

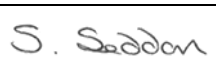
Completion Report

For a site at

Kingsway, Manchester

Undertaken for

Cube Great Places

Report Title:	Kingsway, Manchester Completion Report
Report Reference:	8003G-WML-00-XX RP-G-0003
Client:	Cube Great Places
Issue Date:	25th June 2021
Drafted By:	T P Booth 
Checked By:	S C Seddon 
Authorised By:	S C Seddon 

This document has been prepared for the titled project (or named part thereof) and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authorization being obtained from WML Consulting. WML accepts no responsibility or liability for the consequences of the use of this document, wholly or in part, for any other purpose than that for which it was commissioned. Any persons so using or relying upon this document for such other purpose do so at their own risk.

This report was prepared for the sole use of the Client and shall not be relied upon or transferred to any other party without the express written authorisation of WML. It may contain material subject to copyright or obtained subject to license; unauthorised copying of this report will be in breach of copyright/license.

The findings and opinions provided in this document are given in good faith and are subject to the limitations imposed by employing site assessment methods and techniques, appropriate to the time of investigation and within the limitations and constraints defined within this document. The findings and opinions are relevant to the dates when the assessment was undertaken, but should not necessarily be relied upon to represent conditions at a substantially later date.

The findings and opinions conveyed in this report are based on information obtained from a variety of sources as detailed and which WML assumes to be reliable, but has not been independently confirmed. Therefore, WML cannot and does not guarantee the authenticity or reliability of third party information it has relied upon.

Where opinions expressed in this report are based on current available guidelines and legislation, no liability can be accepted by WML for the effects of any future changes to such guidelines and legislation.

The limitations of liability of WML for the contents of this document have been agreed with the Client, as set out in the terms and conditions of offer and related contract documentation.

Revision Status / History

Rev	Date	Issue	Prepared	Checked	Authorised
-	25/06/2021	Final	TPB	SCS	SCS

WML Consulting Ltd
No. 8 Oak Green,
Earl Road,
Stanley Green Business Park,
Cheadle Hulme,
Cheshire
SK8 6QL

Tel: 0161 482 0600

Email: info@wmlconsulting.com www.wmlconsulting.com

CONTENTS

1.0	INTRODUCTION	1
	Appointment	1
	Proposed Development	1
	Background	1
	Verification	1
2.0	SUMMARY OF ENVIRONMENTAL CONDITIONS AND REMEDIAL OBJECTIVES	2
	Phase 1 Desk Study	2
	Phase 2 Investigations	2
	Summary of Remediation Objectives	3
3.0	VALIDATION.....	4
	Unexpected Ground Contamination	4
	Imported Capping Soils	4
	Capping Validation – Landscaping to Apartments	4
	Potable Water Supplies	5

APPENDICES

Appendix 01	-	Drawings
Appendix 02	-	Site Photographs
Appendix 03	-	Capping Soil Delivery Dockets
Appendix 04	-	Chemical Analyses from Source – Capping Soils
Appendix 05	-	Chemical Analyses from Site – Capping Soils
Appendix 06	-	Assessment Criteria for Capping Soils

1.0 INTRODUCTION

Appointment

- 1.1 WML Consulting (WML) has been commissioned by R.P. Tyson on behalf of Cube Great Places to prepare a Completion Report in relation to development of a site referred to as Kingsway, Manchester.
- 1.2 The site is centred on approximate Ordnance Survey National Grid Reference 386655E, 394027N with an indicative postcode of M19 2LJ. It is bounded to the north and west by the A5079 Kingsway, and to the south by Moseley Road, both with residential properties beyond. To the east the site is bounded by further residential properties.

Proposed Development

- 1.3 The development comprises the construction of twenty seven residential units in the form of apartments and four low-rise residential houses. External areas comprise associated hardstanding for access, car-parking together with communal landscaping and private gardens.
- 1.4 A drawing indicating the layout by Bowker Sadler Architecture, referenced 17-068-201, Rev B, is presented in Appendix 01.

Background

- 1.5 WML Consulting were initially commissioned by to undertake a Phase 1 Desk Study and Phase 2 ground investigation which culminated in the following reports.
 - Phase 1 Desk Study and Preliminary Geo-environmental Assessment, Reference 7147/G/01, dated April 2016.
 - Phase 2 Geo-environmental Investigation and Assessment, Reference 7147/G/02, dated April 2016.
 - Remediation Strategy, Reference 8003G-WML-00-XX RP-G-0001A, dated January 2019.
 - Completion Report, Reference 8003G-WML-00-XX-RP-G-0002C, dated July 2020.
- 1.6 These reports have been presented to Manchester City Council Planning Division in support of Planning Application 117274/FO/2017. This report has been compiled in consideration of the outstanding section of Condition 11 relating to remediation and validation.

Verification

- 1.7 This report presents the final validation of capping within the landscaped area of the apartment structures. The validation of private gardens is covered within the WML report reference 8003G-WML-00-XX-RP-G-0002C, dated July 2021.

2.0 SUMMARY OF ENVIRONMENTAL CONDITIONS AND REMEDIAL OBJECTIVES

2.1 The following paragraphs summarise the most relevant findings of the Phase 1 and Phase 2 reports.

Phase 1 Desk Study

- 2.2 The BGS plans indicated that the northern and southern sections of the site are underlain by Devensian Glacial Till comprising mainly clay which may be more locally interbedded with sand and gravel horizons.
- 2.3 The Drift deposits are underlain at greater depths by strata of the Halesowen Formation which generally comprise mudstone, siltstone and sandstone. The BGS plans indicate that Collyhurst Sandstone may be present in the south-western corner of the site.
- 2.4 The property is not in a Radon Affected Area as defined by the Health Protection Agency as less than 1% of properties are above the Action Level of exposure. Therefore, no radon protection measures are necessary for new structures as described in publication BR211; 2015 by the Building Research Establishment.
- 2.5 The Glacial Till beneath the site is classified by the Environment Agency as Secondary (undifferentiated) Aquifer. The underlying Halesowen Formation is classified as a Secondary (A) Aquifer. However, the Collyhurst Sandstone Formation, potentially present beneath the south-western corner of the site, is classified as a Principal Aquifer.
- 2.6 There are no Environment Agency Source Protection Zone within 250m of the site.
- 2.7 There is 1no Detailed River Network Features within 250m of the site. This relates to a culverted brook, 73m south at its closest point.
- 2.8 There are no active, non-operational or historic landfills recorded within 1km of the site.
- 2.9 Historically, the site has remained largely undeveloped until sometime prior to 1934 when the Kingsway Hotel was constructed in the south-west. The earliest available map in 1849 shows Fallowfield Brook running roughly east to west across the central part of the site, which was no longer shown by 1905.
- 2.10 The surrounding areas comprised mainly undeveloped rural / agricultural land with the conurbation of Levenshulme situated to the east. Extensive nearby residential development occurred between the 1920's and 1930's including the construction of properties immediately to the north, south and east. Industrial and commercial development remote from the site included a Tramway Depot, and later Fallowfield Shopping Centre.

