

Phase 2: Site Investigation

Jubilee Park, Knowsley

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S250705/SI

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PHASE 2 SITE INVESTIGATION REPORT

JUBILEE PARK, KNOWSLEY

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Revision	Date	Prepared By	Signed
Final	July 2025	D Simpson <i>Geotechnical Engineer</i>	
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1 EXECUTIVE SUMMARY

Site Address	Lincombe Road, Dinas Lane, Liverpool, L36 2LW.
Proposed Development	The site is expected to be developed with into an artificial turf playing area with associated parking and peripheral soft landscaping.
Fieldwork	• 10no machine excavated trial pits (TP01 to TP10) to a maximum depth of 3.00mbgl. • In-situ soakaway testing carried out in TP03 and TP10. • In-situ Plate Bearing Tests carried out in TP01, TP02, TP04-09 to determine California Bearing Ratio (CBR) at 0.10mbgl.
Ground Conditions	• Made ground was varied across the site and was encountered to a minimum depth of 0.50mbgl and a maximum depth of 2.40mbgl. The made ground broadly consisted of slightly gravelly sand topsoil underlain by clayey slightly gravelly sand, and sometimes sandy slightly gravelly clay. Within TP07 sandy gravel was encountered between 1.40mbgl and 2.00mbgl. The gravel here comprised mudstone, sandstone, limestone and concrete. Made ground in TP09 and TP10 consisted of very sandy slightly gravelly topsoil underlain by tarmac, 0.10m (TP09) and 0.60m (TP10). • Natural ground varied with cohesive deposits of sandy slightly gravelly clay to depths between 1.20mbgl and 2.90mbgl. These were underlain with clayey slightly gravelly sand or sandy gravel to the base of those trial pits at 3.00mbgl. Within TP's 01, 02, 07 and 08, granular deposits of sandy gravel or slightly clayey slightly gravelly sand were proven to the base of all pits at 3.00mbgl. • No groundwater was encountered.
Contamination Analysis	• Given the site's proposed land use, the levels of contamination recorded on site may pose a risk to the current and future users of the site. • If any zones of odorous, brightly coloured or suspected contaminated ground or groundwater are encountered then work should cease in that area until the material has been investigated. The results of the investigation will therefore determine whether or not remediation will be required. • Made ground classed as posing a low to moderate risk with respect to construction workers. PPE for workers. Damping down of site during dry windy conditions. • Clean cover system required for all proposed areas of soft landscaping, to 0.45m. • Controlled waters unlikely to be at significant risk. • With respect to utilities pH was elevated; as a minimum all services should be laid in clean trenches. • Sub surface concrete should be designed to DS-1 ACEC (Class AC-1s). This assumes static groundwater conditions.
Geotechnical Analysis & Foundation Recommendations	<i>Pitch (TP's 05, 06, 07, 08, 09 and 10)</i> • The ground conditions under the proposed pitch comprise slightly gravelly sand topsoil over varying made ground up to 2.40m deep. The made ground comprised both granular and cohesive deposits as well as buried tarmac. In-situ CBR's varied between 2.07 and 7.21. The latter could have been affected by the buried tarmac in TP09. An equilibrium CBR of <2% should be taken for made ground. <i>Parking and Access</i> • The ground conditions under the proposed parking and access comprise slightly gravelly sand topsoil over varying made ground up to 1.50m deep. The made ground comprised both granular and cohesive deposits. Natural sandy slightly gravelly clay underlay the topsoil from 0.50mbgl in TP03. In-situ CBR's varied between 1.49 and 10. An equilibrium CBR of <2% should be taken for made ground. Where granular made ground is recompacted a CBR of at least 5% however should be achievable, however this should be verified by insitu CBR testing on site and confirmed with the adopting authority. • Normal earthworks plant for excavations.

2 INTRODUCTION

2.1 Authorisation

The site investigation described in this report was carried out by Solmek to the instructions of Steve Wells Associates, on land located at Lincombe Road, Dinas Lane, Liverpool, L36 2LW, (Figure 1).

Sources of information are detailed in *Solmek Phase 1 Desk Study (S250705) July 2025*.

Reference should be made to the above report for details of the site's history and environmental setting.

2.2 Scope of Works

The site is expected to be developed with into an artificial turf playing area with associated parking and peripheral soft landscaping.

The following steps may be required in the investigation and remediation of potentially contaminated land:

- Phase 1: Desk Study
- Phase 2: Intrusive Investigation
- Phase 3: Remediation Statement
- Phase 4: Validation Reports

Phases 1 and 2 are generally required in the redevelopment of most sites. Phases 3 and 4 are subject to the findings of the initial stages.

A geotechnical and environmental (Phase 2) investigation including a ground gas risk assessment was requested. The fieldwork and testing was generally carried out according to:

- BS 5930:2015+A1:2020 Code of Practice for Ground Investigations.
- BS 10175:2011+A1:2013 Investigation of Potentially Contaminated Sites – Code of Practice.
- Rock and soil descriptions shall be in accordance with BS EN ISO 14689-1:2003, BS EN ISO 14688-1:2002 and BS EN ISO 14688-2:2004.

This report forms part of a Stage 1 Risk Assessment (Generic Quantitative Risk Assessment) with respect to the Environment Agency's guidance document Environment Agency *Land Contamination Risk Management*, which replaced the now-withdrawn *Contaminated Land Report 11 – Model Procedures for the Management of Land Contamination (2004)*.

The information provided in this report is based on the investigation fieldwork and is subject to the comments and approval of the various regulatory authorities. There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Solmek reserve the right to alter conclusions and recommendations should further information be available or provided. Any schematic representation or opinion of the possible configuration of ground conditions between exploratory holes is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

3 SITE DESCRIPTION

A site inspection, as recommended in BS 5930 and BS 10175, was undertaken on Tuesday 15th July 2025. The site is centred at Ordnance Survey Co-ordinates 342990, 391550 and covers approximately 0.85Ha.

