³ used to generate Soil Guideline Values (SGVs) to 'low' (referred to as Lowest Level of Toxicological Concern (LLTCs)). The policy companion document and supporting letter by Defra, dated 3rd September 2014, states that C4SLs 'could be used under the planning regime, as well as within Part 2A'. Based on these comments LKC considers the justifications and assumptions used to generate 'low' risk are suitable for the planning regime.

Where no C4SLs have been generated LKC will use the LQM S4ULs⁴. Similar assumptions and land uses to C4SLs have been used. However, toxicological information has been based on 'minimal risk' as per previous guidelines and assumptions^{5,6,7,8}.

An assessment of the data should be undertaken to confirm B(a)P is a suitable surrogate marker by assessing the ratios of carcinogenic PAHs to B(a)P. However, as the majority of

¹ Defra (2014). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Policy Companion Document."

² CL:AIRE (2013). "SP1010: Development of Category 4 Screening Levels and Assessment of Land Affected by Contamination – Final project Report."

³ EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.

⁴ LQM (2014). "The LQM/CIEH S4ULs for Human Health Risk Assessment."

⁵ EA (2008). "Updated Technical Background to the CLEA Model." Science Report – SC050021/SR3.

⁶ EA (2008). "Human Health Toxicological Assessment of Contaminants in Soils." Science Report – SC050021/SR2.

⁷ EA (2008). "A Review of Body Weight and Height Data used within the Contaminated Land Exposure Assessment Model (CLEA)." Project SC050021/Technical Review 1.

⁸ EA (2009). "Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values." Science report SC050021/SR7.

the PAHs were recorded as less than detection limits, the assessment could not be undertaken.

The proposed development is for residential houses with gardens, therefore the assessment criteria for residential without plant uptake has been.

All criteria have been generated using the CLEA V1.06/07 model⁹ based either on 1%, 2.5% and 6% Soil Organic matter (SOM). Results will be compared to the nearest appropriate SOM.

Appropriate screening values are presented in Appendix D.

The analytical results have been compared to the relevant assessment criteria and no elevated contaminants were identified. Therefore, the topsoil and subsoil is considered suitable for use in the cover system.

3 COVER SYSTEM DEPTH IN REAR GARDEN AREAS

The remedial requirement for the cover system depth is 450mm in all shared soft landscaping areas over a geotextile membrane.

LKC attended site in October 2023 to inspect the cover system construction. Photographs are provided in Appendix E and the observations are summarised below.

Location	Topsoil Depth (mm)	Subsoil Depth (mm)	Total Depth (mm)	Geotextile Membrane at base	Required Depth (mm)	Pass (✓) or Fail (x)
1	300	200	500	Y	450	✓
2	250	250	500	Y	450	✓
3	250	230	480	Y	450	✓
4	150	300	450	Y	450	✓

4 CONCLUSIONS

LKC has completed the validation of the cover system within the soft landscaping areas associated with the development. LKC conclude that in the places inspected, chemically suitable material has been laid to an appropriate depth over a geotextile membrane.

Report Prepared By:

Hannah Moss
Senior Geo-Environmental Consultant

Report Reviewed By:

Colin Crompton
Director

Enc:

Figure 1: Proposed Development Plan

Appendix A: Supplier Certificates – Topsoil and Subsoil

Appendix B: Certificates of Analysis – Topsoil and Subsoil

Appendix C: Geo-textile Membrane Specification

Appendix D: Generic Assessment Criteria

Appendix E: Site Photographs

⁹ EA (2008). "CLEA Software (Version 1.05) Handbook." Science Report – SC050021/SR4.

Disclaimer

This report has been prepared by LKC who have exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant experienced in preparing reports of a similar scope. However, to the extent that the report is based on or relies upon information contained in records, reports or other materials provided to LKC which have not been independently produced or verified, LKC gives no warranty, representation or assurance as to the accuracy or completeness of such information.

This report is issued on the condition that LKC will not be held liable for any loss arising from ground conditions between sampling points (i.e. boreholes/trial pits/hand augers/surface samples) which have not been shown by the sampling points or related testing carried out during the investigation, nor for any loss arising from conditions below the maximum depth of the investigation, or for any works done to the garden areas following the date of inspection. Opinions on such conditions, where given, are for general guidance only.

Other works including *inter alia* hotspot removal, drainage, soil texture, permitting, invasive species management and geotechnical requirements are out with this scope and should be dealt with by others.

This report is prepared solely for the benefit of Watson Construction Ltd. It may not be relied upon by, or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance and regulatory approval, until all invoices have been settled in full. Those using this information in subsequent assessments or evaluations do so at their own risk.

FIGURES

KEY

- Proposed Tree
Extra Heavy Standard, 14-16cm girth, set in soft landscaping with double stake support
- Proposed Tree
Feathered/ multi stem, 175-200cm, set in soft landscaping with double stake & crossbar support
- Root Barrier
eg. GreenBlue Urban ReRoot 1000 ribbed root barrier installed with ribs facing tree, no growing medium over top of barrier
- Ornamental Hedge
0.6-1.2m high hedge (at time of planting) planted @ 2-4 per lin.m with 75mm ornamental bark mulch dressing
- Ornamental Hedge
300-500mm high hedge planted @ 4 per lin.m with 75mm ornamental bark mulch dressing
- Native plant mix
Whips/ transplants/ container grown plants planted in double staggered rows (rows 500mm apart), 7 per linear metre with suitable spiral guards
- Ornamental shrub planting
Plants supplied in 2-5L pots planted @ 2 -6/m2 in 450mm imported topsoil with 75mm ornamental bark mulch dressing
- Grass
Grass Seed OR Turf (to be hard wearing amenity quality) eg AllTurf Festival or similar approved laid on minimum 150mm imported topsoil
- Wildflower grassland turf
- Pedestrian Concrete flag paving
eg. Tobermore Textured Flag, 600x600x50mm, Natural Colour laid in a stack bond pattern
- Vehicular Permeable block paving
eg. Tobermore Hydrospave Pedesta, 200x100x80mm, Brindle Colour laid in a stretcher bond pattern with Charcoal colour blocks to delineate parking bays sub bases to engineers specifications
- Vehicular Block paving
eg. Tobermore Pedesta, 200x100x80mm, Brindle Colour laid in a stretcher bond pattern with Charcoal colour blocks to delineate parking bays sub bases to engineers specifications
- Pedestrian Surfacing
Tarmac wearing course to engineers specifications

