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Kent
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24th August 2022

Our Ref: 4768 22 08 24 Ltr Rpt 02 Rev A AS SP

Dear Mark,

SITE: Former St Johns Ambulance HQ, Armoury Drive, Gravesend, DA12 1NB
SERVICE: Supplementary Geo-Environmental Site Investigation

Introduction

The work covered in this Supplementary Geo-Environmental Site Investigation Letter Report was commissioned by Longley Group Ltd for the site known as Former St Johns Ambulance HQ, Armoury Drive, Gravesend, DA12 1NB (See Appendix A Figure 1 – Site Location Plan).

We understand that the site currently comprises an irregular shaped plot covered in soft landscaping and both concrete and tarmac hardstanding areas including a deep brick lined chamber in the northwest corner of the site associated with the former water tower, that has been recently demolished to ground level (See Appendix A Figure 2 – Existing Site Layout Plan).

This assessment was conducted further to the findings of the recent Preliminary Geo-Environmental Site Investigation Report that was also produced by SEC (Report Ref: 4551 22 04 21 Rpt 06 Rev B EH CW) to support the current planning permission (Ref: 2020/0561). The previous report identified an apparent hotspot of shallow Made Ground, that was impacted with asbestos cement fragments and the aim of this additional investigation was to try and better delineate the extent of impacted material and inform remedial requirements.

The proposed re-development is understood to involve the demolition of existing buildings and construction of 1no. 2-storey block of flats and 2 no. detached bungalows (See Appendix A Figure 3 – Proposed Development Plan).

This report aims to review the findings of the previous Report, describe the fieldwork and laboratory testing undertaken as part of this further ground investigation, review the test results in the light of current guidance, and provide an updated Conceptual Site Model based on a source-pathway-receptor linkage qualitative risk assessment in relation to Contaminated Land.

- 1 -

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This report should be read in conjunction with the previous report referenced above.

Site Description

The site forms an irregular shaped plot and was occupied by a former St Johns Ambulance Garage building and a water tower, both of which have since been demolished. At the time of writing the site was undeveloped by any structures although former hardstanding remained undisturbed. A deep chamber had however been uncovered from beneath the water tower (see Appendix A Figure 2 – Existing Site Layout Plan). The site was situated in a predominantly urban location with residential housing surrounding the site.

The ground level across site sloped gently downwards towards the east.

Previous Report (Preliminary Geo-Environmental Site Investigation Report - Ref: 4551 22 04 21 Rpt 06 Rev B EH CW)

The site usage and condition noted on site differed to the previous Site Investigation Report in that the ambulance building and water tower had been demolished with an open brick lined chamber had been identified beneath the demolished water tower. The proposed development upon which the report was based was consistent with the current proposals.

The earlier intrusive site investigation comprised 5no. continuous dynamic sampler mini boreholes and 3no. hand dug trial pits to facilitate collection of soil samples for chemical analysis and the installation of monitoring wells based upon the findings of an earlier Desk Study produced by others. Ground conditions encountered comprised Made Ground in all of the exploratory holes to depths up to between 0.25m bgl (WS04) and 1.35m bgl (WS05). Generally, the Made Ground was found to comprise dark brown slightly sandy gravelly Clay with inclusions of flint, brick concrete and tile. Asbestos cement fragments were identified in both TP01 and TP03 up to 0.45m bgl and 0.90m bgl respectively. It is noted that the asbestos delineation conducted as part of this current additional investigation related to TP03 only. The impacted Made Ground at TP01 had inadvertently been disturbed and this is discussed within our Technical Addendum (Ref: 4551 22 07 04 Tech Adden 01 Rev A BD SP). Natural deposits encountered beneath the Made Ground generally comprised grey mottled orange slightly silty fine Sand proven up to 4.45m bgl (WS01 – WS05).

No groundwater was encountered during the drilling of the boreholes or during subsequent monitoring visits.

As part of the assessment 9no. rounds of environmental ground gas monitoring was conducted, which was reported in a separate Ground Gas Addendum (Ref: 4551 22 07 11 Ltr Rpt 01 Rev A AS SP). Based on the gas monitoring results, concentrations of methane were generally low although spikes up to ~45% (WS05 monitoring round no.5) were recorded. Carbon dioxide was recorded up to 7.3% by Vol and oxygen was identified to be depleted down to 11.8% by Vol. No elevations of VOCs were recorded and flow rates were recorded up to a maximum of 0.4l/hr. Based on the available data a gas screening value of 0.0292l/hr was calculated for the site, which corresponded with Characteristic Situation 1 of current CIRIA C665 guidance, however given that Carbon dioxide concentrations exceeded 5% and that methane concentration spikes were also identified, protective measures associated with Characteristic Situation 2 were recommended. Gas main leaks were also identified in the vicinity of the site.

Chemical analysis of the soil samples analysed Made Ground exhibiting elevated concentrations of lead above the adopted generic guidance value based on the proposed residential use in Made Ground deposits in the western half of the site (WS05 0.50m bgl, TP02 0.30m bgl and TP03 0.50m bgl). Elevated concentration of PAHs were also identified in TP02 at 0.30m bgl and within the bituminous surfacing covering the site.

The following recommendations were made based on the findings of the assessment and the proposed residential end use:

- That the remaining ground gas monitoring be completed in order to inform the Ground Gas Risk Assessment Addendum to supplement the findings of this assessment and to inform the requirement for any protective measures within the building design;
- That prior to the proposed development, all general rubbish and drums of fuel should be appropriately removed from site and disposed of at suitably licensed facilities (all waste disposal documents to be retained);
- That the existing potentially coal tar rich tarmac surfacing be disposed of from site to suitably licensed waste management facilities as hazardous waste under waste code 17 03 01. All waste disposal documentation should be retained for inclusion within a future Validation Report. To help facilitate appropriate waste disposal from site, the tarmac surfacing should be carefully excavated and segregated from the underlying material under the supervision of an Environmental Consultant;
- That a watching brief be maintained by an Environmental Consultant during the removal of the hardstanding across the site and in particular the ground slab of the former buildings. Confirmatory validation samples should be recovered for analysis to confirm an absence of impact associated with contaminants of concern including metals, PAHs, hydrocarbons and asbestos;
- That remedial excavation be conducted to remove the lead and asbestos impacted Made Ground identified on site for appropriate disposal to suitably licensed facilities. Remedial excavation should be overseen by an Environmental Consultant and be certified by soil validation sample analysis from the sides and base of the remedial excavation. Any imported backfill material (e.g. engineered fill / aggregate, subsoil or topsoil) should be chemically validated in relation to suitability for use on site as part of the proposed development, including the review of the supplier's chemical batch data prior to import and chemical analysis of validation samples following importation to site;
- That an asbestos picking exercise be conducted during the excavation of asbestos impacted material locally to TP01 and TP03, to remove fragments of cement bonded asbestos sheeting for separate disposal. Asbestos picking should be conducted by Category A & B Asbestos Awareness trained operatives and to help mitigate potential Health and Safety risks appropriate PPE / RPE should be worn by operatives during the remedial excavation and asbestos picking, including disposable suits and RPE;
- That all waste arisings should be disposed of from site appropriately in accordance with EA WM3 guidance. The impacted Made Ground should be disposed of as Non-Hazardous waste under waste code 17 05 04 and picked asbestos containing material fragments as Hazardous waste under waste code 17 06 05. All arisings should be segregated based on waste stream types and according to waste classification. All waste disposal tickets should be retained;

- That a “clean” cover system be provided to a minimum thickness of 475mm across landscaped / garden areas. The cover system should comprise the provision of a high visibility marker layer (permeable geotextile or similar) overlain by imported certified “clean” topsoil to the required minimum thickness. Subject to existing and proposed site levels it may be necessary to remove some existing soils to facilitate the cover system. Prior to delivery of any imported topsoil to site, the supplier’s chemical batch data should be provided to an Environmental Consultant for review and following provision of the cover system to landscaped areas it should be validated by an Environmental Consultant. This should include chemical analysis of a representative number of imported cover system validation samples based on a minimum frequency of 1 validation sample per garden / landscaped area as a minimum or 1 sample per 50m3 per material source for larger areas. In addition the thickness of cover system should be certified;
- That the water supply pipework included within the design of the proposed development should be chemically resistant barrier pipe. Alternatively the water supplier should be contacted to confirm chemically resistant barrier pipe is not required;
- That groundworkers should wear appropriate PPE/RPE, work in well ventilated areas, avoid confined spaces, avoid contact with soil and groundwater, not smoke, adopt high standards of personal hygiene, and operate with due care;
- That a Discovery Strategy should be implemented on site during the redevelopment work which should include for the immediate reporting of any potential indicators of ground or water contamination e.g. asbestos fragments, ash / clinker or hydrocarbon odours for separate assessment by an Environmental Consultant;
- That prior to the conduct of any remedial work, a Remedial Method Statement should be approved by the Regulators; and
- That any remedial work conducted on site as part of the proposed development should be certified and documented within a Validation Report produced by an Environmental Consultant.

