REMEDIATION STRATEGY & VERIFICATION PLAN

of a site at

LAND ON THE EAST SIDE OF NEWPORT ROAD, HAYES, UB4 8JX

for

WESTWAY CONSTRUCTION LTD

Contaminated Land Solutions

t 020 8291 1354 e ask@gosolve.co.uk
4 De Frene Road, London, SE26 4AB

Project No 2077

Report ref: 2077-P3E-1

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Revision:

Document Control		
Revision	**Issue date**	**Reason for Revision**
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A		
B		
C		
D		

CONTENTS

1 EXECUTIVE SUMMARY

The phase 1 environmental report identified potential sources of contamination to include made ground on-site and former site use as a depot, and a potential risk of ground gas from infilled land and ponds. Contamination testing and ground gas monitoring was recommended.

The Phase 2 Environmental Investigation identified exceedances in lead at two sampling locations, when compared against residential without plant uptake assessment criteria. At these levels there is a potential risk to on-site and off-site receptors and appropriate remediation is required.

The gas regime was monitored on the site over three monitoring visits. No flow rate was recorded and the maximum gas concentration was carbon dioxide at 2.2 %v/v. Comparing these results to the NHBC Traffic Lights Gas Risk Assessment, the site classifies as green or Characteristic Situation 1 when compared to the CIRIA C665 guidance. Therefore, gas protection measures are not necessary.

The proposed redevelopment comprises a multi storey block of flats including parking facilities, cycle and bin storage, communal soft landscaping and private external terraces. Access to the property is gained via a dedicated entrance from Newport Road.

Based on information from the previous reports the remedial actions required comprise:

Removal from site of made ground to a depth of 300mm below finished level or to natural stratum in communal soft landscaped areas and 600mm in the private terraces.

An appropriate capping layer including fill and topsoil should be placed between any residual contamination and finished ground levels.

A protecta-line barrier water supply pipe should be installed, unless advised otherwise by the water supplier.

Prior to the removal of any spoil, the WAC testing results should be agreed with the facility to which the spoil is being transported, and if any additional testing is required, this should be completed. It is critical that the WAC results are representative of the material to be disposed of and therefore care must be taken to ensure that different materials are not mixed. Guidance can be obtained from Environment Agency document Waste Sampling and Testing for Disposal to Landfill.

Records will need to be retained and collated and a verification report prepared on completion of the remediation works.

It is considered that provided the recommendations of this report are implemented that the risk to sensitive receptors will be reduced to an acceptable level for the proposed development.

Risk Summary

Very Low	Low	Moderate / Low	Moderate	High

		Receptors					
		Site Users	Ground Workers	Neighbours	Proposed Building	Aquifer	Watercourse
Sources	Made ground on-site and former site use as a depot (Lead) (On Site)						

2 BRIEF

Mr Jazz Lall of The Property Planner, acting on behalf of Westway Construction Ltd, requested GO Contaminated Land Solutions to develop a remediation strategy for a site at Land On The East Side Of Newport Road, Hayes, UB4 8JX.

This report should be read in conjunction with the following GO Contaminated Land Solutions Reports:

- Phase 2 geo-environmental investigation, ref: 2077-P2GE-1, issued August 2021

3 PRINCIPLES OF REMEDIATION

The principles of the strategy are to:

Provide a barrier in order to remove the pathway between any residual contamination and site users.

Demonstrate that all made ground from areas where soft landscaping are proposed has been removed to at least 300mm or to natural ground.

Install appropriate water supply pipe.

4 PREVIOUS CONTAMINATION TESTING

The Phase 2 Environmental Investigation identified exceedances in lead at two sampling locations, when compared against residential without plant uptake assessment criteria. At these levels there is a potential risk to on-site and off-site receptors and appropriate remediation is required.

The gas regime was monitored on the site over three monitoring visits. No flow rate was recorded and the maximum gas concentration was carbon dioxide at 2.2 %v/v. Comparing these results to the NHBC Traffic Lights Gas Risk Assessment, the site classifies as green or Characteristic Situation 1 when compared to the CIRIA C665 guidance. Therefore, gas protection measures are not necessary.

5 PROPOSED DEVELOPMENT

The proposed redevelopment comprises a multi storey block of flats including parking facilities, cycle and bin storage, communal soft landscaping and private external terraces. Access to the property is gained via a dedicated entrance from Newport Road.

6 CONCEPTUAL MODEL

The legislative framework for the regulation of contaminated land is embodied in Part IIA of the Environmental Protection Act 1990, implemented in the Contaminated Land (England) Regulations 2000. This legislation allows for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment. The approach adopted by UK contaminated land policy is that of "suitability for use" which implies that the land should be suitable for its current use and made suitable for any proposed future use.

In this contamination assessment the site has been modelled using the Source-Pathway-Receptor approach to produce a site specific conceptual model.

Source - substances or potential contaminants which may cause harm

Pathway - a linkage or route between a source and receptor
Receptor - humans, plant life, groundwater etc., which could be harmed

by a contaminant

Geological records indicate that the site is underlain by an aquifer in the superficial stratum and therefore there is a potential for contaminants to be transported both to and from site in the groundwater.

From the information available at present a conceptual model has been considered.