All kerbs to be Tobermore Textured Kerb or similar approved
All footpaths & carriageways within site with no hatch to be tarmac surfacing
All new public footpaths along Williams Rd that are adoptable to be tarmac surfacing to Local Authority Highways standards
Existing ground level

- Proposed ground level
- Welded mesh security fence with matching vehicular gates
eg. Jacksons Fencing Euroguard Regular 2410mm high with metal support posts, Green RAL 6005 colour or similar approved
- 2500mm high timber acoustic fence
(Subject to planning)
eg. Jacksons Fencing 12K Acoustic Envirofence or similar approved
- 2100mm high fence comprising of 1800mm close boarded panel, 300mm concrete gravel board with concrete support posts
- 2400mm high vertical bar railings with metal support posts set in concrete foundations
- 2100mm high vertical bar railings with metal support posts set in concrete foundations
- 1100mm high railings on conservation kerb with metal support posts set in concrete foundations
- Artificial Bird habitat as recommended by Amenity Tree Care Ltd
Ibstock Eco Swift Box integrated into building external wall
- Artificial Bird habitat as recommended by Amenity Tree Care Ltd
Schwegler 1SP House Sparrow Terrace integrated into building external wall

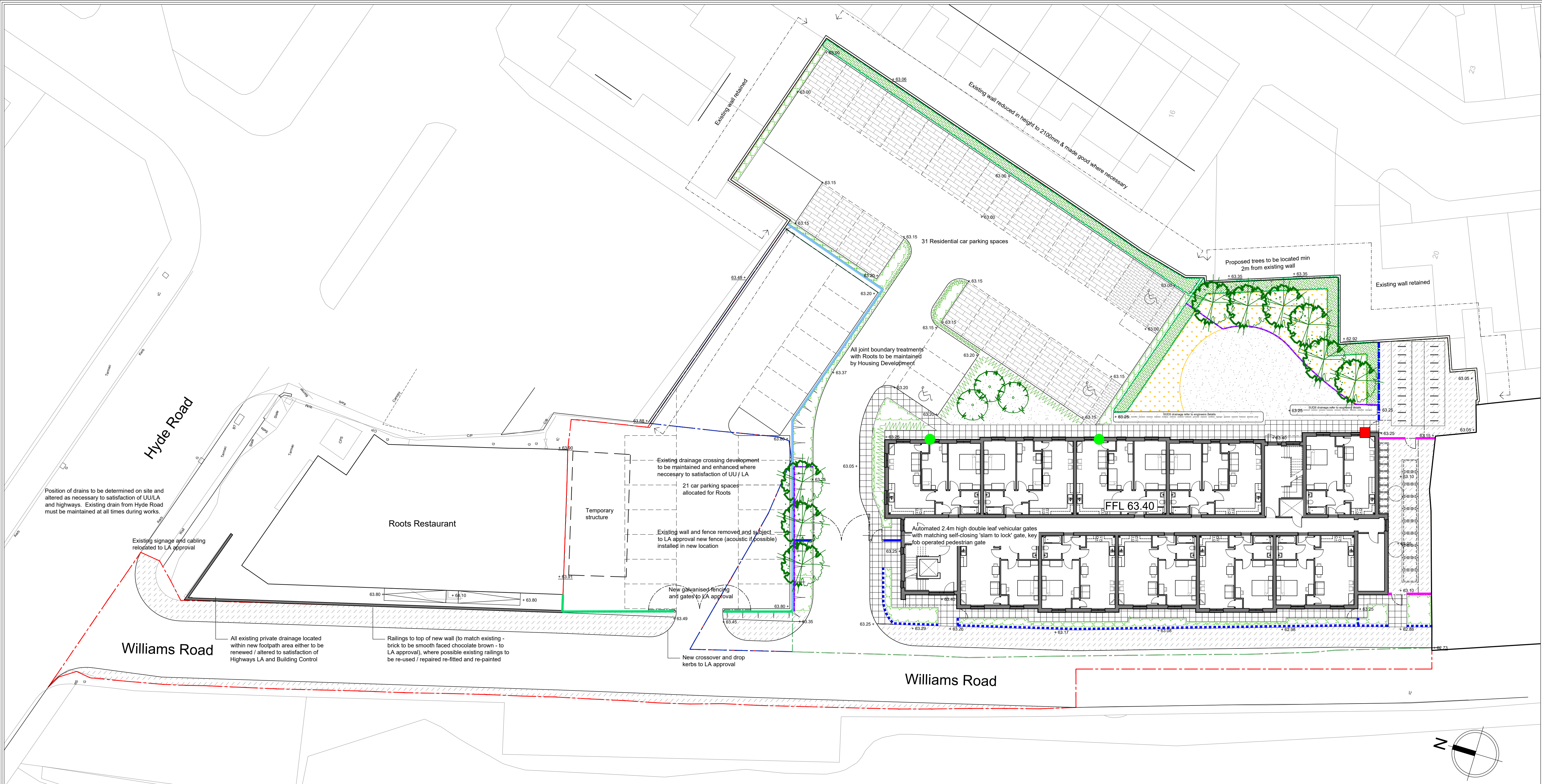
Rev	Description	Initial	Date
B	Boundary treatments amended to SBD comments	KAS	Jul22
A	Amended to client & ecology comments	KAS	Jul22

saville LANDSCAPE DESIGN
Hatherlow House Romiley Stockport, Cheshire SK6 3DY
T : 0161 406 7333 E : info@savillelandscape.co.uk
M : 07502 289193 W : www.savillelandscape.co.uk