Phase 2 Investigations

- 2.11 Investigation work was undertaken between March and June 2016. This comprised the formation of 3no window sample probeholes to a maximum depth of 3.50 metres below ground level (mbgl), 4no cable percussive boreholes to a maximum depth of 4.55mbgl, 2no rotary boreholes were formed to a depth of 10.00mbgl and 1no hand excavated trial pit to a maximum depth of 1.20mbgl
- 2.12 Made Ground was encountered within all exploratory holes extending from ground level to depths of between 0.60m and 2.10mbgl with the deepest Made Ground being encountered in the northern and central areas of the site. Glacial Till was encountered beneath the Made Ground and extending to depths of between 2.60m and 4.00mbgl. Solid strata of the Halesowen Formation were encountered within all exploratory holes (with the exception of HP1), at depths varying between 2.60m and 4.00mbgl and extending to maximum proven depths of 10.00mbgl.

- 2.13 No visual and/or olfactory evidence of significant ground contamination was identified within the exploratory holes during the investigation.
- 2.14 Perched groundwater was encountered within BH1 and WS2 depths of between 2.04m and 2.75mbgl. It was considered that this did not represent the true phreatic groundwater levels which would be encountered at depths of around 4.00m to 4.50mbgl.
- 2.15 7no samples of near surface soil were analysed for suites of Metals, Semi-Metals and Polyaromatic Hydrocarbons. Of these, 3no samples (WS2 0.40m, WS4 0.40m and HP1 0.20m) contained concentrations of PAH compounds which slightly exceeded the relevant SLs, with one sample (WS1 0.30m) containing slightly elevated arsenic and lead above the SLs. No asbestos fibres were detected in any of the samples analysed.
- 2.16 Ground gas monitoring, primarily for methane and carbon dioxide, with associated flow rates was undertaken on six occasions between April and June 2016. Ground gas monitoring results indicate no detectable concentrations of methane with a maximum carbon dioxide concentration of 1.9% by volume in air (v/v). No detectable ground gas flows were recorded during any of the monitoring visits. The results give a maximum composite Qhg value of <0.002l/hr and indicate the site to classify as Characteristic Situation (CS) 1 – 'Very Low Gas Risk' in accordance with BS8485:2015, with no specific gas protection measures required.

Summary of Remediation Objectives

- 2.17 The following objectives were outlined in the Remediation Strategy for the Validation.
- Details of any unexpected ground contamination and the measures undertaken to deal with this, to include records of excavation, the results of chemical analysis resulting from the removal of contaminated soil and / or groundwater.
 - Results of subsequent chemical analysis of imported topsoil/sub-soil to confirm compliance with the Site Specific Assessment Criteria.
 - Records of the volumes and suitability of all imported fill, topsoil and sub-soil delivered to site in the form of delivery slips and certificates.
 - Sample waste management records confirming compliance with Duty of Care regulations;
 - As the level of contamination in the Made Ground renders it unsuitable for direct use beneath proposed landscaped areas, development was to include the provision of a clean cover over the Made Ground in such areas to break the direct contact pollution linkage as set out below. This was to comprise 600mm clean cover (including a minimum of 150mm of clean imported Topsoil). Within structural planting areas, located around the perimeter of the site or where uncontaminated natural strata were encountered at formation level, capping thicknesses were to be reduced to 300mm, subject to confirmation from the landscape architects that such thicknesses would be suitable for the proposed plant species.
 - Alternatively and where appropriate, photographic evidence of suitable sub-soil/topsoil cover in landscaped areas underlain by in situ Made Ground.
 - Confirmation of potable water supply pipe materials.

3.0 VALIDATION

Unexpected Ground Contamination

- 3.1 It is understood from site management that no unforeseen ground contamination, requiring specific consideration, were encountered by Tyson and their groundworker P. M. Groundworks during the development groundworks.

Imported Capping Soils

- 3.2 All capping soils required for use within the landscaped garden areas was imported to site by the groundworker on behalf of Tyson sourced from PM Groundworks.

- 3.3 The topsoil was obtained from a residential development site located at:-

Highview Farm
Sower Carr Lane
Hambleton
Poulton-Le-Fylde
Lancashire
FY6 9DJ

- 3.4 In May 2021, Sub Surface Consultants undertook a sampling and testing exercise for the topsoil on behalf of the supplier PM Groundworks Ltd. This culminated in a letter report, referenced SCB/7220. The report indicated that the capping soil source site comprised part of a 0.006 Ha hectare site where the topsoil have been excavated and stored in mounds surrounded by the ongoing site works. The topsoil comprised a dark brown, slightly gravelly, sandy, slightly clayey silt with occasional rootlets and clay pockets.
- 3.5 Based on the test results Sub Surface concluded that all 6no samples tested from the mound recorded Contaminants of Concern to be below the relevant GAC's indicating the soils were suitable for use within gardens with homegrown produce.
- 3.6 A copy of the letter report and chemical analyses from Sub Surface are included within Appendix 04.
- 3.7 Subsequently, between 17th May and 15th June 2021 approximately 100 tonnes of capping soils, equating to approximately 100m³ to 150m³, depending on bulk density, was imported to site. The delivery dockets for the imported capping soils are presented in Appendix 03.

Capping Validation – Landscaping to Apartments

- 3.8 The capping thicknesses were verified by the formation of hand excavated validation pits across the new landscaped areas by Tyson in June 2021. The validation pits encountered an average of 600mm of capping soils within the landscaped areas around the apartments, reducing to 300mm in the linear strip to the north-west of the car parking spaces on Kingsway and south-east of the pathway on Albert Road. The width of the linear strip and the changes in ground level between Albert Road and the site, resulted in kerblines to limit the depth of excavation for capping soils.
- 3.9 In June 2021 Tyson obtained an additional 4no samples of the imported topsoil and submitted them to the chemical laboratory for a suite of Contaminants of Concern (CoC). Comparison of these results with the screening levels for 'residential gardens with plant uptake' indicates that all of determinants are below the relevant SL's for domestic gardens. No asbestos was recorded within any of the samples tested.
- 3.10 The results of the chemical analyses from Tyson are presented in Appendix 05.

- 3.11 The soft landscaping to the apartments forms a total area of approximately 250m² which based on the estimated thicknesses equates to 135m³ of topsoil. Therefore, the 4no samples (obtained after import) equate to a testing regime of approximately 1 sample per 34m³.
- 3.12 A drawing showing the locations of the validation pits is presented in Appendix 01 with photographs from the groundworker presented within Appendix 02.

Potable Water Supplies

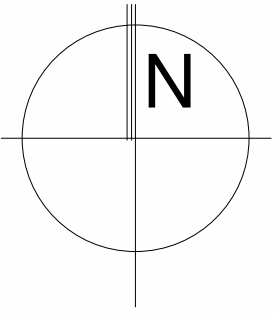
- 3.13 It is understood from Tyson that further to the issue of the appropriate UU Risk Assessment, there were no requirement for specific materials and measures to protect the water supply from ground contamination.