The site is a rectangular shaped parcel of land of level topography located in the western portion of Jubilee Park. The site is currently utilised as grassed recreational ground, including a macadam basketball court, and has locked gated access/open pedestrian access from Lincombe Road. A series of deciduous trees line the northwest, west and southwest boundary of the site. Manhole covers were noted towards the eastern portion of the site.

The surrounding area of the site is predominantly residential housing, a children's playing area and football pitches.

4 FIELDWORK

The fieldwork was carried out between 7th and 8th of July 2025. The extent of the investigation was:

- 10no machine excavated trial pits (TP01 to TP10) were dug to a maximum depth of 3.00mbgl.
 - The trial pits were spaced to target the old rose garden and tennis courts, whilst also providing a baseline overview for chemical and geotechnical samples across the whole site.
- In-situ soakaway testing carried out in TP03 and TP10.
- In-situ Plate Bearing Tests carried out in TP01, TP02, TP04-09 to determine California Bearing Ratio (CBR) at 0.10mbgl.
- Retrieval of samples for geotechnical and chemical testing.

The trial pits were respectively backfilled with clean arisings upon completion.

Descriptions of the strata encountered in the trial pits together with details of sampling and groundwater are presented in Appendix B of this report. A plan showing the location of the trial pits can be found in Appendix A (Figure 2).

5 GROUND CONDITIONS

A summary of the ground conditions encountered is given below. The exploratory pit logs are presented in Appendix B.

5.1 Made Ground

Made ground was varied across the site and was encountered to a minimum depth of 0.50mbgl (TP03) and a maximum depth of 2.40mbgl (TP08). The made ground broadly consisted of slightly gravelly sand topsoil underlain by clayey slightly gravelly sand, and sometimes sandy slightly gravelly clay, with the gravel comprising mudstone, sandstone, limestone and brick. Within TP07 sandy gravel was encountered between 1.40mbgl and 2.00mbgl. The gravel here comprised mudstone, sandstone, limestone and concrete. Made ground in TP09 and TP10 consisted of very sandy slightly gravelly topsoil underlain by tarmac, 0.10m (TP09) and 0.60m (TP10).

5.2 Obstructions/Services

Obstructions were encountered within several positions, they did not result in the termination of any of the exploratory positions, as summarised below:

- TP01 (limestone slab obstruction at 0.30mbgl)
- TP05 (land drain obstruction at 0.80mbgl)
- TP06 (land drain obstruction at 1.00mbgl)
- TP09 (land drain obstruction at 1.50mbgl)

5.3 Natural Deposits

Proven to underlie the made ground deposits across the site, natural ground varied with cohesive deposits of sandy slightly gravelly clay to depths between 1.20mbgl (TP05) and 2.90mbgl (TP04). These were underlain with clayey slightly gravelly sand or sandy gravel to the base of those trial pits at 3.00mbgl. Within TP's 01, 02, 07 and 08, granular deposits of sandy gravel or slightly clayey slightly gravelly sand were proven to the base of all pits at 3.00mbgl. The gravel component comprised mudstone sandstone and limestone.

5.4 Groundwater

Groundwater was not encountered during this investigation.

It should be noted the rapid rate of advancement of the exploratory holes may mask minor seepages and it

should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities.

6 CONTAMINATION TESTING RESULTS

The site is expected to be developed with into an artificial turf playing area with associated parking and soft landscaping. The chemical samples were generally retrieved in line with BS ISO 18400-105:2017 *Soil Quality. Sampling*. The chemical results are presented in Appendix C.

6.1 Site Characterisation

Within the Solmek Phase 1 Desk Study, a preliminary conceptual model was formed based on the information obtained. The initial risk was based on the site history which recorded generally park land since the 1930's.

An overall low to moderate risk was provided for various receptors:

- Human Health – Mod/Low
- Controlled Water – Low
- Current Site Users (on-site workers/visitors) – Low
- Vegetation – Low
- Construction Materials – Mod/Low

6.2 Contamination Testing and Rationale

To provide information upon the possibility of ground contamination six samples of made ground were selected for shallow contamination testing. A low to moderate overall contamination risk was highlighted in the Phase 1 Desk Study due to previous land uses. This coupled with the end use being Public Open Space (Park) land use means that six samples are considered appropriate for testing. The samples selected are detailed below:

- TP01 – 0.40-0.50m (Made ground – granular)
- TP03 – 0.10-0.20m (Made ground – topsoil)
- TP04 – 0.10-0.20m (Made ground – topsoil)
- TP07 – 0.10-0.20m (Made ground – topsoil)
- TP09 – 0.20-0.30m (Made ground- tarmac)
- TP09 – 0.20-0.30m (Made ground- tarmac)
- TP10 – 0.10-0.20m (Made ground- tarmac)
- TP10 – 0.30-0.40m (Made ground- tarmac)

The samples selected are considered to provide coverage of the made ground from across the site that would be most likely to be exposed during future site works. The samples were tested for the following contaminant suites:

- 8no Metals, semi-metals, non-metals, inorganic determinants
- 8no Asbestos identification screenings
- 8no Speciated Polyaromatic Hydrocarbons (PAHs)
- 3no Total Petroleum Hydrocarbon Criteria Working Group fractions (TPHCWG)

6.3 Test Results

Based on the proposed development at the site, the test results have been compared to a series of Land Quality Management (LQM) Suitable for Use Levels (S4UL) based on a Public Open Space (Park) land use. These are the most up to date thresholds published in 2015.