CLIENT
Mangrove Developments Ltd
PROJECT TITLE
Williams Rd, Gorton, Manchester
DRAWING TITLE
Landscape GA
STATUS
PLANNING

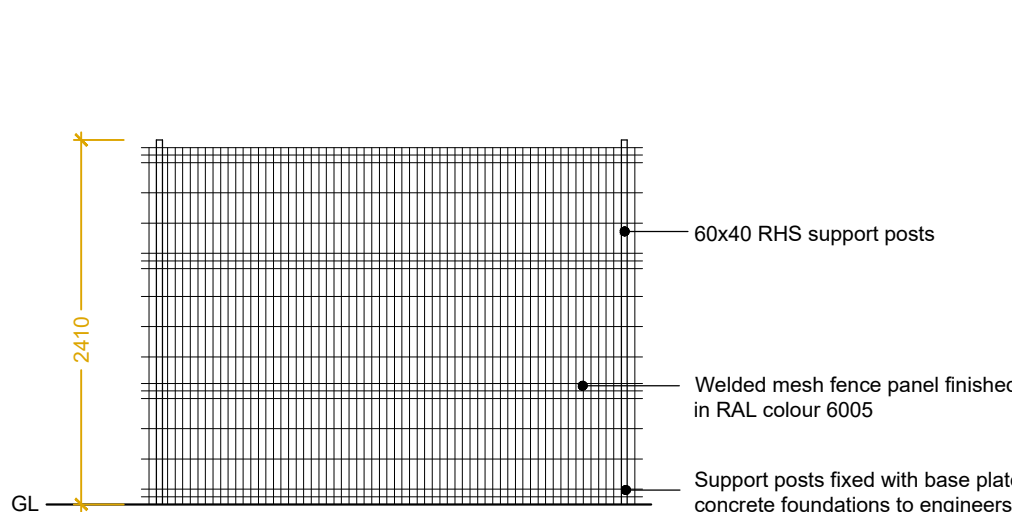
SCALE	SHEET SIZE	DRAWN	CHECKED	DATE
1:200	A1	KAS	-	July 22