APPENDIX 01

Drawings



○ BOWKER SADLER PARTNERSHIP LIMITED
■ THIS DRAWING IS THE SUBJECT OF COPYRIGHT WHICH VESTS IN BOWKER SADLER PARTNERSHIP LIMITED. IT IS AN INFRINGEMENT OF COPYRIGHT TO REPRODUCE THIS DRAWING, BY WHATEVER MEANS, INCLUDING ELECTRONIC, WITHOUT THE EXPRESS WRITTEN CONSENT OF BOWKER SADLER PARTNERSHIP LIMITED WHICH RESERVES ALL ITS RIGHTS.
BOWKER SADLER PARTNERSHIP LIMITED ASSERTS ITS RIGHTS TO BE IDENTIFIED AS THE AUTHOR OF THIS DESIGN
■ DRAWING NOT TO BE SCALED.
■ REPORT ERRORS & OMISSIONS TO ARCHITECT.
■ CHECK ALL DIMENSIONS ON SITE
■ DRAWING TO BE READ IN CONJUNCTION WITH THE HEALTH AND SAFETY PLAN AND ALL RELEVANT RISK ASSESSMENTS



Schedule of Accomodation

- Flats**
- 26No. 2B4P Apartment
 - 1No. 1B2P Apartment
 - 26 Car parking spaces (100% provision)
- Houses**
- 4No. 4B8P Houses
 - 200% Car parking

Total - 31No. Properties

For details of Landscaping GA refer to Saville Landscape Design drawing numbered 080 02 rev.E.

B	17.08.18	CY	Review of car parking	CL
A	15.08.18	KLM	Updated to suit revised apartment building.	CL

REV.	DATE	DRN.	CHKD.
------	------	------	-------

PROJECT
Kingsway, Manchester

CLIENT
Cube Great Places

DRAWING
Proposed Site Plan

SCALE	SHEET SIZE	DRAWN	CHECKED	DATE
As indicated	@ A1	SW	CL	16.08.17

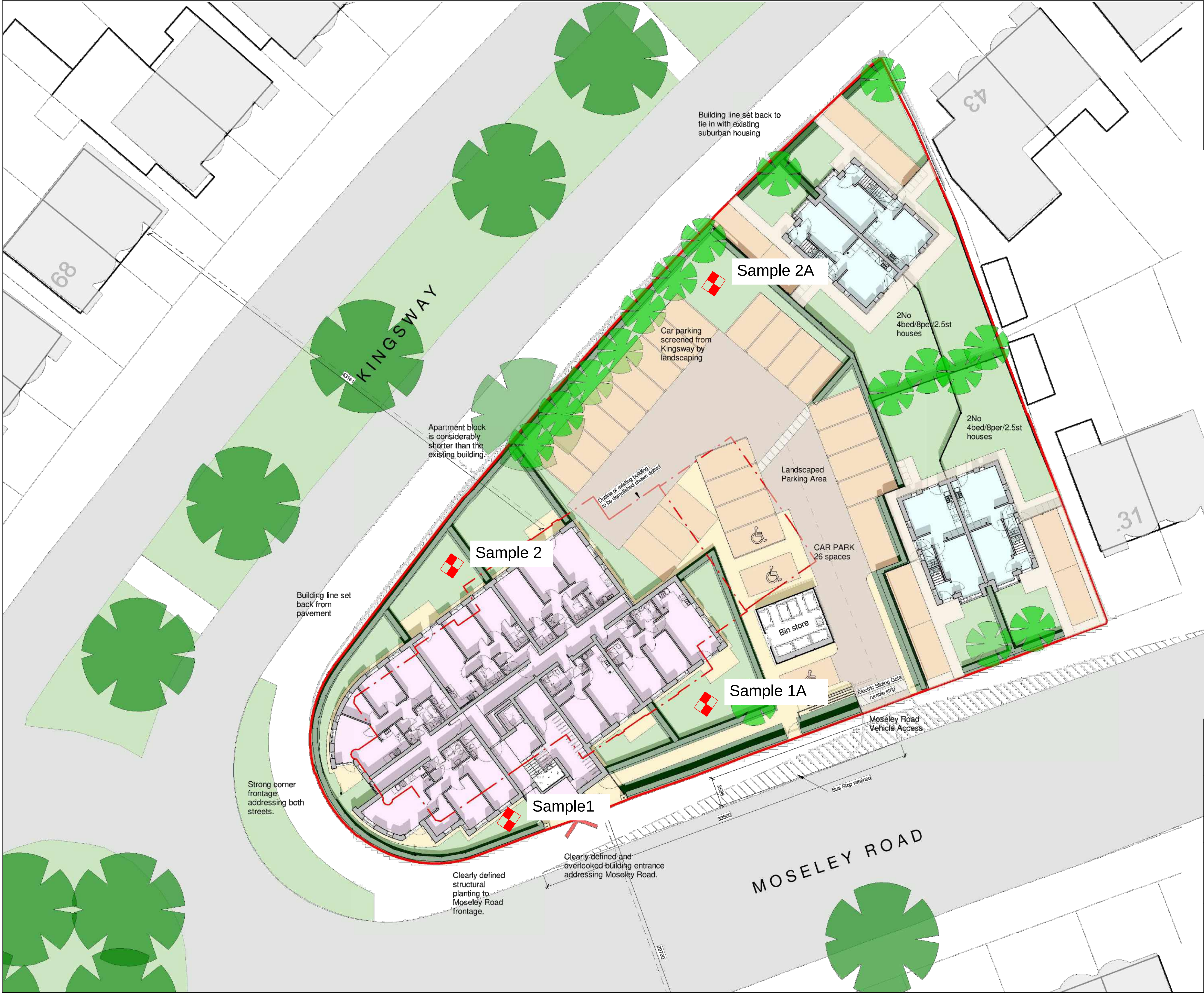
BOWKER SADLER ARCHITECTURE
A: Hatherlow House, Hatherlow, Romiley, Stockport SK6 3DY
T: 0161 406 7333
E: bsp@bowker-sadler.co.uk
W: www.bowker-sadler.co.uk

JOB No	DRAWING No	REVISION
17-068	201	B

STATUS
Tender

Building Information Modeling

Proposed Site Plan
1 : 200



GENERAL NOTES

- 1. DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.
- 2. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.
- 3. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
- 4. THE CONTRACTOR SHALL INCORPORATE ALL THE REQUIREMENTS OF THE PRE-TENDER STAGE HEALTH & SAFETY PLAN.

P1				
Rev.	Amendment	Date	By	Chkd
Project KINGSWAY				
Client TYSON/CUBE GREAT PLACES				
Title VALIDATION PIT LOCATION PLAN				
Drawn SCS	Checked PGD	Date 25-06-21	Scale NTS	
WML CONSULTING Chartered Civil and Structural Engineers No 8 Oak Green Earl Road Stanley Green Business Park Cheadle Hulme Cheshire SK8 6QL Tel 0161 482 0600 Fax 0161 486 9210 e-mail info@wmlconsulting.com www.wmlconsulting.com				
Job No.	8003G	Drawing No.	SK-03-	

APPENDIX 02

Photographs



Photograph 1
Landscaping in the junction of Kingsway and Albert Road.



Photograph 2
Landscaping along Albert Road



Photograph 3
Landscaping to the north-west of the structure on Kingsway.



Photograph 4
Validation Pit 2, located to the north-west of the structure on Kingsway.



Photograph 5
Validation Pit 2.



Photograph 6
Reduced area of thickness to the north-west of the car parking on Kingsway due to linear strip, changes in elevation and street furniture.