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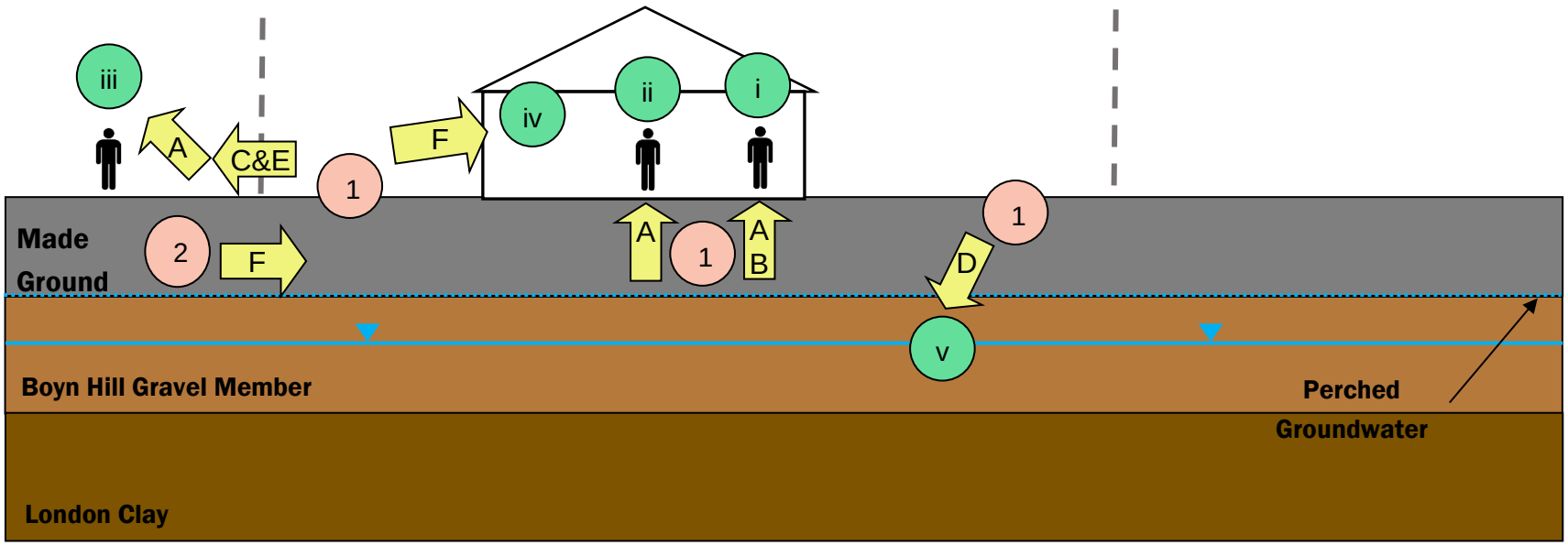
		POTENTIAL PATHWAYS											COMMENTS ON DISCOUNTED PATHWAYS	
		Inhalation of contaminated vapour	Inhalation of contaminated dust	Direct Soil Ingestion	Direct dermal contact	Inhalation of asbestos	Drinking contaminated water supply	Direct contact of soil with building materials	Surface water run-off	Surface water percolation to	Migration via groundwater	Build-up of ground gas - methane		
RECEPTORS	Site Users/ Residents	N	Y	N	Y	N	Y					N	Lead only exceedance identified, therefore vapour pathway no longer considered. No asbestos identified in any of the samples	No significant ground gas volume or flow rate detected
	Construction/ Maintenance Operatives	N	Y	Y	Y	N						N		
	Neighbours	N	Y			N			Y		Y	N		
	Proposed Building							N				N	Ground conditions assessed. design sulphate class for this site is DS-1, with an ACEC class of AC-1	
	Watercourse								N		N		No watercourse of potential significance identified	
	Aquifer									Y				

Schematic Conceptual Model



Sources	Pathways	Receptors
1 Made ground on-site and former site use as a depot (On Site)	A Inhalation, ingestion, dermal contact	i Residents & Site User
2 Infilled land and ponds (Off Site)	B Drinking contaminated water supply	ii Ground Workers
	C Surface water run-off	iii Neighbours
	D Surface water percolation to groundwater	iv Proposed Building
	E Migration via groundwater	v Groundwater (Secondary A Aquifer)
	F Vertical and lateral migration of soil gases	

7 RISK ASSESSMENT

The level of information provided by the previous reports, together with the other information within the report is considered suitable to provide the data for a satisfactory risk assessment for the site. While there will always be uncertainties due to known or unknown gaps in information it is considered that sufficient information is available to reduce those uncertainties to within acceptable limits for the nature of the site under review.

An asbestos survey of existing structures and infrastructure (as defined under Section 5(a) of the Control of Asbestos Regulations 2012) was beyond the brief of this report. The risk assessment has been undertaken on the basis that should asbestos be identified within buildings or infrastructure, these materials will be removed appropriately by licensed contractors and asbestos materials disposed of in accordance with legal requirements prior to demolition or other works in order to avoid contaminating soils at the site.

Only contaminants identified to exceed the environmental screening level have been included in the Risk Assessment.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Made ground on-site and former site use as a depot (On Site)	Lead	Site Users	Dermal contact	Mild	Likely	Moderate/Low risk	Remediation of areas of soft landscaping.
			Soil Ingestion	Mild	Low likelihood	Low risk	
			Inhalation of contaminated dust	Mild	Likely	Moderate/Low risk	
			Drinking of water from supply impacted by contaminated soil	Mild	Likely	Moderate/Low risk	A barrier water supply pipe may be required by water supply company. It is recommended that this report is provided to the water supplier with a request for the testing, if any, that they require.
Made ground on-site and former site use as a depot (On Site)	Lead	Ground Workers	Dermal contact	Mild	Likely	Moderate/Low risk	Information to be contained in site Health & Safety Plan and File. Use of appropriate PPE and normal good hygiene measures. Appropriate dust control measures during construction.
			Soil Ingestion	Mild	Low likelihood	Low risk	
			Inhalation of contaminated dust	Mild	Likely	Moderate/Low risk	

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Made ground on-site and former site use as a depot (On Site)	Lead	Neighbours	Inhalation of contaminated dust (during construction)	Mild	Likely	Moderate/Low risk	Appropriate dust control measures during construction.
			Inhalation of contaminated dust (after construction)	Mild	Likely	Moderate/Low risk	Remediation of areas of soft landscaping.
			Surface water run-off	Mild	Low likelihood	Low risk	No action required.
			Lateral migration of groundwater transporting contaminants	Mild	Low likelihood	Low risk	No action required.

Sources	Potential pollutant	Receptor	Pathway	Hazard severity	Likelihood of occurrence	Risk / Significance	Comment & control measures
Made ground on-site and former site use as a depot (On Site)	Lead	Aquifer	Vertical percolation to groundwater via Foundations	Mild	Low likelihood	Low risk	No action required.
			Vertical percolation to groundwater via soft landscaped and permeable areas	Mild	Low likelihood	Low risk	No action required.
			Percolation to groundwater via SuDS	Mild	Low likelihood	Low risk	No action required.

Any visual or olfactory evidence of contamination noted during works should be investigated by a suitably qualified person and their recommendations implemented.

8 SITE WORKS

8.1 Excavation Arisings

Spoil removed from the site should be taken to an appropriate land fill facility.

If any potentially contaminated spoil is to be removed from site, the Waste Acceptance Criteria (WAC) testing should be agreed with the facility to which the spoil is being transported. It is critical that the WAC results are representative of the material to be disposed of and therefore care must be taken to ensure that different materials are not mixed. Guidance can be obtained from Environment Agency document *Waste Sampling and Testing for Disposal to Landfill*.

8.2 Soft Landscaping

In terms of human health for residents provision of a simple cover system comprising a layer of clean topsoil in soft landscaped areas should be sufficient to provide a reduction of the hazard to human health and to provide a suitable medium for plant growth.

In areas of soft landscaping, including communal areas and the minimal areas of soft landscaping in the private terrace areas, a barrier should be placed between site users and any made ground, in the form of 300mm of clean soil in communal soft landscaped areas and 600mm in the private terraces.

Where the depth of made ground is less than the depth as specified above it is not necessary to remove the underlying stratum.

Clean soil free from invasive plants and complying with the relevant criteria, refer to appendix D, shall be used to replace excavated material and bring the soft landscaping up to finished level. Assessment levels used should be for residential without plant uptake.