PROJECT NO.	DRAWING NO.	REV.
316	01	B

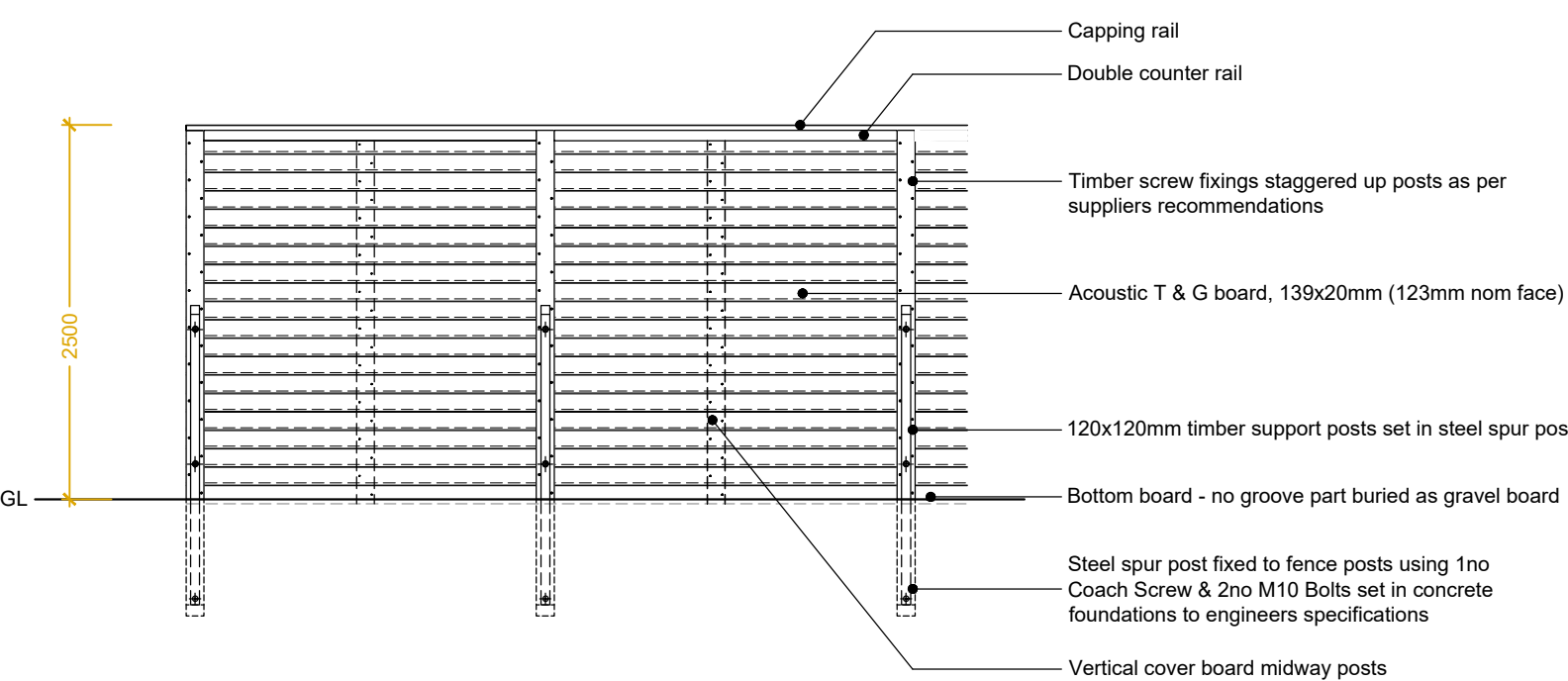


TYPICAL BOUNDARY DETAIL ELEVATIONS Scale 1:50

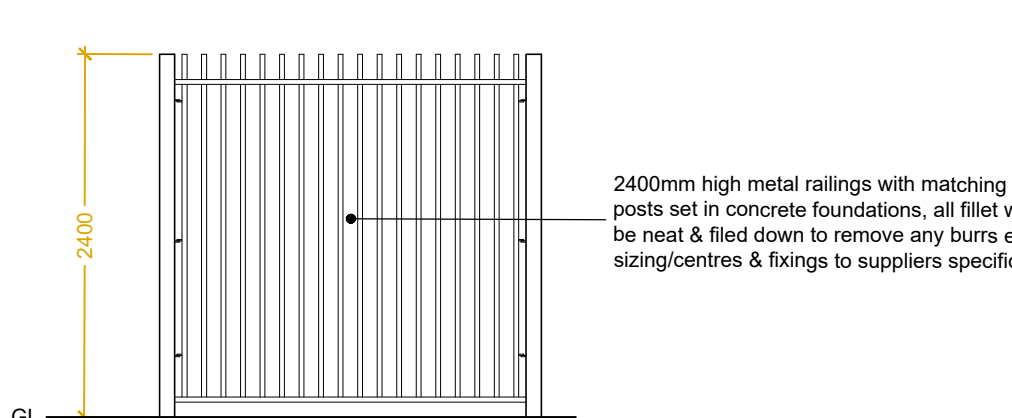
2410mm high welded mesh fence



2500mm high acoustic fence



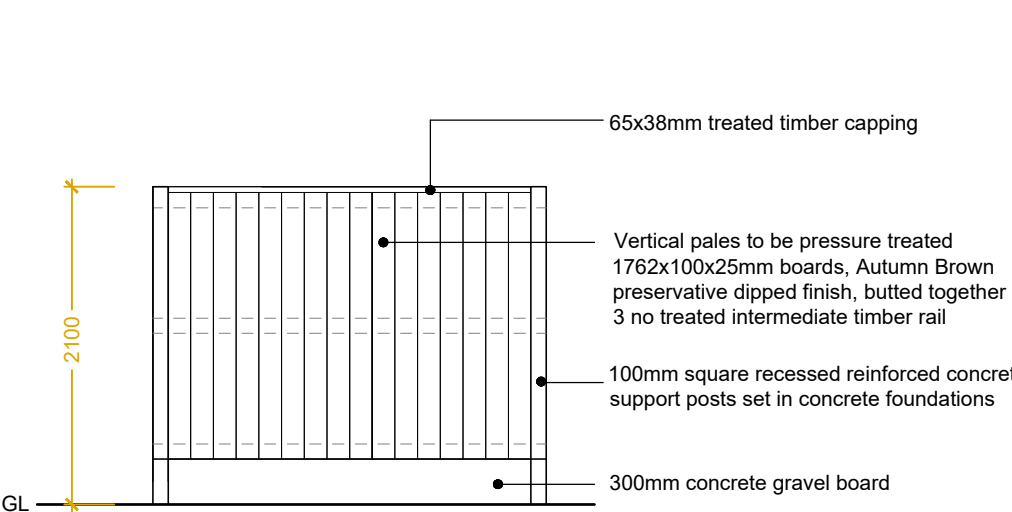
2400mm high metal railings



2100mm high metal railings



2100mm high timber fence



Boundaries & Fences Generally

Boundary Fencing

Where trellis is fitted, this must be secured to the lower panel. Where fence panels are accessible from public places eg driveways, shared spaces, these must be secured with anti-lift brackets to prevent theft

Timber gates

Rear timber gates shall be ledged and braced construction, with full length timber stop fitted to the post/ frame on both sides of the gate. Gates shall be fitted with the following:

- 1no pair galvanised steel hook and band or tee gate hinges, min length 300mm
- 1no galvanised gate latch, Suffolk latch or locking latch
- 1no galvanised steel lockable barrel bolt or pad bolt to backyard gate

Metal Gates

Gate style to match installed railings
Communal access gate to rear garden to be self-closing/ locking, 'slam to lock' steel gate operated by key-fob only
Vehicular & pedestrian access to rear car park to be self-closing/ locking, 'slam to lock' steel gate operated by key-fob only
Access gates to building perimeter for maintenance to be to be self-closing/ locking, 'slam to lock' steel gate by key subject to management company confirmation

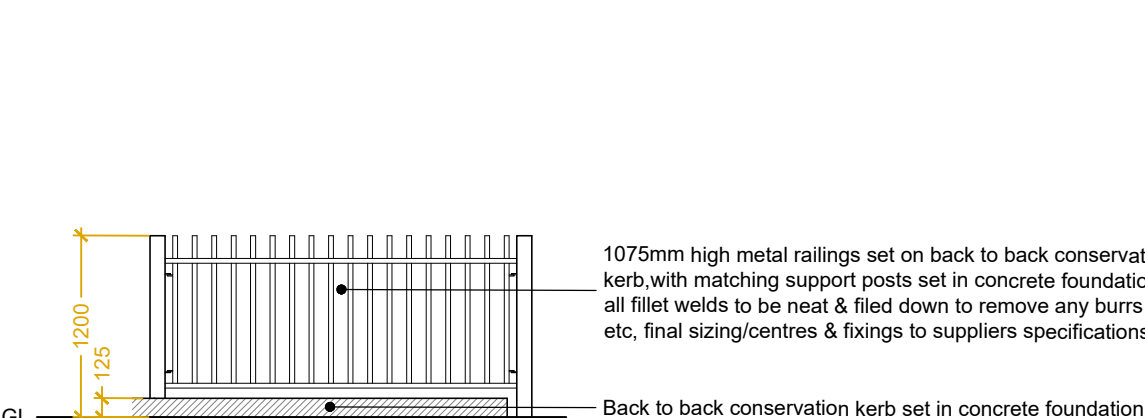
Communal cycle store

Access gate to be self-closing/ locking, 'slam to lock' metal gate final specification TBC further to detailed design of cycle store

Communal external bin store

Access gate to be self-closing/ locking, 'slam to lock' timber gate final specification TBC further to detailed design of bin store

1200mm high metal railings



APPENDICES

Appendix A – Supplier Certificates – Topsoil and Subsoil

TEST CERTIFICATE

Specification for Subsoil

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



Environmental Science

Tested in Accordance with: BS 8601: 2013

Client: Cheshire Soils and Aggregates Ltd
Client Address: Unit 3B, Thelwall Lane, Warrington,
Cheshire, WA4 1TB