Description of Work

SEC attended the site in August 2022 to conduct a 2nd phase of Site Investigation to further delineate the extent of the asbestos hotspot identified at TP03 by the initial assessment and help clarify remedial requirements.

The investigation comprised the excavation of 9no. hand dug trial pits up to 1.20m bgl (TP03A – TP03I) to facilitate the collection of soil samples for chemical laboratory analysis of samples for the contaminant of concern, asbestos and to observe any cement board asbestos sheeting fragments.

The exploratory holes conducted were positioned to better delineate the previously identified asbestos impacted Made Ground associated with TP03 of the previous phase of investigation (see Appendix A Figure 4 – Exploratory Hole Location Plan).

Soil samples were collected from the exploratory holes and were sent for analysis at an independent UKAS and MCERTS accredited laboratory.

Ground Conditions

Details for the ground conditions encountered within the exploratory holes conducted are presented in Appendix C – Exploratory Hole Records. However, a brief summary of the ground conditions encountered on site has been provided below.

Ground conditions were identified to be generally consistent with those observed during the previous phase of investigation. Made Ground was encountered between a minimum depth of 0.50m bgl (TP03A) and a maximum depth of 1.20m bgl (TP03B, TP03C, TP03D, TP03H and TP03 I). At locations TP03B, TP03C, TP03D and TP03I the base of the Made Ground was unproven at 1.2m bgl.

Generally, the Made Ground was observed to comprise a brown gravelly Sand with anthropogenic inclusions including brick, chalk, cement and concrete. No cement bonded asbestos sheeting fragments were identified within the exploratory holes.

Underlying the Made Ground were Natural deposits comprising a brown very sandy gravel up to 1.10m (TP04I) bgl. This is consistent with the previous investigation findings.

Chemical Analysis

A total of 15no. samples of Made Ground were scheduled for laboratory analysis for the contaminant of concern, asbestos. The findings of the chemical analysis are summarised below:

- No asbestos cement fragments or loose fibres were identified within any of the Made Ground samples analysed.

Discussion

Based on the currently available information from the site investigations to date, the previously identified on site sources of contamination remain unchanged. However, his supplementary phase of investigation has delineated that the extent of asbestos impacted Made Ground appears to be limited to locality TP03 only and does not extend across the wider area of the western end of the site.

Conclusions and Recommendations

Based on the findings, the asbestos impacted topsoil / Made Ground has been identified to effect a smaller area of the site than previously suspected, as indicated on the Contamination Hotspot Plan (see Appendix A Figure 5).

As previously recommended the asbestos impacted Made Ground should be excavated and removed prior to any intrusive groundworks within the vicinity of TP03. Removal of the impacted material should be conducted under a Watching Brief by an Environmental Consultant prior. Soil validation samples should be collected and chemically analysed from the sides and base of the resulting remedial excavations in order to certify source removal.

The asbestos impacted Made Ground should be disposed of to suitably licensed facilities. Remedial excavation should be overseen by an Environmental Consultant and be certified by soil validation sample analysis from the sides and base of the remedial excavation. Any imported backfill

material (e.g. engineered fill / aggregate, subsoil or topsoil) should be chemically validated in relation to suitability for use on site as part of the proposed development, including the review of the supplier's chemical batch data prior to import and chemical analysis of validation samples following importation to site;

That an asbestos picking exercise be conducted during the excavation of asbestos impacted material locally to TP03, to remove fragments of cement bonded asbestos sheeting for separate disposal. Asbestos picking should be conducted by Category A & B Asbestos Awareness trained operatives and to help mitigate potential Health and Safety risks appropriate PPE / RPE should be worn by operatives during the remedial excavation and asbestos picking, including disposable suits and RPE with the provision of dust suppression measures;

Whilst the findings of this further assessment specifically help to better inform the extent of asbestos impacted Made Ground locally to TP03, the following recommendations from the previous Geo-Environmental Site Investigation Report remain applicable and the Remedial Method Statement (RMS) Ref: 4551 22 04 29 Rpt 02 Rev A BD SP remains unchanged, despite that the size of the TP03 hotspot has become more limited.

See Appendix E for General Limitation and Exceptions

Kind Regards

Damian Jones
Managing Director
d.jones@sevenoaksenvironmental.co.uk

enc.

Appendix A – Figures

- Figure 1 – Site Location Plan
- Figure 2 – Existing Site Layout Plan
- Figure 3 – Proposed Site Layout Plan
- Figure 4 – Exploratory Hole Location Plan
- Figure 5 – Contamination Hotspot Plan

Appendix B – Exploratory Hole Records

Appendix C – Chemical Laboratory Results

Appendix D – General Limitations and Exceptions

Appendix A

Figures

Gravesham Borough Council



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This map is not to be relied upon for accuracy and is for identification purposes only