The value for lead has been compared with the Category 4 Screening Level (March 2014) developed by Contaminated Land: Applications In Real Environments (CL:AIRE).

The test results are presented in Appendix C, and a summary is provided below in Tables 1 & 2.

TABLE 1: SUMMARY OF INORGANIC CONTAMINATION TESTING RESULTS

Determinand	Units	Number of Samples above Level of Detection	Minimum Recorded Level	Maximum Recorded Level	POS (Park) Threshold Value	Number of Results Exceeding Threshold Value
Metals						
Cadmium	mg/kg	7	<0.1	0.6	532	0
Chromium	mg/kg	8	11	23	33000	0
Copper	mg/kg	8	14	68	44000	0
Lead	mg/kg	8	18	3400	1300	1
Mercury	mg/kg	3	<0.1	0.18	240	0
Nickel	mg/kg	8	13	21	3400	0
Zinc	mg/kg	8	41	110	170000	0
Semi metals and non metals						
Arsenic	mg/kg	8	5	19	170	0
Boron	mg/kg	3	<0.4	0.5	46000	0
Selenium	mg/kg	3	<0.2	1.2	1800	0
Inorganic chemicals						
Cyanide (Total)	mg/kg	0	<0.5	-	73.8**	0
Sulphate (2:1 Water Soluble)	mg/l	8	15	56	2000^	0
Other						
pH	pH	-	6.4	11.3	5.5^	0
* Category 4 Screening Levels, March 2014 ** CLEA Software Version 1.06 (pH7 and 1%SOM) ^ EA Threshold Values + BRE Special Digest 1: 2005 HGP Home Grown Produce						

6.4 Metals, Semi Metals and Non Metals

Significantly elevated concentrations of lead were encountered in TP10 (0.00-0.30m), in the north of the site. No other samples indicated significant raised levels of contamination above the S4UL threshold values, based on the eight samples tested.

6.5 Inorganic Chemicals

Soluble sulphates (potentially aggressive to foundation concrete) were recorded between 15 and 56mg/l. None of the samples were elevated above levels affecting human health or were raised above the BRE Special Digest 1 500mg/l limit for the sulphate classification of concrete.

The results of the pH testing were between 6.4 and 11.4. These pH levels are consistent with slightly acidic to alkaline conditions.

6.6 Organic Chemicals

The organic thresholds vary depending on the levels of soil organic matter (SOM).

The average SOM recorded across the site was 3.20% therefore a SOM of 2.50% has been used to determine the S4UL thresholds. Table 2, below, summarises the results.

TABLE 2: SUMMARY OF ORGANIC CONTAMINATION TESTING RESULTS

Determinand	Units	Number of Samples above Level of Detection	Minimum Recorded Level	Maximum Recorded Level	POS (Park) Threshold Value at 2.5% SOM	Number of Results Exceeding Threshold Value
TPH Aliphatic Fractions						
Aliphatic (C5-C6)	mg/kg	0	<1	-	130000	0

Aliphatic (C6-C8)	mg/kg	0	<1	-	220000	0
Aliphatic (C8-C10)	mg/kg	0	<1	-	18000	0
Aliphatic (C10-C12)	mg/kg	0	<1	-	23000	0
Aliphatic (C12-C16)	mg/kg	0	<1	-	25000	0
Aliphatic (C16-C21)	mg/kg	0	<1	-	110000	0
Aliphatic (C21-C35)	mg/kg	0	<1	-	110000	0
TPH Aromatic Fractions						
Aromatic (C5-C7)	mg/kg	0	<1	-	84000	0
Aromatic (C7-C8)	mg/kg	0	<1	-	95000	0
Aromatic (C8-C10)	mg/kg	0	<1	-	8500	0
Aromatic (C10-C12)	mg/kg	0	<1	-	9700	0
Aromatic (C12-C16)	mg/kg	2	<1	16.91	10000	0
Aromatic (C16-C21)	mg/kg	3	7.13	490.8	7700	0
Aromatic (C21-C35)	mg/kg	3	14.4	889.3	7800	0
Speciated PAH						
Naphthalene	mg/kg	3	<0.1	0.67	1900	0
Acenaphthylene	mg/kg	8	0.11	3.9	30000	0
Acenaphthene	mg/kg	6	<0.1	8.6	30000	0
Fluorene	mg/kg	8	0.18	12	20000	0
Phenanthrene	mg/kg	8	0.19	100	6200	0
Anthracene	mg/kg	6	<0.1	27	150000	0
Fluoranthene	mg/kg	8	0.12	210	6300	0
Pyrene	mg/kg	7	<0.1	190	15000	0
Benzo[a]anthracene	mg/kg	7	<0.1	86	56	2
Chrysene	mg/kg	7	<0.1	91	110	0
Benzo[b]fluoranthene	mg/kg	7	<0.1	69	15	3
Benzo[k]fluoranthene	mg/kg	7	<0.1	38	410	0
Benzo[a]pyrene	mg/kg	8	0.17	89	12	3
Benzo[g,h,i]perylene	mg/kg	6	<0.1	44	1500	0
Dibenz[a,h]Anthracene	mg/kg	6	<0.1	8	1.3	3
Indeno[1,2,3-c,d]Pyrene	mg/kg	6	<0.1	64	170	0
Total PAH	mg/kg	7	<2	1000	50*	3
Total Phenol	mg/kg	6	<0.3	1.8	1500	0
* EA Threshold Values						

From the six samples tested for organic determinants, elevated PAH compounds were detected within samples of topsoil and of the made ground containing tarmac.

6.7 Asbestos

From the six samples subject to asbestos screening, asbestos fibres were not recorded.