Care should be taken when importing soils and aggregates as asbestos is a common contaminant, even in certified materials.

8.3 External Permeable Hardstanding

The pavement construct shall be a minimum of 300mm in order to provide a suitably robust barrier between any remaining potentially contaminated made ground and site users.

8.4 External Impermeable Hardstanding

Underlying made ground can remain on the site. The pavement construct shall be a minimum of 300mm in order to provide a suitably robust barrier between any remaining potentially contaminated made ground and site users.

8.5 Site Boundaries

Around the site perimeter where it is not practicable to remove soil to a depth of 300mm due to risk of instability of neighbouring structures, walls or fences, the ground should be excavated down to level with the underside of the foundation and then battered at a slope of one in three down to 300mm below proposed finished level (refer to appendix F). In the case of shallow fence posts additional temporary support should be provided to permit excavation to reach the specified depth.

8.6 Water Supply

Appropriate water supply pipe should be installed in accordance with the requirements of the water supplier. Unless confirmation is received from the water supplier that a standard pipe is suitable protecta-line barrier pipe should be used.

8.7 Watching Brief

Soil contamination sampling was undertaken across the site, sufficient to ensure an acceptable level of certainty of the nature of the made ground.

A watching brief is to be maintained by a suitably experience person during ground works with instructions to advise GO Contaminated Land Solutions Ltd should any made ground appear to vary significantly from the soil sampled and tested.

If any potential contamination is identified works must be stopped and GO Contaminated Land Solutions Ltd advised. Works must not recommence until further investigation has been completed and if required a revised remediation strategy has been produced to remediate the impacted area.

9 VERIFICATION PLAN

In order to demonstrate that the made ground within the soft landscape area has been removed to a depth of 300mm or to natural strata, photographs will be taken of the proposed soft landscaped areas following removal of made ground.

Test certification for any proposed fill, demonstrating compliance with the requirements of section 8.2, is to be obtained prior to importation, the list of determinands is provided in appendix D. Documentation such as purchase records to confirm the volume of imported material is also to be provided.

After placing of the topsoil verification samples will be taken and tested. The clean fill for gardens and landscaped areas should comply with the requirements set out in appendix D.

Four verification pits will be excavated to a minimum depth of 300mm to confirm the thickness of the capping layer.

Documentation to demonstrate that the correct grade of pipe has been installed will be provided.

An indicative plan of the proposed sample locations and verification pits is contained in appendix B. The actual locations will be determined during the verification visit.

10 DUTY OF CARE DOCUMENTATION

A full record of "Duty of Care" documentation must be retained and a copy provided to GO Contaminated Land Solutions. This will include Waste Transfer Notes (WTN) and for hazardous waste, a Consignment Note, also tickets from the landfill confirming receipt at their facility.

Documentation must be provided to demonstrate compliance of imported fill with the criteria in appendix D.

11 CONCLUSIONS

11.1 The phase 1 environmental report identified potential sources of contamination to include made ground on-site and former site use as a depot, and a potential risk of ground gas from infilled land and ponds. Contamination testing and ground gas monitoring was recommended. The Phase 2 Environmental Investigation identified exceedances in lead at two sampling locations, when compared against residential without plant uptake assessment criteria. At these levels there is a potential risk to on-site and off-site receptors and appropriate remediation is required.

11.2 Provision of a barrier of clean soil in soft landscaped areas, will ensure the risk to site residents and potential off-site receptors will be reduced to an acceptable level for the proposed residential end use. The barrier of clean soil should be 300mm in communal soft landscaped areas and 600mm in the private terraces.

11.3 A water supply pipe should be installed in accordance with the requirements of the water supplier. Unless confirmation is received from the water supplier that a standard pipe is suitable protecta-line barrier pipe should be used.

11.4 If any potentially contaminated material is to be removed from site, the Waste Acceptance Criteria (WAC) testing should be agreed with the facility to which the spoil is being transported.

11.5 It is recommended that appropriate dust control measures are implemented during construction. To assist in establishing what would be appropriate reference should be made to the Institute of Air Quality Management report entitled: *Guidance on the assessment of dust from demolition and construction*, version 1.1.

11.6 If any unexpected contamination encountered during development (eg discoloured soil or odours or buried waste), then all works should be stopped and be investigated by a suitably qualified person and their recommendations implemented. Council should be notified and any additional remediation requirements agreed in writing before any works recommence.

11.7 Therefore if the strategy recommended herein is adopted the risk to site users and potential off site receptors will be reduced to an acceptable level for the proposed residential end use.

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Appendix A – Site Location Plan

SITE LOCATION PLAN

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SITE APPLICATION BOUNDARY

EXISTING SURROUNDING BUILT CONTEXT

Drawing / Project Number
PR47.01

Drawing Revision Letter

Revision Notes & Dates

Project Title
Proposed New Build Apartments at Newport Road, Hayes

Client Details
Bugler Homes

Drawing Title
Site Location Plan

Drawn
On Architecture

Date
24.04.2018

Scale
1:1250 @ A4

PROPOSED NEW BUILD APARTMENTS AT NEWPORT ROAD, HAYES

Site Location Plan

ON ARCHITECTURE

The Old Brewery Business Centre
75 Stour Street,
Canterbury,
CT1 2NR

info@onarchitecture.co.uk
onarchitecture.co.uk
01227 634334

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Appendix B – Indicative Sample Location Plan