SITE: Armoury Drive, Gravesend

SCALE: NTS

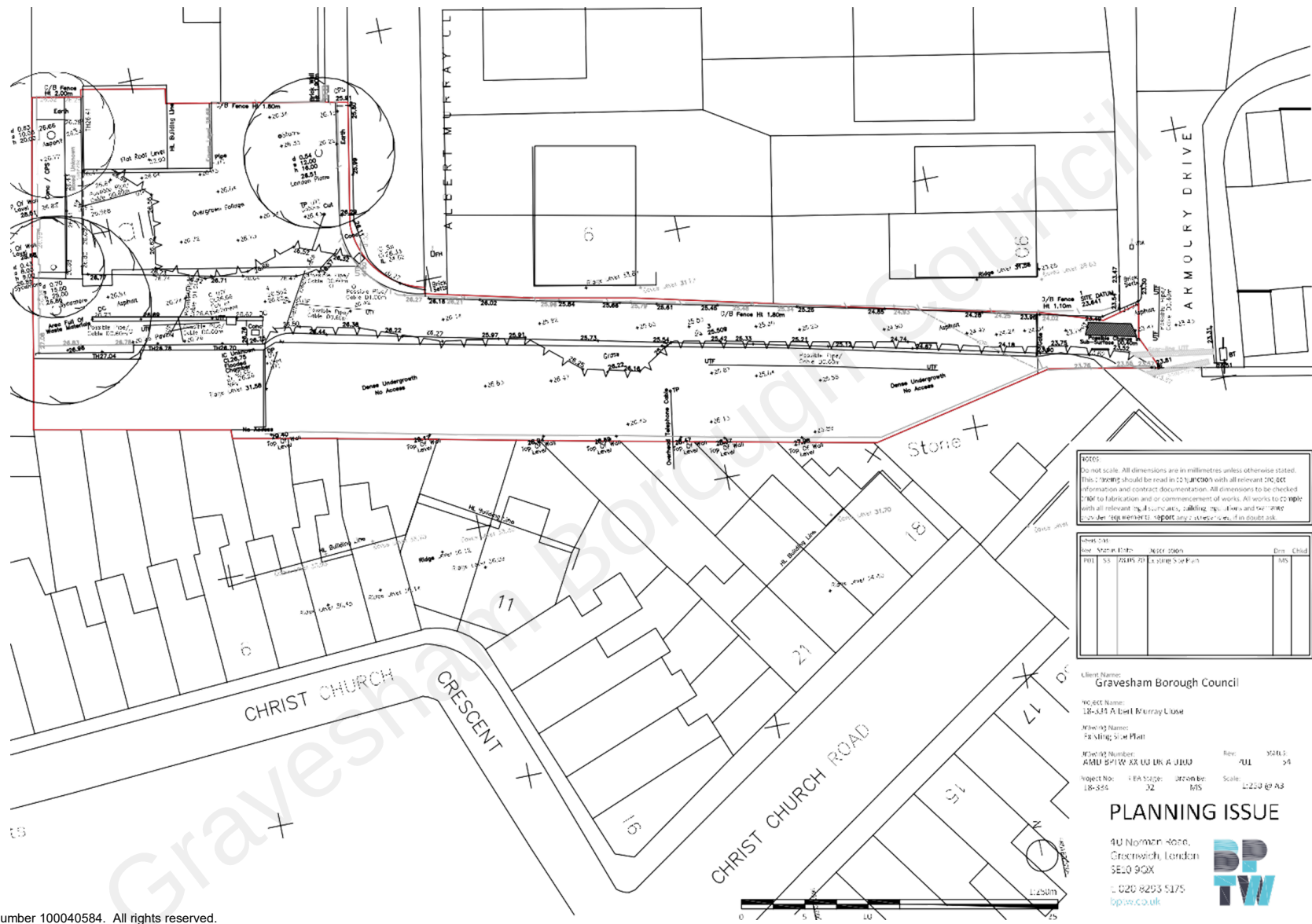
JOB NO: 4768

FIGURE TITLE: Site Location Plan

REV: 01

FIGURE NO: 01

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NOTES
Do not scale. All dimensions are in millimetres unless otherwise stated.
This drawing should be read in conjunction with all relevant DCS, DCC
information and contract documentation. All dimensions to be checked
prior to fabrication and/or commencement of works. All works to comply
with all relevant building regulations, building rules and standards
and the requirements of the relevant authorities.

Rev	Rev	Rev	Rev	Rev	Rev
001	002	003	004	005	006

Client Name:
Gravesend Borough Council

Project Name:
126-128 A East Murrey Close

Working Name:
Planning Site Plan

Sheet No:
ARMU SITE PLAN A-001

Project No:
126-128

Scale:
1:250 @ A3

PLANNING ISSUE

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Gravesend, London
SE13 9QX

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**DP
TW**

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SITE: Armory Drive, Gravesend	SCALE: NTS	JOB NO: 4768	
FIGURE TITLE: Existing Site Layout Plan	REV: 01	FIGURE NO: 02	



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 This map is not to be relied upon for accuracy and is for identification purposes only