Contact: Dave B
Site Address: Charcoal Lane

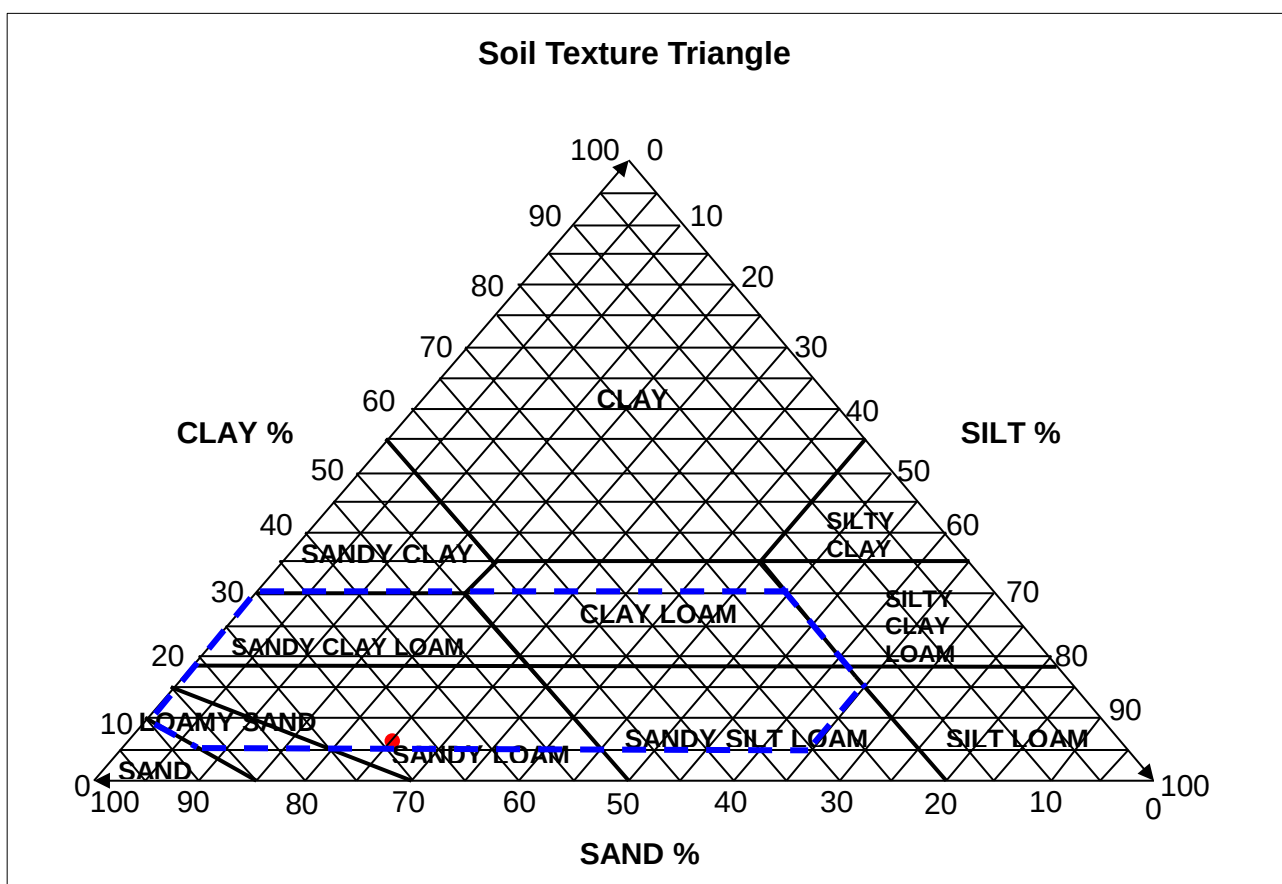
Client Reference: DUNHAM
Job Number: 21-10825
Date Sampled: 16/09/2021
Date Received: 17/09/2021
Date Tested: 21/09/2021
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 2015994
Hole No.: Sample
Sample Reference: Not Given
Sample Description: SANDY LOAM

Depth Top [m]: 0.00
Depth Base [m]: Not Given
Sample Type: D



Sample Proportion	% dry mass
Sand	69.2
Silt	23.4
Clay	7.4

Remarks:

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

Signed:

Anna Wiczorek
Deputy Head of Geo Office Section
for and on behalf of i2 Analytical Ltd

Dave B

Cheshire Soils and Aggregates Ltd
Unit 3B, Thelwall Lane
Warrington
Cheshire
WA4 1TB

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

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

e: dave@cheshiresoils.co.uk

Analytical Report Number : 21-92416

Project / Site name: Halewood

Samples received on: 11/08/2021

Your job number:

**Samples instructed on/
Analysis started on:** 11/08/2021

Your order number:

Analysis completed by: 20/08/2021

Report Issue Number: 1

Report issued on: 20/08/2021

Samples Analysed: 1 soil sample

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.