V Verification sampling locations

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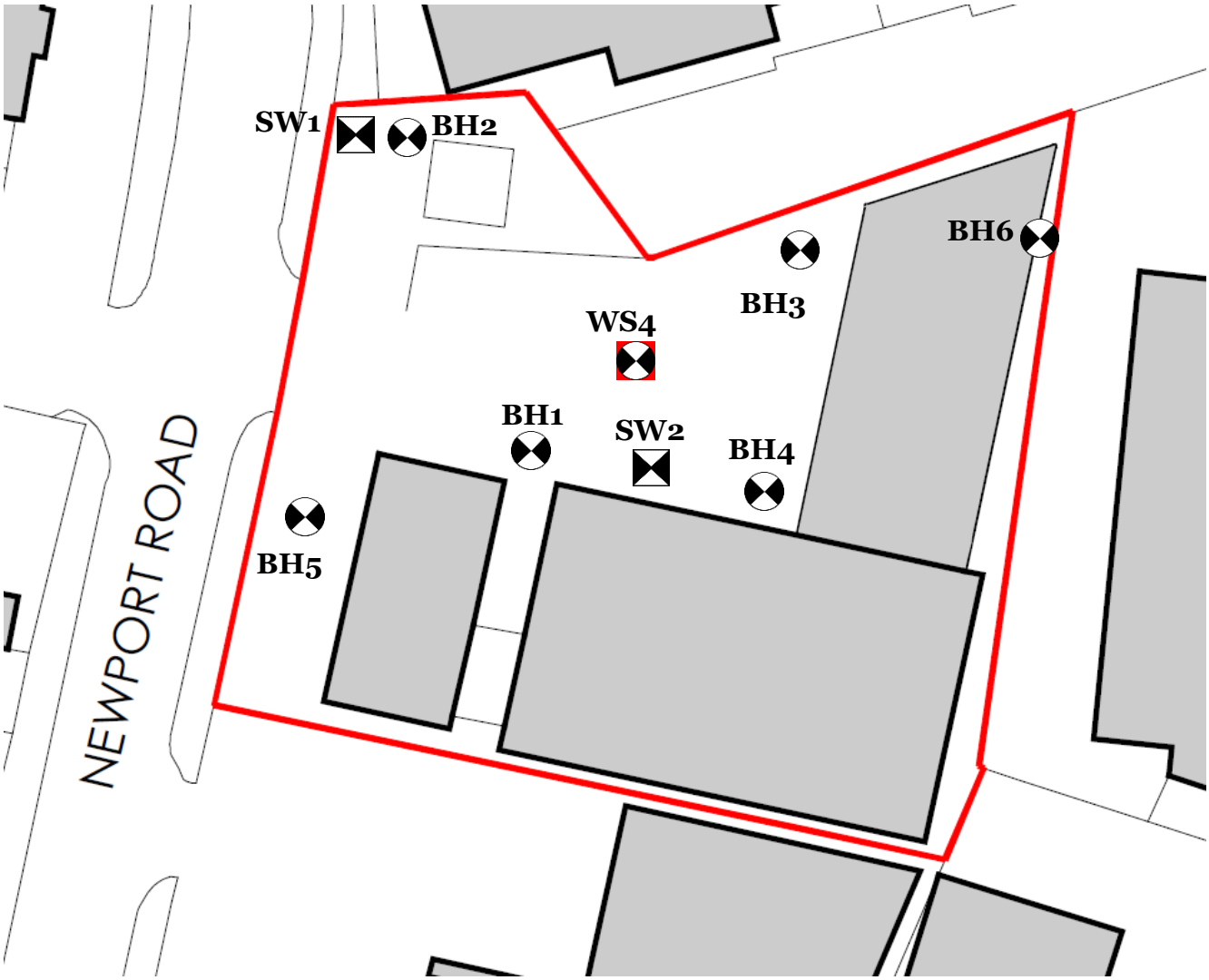
Appendix C – Previous Contamination Testing and Gas Monitoring


SW1
BH2
BH6
BH3
WS4
BH1
SW2
BH4
BH5
NEWPORT ROAD
Sampling locations
Percolation test locations
BH from unknown previous investigation

FASTRACK	Fastrack Site Investigations Ltd Unit 9, Tyndales Farm Southend Road Maldon CM9 6TQ	Borehole Log	Borehole No. **BH1** Sheet 1 of 1

Project Name:	2077	Project No. 22399	Site Date:	11/05/2021	Hole Type BH
Location:	Newport Road, Hayes, London UB4 8JX				Scale 1:75
Client:	GO Contaminated Land Solutions Ltd				Logged By SE1

Water Strikes	Sample and In Situ Testing			Depth (m)	Legend	Stratum Description
	Depth (m)	Type	Results			
				0.03		Reinforced CONCRETE Brick and Hardcore/Rubble FILL
	1.00	D		1.00		Mid Brown Clayey SAND & GRAVEL. Gravel is Flint
	1.50	SPT	N = 54			
	2.00	D				
▼	3.00	D SPT	N = 42			*Water Strike noted at 3.80m*
	4.00	D				
	4.50	SPT	N = 10	4.50		Mid Brown Silty Sandy CLAY containing occasional Gravel. Gravel is Flint
	5.00	D				
	6.00	D SPT	N = 16	6.00		Dark Brown/Blue Silty CLAY
	7.00	D				
	7.50	SPT	N = 31			
	8.00	D				
	9.00	D SPT	N = 21			
	10.00	D				
	10.50	SPT	N = 22			
	11.00	D				
	12.00	D SPT	N = 23			
	13.00	D				
	13.50	SPT	N = 26			
	14.00	D				
	14.55	SPT	N = 27			
	15.00	D		15.00		End of Borehole at 15.000m

Key: D - Disturbed Sample V - Insitu Vane Test MP - Mackintosh Probe Test

Remarks: Borehole closed at 15.00m.
Borehole noted to contain standing water at 3.20m below ground level. No Roots noted.

AGS

FASTRACK	Fastrack Site Investigations Ltd Unit 9, Tyndales Farm Southend Road Maldon CM9 6TQ	Borehole Log	Borehole No. **BH2** Sheet 1 of 1

Project Name:	2077	Project No. 22399	Site Date:	11/05/2021	Hole Type BH
Location:	Newport Road, Hayes, London UB4 8JX				Scale 1:30
Client:	GO Contaminated Land Solutions Ltd				Logged By SE1

Water Strikes	Sample and In Situ Testing			Depth (m)	Legend	Stratum Description
	Depth (m)	Type	Results			
				0.15		CONCRETE
						Mid Brown Sandy CLAY containing Brick fragments and Gravel. Gravel is Flint (MADE GROUND)
				0.70		Orange/Brown Clayey SAND & GRAVEL. Gravel is Flint
	1.00	D	MP = 52/75mm MP = 48/75mm MP = 49/75mm MP = 54/75mm			
	2.00	D	MP = 62/75mm MP = 68/75mm MP = 71/75mm MP = 73/75mm			
▼	3.00	D	MP = 81/75mm MP = 86/75mm MP = 85/75mm MP = 94/75mm			*Water Strike noted at 3.10m*
	4.00	D	MP = 88/75mm MP = 96/75mm MP = 92/75mm MP = 97/75mm			
				4.70		Mid Brown Silty Sandy CLAY containing occasional Gravel. Gravel is Flint
	5.00	D	V (kPa) = 140	5.00		End of Borehole at 5.000m

Key: D - Disturbed Sample V - Insitu Vane Test MP - Mackintosh Probe Test

Remarks: Borehole closed at 5.00m.
Borehole noted to contain standing water at 2.60m below ground level. No Roots noted.