6.8 Leachates

The results of the two leachate tests are presented in Table 3. The results have been compared, where available, to UK Drinking Water Standards (DWS), otherwise EA Leachate Quality Thresholds, EQS Freshwater and WHO Guidelines (2005) have been used.

TABLE 3: LEACHATE TESTING

Determinant	Units	Number of Samples above Level of Detection	Minimum Recorded Level	Maximum Recorded Level	UK DWS	Number of Results Exceeding Threshold Value
Inorganic Contaminants						
Cadmium	µg/l	0	<0.03	-	5	0
Chromium (Total)	µg/l	2	0.43	1.00	50	0
Copper	µg/l	2	2.6	5.5	2000	0
Lead	µg/l	2	3.1	6.3	25	0
Mercury	µg/l	0	<0.01	-	1	0
Nickel	µg/l	2	0.6	1.1	20	0

Zinc	µg/l	2	5.2	11	5000	0
Arsenic	µg/l	2	1.7	2.4	10	0
Selenium	µg/l	1	<0.25	0.26	10	0
Cyanide (Total)	µg/l	0	<20	-	50	0
Sulphate	mg/l	2	2.5	4.0	250	0
Boron	µg/l	0	<12.0	-	2000	0
PAH						
Naphthalene	µg/l	0	<0.05	-	PAH DWS is 0.1 µg/l	0
Acenaphthylene	µg/l	1	<0.01	0.03		0
Acenaphthene	µg/l	1	<0.01	0.02		0
Fluorene	µg/l	0	<0.01	-		0
Phenanthrene	µg/l	1	<0.01	0.12		0
Anthracene	µg/l	1	<0.01	0.08		0
Fluoranthene	µg/l	2	0.02	0.51		0
Pyrene	µg/l	2	0.01	0.53		0
Benzo(a)anthracene	µg/l	1	<0.01	0.31		0
Chrysene	µg/l	1	<0.01	0.27		0
Benzo(b)fluoranthene	µg/l	2	0.02	0.52		0
Benzo(k)fluoranthene	µg/l	1	<0.01	0.20		0
Benzo(a)pyrene	µg/l	2	0.01	0.46		0
Benzo(ghi)perylene	µg/l	2	0.01	0.38		0
Dibenzo(ah)anthracene	µg/l	1	<0.01	0.38		0
Ideno(123cd)pyrene	µg/l	1	<0.01	0.33		0
PAH Total	µg/l	1	<0.20	3.8	0.2**	0
Phenol	µg/l	0	<1.5	-	0.5	0
TPH Aliphatic Fractions						
C5-6	µg/l	0	<0.1	-	15000*	0
C6-8	µg/l	0	<0.1	-	15000*	0
C8-10	µg/l	0	<0.1	-	300*	0
C10-12	µg/l	0	<1.0	-	300*	0
C12-16	µg/l	0	<1.0	-	300*	0
C16-21	µg/l	0	<1.0	-	300*	0
C21-35	µg/l	0	<1.0	-	300*	0
TPH Aromatic Fractions						
C5-7	µg/l	0	<0.1	-	10*	0
C7-8	µg/l	0	<0.1	-	10*	0
C8-10	µg/l	0	<0.1	-	100*	0
C10-12	µg/l	0	<1.0	-	100*	0
C12-16	µg/l	0	<1.0	-	100*	0
C16-21	µg/l	0	<1.0	-	90*	0
C21-35	µg/l	0	<1.0	-	90*	0
* WHO Guidelines 2005 ** EA leachate quality thresholds *** EQS Freshwater						

Following comparison of the leachate results to date, slightly leachable PAH compounds were recorded above drinking water standards.

6.9 Environmental Protection Act 1990: Part 2A Revised Statutory Guidance (April 2012)

This revised document explains how the Local Authority should decide if land, based on a legal interpretation, is contaminated. The document replaces the previous guidance given in Annex 3 of DEFRA Circular 01/2006, issued in accordance with section 78YA of the 1990 Environmental Protection Act.

The main objectives of the Part 2A regime are to “identify and remove unacceptable risks to human health and the environment” and to “seek to ensure that contaminated land is made suitable for its current use”. Part 2A uses a risk based approach to defining contaminated land whereby the “risk” is interpreted as “the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land” and by “the scale and seriousness of such harm or pollution if it did occur”.

For a relevant risk to exist a contaminant, pathway and receptor linkage must be present before the land can be considered to be contaminated. The document explains that *“for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters.”*

A conceptual model is used to develop and communicate the risks associated with a particular site.

To determine if land is contaminated the local authority use various categories from 1 to 4. Categories 1 and 2 include “land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health.” Categories 3 and 4 “encompass land which is not capable of being determined on such grounds”.

See Appendix E for additional notes on contamination guidelines.

7 CONCEPTUAL MODEL AND CONTAMINATION ANALYSIS

The contamination conceptual model in Table 3 identifies the potential pollution linkages present on site based on source – pathway – receptor relationships.