SITE: Armory Drive, Gravesend

SCALE: NTS

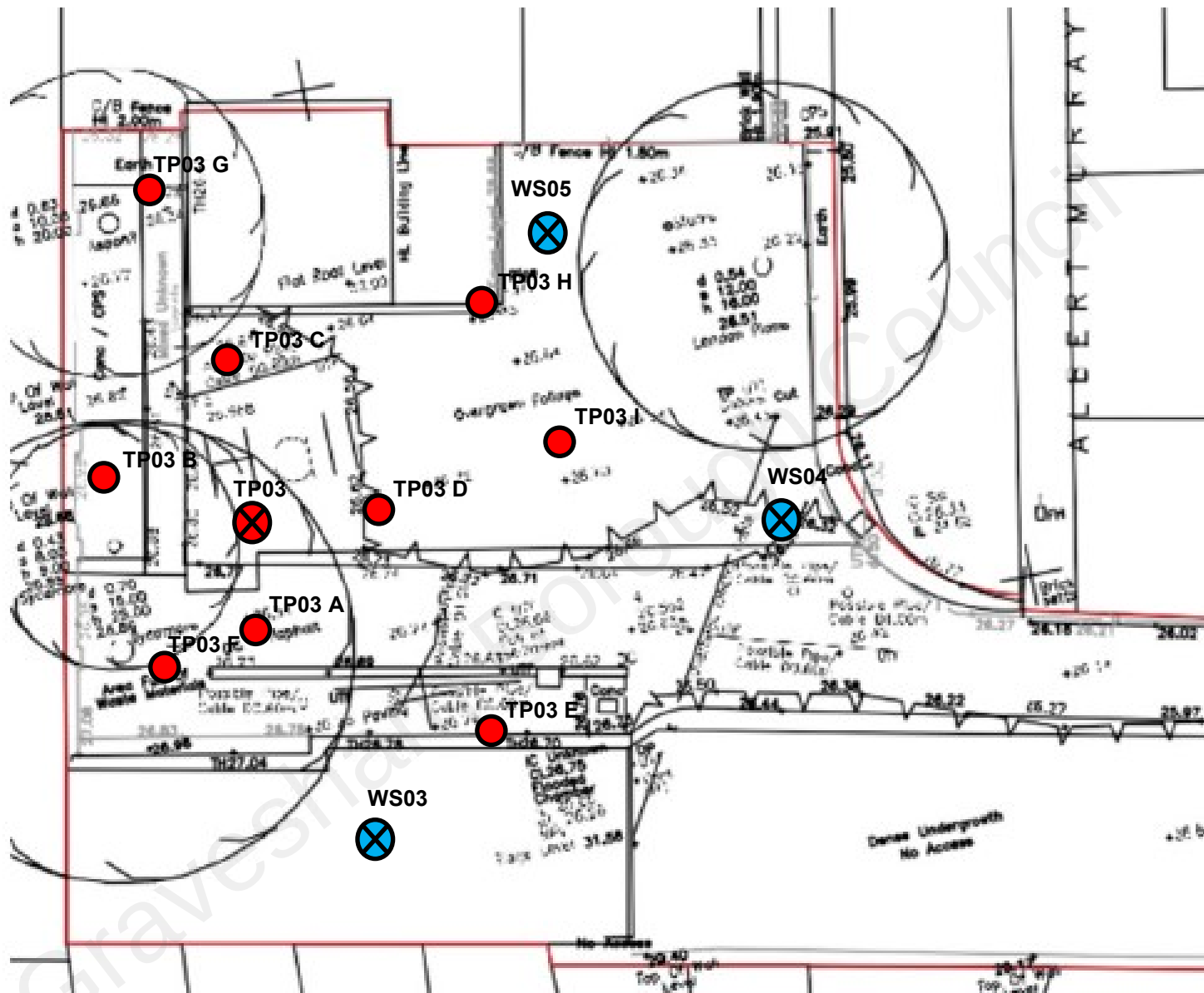
JOB NO: 4768

FIGURE TITLE: Proposed Site Layout Plan

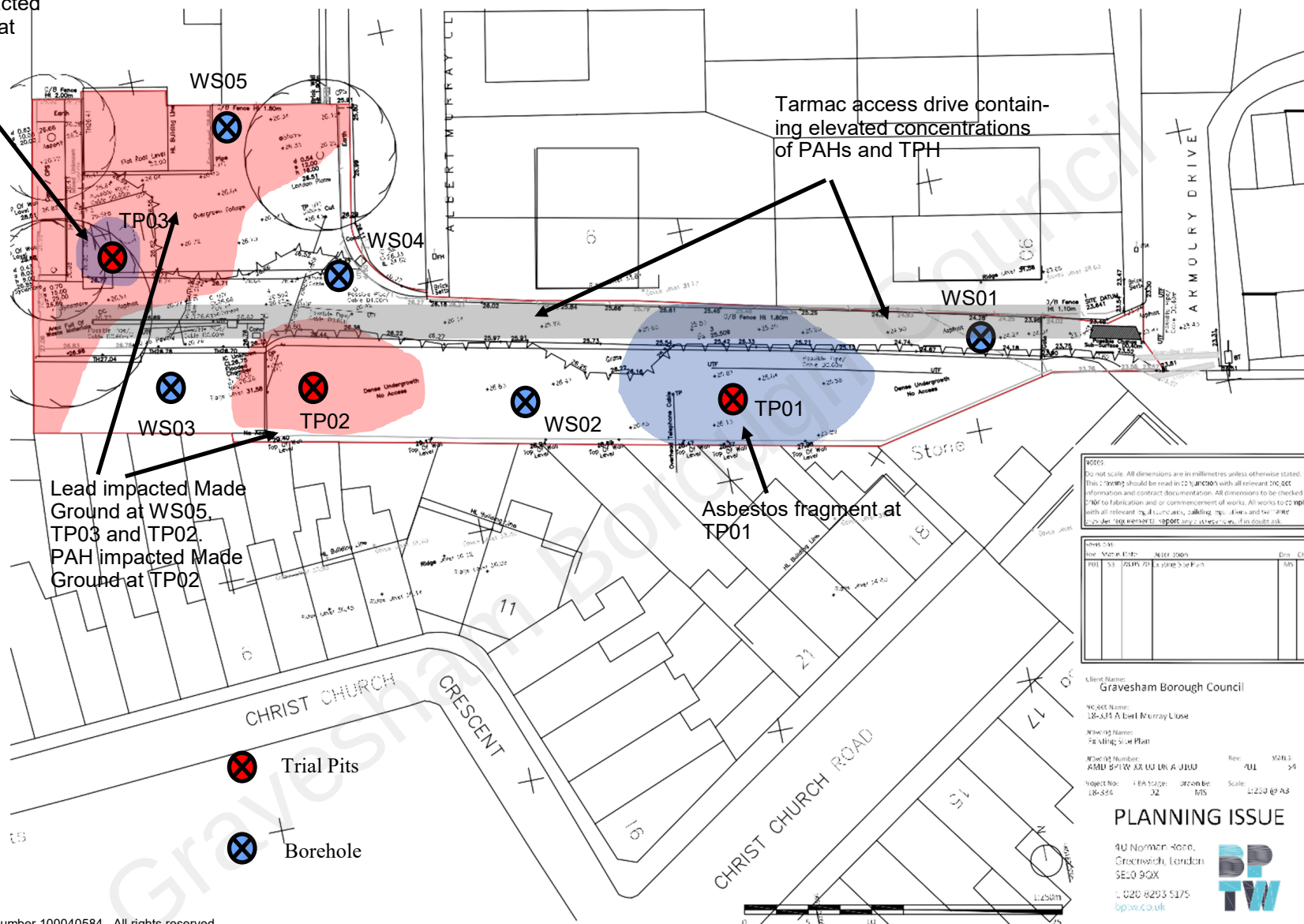
REV: 01

FIGURE NO: 03

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Asbestos impacted
Made Ground at
TP03



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This map is not to be relied upon for accuracy and is for identification purposes only

SITE: Armory Drive, Gravesend

SCALE: NTS

JOB NO: 4768

FIGURE TITLE: Contamination Hotspot Layout Plan

REV: 01

FIGURE NO: 05

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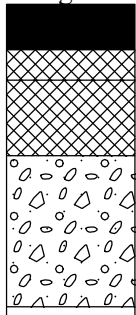
Appendix B

Exploratory Hole Records

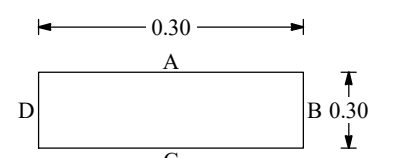
Gravesham Borough Council

TRIAL PIT LOG

Project Former St Johns Ambulance HQ, Armoury Drive - Asbestos Delineation Handpits				TRIAL PIT No TP03A
Job No 4768	Date 09-08-22	Ground Level (m)	Co-Ordinates ()	
Contractor Sevenoaks Environmental Consultancy Ltd				Sheet 1 of 1

0	A	B	C	D	0	Legend 
1					1	
2					2	

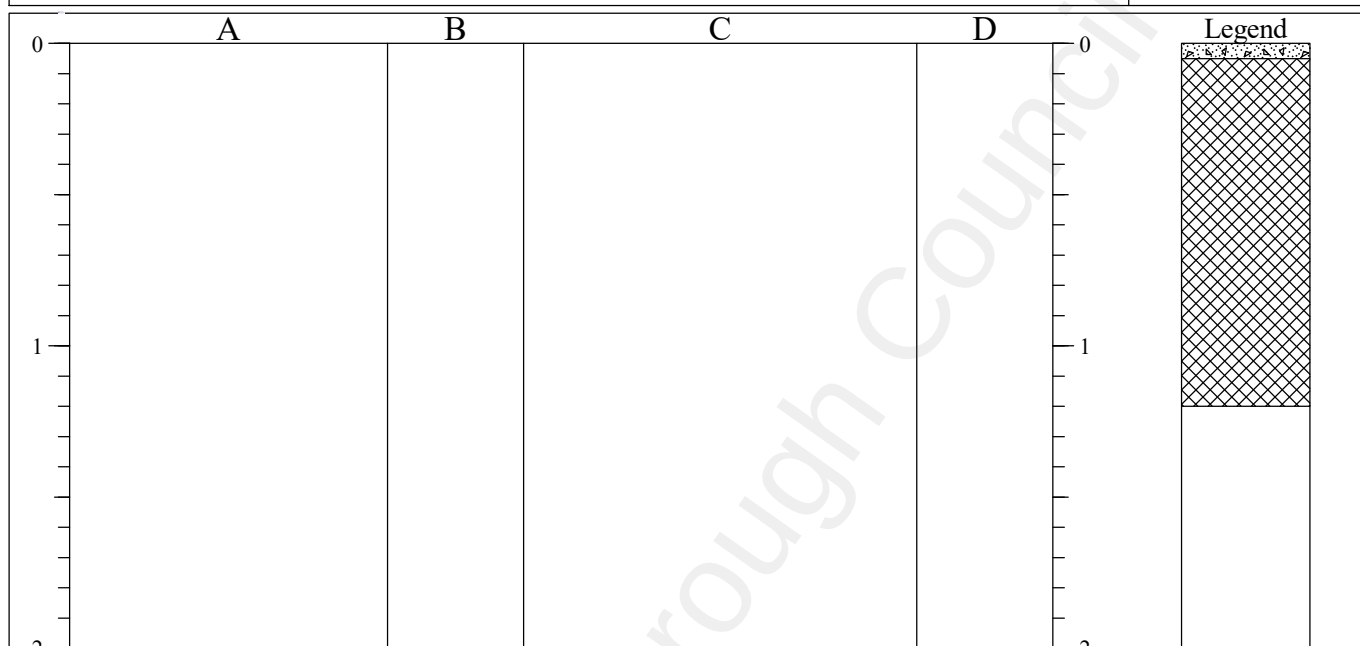
STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.15		HARDSTANDING: Asphalt			
0.15-0.25		MADE GROUND: Medium dense cream coarse sub-angular Chalk Gravel.	0.20	D	
0.25-0.50		MADE GROUND: Medium dense brown slightly clayey Sand and Gravel with occasional roots (<2cm) and rootlets. Sand is medium. Gravels are abundant fine to coarse rounded flints and occasional fine sub-angular chalk gravels.	0.40	D	
0.50-1.00		Medium dense brown slightly clayey very sandy Gravel. Sand is medium. Gravels are medium to coarse rounded flints.	0.80	D	
		Hand Pit completed @1.00m.			

Shoring/Support: N/A Stability: Stable 				GENERAL REMARKS No groundwater encountered.	
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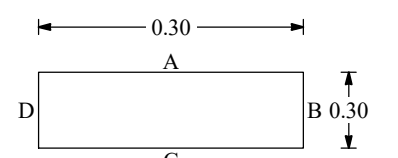
All dimensions in metres Scale 1:25	Client Longley Group Ltd	Method/ Plant Used Hand Digging Tools	Logged By AS
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TRIAL PIT LOG

Project Former St Johns Ambulance HQ, Armoury Drive - Asbestos Delineation Handpits				TRIAL PIT No TP03B
Job No 4768	Date 09-08-22	Ground Level (m)	Co-Ordinates ()	
Contractor Sevenoaks Environmental Consultancy Ltd				Sheet 1 of 1