AGS

FASTRACK	Fastrack Site Investigations Ltd Unit 9, Tyndales Farm Southend Road Maldon CM9 6TQ	Borehole Log	Borehole No. **BH3** Sheet 1 of 1

Project Name: 2077	Project No. 22399	Site Date: 11/05/2021	Hole Type BH
Location:	Newport Road, Hayes, London UB4 8JX		Scale 1:30
Client:	GO Contaminated Land Solutions Ltd		Logged By SE1

Water Strikes	Sample and In Situ Testing			Depth (m)	Legend	Stratum Description
	Depth (m)	Type	Results			
				0.15		CONCRETE
				0.30		Brick and Hardcore/Rubble FILL
						Mid Brown Sandy CLAY containing Brick fragments and Gravel. Gravel is Flint (MADE GROUND)
				0.60		Orange/Brown Clayey Sandy GRAVEL. Gravel is Flint
	1.00	D	MP = 68/75mm MP = 66/75mm MP = 69/75mm MP = 74/75mm			
	2.00	D	MP = 46/75mm MP = 48/75mm MP = 54/75mm MP = 66/75mm	2.00		Orange Clayey SAND containing Gravel. Gravel is Flint
▼	3.00	D	MP = 58/75mm MP = 64/75mm MP = 69/75mm MP = 66/75mm			*Water Strike noted at 3.30m*
	4.00	D	MP = 42/75mm MP = 46/75mm MP = 43/75mm MP = 40/75mm	4.00		Grey Silty Sandy CLAY containing Gravel. Gravel is Flint
	5.00	D	V (kPa) = 130 V (kPa) = 140	5.00		End of Borehole at 5.000m

Key: D - Disturbed Sample V - Insitu Vane Test MP - Mackintosh Probe Test

Remarks: Borehole closed at 5.00m. Standpipe installed to 4.00m.
Borehole noted to contain standing water at 2.60m below ground level. Standing Water noted at 2.20m below ground level after 2 hours. No Roots noted.

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FASTRACK	Fastrack Site Investigations Ltd Unit 9, Tyndales Farm Southend Road Maldon CM9 6TQ	Borehole Log	Borehole No. **BH4** Sheet 1 of 1

Project Name:	2077	Project No. 22399	Site Date:	11/05/2021	Hole Type BH
Location:	Newport Road, Hayes, London UB4 8JX				Scale 1:30
Client:	GO Contaminated Land Solutions Ltd				Logged By SE1

Water Strikes	Sample and In Situ Testing			Depth (m)	Legend	Stratum Description
	Depth (m)	Type	Results			
				0.15		CONCRETE
						Mid Brown Sandy CLAY containing Brick fragments and Gravel. Gravel is Flint (MADE GROUND)
				0.70		Orange/Brown Clayey Sandy GRAVEL. Gravel is Flint
	1.00	D	MP = 46/75mm MP = 49/75mm MP = 54/75mm MP = 59/75mm			
				1.60		Orange/Brown Clayey SAND containing Gravel. Gravel is Flint
	2.00	D	MP = 78/75mm MP = 79/75mm MP = 86/75mm MP = 90/75mm			
				2.60		Orange Clayey Sandy GRAVEL. Gravel is Flint
▼	3.00	D	MP = 78/75mm MP = 84/75mm MP = 86/75mm MP = 91/75mm			*Water Strike noted at 3.20m*
	4.00	D	MP = 86/75mm MP = 84/75mm MP = 94/75mm MP = 100/50mm			
				4.80		Mid Brown Silty Sandy CLAY containing Gravel. Gravel is Flint
	5.00	D	V (kPa) = 140	5.00		End of Borehole at 5.000m

Key: D - Disturbed Sample V - Insitu Vane Test MP - Mackintosh Probe Test

Remarks: Borehole closed at 5.00m. Standpipe installed to 4.00m.
Borehole noted to contain standing water at 2.70m below ground level. Standing Water noted at 2.20m below ground level after 4 hours. No Roots noted.

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FASTRACK	Fastrack Site Investigations Ltd Unit 9, Tyndales Farm Southend Road Maldon CM9 6TQ	Borehole Log	Borehole No. **BH5** Sheet 1 of 1

Project Name:	2077	Project No. 22399	Site Date:	11/05/2021	Hole Type BH
Location:	Newport Road, Hayes, London UB4 8JX				Scale 1:30
Client:	GO Contaminated Land Solutions Ltd				Logged By SE1

Water Strikes	Sample and In Situ Testing			Depth (m)	Legend	Stratum Description
	Depth (m)	Type	Results			
				0.15		CONCRETE
						Mid-Dark Brown Silty Sandy CLAY containing Brick fragments (MADE GROUND)
				0.70		Mid Brown Clayey SAND & GRAVEL. Gravel is Flint
	1.00	D	MP = 50/75mm MP = 56/75mm MP = 58/75mm MP = 57/75mm			
	2.00	D	MP = 72/75mm MP = 76/75mm MP = 84/75mm MP = 81/75mm			
▼	3.00	D	MP = 84/75mm MP = 88/75mm MP = 92/75mm MP = 91/75mm			*Water Strike noted at 3.10m*
	4.00	D	MP = 76/75mm MP = 74/75mm MP = 89/75mm MP = 94/75mm			
	5.00	D	V (kPa) = 140	4.95 5.00		Mid Brown Silty Sandy CLAY containing Gravel. Gravel is Flint End of Borehole at 5.000m

Key: D - Disturbed Sample V - Insitu Vane Test MP - Mackintosh Probe Test

Remarks: Borehole closed at 5.00m. Standpipe installed to 4.00m.
Borehole noted to contain standing water at 2.10m below ground level. Standing Water noted at 2.10m below ground level after 1 hour. No Roots noted.

AGS

GO Contaminated Land Solutions
4 De Frene Rd
London, SE26 4AB
Tel.: 020 8291 1354
Email: askgo@gosolve.co.uk
Web: www.gosolve.co.uk

BOREHOLE/TRIAL PIT LOG

Project	Newport Road, Hayes					Project No.	2077	
Client						Survey date:	11/05/21	

Log ID BH6 Hole type: BH

Water Strikes	Samples Type	Samples depth (m)	Level (m OD)	Depth (m)	Legend	Stratum Description and Observations	Depth (m)
						MADE GROUND Light Brown Stoney, Sandy Topsoil containing brick and concrete	-0.10
				0.20			-0.20
	C	0.2 - 0.5				MADE GROUND Dark Brown Sandy Subsoil containing brick and concrete fragments	-0.30 -0.40 -0.50
				0.60		Borehole Terminated	-0.60 -0.70 -0.80 -0.90 -1.00 -1.10 -1.20 -1.30 -1.40 -1.50 -1.60 -1.70

▽ Water strike

Remarks: Groundwater not noted during excavations. No visual or olfactory evidence of contamination noted.