TABLE 3: CONCEPTUAL MODEL

Source	Pathway	Receptor	Risk Rating	Comments
Asphyxiating or explosive ground gases - Made ground (<2.40m) - Infilled land within 250m - Not in Radon Affected Area	Ground gas migration - Migration through permeable soils - Inhalation	Future site users Adult & infant residents	Low	Gas monitoring not required as no occupied building is proposed as part of the development.
		Users during development Construction workers	Low	
Areas of contamination hazardous to human health Significantly elevated PAH compounds and lead were encountered in samples of topsoil and made ground.	- Inhalation - Dust ingestion - Dermal contact	Future site users Adult & infant residents	Moderate /Low	Made ground found to contain elevated PAH compounds and is considered unsuitable to remain as a near surface material in soft landscaped areas. Where the intended car park and astor turf pitches are to be placed above the made ground no linkage will be present as such the risk to human health is considered low in these areas.
		Users during development Construction workers	Moderate /Low	Mitigation measures required during construction. Consideration to be given to Health and Safety Executive: <i>Protection of Workers and the General Public During the Development of Contaminated Land</i> .
	- Inhalation - Dust ingestion	Users of surrounding sites Transient adult workers	Moderate /Low	Potential moderate risk during remediation/construction from dust generation. Consideration to be given to dust suppression, in line with BRE: <i>The Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance</i> .
Leachable contamination Slightly leachable PAH compounds detected	Leaching of mobilised contaminants	Drift geology Secondary Aquifer - Undifferentiated	Low	Risk to groundwater considered to be low from the slightly elevated PAH compounds detected due to: - No abstractions within 1km of the site. - No shallow groundwater encountered. - Development will include hardstanding car parking and cover layer or astroturf design layers which will limit surface water infiltration and subsequent leaching. - Natural deposits contain interbedded layers of clay which will attenuate the leachable compounds above the solid geology which was not encountered within the depths excavated.
		Solid geology Principal Aquifer	Low	
	- Drainage - Lateral migration - Accumulation of contaminated sediment	Surface water features Pond 680m south	Low	No significant risk due to distance of site from nearest surface water feature.
Areas of phytotoxic contamination Locally phytotoxic lead	Uptake via roots and leaf surfaces	Vegetation Peripheral proposed	Low	Cover layer for proposed new soft landscaping above made ground deposits. The topsoil was found to contain significantly elevated PAH compounds, which in the one sample of topsoil to contain such elevations may be associated with coal within the sample as defined by the double plot ratio of PAH compounds. In view of the this the topsoil from the site could be stripped and stockpiled separately prior to retesting for re-use suitability.

Areas of contamination above service fabric or BRE Special Digest 1 thresholds Elevated pH	Direct contact	Construction Materials Concrete	Low	No significant risk identified from the testing of the made ground.
		Construction Materials Service Fabric	Low	Copper piping to be avoided and prudent to lay any service within a clean bedding.

Mitigation measures to reduce the risks identified for each receptor are discussed in the following sections.

7.1 Users of the Site Once Development is Complete

The users of the site, particularly construction workers, are likely to be exposed to contaminants present in the soils beneath the site during redevelopment work. Potential exposure pathways include dermal absorption after contact with contaminated ground, inhalation of soil or dust, inhalation of volatised compounds, and inadvertent soil ingestion.

To establish if the levels of contaminants present on site may pose a risk to the health of the future users of the site the results of the contamination testing have been compared to a series of LQM S4UL thresholds based on a public open space end use (see Tables 1 and 2).

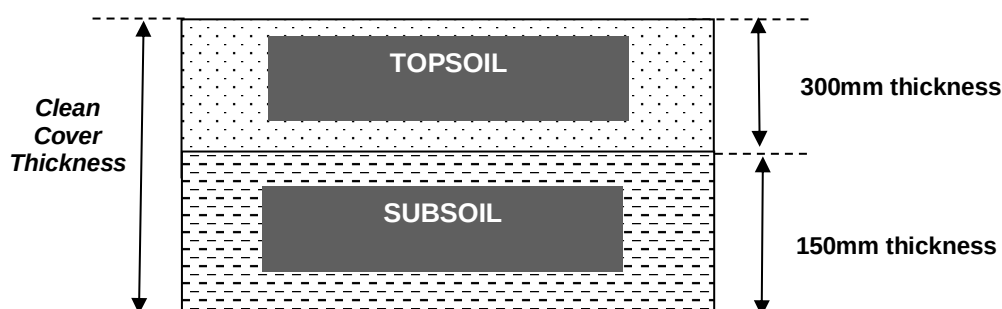
The levels of contaminants across the site are generally low with exceedances limited to significantly elevated lead within the made ground and significantly elevated PHA compounds within The topsoil and made ground.

The new development is expected to comprise a new astro turf pitch, peripheral soft landscaping and a hardstanding car park. Based on the shallow soil contamination testing, it is considered that the levels of contamination may pose a risk to future users of the site, as soft landscaping is proposed in the final development. This pollutant linkage however will be severed as long as all contaminated areas are covered either by hardstanding, a built up astroturf design or a clean cover system.

During the initial site strip, proposed soft landscaped areas should be excavated to 0.45mbgl or natural ground (whichever is the shallowest). Any deleterious materials encountered (i.e. ash, slag, brick rubble and concrete) should be removed and placed beneath areas of permanent hardcover. If material is to be moved either elsewhere on site or removed from site, consideration should be given to carrying out these works in accordance with the CL:AIRE Definition of Waste: Code of Practice, and a Materials Management Plan may be required. Topsoil from around the site is deemed potentially suitable and should be stockpiled and retested to assess its re-useability.

The cover system should include imported topsoil or clean topsoil from site, to a depth of 300mm over either natural ground or clean imported subsoil at least 150mm in thickness. If insufficient topsoil is available on site then it should be imported from a reputable source. Appropriate certification would be required to ensure that the onsite or imported materials are clean and free from deleterious materials in accordance with the Local Authority Guidelines *Verification Requirements for Cover Systems, Technical Guidance for developers, Landowners and Consultants* (Yorkshire and Lincolnshire Pollution Advisory Group Version 4.1 – June 2021). Details of the clean cover system must be presented in a Phase 3 Remediation Statement.

The diagram below gives an overview of the minimum thicknesses of clean cover system that should be placed by the site operatives in soft landscaped areas.