i2 Analytical

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

Telephone: 01923 225404
Fax: 01923 237404
email: reception@i2analytical.com

Certificate of Analysis									
BS 3882:2015 Specification For Topsoil									
	Pass BS 3882 for Multipurpose Topsoil; Calcareous;						client		
Report No:	21-92416					Cheshire Soils and Aggregates Ltd			
Location	Halewood								
Lab Reference (Sample Number)	1969316								
Sampling Date	10/08/2021								
Sample ID	Sample								
Depth (m)	0.00			Compliant with range (Y/N)					
		unit	Result	Multi-P	Acid	Calc	Low-F	Low-F(a)	Low-F(c)
Soil texture	<2mm fraction	%m/m	SANDY LOAM	Y	Y	Y	Y	Y	Y
Maximum coarse fragment content:	>2mm	%m/m	0.00	Y	Y	Y	Y	Y	Y
	>20mm	%m/m	0.00	Y	Y	Y	Y	Y	Y
	>50mm	%m/m	0.00	Y	Y	Y	Y	Y	Y
Mass loss on ignition		%	4.80						
	Clay 5-20%		Y	Y	Y	Y	Y	Y	Y
	Clay 20-35%		-	-	-	-	-	-	-
Soil pH:		pH	7.60	Y	N	Y	Y	N	Y
Carbonate:		%m/m	1.80	-	-	Y	-	-	Y
Available plant nutrients	Nitrogen	%m/m	0.22	Y	Y	Y	-	-	-
	Extractable Phosphate (as P)	mg/l	41.00	Y	Y	Y	N	N	N
	Extractable Potassium	mg/l	189.00	Y	Y	Y	-	-	-
	Extractable Magnesium	mg/l	77.00	Y	Y	Y	-	-	-
Carbon: Nitrogen Ratio:		:1	13.00	Y	Y	Y	Y	Y	Y
Conductivity		us/cm	1900.00	Y	-	-	-	-	-
Phytotoxic contaminants:	** Total Zinc	mg/kg	110.00	Y	Y	Y	Y	Y	Y
	** Total Copper	mg/kg	61.00	Y	Y	Y	Y	Y	Y
	** Total Nickel	mg/kg	27.00	Y	Y	Y	Y	Y	Y
Visible contaminants:	>2mm	%m/m	0.00	Y	Y	Y	Y	Y	Y
	Plastics	%m/m	0.00	Y	Y	Y	Y	Y	Y
	Sharps	no. in 1 kg	0.00	Y	Y	Y	Y	Y	Y
Compliance:				Pass	Fail	Pass	Fail	Fail	Fail
Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and 12 cannot be held responsible for any discrepancies with current legislation									

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Analytical Report Number : 21-92416

Project / Site name: Halewood

* 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 *
1969316	Sample	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 21-92416

Project / Site name: Halewood

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
Geotechnical Testing in Soil	See attached geotechnical report	See attached geotechnical report		W	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.	L038-PL	D	MCERTS
Textural Classification Diagram	Textural classification Diagram	BS3882:2015		D	NONE
Carbon to Nitrogen Ratio (Topsoil - BS3882:2015)	Carbon to Nitrogen ratio (:1) calculated using Loss on Ignition.	BS3882:2015	L01TS2015	W	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Kjeldahl nitrogen in soil	Determination of total nitrogen using the Kjeldahl-digestion method and colorimetric determination.	In house method based on BS 7755-3.7:1995 &	L087-PL	D	NONE
Topsoil	See attached report.	BS 3882: 2015	PL	W	NONE
Mass loss on ignition (Topsoil - BS3882)	Determination of Loss on Ignition as per BS 3882:2015.	BS3882:2015	L047-PL	D	NONE
Carbonate (Topsoil - BS3882)	Determination of Carbonate as per BS 3882:2015.	BS3882:2015	L034-PL	D	NONE
Phosphorus as PO4 (BS3882/BS8601)	Determination of the extractable phosphorus in soil, in accordance with BS3882:2007 methodology.	BS3882:2015 & BS8601:2013	L082-PL	D	NONE
Coarse Fragment and Contaminant Analysis	Determination of >2mm contaminants	BS3882:2007 & BS8601:2013 & PAS 100:2005	L01TS	D	NONE
Nitrogen (TKN)	Determination of total nitrogen by Kjeldahl method.	BS3882:2007	L087-PL	D	NONE
Conductivity (BS3882/BS8601)	Determination of the conductivity of soil in accordance with BS 3882:2007 methodology	BS3882:2007 & BS8601:2013	L099-PL	D	NONE
pH (BS3882/BS8601)	Determination of the pH of soil in accordance with BS 3882:2007 methodology	BS3882:2007 & BS8601:2013	L099-PL	D	NONE
Extractable/Available Metals (BS3882/BS8601)	Determination of the extractable metals in soil, in accordance with BS3882:2007 methodology.	BS3882:2007 & BS8601:2013	L038-PL	D	NONE

Analytical Report Number : 21-92416

Project / Site name: Halewood

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
Sodium (exchangeable %)	Determination of exchangeable sodium (%) by calculation, in accordance with BS3882:2007 methodology.	BS3882:2007	L028-PL	D	NONE
Textural Classification (BS3882/BS8601)	Determination of the textural classification of soil following BS3882:2007 methodology.	BS3882:2007 & BS8601:2013	L01TS	D	NONE

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.

Appendix B – Certificates of Analysis – Topsoil and Subsoil



Hannah Moss
LK Consult Limited
Unit 29 Eton Business Park
Eton Hill Road
Manchester
M26 2ZS

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 23-13047

Site Reference: Former Chatsworth Mill, Gorton

Project / Job Ref: LKC 21 1152

Order No: LKC 21 1152-HM

Sample Receipt Date: 20/10/2023

Sample Scheduled Date: 20/10/2023

Report Issue Number: 1

Reporting Date: 25/10/2023

Authorised by:

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate						
DETS Report No: 23-13047	Date Sampled	18/10/23	18/10/23	18/10/23	18/10/23	18/10/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Chatsworth Mill, Gorton	TP / BH No	TS001	TS002	TS003	SS001	SS002
Project / Job Ref: LKC 21 1152	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 21 1152-HM	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 25/10/2023	DETS Sample No	681294	681295	681296	681297	681298

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
pH	pH Units	N/a	MCERTS	6.9	6.7	6.9	7.2	7.3
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	11	10	15	32	47
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.01	0.01	0.01	0.03	0.05
Organic Matter (SOM)	%	< 0.1	MCERTS	2.6	2.7	2.9	1.1	0.9
Arsenic (As)	mg/kg	< 2	MCERTS	3	3	3	2	2
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	7	7	7	5	5
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	9	8	9	9	8
Lead (Pb)	mg/kg	< 3	MCERTS	17	15	17	23	13
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	7	6	7	6	6
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	9	8	9	7	7
Zinc (Zn)	mg/kg	< 3	MCERTS	21	20	22	27	21
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate						
DETS Report No: 23-13047	Date Sampled	18/10/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Former Chatsworth Mill, Gorton	TP / BH No	SS003				
Project / Job Ref: LKC 21 1152	Additional Refs	None Supplied				
Order No: LKC 21 1152-HM	Depth (m)	None Supplied				
Reporting Date: 25/10/2023	DETS Sample No	681299				