Key: C - Contamination sample W - Water sample P - PID test

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GROUNDWATER & GAS MONITORING RESULTS

Project Number	**2077**
Project Name	**Newport Road, Hayes**

BH ref	Date	Time	Weather	Borehole Pressure (mb)	Flow Rate (l/hr)	Methane (%)		Methane LEL (%)		Oxygen (%v/v)		Carbon dioxide (%)		Ground water level (m)
						Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	
BH3	27/05/21	08:10	Sunny and Dry	1013	0.0	0.0	0.0	n/a	n/a	20.8	21.2	0.0	0.0	1.95
	03/06/21	08:20	Sunny and Dry	1011	0.0	0.0	0.0	n/a	n/a	21.1	21.1	0.2	0.0	2.32
	23/06/21	07:45	Sunny and Mild	1017	0.0	0.0	0.0	n/a	n/a	17.9	20.7	2.0	0.1	2.45
BH4	27/05/21	08:00	Sunny and Dry	1013	0.0	0.0	0.0	n/a	n/a	20.9	21.0	0.5	0.0	2.30
	03/06/21	08:10	Sunny and Dry	1011	0.0	0.0	0.0	n/a	n/a	20.1	20.8	0.6	0.1	2.00
	23/06/21	07:30	Sunny and Mild	1018	0.0	0.0	0.0	n/a	n/a	20.1	20.8	0.1	0.1	Dry
BH5	27/05/21	08:20	Sunny and Dry	1013	0.0	0.0	0.0	n/a	n/a	21.1	21.1	0.0	0.0	2.00
	03/06/21	08:30	Sunny and Dry	1011	0.0	0.0	0.0	n/a	n/a	21.1	21.2	0.0	0.0	2.20
	23/06/21	07:50	Sunny and Mild	1017	0.0	0.0	0.0	n/a	n/a	20.5	20.9	0.1	0.1	Dry
WS4	23/06/21	07:40	Sunny and Mild	1018	0.0	0.0	0.0	n/a	n/a	20.9	17.5	0.1	2.2	Dry

Monitoring Equipment: Gas Data GFM436 Multichannel Portable gas analyser, an ATEX and MCERTS accredited hand held gas analyser.

*Gas monitoring should not be for less than 3 minutes. If high concentrations, monitoring should be for up to 10 minutes.

Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

cs@elab-uk.co.uk
info@elab-uk.co.uk

UKAS TESTING 2683

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number:	21-33710
Issue:	1
Date of Issue:	19/05/2021
Contact:	Peter George
Customer Details:	GO Contaminated Land Solutions Ltd 4 De Frene Road Sydenham London SE26 4AB
Quotation No:	Q14-00029
Order No:	2077
Customer Reference:	2077
Date Received:	12/05/2021
Date Approved:	19/05/2021
Details:	Land to East Side of Newport Road, Hayes
Approved by:	

Tim Reeve, Quality Officer

ELAB

Sample Summary

Report No.: 21-33710, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
237096	BH1 0.30 - 0.60	11/05/2021	12/05/2021	Silty clayey loam	
237097	BH2 0.20 - 0.50	11/05/2021	12/05/2021	Silty loam	
237098	BH3 0.30 - 0.60	11/05/2021	12/05/2021	Silty loam	
237099	BH4 0.30 - 0.50	11/05/2021	12/05/2021	Sandy silty loam	
237100	BH5 0.25 - 0.55	11/05/2021	12/05/2021	Silty loam	
237101	BH6 0.20 - 0.50	11/05/2021	12/05/2021	Silty loam	

ELAB

Results Summary

Report No.: 21-33710, Issue number 1

ELAB Reference				237096	237097	237098	237099	237100	237101
Customer Reference									
Sample ID									
Sample Type				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location				BH1	BH2	BH3	BH4	BH5	BH6
Sample Depth (m)				0.30 - 0.60	0.20 - 0.50	0.30 - 0.60	0.30 - 0.50	0.25 - 0.55	0.20 - 0.50
Sampling Date				11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
Determinand	**Codes**	**Units**	**LOD**						
Soil sample preparation parameters									
Moisture Content	N	%	0.1	22.8	13.7	12.0	18.8	16.8	9.9
Stones Content	N	%	0.1	41.2	48.1	57.9	38.8	44.7	50.8
Material removed	N	%	0.1	41.2	48.1	57.9	38.8	44.7	50.8
Description of inert material removed	N		0	Stones	Stones	Stones	Stones	Stones	Stones
Metals									
Arsenic	M	mg/kg	1	9.2	14.8	12.9	10.2	10.4	24.4
Cadmium	M	mg/kg	0.5	< 0.5	0.5	< 0.5	< 0.5	< 0.5	2.5
Chromium	M	mg/kg	5	21.3	30.1	24.2	29.1	23.4	25.1
Copper	M	mg/kg	5	20.1	52.4	101	30.8	22.3	88.1
Lead	M	mg/kg	5	83.4	383	176	68.1	77.7	380
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	0.8	< 0.5	< 0.5	1.2
Nickel	M	mg/kg	5	16.5	21.2	15.2	20.3	13.5	26.7
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	67.8	188	116	70.8	59.5	388
Inorganics									
Free Cyanide	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Miscellaneous									
pH	M	pH units	0.1	8.2	7.9	8.9	10.1	8.5	8.1
Soil Organic Matter	U	%	0.1	1.9	3.1	2.4	1.9	2.2	4.2
Phenols									
Total Monohydric Phenols	N	mg/kg	5	< 5	< 5	< 5	< 5	< 5	< 5

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Results Summary

Report No.: 21-33710, Issue number 1

				ELAB Reference	237096	237097	237098	237099	237100	237101
				Customer Reference						
				Sample ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Location	BH1	BH2	BH3	BH4	BH5	BH6
				Sample Depth (m)	0.30 - 0.60	0.20 - 0.50	0.30 - 0.60	0.30 - 0.50	0.25 - 0.55	0.20 - 0.50
				Sampling Date	11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
Determinand	**Codes**	**Units**	**LOD**							
Polyaromatic hydrocarbons										
Naphthalene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1
Acenaphthene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	< 0.1	0.2	0.1	0.3	< 0.1	0.7
Anthracene	M	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2
Fluoranthene	M	mg/kg	0.1	< 0.1	0.6	0.3	0.4	0.2	2.1
Pyrene	M	mg/kg	0.1	< 0.1	0.5	0.2	0.4	0.1	1.8
Benzo(a)anthracene	M	mg/kg	0.1	< 0.1	0.3	0.1	0.2	< 0.1	1.3
Chrysene	M	mg/kg	0.1	< 0.1	0.4	0.2	0.2	< 0.1	1.5
Benzo(b)fluoranthene	M	mg/kg	0.1	< 0.1	0.4	0.1	0.2	< 0.1	1.2
Benzo(k)fluoranthene	M	mg/kg	0.1	< 0.1	0.3	0.1	0.2	< 0.1	2.3
Benzo(a)pyrene	M	mg/kg	0.1	< 0.1	0.4	0.2	0.2	< 0.1	1.8
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	< 0.1	0.4	0.2	0.2	< 0.1	1.5
Dibenzo(a,h)anthracene	M	mg/kg	0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	0.4
Benzo(g,h,i)perylene	M	mg/kg	0.1	< 0.1	0.3	0.1	0.2	< 0.1	1.5
Total PAH(16)	M	mg/kg	0.4	< 0.4	4.0	1.7	2.5	0.9	16.4
TPH CWG										
>C5-C6 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C6-C8 Aliphatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C10-C12 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C12-C16 Aliphatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C16-C21 Aliphatic	N	mg/kg	1	< 1.0	5.8	< 1.0	< 1.0	< 1.0	< 1.0
>C21-C35 Aliphatic	N	mg/kg	1	1.3	221	< 1.0	< 1.0	< 1.0	4.4
>C35-C40 Aliphatic	N	mg/kg	1	< 1.0	124	< 1.0	< 1.0	< 1.0	< 1.0
>C5-C7 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C7-C8 Aromatic	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
>C8-C10 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C10-C12 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C12-C16 Aromatic	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C16-C21 Aromatic	N	mg/kg	1	< 1.0	5.4	< 1.0	< 1.0	< 1.0	1.2
>C21-C35 Aromatic	N	mg/kg	1	< 1.0	320	< 1.0	< 1.0	< 1.0	20.0
>C35-C40 Aromatic	N	mg/kg	1	< 1.0	186	< 1.0	< 1.0	< 1.0	3.7
Total (>C5-C40) AliAro	N	mg/kg	1	1.3	863	< 1.0	< 1.0	< 1.0	29.3