7.2 Construction Workers and Users of Surrounding Sites

Short term human exposure to contaminants present in soils can occur via several pathways during the construction and ground works phase of the development. These include dermal absorption after contact with contaminated ground, inhalation of soil or dust (including windblown dust), inhalation of volatised compounds, inadvertent soil ingestion and contact with contaminated groundwater.

Raised levels of lead and some PAHs were detected. It is considered that such levels of contamination may pose a risk to construction workers and users of surrounding sites, however S4ULs assume long term exposure to contamination and therefore relate primarily to chronic health risks. The risk of short-term acute exposure (e.g. to construction workers) falls under the *Health and Safety at Work Act: 1974* and underlying regulations, such as the *Control of Substances Hazardous to Health (COSHH, 2002)* Regulations. The levels of contamination and the associated risks to site workers should be considered under the *Construction Design and Management (CDM, 2015)* regulations during the planning of works and the preparation of the designers and contractors Health and Safety Plans and Method Statements.

As good practice, full PPE must be employed in accordance with Health and Safety Executive: *Protection of Workers and the General Public During the Development of Contaminated Land* and safeguards should be taken to limit dust during ground works, and access to the public should be restricted. Construction workers should use gloves as a precaution when handling any fill materials. Provision of suitable hygiene facilities are needed for site workers. Wheel washers should be provided and used for any vehicle entering or leaving site to prevent cross contamination.

Although asbestos was not detected from the soil samples subjected to testing within this investigation, the possibility still exists that asbestos containing materials may still be present on site and currently lie undetected. It is therefore advised that a 'watching brief' is undertaken during the initial site strip and any excavation works and advice sought if asbestos is found or suspected.

During dry weather, any excavations may require clean water to be sprinkled at shallow depth to prevent excess dust escaping to off-site receptors. Monitoring of dust concentrations during construction should be given careful consideration to ensure occupational exposure levels are not exceeded. Works should be undertaken in line with BRE: *The Control of Dust and Emissions from Construction and Demolition, Best Practice Guidance*.

7.3 Vegetation

Plants can be affected by soil contamination in a number of ways resulting in growth inhibition, nutrient deficiencies and yellowing of leaves. Contaminants are taken up by plants through the roots and through foliage. Contaminants identified as being highly phytotoxic include boron, cadmium, copper, nickel, and zinc.

To establish if the levels of contaminants present on site may pose a risk to vegetation the results of the contamination testing have been compared to a series of threshold values published in *Code of Good Agricultural Practice for the Protection of Soil*. Phytotoxic lead was encountered as well as the made ground on site being considered unsuitable as a near surface rooting medium and as such a cover layer, as described above should be used in new soft landscaping areas.

7.4 Ground and Surface Water

The principal pathway by which soil contamination may reach the water environment is through a slow seepage or leaching to groundwater or surface water. The potential for contaminants to migrate along such pathways is dependent on the chemical and physical characteristics of the contaminants and the local hydrogeology.

7.4.1 Hydrogeological Context

From the site investigation undertaken, ground conditions broadly comprise deep made ground over drift deposits comprising sandy gravelly clays (low permeability) or sands/gravels (moderate to high permeability). The drift deposits are designated as a Secondary Aquifer by the Environment Agency.

The published geology indicates the site is underlain by solid geology of Principal Aquifer by the Environment Agency.

The nearest surface water is a pond 680m south.

No groundwater was encountered during this investigation.

7.4.2 Contamination Context

Significantly elevated lead and PAH compounds were detected within the made ground and topsoil samples and the PAH compounds were also found to be leachable with respect to stringent Drinking Water Standards (DWS).

7.4.3 Hydrogeological Risk Assessment

The risk to controlled waters is considered to be low from the leachable PAH compounds due to the following:

- No ground or surface water abstractions within 1km of the site.
- No shallow groundwater encountered.
- Development will include hardstanding car parking and cover layer or astroturf built up design layers which will limit surface water infiltration and subsequent leaching.
- Natural deposits contain interbedded layers of clay which will attenuate the leachable compounds above the solid geology which was not encountered within the depths excavated.
- Distance to surface water feature >600m from site.

7.5 Construction Materials

Materials at risk from potential soil contamination include inorganic matrices such as cement and concrete and also organic material; e.g. plastics and rubbers. Acid ground conditions and elevated levels of sulphates can accelerate the corrosion of building materials. Plastics and rubbers are generally used for piping and service ducts and are potentially attacked by a range of chemicals, most of which are organic, particularly petroleum-based substances. Drinking water supplies can be tainted by substances that can penetrate piping and water companies enforce stringent threshold values.

7.5.1 Concrete Classification

BRE Special Digest One: *Concrete in Aggressive Ground*: 2005 3rd Edition has been used to assess the risks posed to underground concrete and to establish the design measures required to mitigate the risks. The results of the pH and water-soluble sulphate tests (when converted to total potential sulphate) fall into Class DS-1 ACEC (Class AC-1s) requirements for concrete protection. This assumes static groundwater conditions.

7.5.2 Water Supply Pipes Material Selection

The levels of potential contaminants should be compared to thresholds supplied in the UK Water Industry Research (UKWIR) publication *Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites* (January 2011). A Brownfield Site is defined in the document as "Land or premises that have previously been used or developed that may be vacant or derelict". It should be noted that Brownfield sites may not be contaminated. The guidance does not apply to Greenfield Sites however water companies may have their own assessment criteria which should be checked by the developer.

Based on the samples tested during the site investigation, levels of slightly acidic to alkaline pH were recorded.

The concentrations of the selected determinants should be compared to the pipe material selection table in Appendix E, and consultation with the appropriate utility supply company is required to identify the most suitable service fabric. However, the pH levels may preclude the use of copper pipes depending on the depth of proposed service corridors.