APPENDIX 03

Capping Soils Delivery Dockets



GRAB HIRE & CIVILS

Tel: 01253 700401 Mobile: 07754 720056 www.pmggroundworks.co.uk
Highview • Sower Carr Lane • Hambleton • Poulton-Le-Fylde • Lancs • FY6 9DJ

Date: 17/5/21

No. 04706

Customer: TYSON

Delivery Address: KINGSWAY MANCHESTER

Reg No: YJ13 GRF

Trailer:

Loaded at: P.M.S. U/O

Description:

1 (8w) LOAD TOPSOIL

Tonnes:

Gross:

Nett:

Received by:

Print: A NASH

Signed: A CR



GRAB HIRE & CIVILS

Tel: 01253 700401 Mobile: 07754 720056 www.pmggroundworks.co.uk
Highview • Sower Carr Lane • Hambleton • Poulton-Le-Fylde • Lancs • FY6 9DJ

Date: 7-6-21

No. 04773

Customer: TYSON

Delivery Address: KINGSWAY MANCHESTER

Reg No: YJBGRF

Trailer:

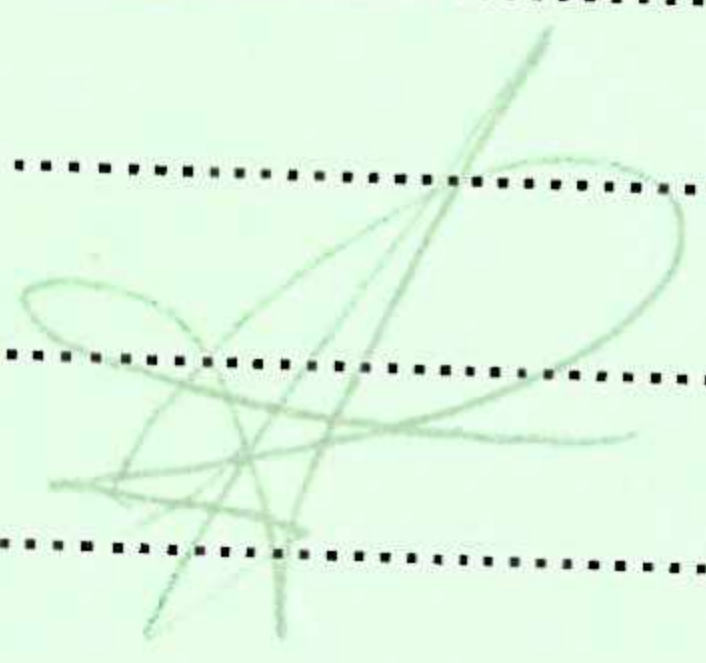
Loaded at: PMG HQ

Description: Soil

Tonnes: 20 TON

Gross:

Nett:

Received by: 

Print:

Signed:



GRAB HIRE & CIVILS

Tel: 01253 700401 Mobile: 07754 720056 www.pmggroundworks.co.uk
Highview • Sower Carr Lane • Hambleton • Poulton-Le-Fylde • Lancs • FY6 9DJ

Date: 10-6-21

Nº. 04776

Customer: TYSON

Delivery Address: KNOXWAY MANCHESTER

Reg No: 4513 GRC

Trailer:

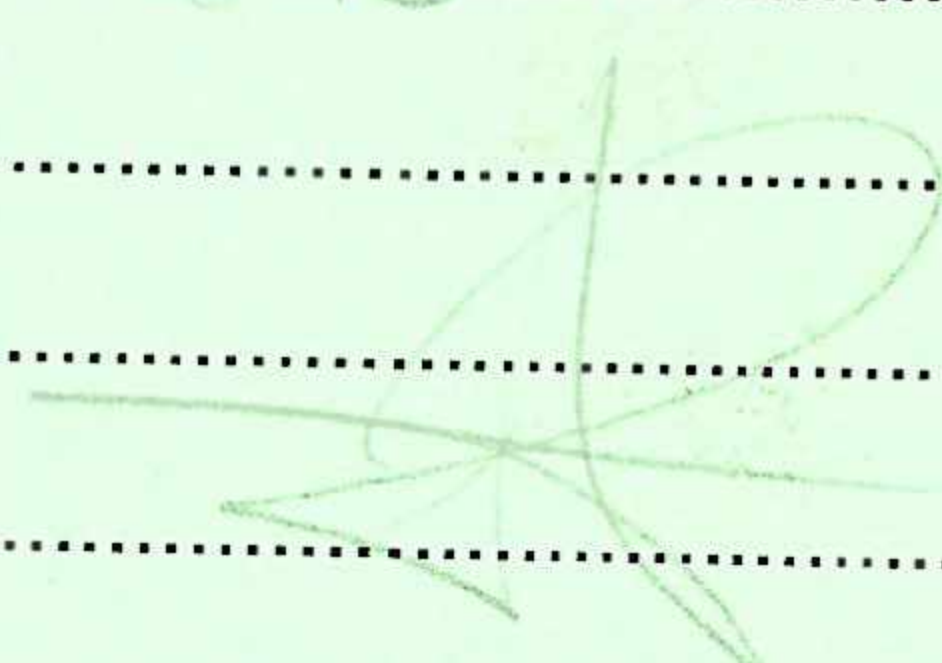
Loaded at: PMG HQ

Description: Soil

Tonnes: 1.1000

Gross:

Nett:

Received by: 

Print:

Signed:



GRAB HIRE & CIVILS

Tel: 01253 700401 Mobile: 07754 720056 www.pmggroundworks.co.uk
Highview • Sower Carr Lane • Hambleton • Poulton-Le-Fylde • Lancs • FY6 9DJ

Date: 14-6-21

No. 04777

Customer: TYSON

Delivery Address: KESSALL MANCHESTER

Reg No: 453 GEF

Trailer:

Loaded at: PMG HQ

Description: Soil

Tonnes: 1 load

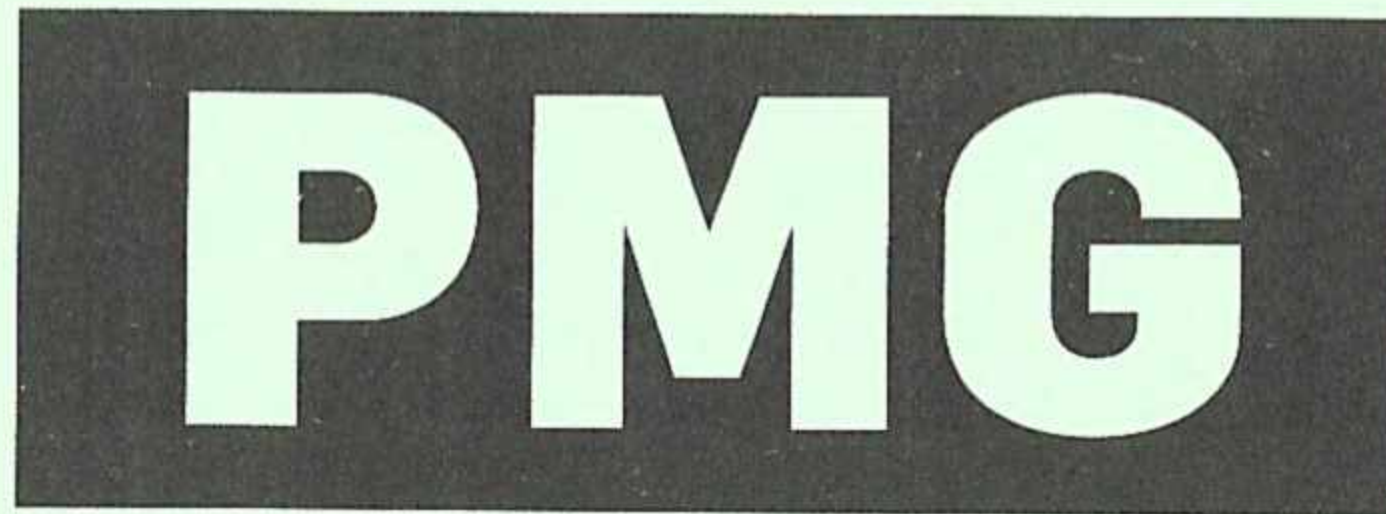
Gross:

Nett:

Received by: 

Print:

Signed:



GRAB HIRE & CIVILS

Tel: 01253 700401 Mobile: 07754 720056 www.pmggroundworks.co.uk
Highview • Sower Carr Lane • Hambleton • Poulton-Le-Fylde • Lancs • FY6 9DJ

Date: 15-6-21

No. 04779

Customer: TYSON

Delivery Address: KINGS WAY MANCHESTER

Reg No: YJ13CRF

Trailer:

Loaded at: PMG HQ

Description: SOIL

Tonnes: 1 LOAD 20 TON

Gross:

Nett:

Received by:

Print:

Signed:

APPENDIX 04

Chemical Analyses from Source– Capping Soils



SUB SURFACE CONSULTANTS

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS



Your ref:

Our ref:

SCB/ 7220

7th May 2021

PM Groundworks Limited,
Highview Farm,
Sower Carr Lane,
Hambleton,
Poulton-le-Fylde,
Lancashire,
FY6 9DJ

Reg. Office

SUB SURFACE CONSULTANTS LTD.
3 PEEL STREET
PRESTON
PR2 2QS

Telephone: 01772-561135

Fax: 01772-204907

e-mail: preston@subsurface.co.uk
www.subsurface.co.uk

For the attention of Ms. Samantha Murro

RE: PM GROUNDWORKS LIMITED, HIGHVIEW FARM, SOWER CARR LANE, HAMBLETON, POULTON-LE-FYLDE, LANCASHIRE, FY6 9DJ

Dear Madam,

This report has been prepared in accordance with an email, dated 16th April 2021, from the Client.

The brief was set out in our estimate, ref. E4901 and dated 15th April 2021, with amendments as the investigation proceeded and includes:

- Six near surface samples of a spoil mound.
- Provision of an contamination analysis interpretative letter report on the above.

Introduction

The site is located at Highview, Sower Carr Lane, Hambleton, Poulton-le-Fylde, Lancashire, as indicated on Figure 1. The approximate National Grid Reference of the centre of the site is 37912, 43634.

As shown on Figure 1, the irregular shaped about 0.006-hectare site is bounded on all sides by the compound, PM Groundworks Limited.

Investigation

Six near surface samples were taken at the positions determined and set out by Sub Surface, as shown on Figure 2 and were logged in accordance with BS EN ISO 14688-1: 2002 and BS EN ISO 14689-1: 2003 and samples were taken for contamination analysis. The log of the sample and photographs of the spoil mound sample locations are appended.

Contamination Analysis and Assessment

Contamination analyses have been performed on six soil samples to determine: pH and concentrations of sulphate, sulphide, cyanide, arsenic, boron (soluble), cadmium, chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, speciated total petroleum hydrocarbons (TPHs), the speciated polynuclear aromatic hydrocarbons (PAHs) suite, the benzene/ ethylbenzene/ toluene/ xylene (BTEX) suite and phenols. In addition, six soil samples were subjected to an asbestos screen. The results of the above analyses are appended. At the outset it should be noted that this contamination investigation is a baseline survey in order to provide a contamination risk assessment to assess whether the material can be re- used on another development site. However, the absence of other specific contaminants cannot be guaranteed.

Levels of the determinants have been compared against the most recently published guideline values. Contaminated Land: Applications in Real Environments (CL:AIRE) published guideline values in December 2009 to supplement previous guideline values. The Department for Environment, Food and Rural Affairs (DEFRA) published in March 2014 Category 4 Screening Levels (C4SLs) for arsenic, cadmium, lead, hexavalent chromium, benzo(a)pyrene and benzene. Land Quality Management Limited (LQM)/ Chartered Institute of Environmental Health (CIEH) then published Suitable for Use Levels (S4ULs) in November 2014, which largely superseded the previous guideline values. Updated S4ULs values for cadmium and phenols were published in July 2015 and for nickel in August 2015. The guideline values (S4ULs and occasionally C4SLs and CL:AIRE) these are derived using the Environment Agency's CLEA Model and vary dependent upon the land use; allotment and residential use being the most sensitive and commercial/ industrial use being the least sensitive.

For the purposes of assessment, as the proposed development/ end use for the spoil is to be used as imported soil, contamination analyses have been compared with the guideline values for a standard land use of residential with plant uptake (with homegrown produce).

The chemical analysis indicates a single slightly elevated level of dibenzo(ah)anthracene from the SP1 sample, when assessed against S4UL levels. Further analysis was subsequently carried out to assess the risk of the elevated result.

TABLE 1 ASSESSMENT OF SOIL CONTAMINATION

Determinant	Expl. Hole No.	Depth (m)	Recorded Level (mg/kg)	Published Guideline Value (mg/kg)
dibenzo(ah)anthracene	SP1	-	0.61	0.30

Copyright: Land Quality Management Limited data reproduced with permission; Publication Number S4UL3114. All Rights Reserved.

Guideline values for the assessment can be supplied directly to the Regulator, if requested.

To assess the polycyclic aromatic hydrocarbon (PAH) contamination the surrogate marker approach has been used. The ratios of the seven genotoxic PAH's (benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(123-cd)pyrene, dibenzo(ah)anthracene and benzo(ghi)perylene) to benzo(a)pyrene, have been determined and compared with the published ratio profile of a coal tar test material (Culp et al in 1998). The comparison indicates that the PAH contamination matches the Culp profile within reasonable bounds (as defined in Defra 2014) allowing the genotoxic PAHs to be assessed against the C4SL for benzo(a)pyrene as a surrogate marker (see appended Benzo(a)pyrene Surrogate Marker Test).

The contamination analysis on the seven genotoxic PAH's determined no elevated levels of the determinants analysed when compared with the C4SL guideline value for benzo(a)pyrene, 5.3mg/kg for a standard land use of residential with plant uptake (with homegrown produce).

Guideline values for the assessment can be supplied directly to the Regulator, if requested.

An asbestos screen was undertaken on six soil samples and no asbestos was detected.

Conclusions and Recommendations

The ground investigation found the spoil mound to comprise of dark brown, slightly gravelly, sandy, slightly clayey silt with occasional rootlets and occasional pockets of clay. Gravel size fragments were fine to coarse of brick and stone. From the chemical analysis undertaken on the six samples, no elevated levels of contaminants were detected, and no asbestos found in the samples as well.

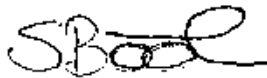
We conclude that the six samples taken around the spoil mound found no elevated levels of the contaminants tested. Consequently, the spoil mound can be considered as clean imported material when used on other sites.

Our recommendation is subject to Local Authority Environmental Health Officers approval.

General

We trust that this letter report fulfils your present requirements but if you have any queries or we can be of further assistance please contact the undersigned or Miss Anna Marsden at our Preston office.

Your faithfully

A handwritten signature in black ink, appearing to read 'S. C. Boot', with a stylized flourish at the end.