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Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY
Tel: +44 (0)1424 718618, Email: info@elab-uk.co.uk, Web: www.elab-uk.co.uk

Results Summary

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Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
237096	0.30 - 0.60	BH1	Brown soil, stones	No asbestos detected	n/t	n/t	n/t	n/t
237097	0.20 - 0.50	BH2	Brown sandy soil, stones, concrete, brick, clinker, glass	No asbestos detected	n/t	n/t	n/t	n/t
237098	0.30 - 0.60	BH3	Brown sandy soil, stones, concrete, brick, clinker, organics	No asbestos detected	n/t	n/t	n/t	n/t
237099	0.30 - 0.50	BH4	Brown sandy soil, stones, brick, clinker	No asbestos detected	n/t	n/t	n/t	n/t
237100	0.25 - 0.55	BH5	Brown sandy soil, stones, concrete, clinker	No asbestos detected	n/t	n/t	n/t	n/t
237101	0.20 - 0.50	BH6	Brown sandy soil, stones, concrete, brick, clinker, organics	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

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Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Free cyanide	N	As submitted sample	14/05/2021	107	Colorimetry
Hexavalent chromium	N	As submitted sample	14/05/2021	110	Colorimetry
pH	M	Air dried sample	19/05/2021	113	Electromeric
Phenols in solids	N	As submitted sample	14/05/2021	121	HPLC
PAH (GC-FID)	M	As submitted sample	14/05/2021	133	GC-FID
Low range Aliphatic hydrocarbons soil	N	As submitted sample	18/05/2021	181	GC-MS
Low range Aromatic hydrocarbons soil	N	As submitted sample	18/05/2021	181	GC-MS
Aliphatic hydrocarbons in soil	N	As submitted sample	14/05/2021	214	GC-FID
Aliphatic/Aromatic hydrocarbons in soil	N	As submitted sample	18/05/2021	214	GC-FID
Aromatic hydrocarbons in soil	N	As submitted sample	14/05/2021	214	GC-FID
Asbestos identification	U	Air dried sample	19/05/2021	280	Microscopy
Aqua regia extractable metals	M	Air dried sample	14/05/2021	300	ICPMS
Soil organic matter	U	Air dried sample	18/05/2021	BS1377:P3	Titrimetry

Tests marked N are not UKAS accredited

Report Information

Report No.: 21-33710, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination.

Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.
ELAB are unable to provide an interpretation or opinion on the content of this report.
The results relate only to the sample received.
PCB congener results may include any coeluting PCBs
Uncertainty of measurement for the determinands tested are available upon request
Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
All water samples will be retained for 7 days following the date of the test report
Charges may apply to extended sample storage

Appendix D – Imported Material

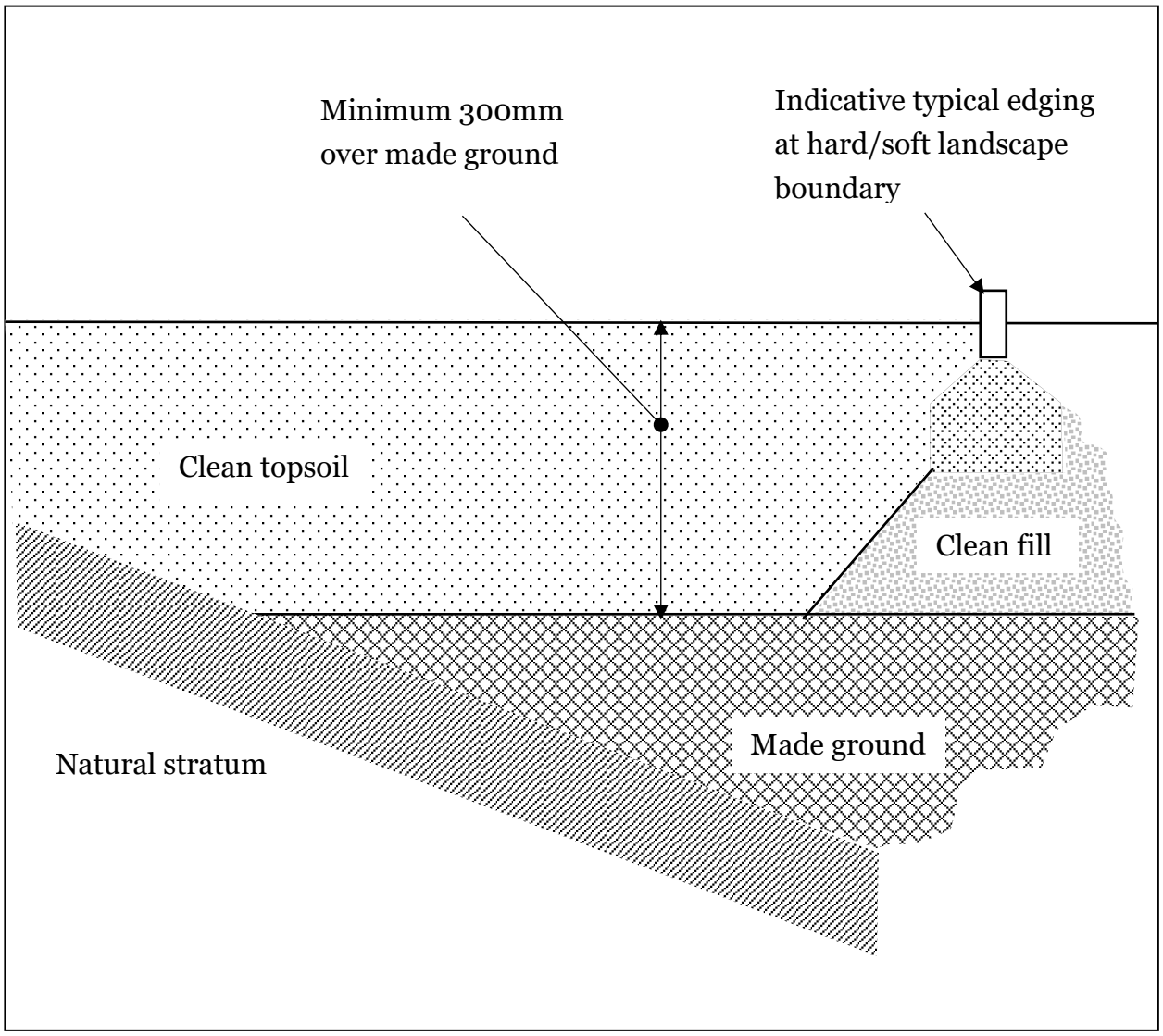
Any imported material should be tested for the following parameters, and compared against the current environmental screening levels to ensure that the fill material meets the criteria for the proposed end use.