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected			
pH	pH Units	N/a	MCERTS	7.2			
Total Cyanide	mg/kg	< 1	NONE	< 1			
Free Cyanide	mg/kg	< 1	NONE	< 1			
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	34			
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.03			
Organic Matter (SOM)	%	< 0.1	MCERTS	1			
Arsenic (As)	mg/kg	< 2	MCERTS	2			
W/S Boron	mg/kg	< 1	NONE	< 1			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2			
Chromium (Cr)	mg/kg	< 2	MCERTS	6			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	9			
Lead (Pb)	mg/kg	< 3	MCERTS	36			
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	7			
Selenium (Se)	mg/kg	< 2	MCERTS	< 2			
Vanadium (V)	mg/kg	< 1	MCERTS	7			
Zinc (Zn)	mg/kg	< 3	MCERTS	19			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 23-13047	Date Sampled	18/10/23	18/10/23	18/10/23	18/10/23	18/10/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Chatsworth Mill, Gorton	TP / BH No	TS001	TS002	TS003	SS001	SS002
Project / Job Ref: LKC 21 1152	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 21 1152-HM	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 25/10/2023	DETS Sample No	681294	681295	681296	681297	681298

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.23
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.18
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.20	1.47
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.38
Fluoranthene	mg/kg	< 0.1	MCERTS	0.14	< 0.1	< 0.1	0.34	1.54
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.33	1.41
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.16	0.64
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.18	0.72
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.17	0.64
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.25
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.16	0.59
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.32
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.24
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	8.6



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Soil Analysis Certificate - Speciated PAHs

DETS Report No: 23-13047	Date Sampled	18/10/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Former Chatsworth Mill, Gorton	TP / BH No	SS003				
Project / Job Ref: LKC 21 1152	Additional Refs	None Supplied				
Order No: LKC 21 1152-HM	Depth (m)	None Supplied				
Reporting Date: 25/10/2023	DETS Sample No	681299				

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	0.23			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	0.42			
Pyrene	mg/kg	< 0.1	MCERTS	0.38			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.19			
Chrysene	mg/kg	< 0.1	MCERTS	0.23			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.23			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.18			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	1.9			



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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 23-13047	Date Sampled	18/10/23	18/10/23	18/10/23	18/10/23	18/10/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Chatsworth Mill, Gorton	TP / BH No	TS001	TS002	TS003	SS001	SS002
Project / Job Ref: LKC 21 1152	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 21 1152-HM	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 25/10/2023	DETS Sample No	681294	681295	681296	681297	681298

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic >C34 - C44 : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	< 21
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	3
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	3
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	9
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	19
Aromatic >C35 - C44 : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21	< 21	< 21	< 21	34
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	< 42



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Soil Analysis Certificate - TPH CWG Banded

DETS Report No: 23-13047	Date Sampled	18/10/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Former Chatsworth Mill, Gorton	TP / BH No	SS003				
Project / Job Ref: LKC 21 1152	Additional Refs	None Supplied				
Order No: LKC 21 1152-HM	Depth (m)	None Supplied				
Reporting Date: 25/10/2023	DETS Sample No	681299				

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01			
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05			
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C16 - C21 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C21 - C34 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10			
Aliphatic >C34 - C44 : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 10	NONE	< 10			
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 21	NONE	< 21			
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01			
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05			
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2			
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2			
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2			
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	< 3			
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	< 10			
Aromatic >C35 - C44 : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 10	NONE	< 10			
Aromatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 21	NONE	< 21			
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Tot al	mg/kg	< 42	NONE	< 42			



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-13047	Date Sampled	18/10/23	18/10/23	18/10/23	18/10/23	18/10/23
LK Consult Limited	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Former Chatsworth Mill, Gorton	TP / BH No	TS001	TS002	TS003	SS001	SS002
Project / Job Ref: LKC 21 1152	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: LKC 21 1152-HM	Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 25/10/2023	DETS Sample No	681294	681295	681296	681297	681298

Determinand	Unit	RL	Accreditation						
Benzene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2	< 2
Toluene : HS 1D MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2	13	< 2	< 2	< 2
p & m-xylene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2	10	< 2	< 2	< 2
o-xylene : HS 1D MS	ug/kg	< 2	MCERTS	< 2	< 2	3	< 2	< 2	< 2
MTBE : HS 1D MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5	< 5



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Soil Analysis Certificate - BTEX / MTBE						
DETS Report No: 23-13047	Date Sampled	18/10/23				
LK Consult Limited	Time Sampled	None Supplied				
Site Reference: Former Chatsworth Mill, Gorton	TP / BH No	SS003				
Project / Job Ref: LKC 21 1152	Additional Refs	None Supplied				
Order No: LKC 21 1152-HM	Depth (m)	None Supplied				
Reporting Date: 25/10/2023	DETS Sample No	681299				

Determinand	Unit	RL	Accreditation				
Benzene : HS 1D MS	ug/kg	< 2	MCERTS	< 2			
Toluene : HS 1D MS	ug/kg	< 5	MCERTS	< 5			
Ethylbenzene : HS 1D MS	ug/kg	< 2	MCERTS	< 2			
p & m-xylene : HS 1D MS	ug/kg	< 2	MCERTS	< 2			
o-xylene : HS 1D MS	ug/kg	< 2	MCERTS	< 2			
MTBE : HS 1D MS	ug/kg	< 5	MCERTS	< 5			