S. C. Boot B.Sc.(Hons.), F.G.S.
Geoenvironmental Engineer
For and on behalf of
Sub Surface Consultants Limited



SUB SURFACE

SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907

Photographs

Site: PM GROUNDWORKS LTD, HIGHVIEW FARM, SOWER CARR LANE, HAMBLETON, LANCS, FY6 9DJ

Client: PM GROUNDWORKS LIMITED

Job Number:

7220

Sheet:

1 / 1

Survey Date:

19/04/21

SPOIL MOUND SAMPLE LOCATIONS

1 SP1 AND 2



2 SP2 AND 3



3 SP3

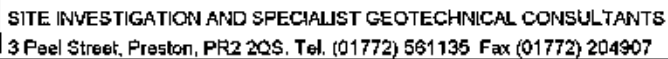


4 SP4



5 SP5 AND 6





D- Disturbed, A- Amber Jar, V- Vial



Final Report

Report No.: 21-12780-1
Initial Date of Issue: 28-Apr-2021
Client Sub Surface
Client Address: 3 Peel Street
Preston
Lancashire
PR2 2QS
Contact(s): Simon Gabbatt
Project 7220 High View Farm, Sower Carr
Lane

Quotation No.: **Date Received:** 21-Apr-2021

Order No.: **Date Instructed:** 21-Apr-2021

No. of Samples: 6

Turnaround (Wkdays): 7 **Results Due:** 29-Apr-2021

Date Approved: 28-Apr-2021

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 7220 High View Farm, Sower Carr Lane

Client: Sub Surface	Chemtest Job No.:					21-12780	21-12780	21-12780	21-12780	21-12780	21-12780
Quotation No.:	Chemtest Sample ID.:					1183335	1183336	1183337	1183338	1183339	1183340
	Client Sample ID.:					740 741 742	736 737 738	732 733 734	728 729 726	724 725 726	720 721 722
	Sample Location:					SP1	SP2	SP3	SP4	SP5	SP6
	Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:					19-Apr-2021	19-Apr-2021	19-Apr-2021	19-Apr-2021	19-Apr-2021	19-Apr-2021
	Asbestos Lab:					COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD							
ACM Type	U	2192		N/A	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	-	-	-
Moisture	N	2030	%	0.020	16	13	18	18	19	18	18
pH	U	2010		4.0	8.7	8.6	8.5	8.4	8.2	8.2	8.2
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.54	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	1.5	5.7	4.1	2.0	2.4	1.5	1.5
Sulphate (Total)	U	2430	%	0.010	0.12	0.14	0.12	0.11	0.14	0.14	0.14
Arsenic	U	2450	mg/kg	1.0	12	13	12	10	16	19	19
Cadmium	U	2450	mg/kg	0.10	0.25	0.24	0.27	0.25	0.34	0.27	0.27
Chromium	U	2450	mg/kg	1.0	20	21	20	19	26	28	28
Molybdenum	U	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	U	2450	mg/kg	0.50	28	50	28	43	35	43	43
Mercury	U	2450	mg/kg	0.10	0.13	0.13	0.14	0.10	0.17	0.14	0.14
Nickel	U	2450	mg/kg	0.50	17	17	18	16	22	24	24
Lead	U	2450	mg/kg	0.50	75	65	67	58	79	63	63
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Zinc	U	2450	mg/kg	0.50	92	90	110	110	120	100	100
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TPH >C6-C10	N	2670	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C21	N	2670	mg/kg	1.0	11	4.8	12	< 1.0	< 1.0	4.7	4.7
TPH >C21-C40	N	2670	mg/kg	1.0	41	14	1700	< 1.0	< 1.0	40	40
Total TPH >C6-C40	U	2670	mg/kg	10	52	19	1800	< 10	< 10	44	44
Naphthalene	U	2700	mg/kg	0.10	0.43	< 0.10	< 0.10	< 0.10	< 0.10	0.76	0.76
Acenaphthylene	U	2700	mg/kg	0.10	0.28	< 0.10	< 0.10	< 0.10	< 0.10	0.21	0.21
Acenaphthene	U	2700	mg/kg	0.10	0.21	< 0.10	< 0.10	< 0.10	< 0.10	0.15	0.15
Fluorene	U	2700	mg/kg	0.10	0.23	< 0.10	< 0.10	< 0.10	< 0.10	0.35	0.35
Phenanthrene	U	2700	mg/kg	0.10	2.2	1.8	1.1	0.96	0.94	1.4	1.4
Anthracene	U	2700	mg/kg	0.10	0.74	0.55	0.28	0.23	0.23	0.38	0.38
Fluoranthene	U	2700	mg/kg	0.10	6.2	3.1	2.5	2.1	1.3	2.0	2.0
Pyrene	U	2700	mg/kg	0.10	5.9	3.3	2.6	2.2	1.5	2.2	2.2
Benzo[a]anthracene	U	2700	mg/kg	0.10	2.7	1.3	1.7	1.4	1.2	1.2	1.2
Chrysene	U	2700	mg/kg	0.10	2.8	1.0	1.6	1.2	1.1	1.2	1.2
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	3.5	2.2	2.0	1.7	1.2	1.4	1.4
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	1.6	1.1	1.1	0.80	0.66	0.87	0.87
Benzo[a]pyrene	U	2700	mg/kg	0.10	2.8	1.8	1.7	1.5	1.1	1.2	1.2
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	1.9	< 0.10	< 0.10	0.90	< 0.10	0.71	0.71

Results - Soil

Project: 7220 High View Farm, Sower Carr Lane

Client: Sub Surface	Chemtest Job No.:					21-12780	21-12780	21-12780	21-12780	21-12780	21-12780
Quotation No.:	Chemtest Sample ID.:					1183335	1183336	1183337	1183338	1183339	1183340
	Client Sample ID.:					740 741 742	736 737 738	732 733 734	728 729 726	724 725 726	720 721 722
	Sample Location:					SP1	SP2	SP3	SP4	SP5	SP6
	Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Date Sampled:					19-Apr-2021	19-Apr-2021	19-Apr-2021	19-Apr-2021	19-Apr-2021	19-Apr-2021
	Asbestos Lab:					COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD							
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.61	< 0.10	< 0.10	0.30	< 0.10	0.26	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	2.1	< 0.10	< 0.10	1.2	< 0.10	1.4	
Total Of 16 PAH's	U	2700	mg/kg	2.0	34	16	15	15	9.2	16	
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Total Phenols	U	2920	mg/kg	0.10	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

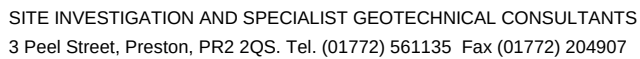
All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