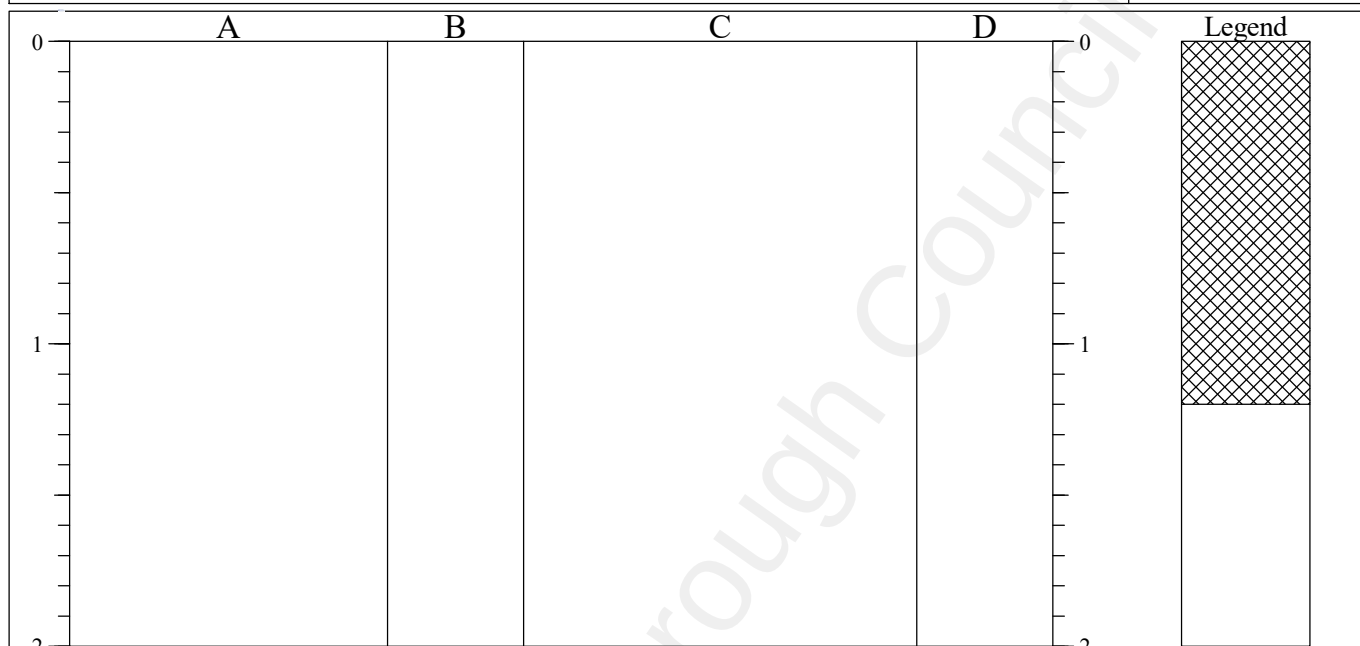
STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.05		HARDSTANDING: Concrete paving.			
0.05-1.20		MADE GROUND: Medium dense brown slightly clayey gravelly Sand with occasional rootlets. Sand is medium. Gravels are abundant medium to coarse sub-angular flints and occasional fine sub-angular brick and chalk fragments. ...@0.30m bgl becomes without rootlets. Hand Pit terminated @ 1.20m bgl.	0.30	D	
			0.80	D	

Shoring/Support: N/A Stability: Stable 				GENERAL REMARKS	
				No groundwater encountered.	

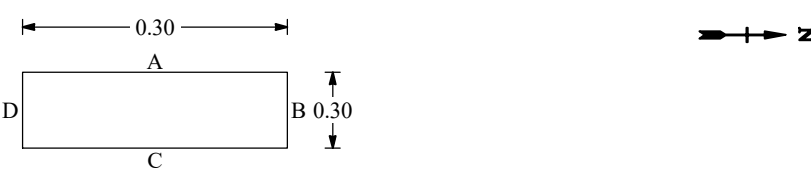
All dimensions in metres Scale 1:25	Client Longley Group Ltd	Method/ Plant Used Hand Digging Tools	Logged By AS
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TRIAL PIT LOG

Project Former St Johns Ambulance HQ, Armoury Drive - Asbestos Delineation Handpits				TRIAL PIT No TP03C
Job No 4768	Date 09-08-22	Ground Level (m)	Co-Ordinates ()	
Contractor Sevenoaks Environmental Consultancy Ltd				Sheet 1 of 1



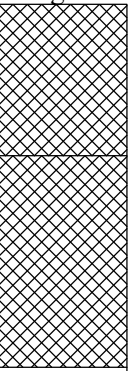
STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-1.20		MADE GROUND: Medium dense brown very gravelly Sand with occasional rootlets. Sand is medium. Gravels are medium to coarse sub-angular abundant flint and occasional brick fragments.			
		...@0.10m bgl becomes without rootlets.	0.30	D	
		...@ 1.10m bgl becomes with occasional coarse air brick gravels.			
		Hand Pit terminated @1.20m bgl.	0.80	D	

Shoring/Support: N/A Stability: Stable 	GENERAL REMARKS No groundwater encountered.
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All dimensions in metres Scale 1:25	Client Longley Group Ltd	Method/ Plant Used Hand Digging Tools	Logged By AS
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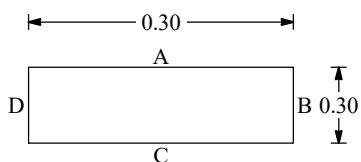
TRIAL PIT LOG

Project Former St Johns Ambulance HQ, Armoury Drive - Asbestos Delineation Handpits				TRIAL PIT No TP03D
Job No 4768	Date 09-08-22	Ground Level (m)	Co-Ordinates ()	
Contractor Sevenoaks Environmental Consultancy Ltd				Sheet 1 of 1

0	A	B	C	D	0	Legend 
1					1	
2					2	

STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.50		MADE GROUND: Medium dense greyish brown very gravelly Sand. Sand is medium. Gravels are abundant fine to coarse sub-angular to sub-rounded flint, concrete, cement and brick fragments. ...@0.50m concrete obstruction identified - Hand Pit extended westward.	0.30	D	
0.50-1.20		MADE GROUND: Medium dense brown slightly clayey gravelly Sand with occasional rootlets. Sand is medium. Gravels are abundant medium to coarse sub-angular flints and occasional fine sub-angular brick and chalk fragments. Hand Pit terminated @ 1.20m bgl.	0.80	D	

Shoring/Support: N/A
Stability: Stable



GENERAL REMARKS

No groundwater encountered.