7.6 Unexpected Contamination

If during the initial site strip or subsequent ongoing construction activities, any zones of odorous, brightly coloured or suspected contaminated ground, or suspected Asbestos Containing Materials (ACMs) are encountered, then the following procedure should be followed:

- Stop work in the affected area
- Contact Solmek and provide pictures of the affected area

- Solmek can visit site to investigate the material and provide guidance
- If required – Solmek can sample and test the material
- Once test results are returned, this will determine whether or not remediation will be required

7.7 Waste Classification

During the site strip and construction activities, material may be required to be removed from site. Any such material would require classification, in line with Environment Agency Technical Guidance *Waste Classification: Guidance on the classification and assessment of waste* (2015). This would classify the material as either Non-Hazardous or Hazardous Waste.

Once the material has been classified, determining the suitable landfill for disposal is governed by landfill directive Waste Acceptance Criteria (WAC) testing, with landfills categorized as Inert Waste, Stable Non-Reactive Hazardous Waste and Hazardous Waste.

If waste classification and/or WAC testing are not undertaken, material taken off site may be subject to WAC testing by the appropriate waste disposal company. The decision on whether or not to accept waste, or whether further testing is required, is at the discretion of the waste disposal company.

For this project, Waste Classification has not been requested by the client. Waste classification, in line with the aforementioned EA guidance, would be needed to classify the material as Hazardous or Non-Hazardous Waste. WAC testing would then be required to determine the suitability of the material for the relevant landfill.

Solmek note that tarmac was locally present across the site which may not have been tested – the client may wish to consider subjecting select tarmac samples to coal tar testing, to determine whether coal tar is present within the material. Should coal tar be present, it may require disposal as hazardous waste.

8 GEOTECHNICAL TESTING AND ANALYSIS

Samples taken from the trial pits underwent a series of geotechnical tests at a UKAS accredited laboratory to aid foundation design and soil description. In-situ Plate Bearing Tests were undertaken at 0.10mbgl. The geotechnical results are presented in Appendix D.

8.1 Moisture Contents

Five samples recovered from the trial pits have been subject to moisture content tests to determine the moisture profile at depths of between 0.50mbgl to 2.10mbgl. Moisture levels were between 11% and 20%.

8.2 Atterberg Limit Determinations

Five Atterberg Limit Determination tests were carried out on samples of cohesive material to classify the fine grained soils. The results were compared to the Casagrande Chart published in BS 5930 and showed the samples to generally be clay of low to intermediate plasticity.

The Plasticity Indices ranged from 10% to 23% meaning most moisture contents recorded above the corresponding plastic limits. The cohesive material can be assessed as having a **medium** shrinkage potential in relation to current relevant guidance

8.3 Particle Size Distribution and Sedimentation Testing

Four samples from the trial pits at varying depths were subject to Particle Size Distribution (PSD) tests in accordance with BS1377 Part 2 to aid soil descriptions. The results have been used to prepare precise soil descriptions in accordance with BS5930:2015 Section 6 and are presented in Appendix D.

8.4 Percolation Tests

Two percolation tests were carried out within the bases of TP03 and TP10. The results returned infiltration rates of 15.9×10^{-6} m/sec and 28.1×10^{-6} m/sec for the tests.

Given the results encountered and the significant thickness of low permeability cohesive deposits, soakaway

drainage may not be suitable for the proposed development. Soakaway drainage, if incorporated, should be designed in accordance with BRE *Special Digest 365 – Soakaway Design*. The results are presented in Appendix D.

8.5 CBR Tests

Plate Bearing CBR testing was undertaken on granular made ground in TP01, TP02, TP04-09 across the site. The in-situ CBR results are detailed below in Table 4.

TABLE 4: SUMMARY OF CBR TESTING RESULTS

Test Number	Ground Conditions	Depth (mbgl)	Maximum Applied Load (kPa)	Measured Plate Penetration (mm)	CBR (%)
PBT01	MG. slightly gravelly sand	0.10	150	4.47	1.49
PBT02	MG. slightly gravelly sand	0.10		2.07	10
PBT04	MG. slightly gravelly sand	0.10		5.14	1.67
PBT05	MG. sand	0.10		4.02	2.07
PBT06	MG. slightly gravelly sand	0.10		5.27	1.99
PBT07	MG. slightly gravelly sand	0.10		2.90	5.01
PBT08	MG. slightly gravelly sand	0.10		5.95	2.32
PBT09	MG. slightly gravelly sand	0.10		2.88	7.21

Where made ground was present, a conservative equilibrium CBR of <2% should be adopted for design purposes.

A detailed Plate Bearing Test Report has been included in Appendix D.

8.6 Discussion

8.6.1 Pitch (TP's 05, 06, 07, 08, 09 and 10)

The ground conditions under the proposed pitch comprise slightly gravelly sand topsoil over varying made ground up to 2.40m deep. The made ground comprised both granular and cohesive deposits as well as buried tarmac. In-situ CBR's varied between 2.07 and 7.21. The latter could have been affected by the buried tarmac in TP09. An equilibrium CBR of <2% should be taken for made ground.

8.6.2 Parking and Access

The ground conditions under the proposed parking and access comprise slightly gravelly sand topsoil over varying made ground up to 1.50m deep. The made ground comprised both granular and cohesive deposits. Natural sandy slightly gravelly clay underlay the topsoil from 0.50mbgl in TP03. In-situ CBR's varied between 1.49 and 10. An equilibrium CBR of <2% should be taken for made ground.

Where granular made ground is recompacted a CBR of at least 5% however should be achievable, however this should be verified by insitu CBR testing on site and confirmed with the adopting authority.