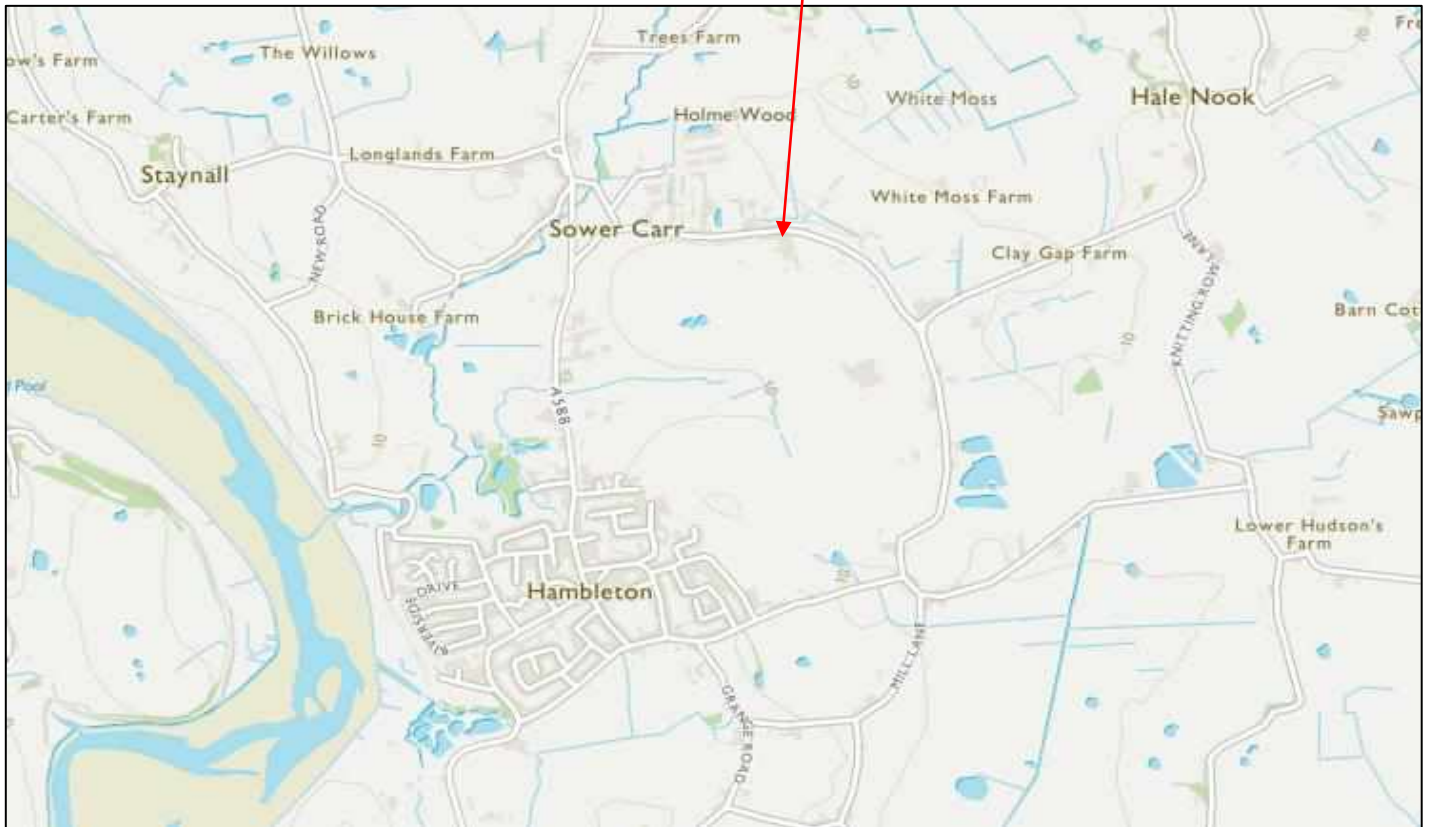
customerservices@chemtest.com



Job Number:
7220

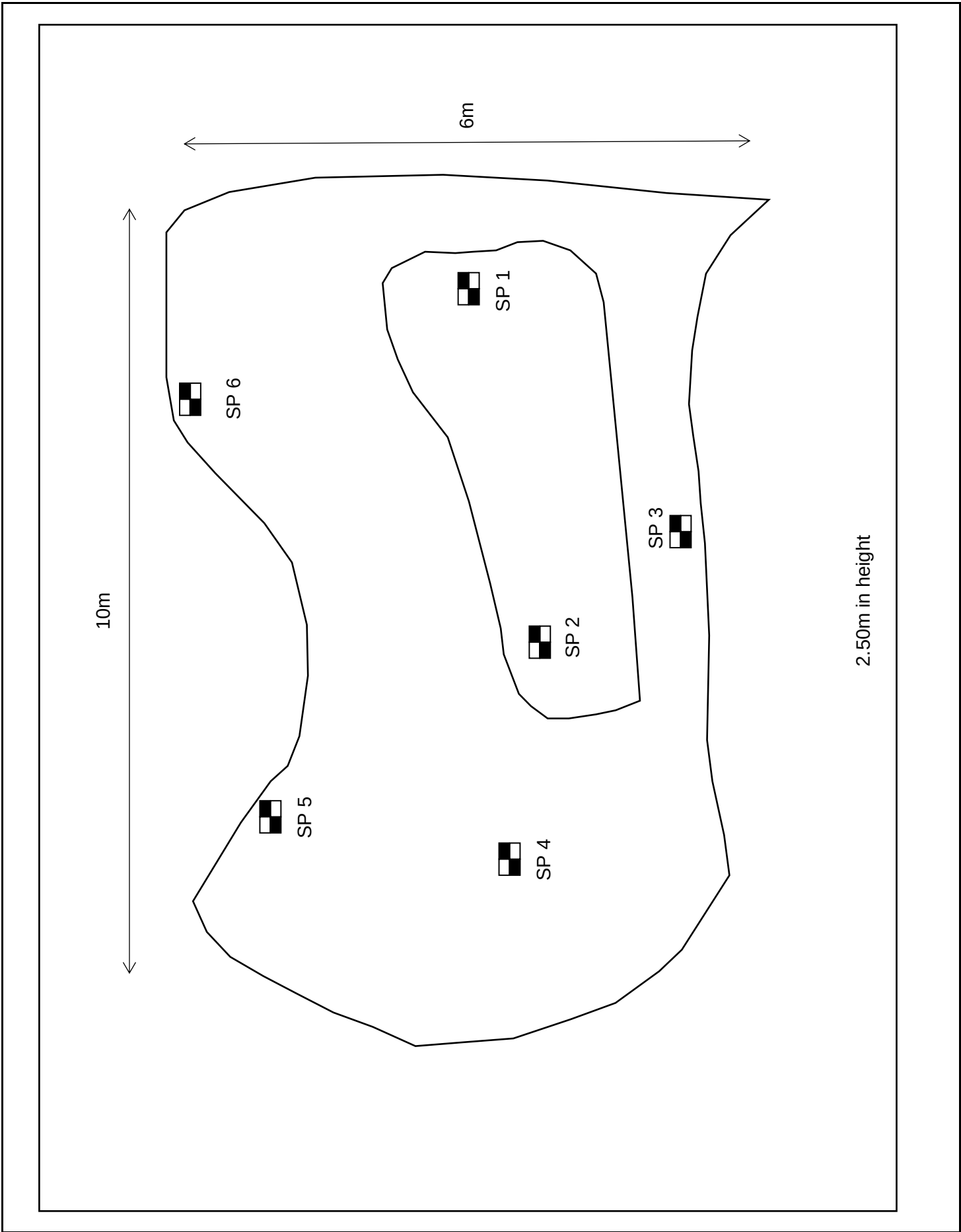
Sheet:
1 / 1

*CULP, S.J., GAYLOR, D.W., SHELDON, W.G. GOLDSTEIN, L.W., BELAND, F.A., 1998. A comparison of the tumors induced by coal tar and benzo(a)pyrene in a 2-year bioassay. Assessed in accordance with Development of Category 4 Screening Levels for assessment of land affected by contamination - SP1010 Appendix E