All dimensions in metres
Scale 1:25

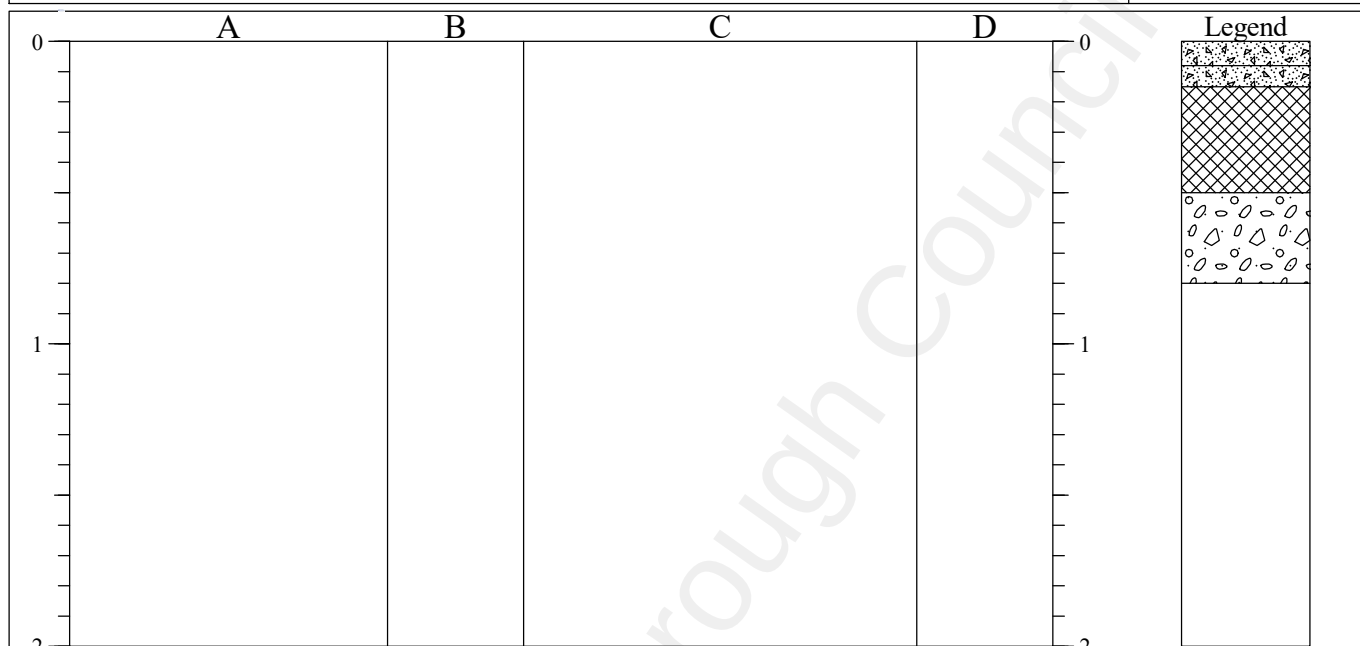
Client **Longley Group Ltd**

Method/
Plant Used **Hand Digging Tools**

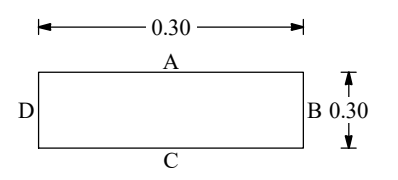
Logged By
AS

TRIAL PIT LOG

Project Former St Johns Ambulance HQ, Armoury Drive - Asbestos Delineation Handpits				TRIAL PIT No TP03E
Job No 4768	Date 09-08-22	Ground Level (m)	Co-Ordinates ()	
Contractor Sevenoaks Environmental Consultancy Ltd				Sheet 1 of 1



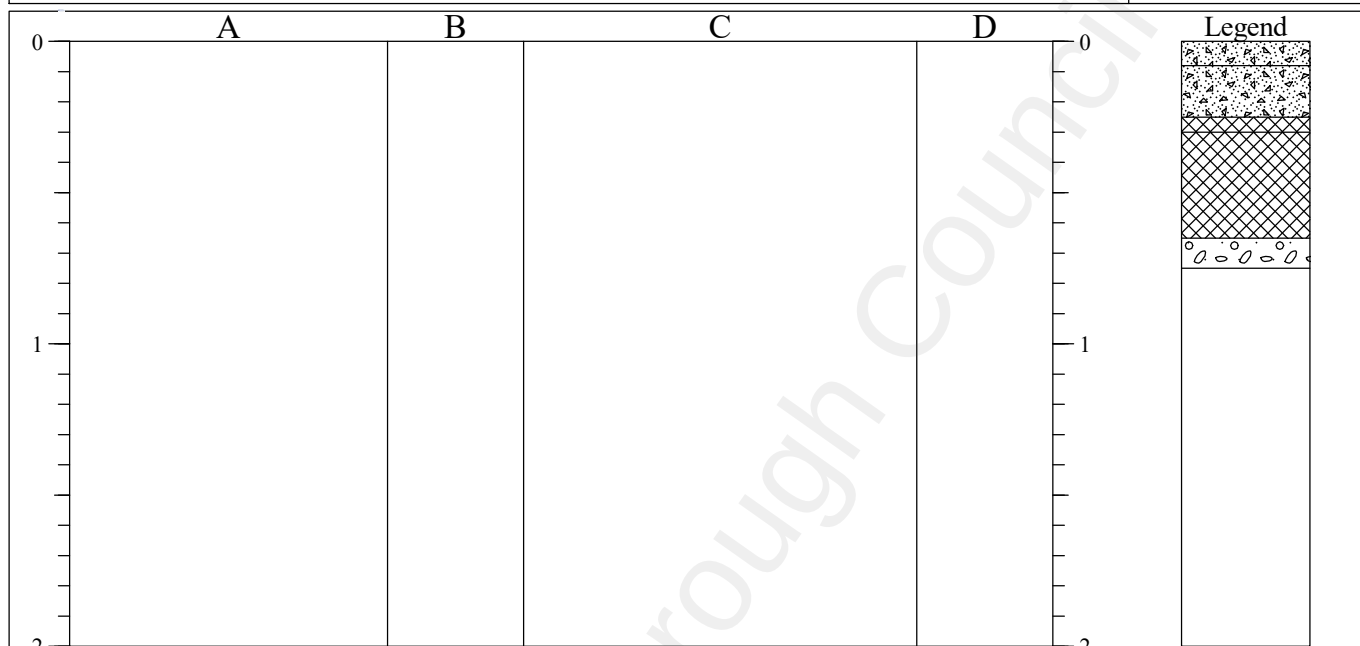
STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.08		HARSTANDING: Brick paving.			
0.08-0.15		HARDSTANDING: Concrete.			
0.15-0.50		MADE GROUND: Medium dense brown very gravelly slightly clayey Sand with rare rootlets. Sand is medium. Gravels are abundant medium to coarse sub -rounded to sub-angular flint, concrete, chalk and brick fragments.	0.25	D	
0.50-0.80		Medium dense brown slightly clayey very sandy Gravel. Sand is medium. Gravels are medium to coarse rounded flints.	0.70	D	
		Hand Pit completed @0.80m.			

Shoring/Support: N/A Stability: Stable 			GENERAL REMARKS No groundwater encountered.	
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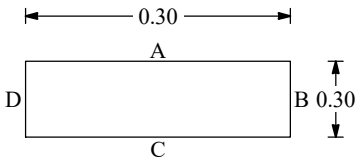
All dimensions in metres Scale 1:25	Client Longley Group Ltd	Method/ Plant Used Hand Digging Tools	Logged By AS
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TRIAL PIT LOG

Project Former St Johns Ambulance HQ, Armoury Drive - Asbestos Delineation Handpits				TRIAL PIT No TP03F
Job No 4768	Date 09-08-22	Ground Level (m)	Co-Ordinates ()	
Contractor Sevenoaks Environmental Consultancy Ltd				Sheet 1 of 1



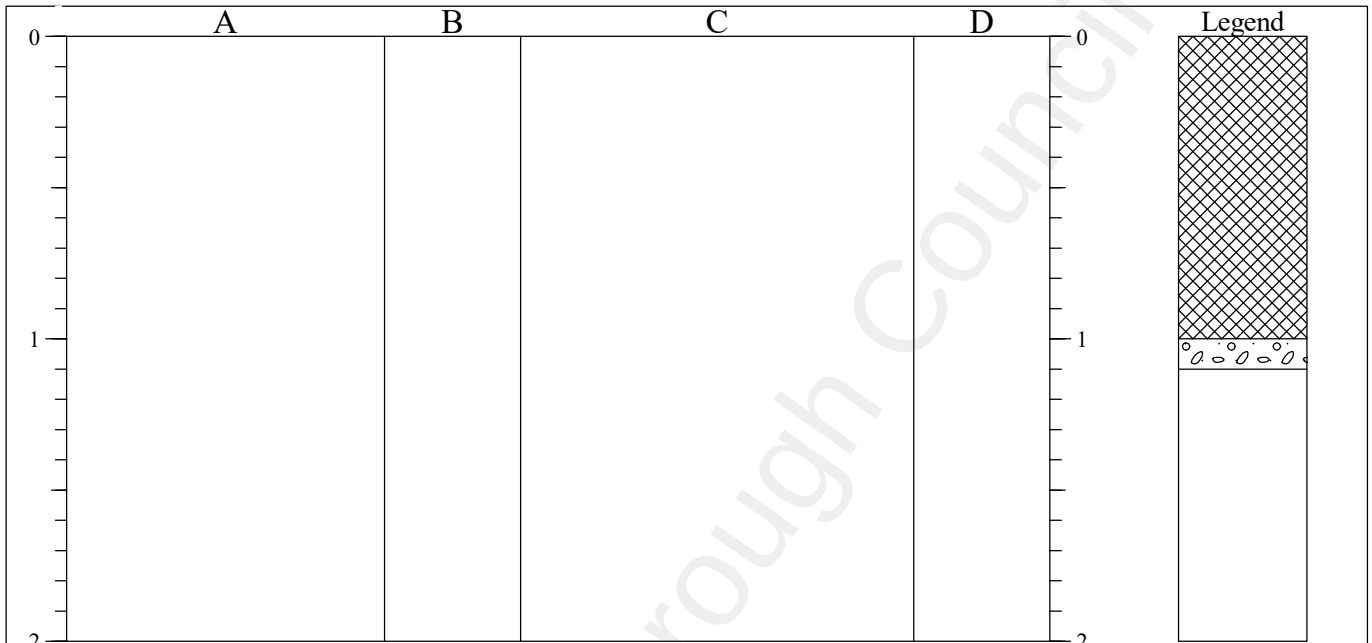
STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.08		HARSTANDING: Brick paving.			
0.08-0.25		HARDSTANDING: Concrete.			
0.25-0.30		MADE GROUND: Medium dense white coarse sub-angular Chalk Gravel.	0.20	D	
0.30-0.65		MADE GROUND: Medium dense brown slightly clayey gravelly Sand with occasional rootlets. Sand is medium. Gravels are abundant medium to coarse sub-angular flints and occasional fine sub-angular brick and chalk fragments.	0.40	D	
0.65-0.75		Medium dense brown slightly clayey very sandy Gravel. Sand is medium. Gravels are medium to coarse rounded flints.	0.70	D	
		Hand Pit completed @0.75m.			