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 23-13047	
LK Consult Limited	
Site Reference: Former Chatsworth Mill, Gorton	
Project / Job Ref: LKC 21 1152	
Order No: LKC 21 1152-HM	
Reporting Date: 25/10/2023	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
681294	TS001	None Supplied	None Supplied	15	Brown sandy clay
681295	TS002	None Supplied	None Supplied	12.1	Brown sandy clay with vegetation
681296	TS003	None Supplied	None Supplied	16.4	Brown sandy clay
681297	SS001	None Supplied	None Supplied	11.5	Brown sandy clay
681298	SS002	None Supplied	None Supplied	11.1	Brown sandy clay with stones
681299	SS003	None Supplied	None Supplied	11.7	Brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{I/S}

Unsuitable Sample ^{U/S}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 23-13047

LK Consult Limited

Site Reference: Former Chatsworth Mill, Gorton

Project / Job Ref: LKC 21 1152

Order No: LKC 21 1152-HM

Reporting Date: 25/10/2023

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphénylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
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List of HWOL Acronyms and Operators	
DETS Report No: 23-13047	
LK Consult Limited	
Site Reference: Former Chatsworth Mill, Gorton	
Project / Job Ref: LKC 21 1152	
Order No: LKC 21 1152-HM	
Reporting Date: 25/10/2023	

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH CWG - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH CWG - Aliphatic >C16 - C21 - EH_CU_1D_AL
TPH CWG - Aliphatic >C21 - C34 - EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AL
TPH CWG - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH CWG - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH CWG - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH CWG - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH CWG - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH CWG - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AR
TPH CWG - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH CWG - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH CWG - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH CWG - Total >C5 - C44 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

Appendix C – Geotextile Membrane Specification

PRODUCT DESCRIPTION

A UV stabilized, needle punched, nonwoven geotextile produced from 100% polypropylene staple fibers.

USES & FUNCTIONS

Used in many civil engineering and building applications. Designed to offer filtration and separation functions.

Typical applications for TNW non woven geotextiles include:

- As a general purpose separator for use under site access roads and areas of hardstanding.
- As a separation and strengthening layer under new roadways, car parks, industrial units etc.
- As a filter surround in the construction of a French drain or granular drainage blanket.
- For separation: to prevent the intermixing of dissimilar soil layers.
- For filtration: to allow the passage of fluids whilst preventing the uncontrolled passage of soil.



TNW1100 meets the requirements of BS8661:2019 for mechanical characteristics of high-extension geotextiles TYPE 1 and the hydraulic requirements for use in Separation with Filtration.

PROPERTY		STANDARD	UNITS	VALUE	TNW1100
MECHANICAL					
UNIT TENSILE STRENGTH (MD/CD)		EN 10319	kN/m	AVERAGE	8/8
TENSILE ELONGATION (MD/CD)		EN 10319	%	AVERAGE	45/45
RESISTANCE TO STATIC PUNCTURE		EN ISO 12236	N	AVERAGE	1500
DYNAMIC PERFORATION RESISTANCE		EN ISO 13433	mm	AVERAGE	36
HYDRAULIC					
CHARACTERISTICS OPENING SIZE (O ₉₀)		EN ISO 12956	µm	AVERAGE	100
WATER PERMEABILITY V _{IH50}		EN ISO 11058	mm/sec	AVERAGE	130
WATER FLOW RATE		EN ISO 11058	l/(m²-sec)	AVERAGE	130
WATER FLOW CAPACITY IN THE PLANE (MD/CD)	HG 1.0 AT 20kPa	EN ISO 12958	10 ⁻⁴ l/(m-sec)	AVERAGE	37/25
	HG 1.0 AT 100kPa				2.2/3.8
	HG 1.0 AT 200kPa				1.7/1.3
ENDURANCE					
WEATHERING RESISTANCE		EN 12224	%RETAIN STRENGTH	AVERAGE	90
RESISTANCE TO LIQUIDS - ACID		EN 14030	%RETAIN STRENGTH	AVERAGE	90
RESISTANCE TO LIQUIDS - ALKALINE		EN 14030	%RETAIN STRENGTH	AVERAGE	90
OXIDATION RESISTANCE		EN 13438	%RETAIN STRENGTH	AVERAGE	90
RESISTANCE TO SOIL BURIAL		EN 12225	%RETAIN STRENGTH	AVERAGE	90
PHYSICAL					
MASS/UNIT AREA		EN 9864	gr/m²	AVERAGE	100
THICKNESS (2kPa)		EN 9863-1	mm	AVERAGE	0.8
STANDARD PACKING					
ROLL WIDTH		MEASURED	m	TYPICAL	4.5
ROLL LENGTH		MEASURED	m	TYPICAL	100

1. TCS Geotechnics is a trading name of Technical Civils Solutions Ltd
2. TCS Geotechnics Ltd reserves the right to alter product specifications without prior notice.
3. It is the responsibility of all users to satisfy themselves that the above data is current.
4. The above figures are average values obtained from testing to current EN ISO standards
5. TCS Ltd cannot accept responsibility for the performance of these products as the conditions of use are beyond our control.
6. Installation details are available on request.
7. MD...Machine direction CD...Cross direction

Appendix D – Generic Assessment Criteria

Appendix E – Site Photographs

Location 1

	Photograph 1: View of soil in capping layer excavation in soft landscaping – Location 1. White geotextile membrane at base.
	Photograph 2: Depth measurement in soft landscaping – Location 1.
	Photograph 3: View of soft landscaping – Location 1.

Location 2

	Photograph 1: View of soil in capping layer excavation in soft landscaping – Location 2. White geotextile membrane at base.
	Photograph 2: Depth measurement in soft landscaping – Location 2
	Photograph 3: View of soft landscaping – Location 2

Location 3

	Photograph 1: View of soil in capping layer excavation in soft landscaping – Location 3. White geotextile membrane at base.
	Photograph 2: Depth measurement in soft landscaping – Location 3.
	Photograph 3: View of soft landscaping – Location 3.

Location 4

	Photograph 1: View of soil in capping layer excavation in soft landscaping – Location 4. White geotextile membrane at base.
	Photograph 2: Depth measurement in soft landscaping – Location 4.
	Photograph 3: View of soft landscaping – Location 4.

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