CROWN COPYRIGHT © REPRODUCED FROM THE ORDNANCE SURVEY WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE. LICENCE NO: 100033464

SS SUB SURFACE SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907	Site Location Plan			
Site: PM GROUNDWORKS LTD, HIGHVIEW FARM, SOWER CARR LANE, HAMBLETON, LANCASHIRE, FY6 9DJ	Date Drawn: 06-May-21	Date Checked:	Orientation: 	Job Number: 7220
Client: PM GROUNDWORKS LIMITED	Drawn By: SCB	Checked By:	Scale: —	Figure Number: 1



SS SUB SURFACE SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907	Spoil Mound Sample Location Plan			
Site: PM GROUNDWORKS LTD, HIGHVIEW FARM, SOWER CARR LANE, HAMBLETON, LANCASHIRE, FY6 9DJ	Date Drawn: 06-May-21	Date Checked:	Orientation:	Job Number: 7220
Client: PM GROUNDWORKS LIMITED	Drawn By: SCB	Checked By:	Scale: -	Figure Number: 2

APPENDIX 05

Chemical Analyses from Site– Capping Soils



Final Report

Report No.:	21-18125-1		
Initial Date of Issue:	04-Jun-2021		
Client	R P Tyson Construction Ltd		
Client Address:	1 Mitcham Road Blackpool FY4 4QN		
Contact(s):	Jordan Whelan		
Project	APC 73939 Kingways Manchester		
Quotation No.:	Q21-24015	Date Received:	26-May-2021
Order No.:		Date Instructed:	28-May-2021
No. of Samples:	4		
Turnaround (Wkdays):	5	Results Due:	04-Jun-2021
Date Approved:	04-Jun-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Soil

Project: APC 73939 Kingways Manchester

Client: R P Tyson Construction Ltd	Chemtest Job No.:				21-18125	21-18125	21-18125	21-18125
Quotation No.: Q21-24015	Chemtest Sample ID.:				1210378	1210379	1210380	1210381
Order No.:	Client Sample Ref.:				1A	1	2A	2
	Sample Location:				1A	1	2A	2
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				4.00	4.00	4.00	4.00
	Bottom Depth (m):				5.00	5.00	5.00	5.00
	Date Sampled:				21-May-2021	21-May-2021	21-May-2021	21-May-2021
	Asbestos Lab:				NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-
Moisture	N	2030	%	0.020	25	24	26	23
pH	U	2010		4.0	7.8	7.9	7.9	7.9
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.087	0.084	0.068	0.049
Arsenic	U	2450	mg/kg	1.0	10	12	7.1	7.8
Beryllium	U	2450	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cadmium	U	2450	mg/kg	0.10	0.30	0.29	0.18	0.23
Chromium	U	2450	mg/kg	1.0	21	21	14	18
Copper	U	2450	mg/kg	0.50	29	28	26	24
Mercury	U	2450	mg/kg	0.10	0.23	0.20	0.13	0.15
Nickel	U	2450	mg/kg	0.50	17	17	11	15
Lead	U	2450	mg/kg	0.50	71	68	44	54
Selenium	U	2450	mg/kg	0.20	< 0.20	0.24	0.21	0.27
Vanadium	U	2450	mg/kg	5.0	14	14	< 5.0	10
Zinc	U	2450	mg/kg	0.50	100	100	70	90
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	1.1	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0

Results - Soil

Project: APC 73939 Kingways Manchester

Client: R P Tyson Construction Ltd	Chemtest Job No.:				21-18125	21-18125	21-18125	21-18125
Quotation No.: Q21-24015	Chemtest Sample ID.:				1210378	1210379	1210380	1210381
Order No.:	Client Sample Ref.:				1A	1	2A	2
	Sample Location:				1A	1	2A	2
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				4.00	4.00	4.00	4.00
	Bottom Depth (m):				5.00	5.00	5.00	5.00
	Date Sampled:				21-May-2021	21-May-2021	21-May-2021	21-May-2021
	Asbestos Lab:				NEW-ASB	NEW-ASB	NEW-ASB	NEW-ASB
Determinand	Accred.	SOP	Units	LOD				
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	1.5	0.98	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	0.56	0.49	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	2.1	1.8	1.9	< 0.10
Pyrene	U	2700	mg/kg	0.10	3.2	1.7	1.8	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	1.0	1.5	< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10	1.9	1.9	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	1.7	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	1.3	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	2.1	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	15	8.4	3.7	< 2.0
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

APPENDIX 06

Assessment Criteria for Capping Soils

Site Specific Assessment Criteria for Residential (with homegrown produce) assuming a 1% SOM for Hydrocarbons

Contaminant	Assessment Criteria for Residential (mg/kg)
Metals	
Arsenic	37
Boron	290
Cadmium	26
Chromium III	910
Chromium VI	6
Copper	2,400
Lead*	200
Mercury	1.2
Nickel	130
Selenium	250
Vanadium	410
Zinc	3,700
Non – Metals	
Phenol	120
Polyaromatic Hydrocarbons (PAH)	
Benz[a]anthracene	7.2
Benzo[a]pyrene	2.2
Benzo[b]fluoranthene	2.6
Benzo[ghi]perylene	320
Benzo[k]fluoranthene	77
Chrysene	15
Dibenz[ah]anthracene	0.24
Fluoranthene	280
Indeno[123-cd]pyrene	27
Naphthalene	2.3
Pyrene	620

Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3240. All rights reserved.

* Where not included in the S4UL's criteria for a limited number of contaminants, namely lead, have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.

Contaminant	Criteria for Residential End Use (mg/kg)
Volatile Organic Compounds (VOCs)	
Benzene	0.087
Ethylbenzene	47
Toluene	130
Xylene	56
1,2-Dichloroethane	0.0071
1,1,1-Trichloroethane	8.8
Tetrachloroethane	1.6
Tetrachloroethene (PCE)	0.18
Tetrachloromethane	0.026
Trichloroethene (TCE)	0.016
Trichloromethane	0.91
Vinyl Chloride	0.00064
Semi-Volatile Organic Compounds (SVOCs)	
1,2-Dichlorobenzene	23
1,4-Dichlorobenzene	61 ^f
1,2,4-Trichlorobenzene	2.6
Hexachlorobenzene	1.8 (0.2) ^{vap}
Total Petroleum Hydrocarbons (TPH)	
Aliphatic C5-6	42
Aliphatic C6-8	100
Aliphatic C8-10	27
Aliphatic C10-12	130(48) ^{vap}
Aliphatic C12-16	1,100(24) ^{sol}
Aliphatic C16-35	65,000(8.48) ^{f, sol}
Aliphatic C35 - 44	65,000(8.84) ^{f, sol}
Aromatic C5 – 7 (benzene)	70
Aromatic C7 – 8 (toluene)	130
Aromatic C8-10	34
Aromatic C10-12	74
Aromatic C12-16	140
Aromatic C16-21	260 ^f
Aromatic C21-35	1,100 ^f
Aromatic C35 - 44	1,100 ^f

Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3240. All rights reserved.

* Where not included in the S4UL's criteria for a limited number of contaminants, namely lead, have been derived by DEFRA in their document entitled SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination, April 2014.