Shoring/Support: N/A Stability: Stable 			GENERAL REMARKS No groundwater encountered.	
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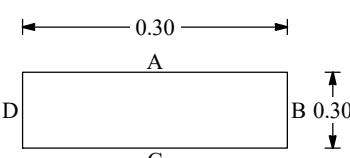
All dimensions in metres Scale 1:25	Client Longley Group Ltd	Method/ Plant Used Hand Digging Tools	Logged By AS
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TRIAL PIT LOG

Project Former St Johns Ambulance HQ, Armoury Drive - Asbestos Delineation Handpits				TRIAL PIT No TP03G
Job No 4768	Date 09-08-22	Ground Level (m)	Co-Ordinates ()	
Contractor Sevenoaks Environmental Consultancy Ltd				Sheet 1 of 1



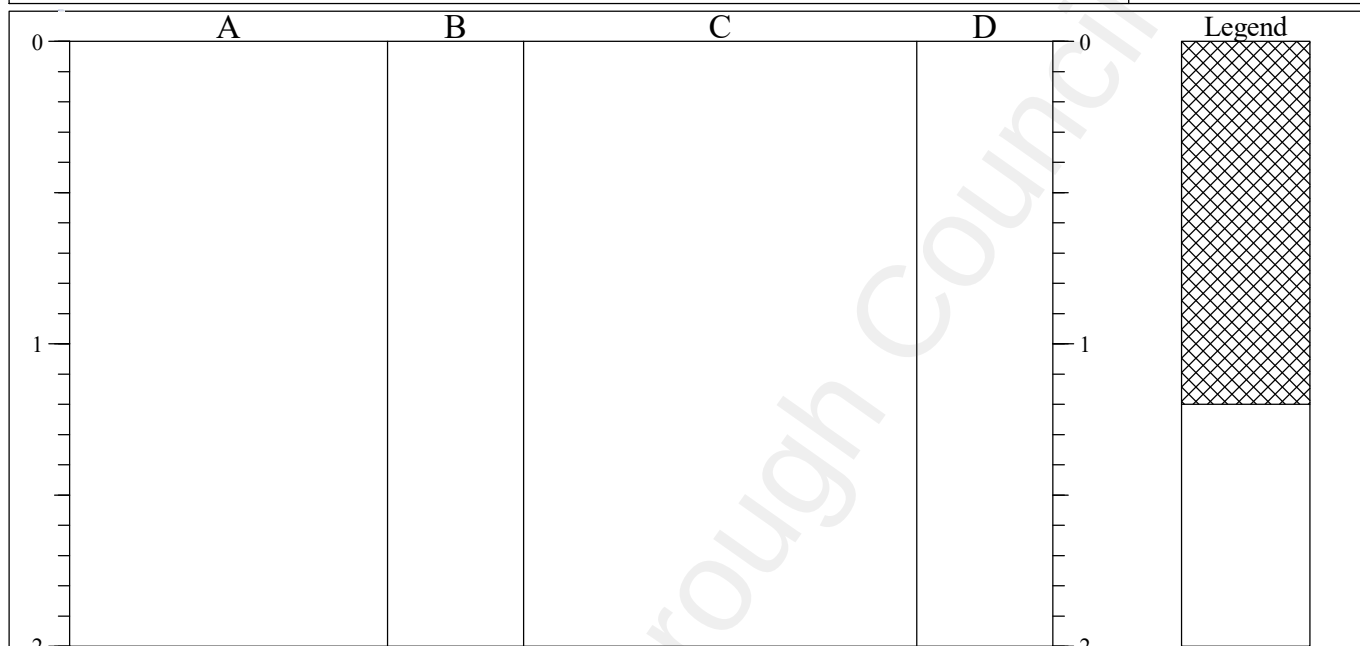
STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-1.00		MADE GROUND: Medium dense brown slightly clayey gravelly Sand with occasional rootlets. Sand is medium. Gravels are abundant medium to coarse sub-angular flints and occasional fine sub-angular brick and chalk fragments. ...@0.30m bgl becomes without rootlets.	0.50	D	
1.00-1.10		Medium dense brown slightly clayey very sandy Gravel. Sand is medium. Gravels are medium to coarse rounded flints. Hand Pit completed @1.10m.	1.05	D	

Shoring/Support: N/A Stability: Stable 	GENERAL REMARKS No groundwater encountered.
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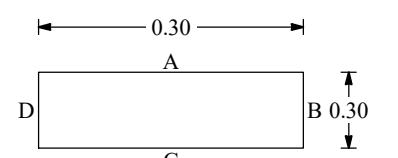
All dimensions in metres Scale 1:25	Client Longley Group Ltd	Method/ Plant Used Hand Digging Tools	Logged By AS
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TRIAL PIT LOG

Project Former St Johns Ambulance HQ, Armoury Drive - Asbestos Delineation Handpits				TRIAL PIT No TP03H
Job No 4768	Date 09-08-22	Ground Level (m)	Co-Ordinates ()	
Contractor Sevenoaks Environmental Consultancy Ltd				Sheet 1 of 1



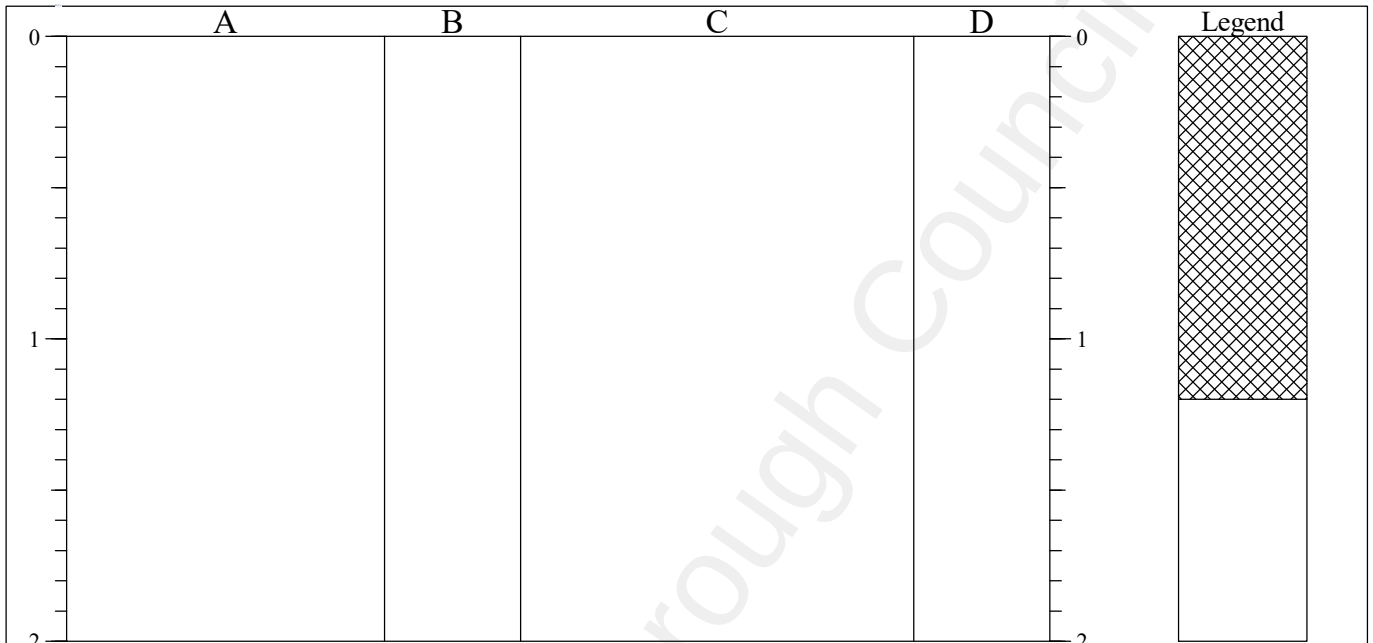
STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-1.20		MADE GROUND: Medium dense brown slightly clayey gravelly Sand. Sand is medium. Gravels are abundant medium to coarse sub-angular flints and occasional fine sub-angular brick and chalk fragments. Hand Pit terminated @ 1.20m bgl.	0.30	D	
			0.80	D	