Care should be taken when importing soils and aggregates as asbestos is a common contaminant, even in certified materials.

Determinand	
Arsenic	
Cadmium	
Chromium	
Lead	
Mercury	
Nickel	
Copper	
Zinc	
Selenium	
Hexavalent Chromium	
pH Value	
Free Cyanide	
Naphthalene	
Acenaphthylene	
Acenaphthene	
Fluorene	
Phenanthrene	
Anthracene	
Fluoranthene	
Pyrene	
Benz(a)anthracene	
Chrysene	
Benzo(b)fluoranthene	
Benzo(k)fluoranthene	
Benzo(a)pyrene	
Indeno(123-cd)pyrene	
Dibenz(ah)anthracene	
Benzo(ghi)perylene	
TOTAL PAH	
Aromatic Hydrocarbons	>C_5-C_7
	>C_7-C_8
	>C_8-C_{10}
	>C_{10}-C_{12}
	>C_{12}-C_{16}
	>C_{16}-C_{21}
	>C_{21}-C_{35}
Aliphatic Hydrocarbons	>C_5-C_6
	>C_6-C_8
	>C_8-C_{10}
	>C_{10}-C_{12}
	>C_{12}-C_{16}
	>C_{16}-C_{35}
TOTAL TPH	
Asbestos	

Contaminated Land Solutions

Appendix E – Indicative Capping Layer



Cross-section

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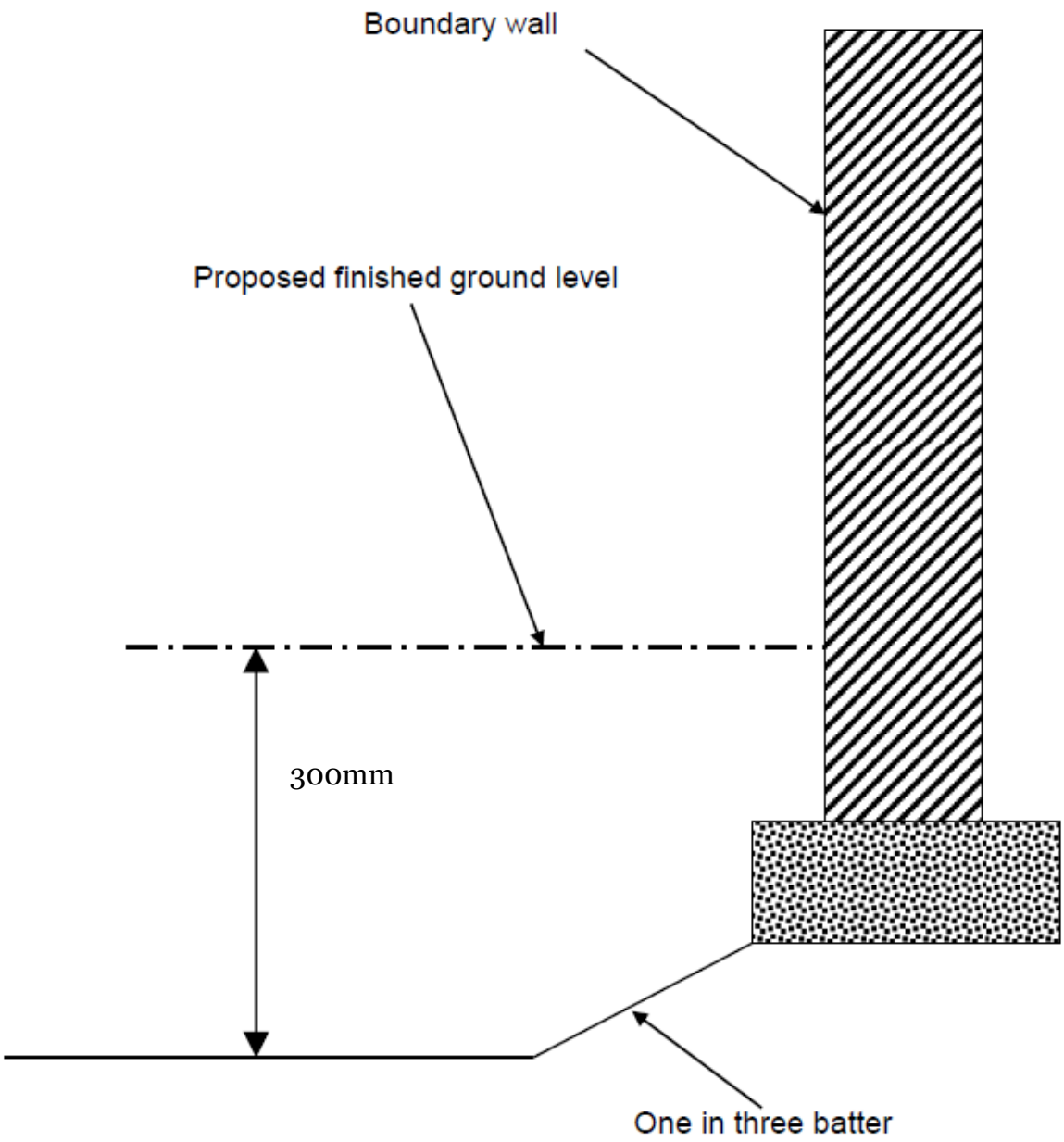
Appendix F – Indicative Boundary Wall Remediation



Indicative Schematic

If the boundary wall is acting as a retaining wall or appears to be unsound or there are any concerns regarding stability advice should be obtained from a civil, structural or geotechnical engineer.

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Appendix G – Example Record Photographs

Example A: Close up, showing the depth clearly.

Example A: Showing the location of the close up

Example B: Close up, showing the depth clearly

Example B: Showing the location of the close up