Shoring/Support: N/A Stability: Stable 	GENERAL REMARKS No groundwater encountered.
--	--

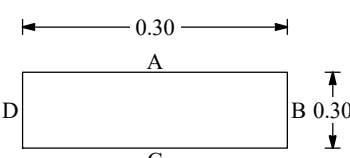
All dimensions in metres Scale 1:25	Client Longley Group Ltd	Method/ Plant Used Hand Digging Tools	Logged By AS
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TRIAL PIT LOG

Project Former St Johns Ambulance HQ, Armoury Drive - Asbestos Delineation Handpits				TRIAL PIT No TP03I
Job No 4768	Date 09-08-22	Ground Level (m)	Co-Ordinates ()	
Contractor Sevenoaks Environmental Consultancy Ltd				Sheet 1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-1.20		MADE GROUND: Medium dense brown slightly clayey gravelly Sand. Sand is medium. Gravels are abundant medium to coarse sub-angular flints and occasional fine sub-angular brick and chalk fragments. Hand Pit terminated @ 1.20m bgl.	0.40	D	
			0.90	D	

Shoring/Support: N/A Stability: Stable 	GENERAL REMARKS No groundwater encountered.
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All dimensions in metres Scale 1:25	Client Longley Group Ltd	Method/ Plant Used Hand Digging Tools	Logged By AS
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Appendix C

Chemical Laboratory Results

Gravesham Borough Council



Damian Jones
Sevenoaks Environmental Consultancy Ltd
145a Hastings Road
Pembury
Tunbridge Wells
Kent
TN2 4JU

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

DETS Report No: 22-06909

Site Reference: Gravesend

Project / Job Ref: 4768

Order No: 4768

Sample Receipt Date: 12/08/2022

Sample Scheduled Date: 15/08/2022

Report Issue Number: 1

Reporting Date: 19/08/2022

Authorised by:

Dave Ashworth
Technical Manager

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

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



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



Soil Analysis Certificate						
DETS Report No: 22-06909	Date Sampled	09/08/22	09/08/22	09/08/22	09/08/22	09/08/22
Sevenoaks Environmental Consultancy Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Gravesend	TP / BH No	TP03A	TP03A	TP03B	TP03C	TP03D
Project / Job Ref: 4768	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 4768	Depth (m)	0.20	0.40	0.30	0.30	0.30
Reporting Date: 19/08/2022	DETS Sample No	609069	609070	609071	609072	609073

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected

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



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Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
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Soil Analysis Certificate						
DETS Report No: 22-06909	Date Sampled	09/08/22	09/08/22	09/08/22	09/08/22	09/08/22
Sevenoaks Environmental Consultancy Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Gravesend	TP / BH No	TP03D	TP03E	TP03E	TP03F	TP03F
Project / Job Ref: 4768	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 4768	Depth (m)	0.80	0.25	0.70	0.20	0.40
Reporting Date: 19/08/2022	DETS Sample No	609074	609075	609076	609077	609078

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected

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



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Lenham Heath
Maidstone
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Soil Analysis Certificate						
DETS Report No: 22-06909	Date Sampled	09/08/22	09/08/22	09/08/22		
Sevenoaks Environmental Consultancy Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Gravesend	TP / BH No	TP03G	TP03H	TP03I		
Project / Job Ref: 4768	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: 4768	Depth (m)	0.50	0.30	0.40		
Reporting Date: 19/08/2022	DETS Sample No	609079	609080	609081		

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	

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



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 22-06909

Sevenoaks Environmental Consultancy Ltd

Site Reference: Gravesend

Project / Job Ref: 4768

Order No: 4768

Reporting Date: 19/08/2022

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

D Dried
AR As Received



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4480

List of HWOL Acronyms and Operators
DETS Report No: 22-06909
Sevenoaks Environmental Consultancy Ltd
Site Reference: Gravesend
Project / Job Ref: 4768
Order No: 4768
Reporting Date: 19/08/2022

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

Det - Acronym

Appendix D

General Limitations and Exceptions

Gravesham Borough Council

General Limitations and Exceptions

1. The advice given in this report with respect to contaminated land / pollution is based on the guidelines available at the time of writing.
2. The Client is advised that the conditions observed on site by SEC at the time of the investigation or assessment are subject to change. Certain indicators of the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance or investigation and they may subsequently have become observable.
3. Comments made relating to land gas or groundwater conditions are based on observations made at the time of an investigation unless otherwise stated. However, land gas or groundwater conditions may vary as a result of seasonal or other effects.
4. Ground contamination often exists as small discrete areas of contamination and there can be no certainty that any or all such areas have been located, sampled and / or identified.
5. Whilst commonly regarded as one of the most reliable drilling techniques, cable percussive drilling may result in a certain amount of soil mixing.
6. This assessment may be subject to amendment in light of additional information becoming available.
7. The findings and opinions conveyed in this report are based on information obtained from a variety of sources, including that from 1) previous site investigations and 2) chemical testing laboratories, and which SEC has assumed are correct. Nevertheless, SEC cannot and does not guarantee the authenticity or reliability of the information it has relied upon. SEC can accept no responsibility for inaccuracies within the data supplied by other parties.
8. This report is written in the context of an agreed scope of work between SEC and the Client and should not be used in a different context. In light of additional information becoming available, improved practices and changes in legislation amendment or re-interpretation of the assessment or report in whole or part may be necessary after its original submission.
9. This report is provided for sole use by the Client and is confidential to them. No responsibility whatsoever for the contents of the report will be accepted to anyone other than the Client.
10. SEC believes that providing information about limitations is essential to help the Client identify and thereby manage risks.
11. The copyright of written materials supplied shall remain the property of SEC but with a royalty free perpetual licence, granted to the Client on payment in full of any outstanding monies.
12. SEC does not provide legal advice and the advice of the Clients legal advisors may also be required.
13. The use of data generated by this site investigation for the design of foundations or geo-technical assessment was outside the scope of this report.
14. An ecological, topographical or asbestos survey was outside of the scope of this report.

15. SEC notes that all recommendations made within our report are subject to regulatory approval and should be agreed with them prior to the conduct of any further site investigation, remediation or development works.
16. This report represents a stage in an iterative process of investigation and assessment and as such it is possible that further work may be recommended.
17. The report is issued on the condition that SEC will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the boreholes or trial pits which have not been shown by the borehole, trial pits or other tests carried out during the investigation.
18. In addition, SEC will not be liable for any loss whatsoever arising directly or indirectly from any opinion given on the possible configuration of strata both between the borehole and/or trial pit positions and/or below the maximum depth of the investigation. Such opinions, where given, are for guidance only.
19. No allowance has been made in this report for testing which may be required for waste categorisation prior to the removal of any material from site for disposal.
20. No person other than the client to whom this report is addressed, shall rely on it in any respect and no duty of care shall be owed to any such third party.
21. That this investigation has relied on information from a discrete number of exploratory hole locations and allowances should be made for the variation in ground conditions between these locations and within the site boundary.
22. The opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between or beyond borehole positions, these are only for guidance only and no liability can be accepted for their accuracy.
23. It should be noted that the Made Ground depth recorded above is that encountered within the exploratory holes undertaken during the phase of work to which this report pertains. Owing to the variable nature and unknown deposition criteria of Made Ground it is possible that deeper or more extensive areas of Made Ground may exist at this site which has not been revealed by the current work. SEC can only comment on the findings within the exploratory holes conducted and cannot be held liable for variation of ground conditions between exploratory hole.
24. The above should take into account any LPA requirements with regard to the sites archaeological sensitivity (e.g. Watching Brief on excavation works)