8.6.3 General Foundation Comments

It is recommended that an adequate drainage system for surface water be installed by a competent contractor in order to prevent surface water ponding or collecting during and post construction, which may in turn lead to deterioration of the founding stratum.

Prior to placing foundation concrete, obvious soft or loose spots should be removed and replaced with

suitably recompacted hardcore or lean mix concrete. In addition, all excavations should be inspected to ensure that they fully penetrate areas of disturbed ground.

Further advice should be sought from Solmek if unexpected ground conditions are encountered during redevelopment.

8.7 Excavation

Based on the nature of the ground conditions encountered, excavations should be within the capacity of normal earthworks plant although breaking out of tarmac and other obstructions should be anticipated. Stability of excavations will be poor in the made ground but should improve in the natural deposits. Excavation sides should be designed, constructed and supported in accordance with the recommendations given in CIRIA Report No. 97: "Trenching Practice".

8.8 Groundwater

Groundwater was not encountered during this investigation.

It should be noted the rapid rate of advancement of the exploratory holes may mask minor seepages and it should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities.

SOLMEK

Appendix A



12-16 Yarm Road, Stockton on Tees, TS18 3NA
Tel: 01642 607083 Email: info@solmek.com

Figure Title

Site Location Plan

Project Number

S250705

Project Name

Jubilee Park, Knowsley

Client

SWA

Date

July 2025

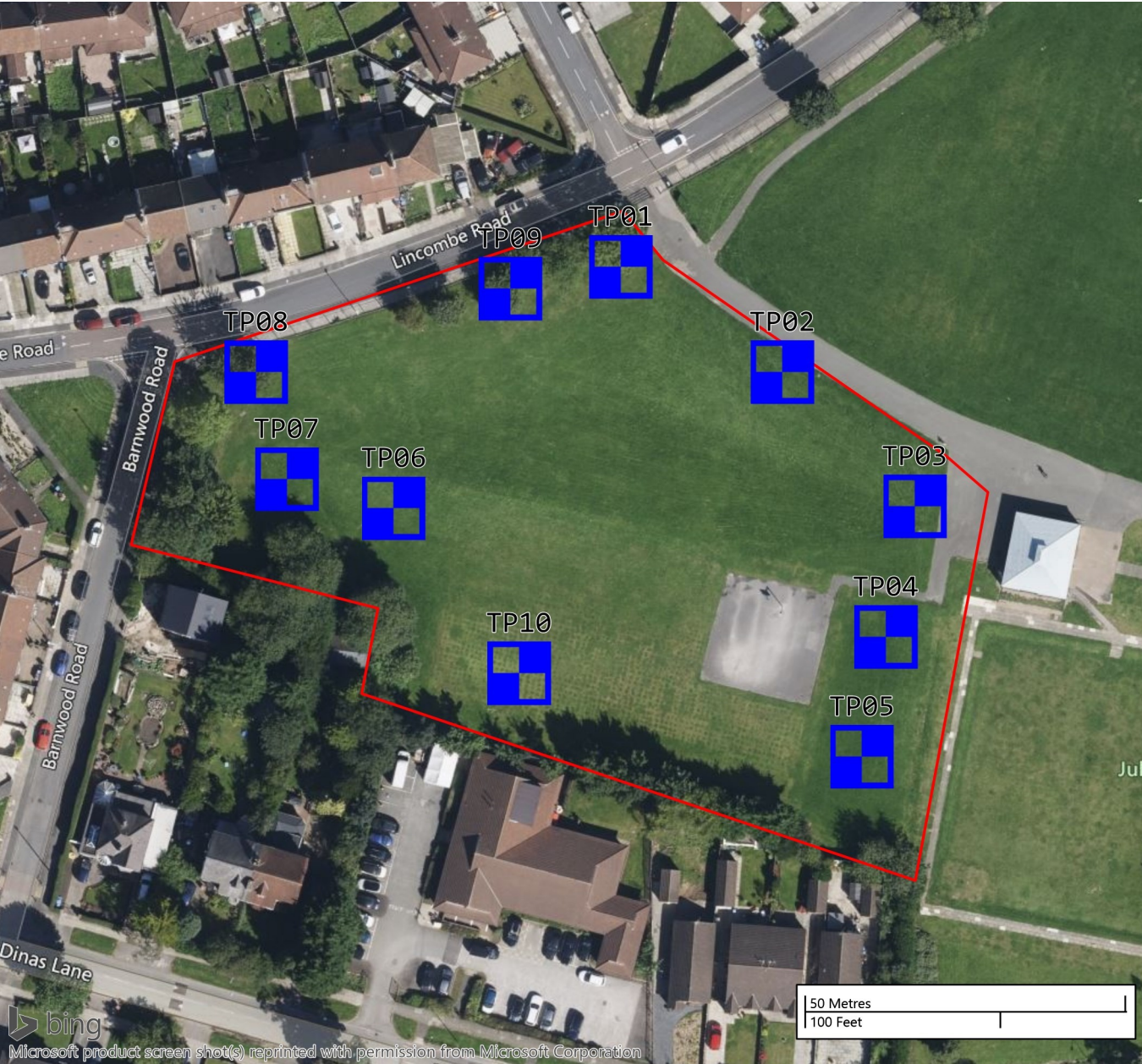
DRG Number

Figure 1

Scale

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Legend Key
Project Bounds - Project Bounds



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Figure Title

Exploratory Hole Location Plan

Project Number

S250705

Project Name

Jubilee Park, Knowsley

Client

SWA

Date

July 2025

DRG Number

Figure 2

Scale

1:1000 @ A4 [DO NOT SCALE]

Legend Key

-  Locations By Type - TP
-  Project Bounds - Project Bounds



Figure 3: TP01



Figure 4: TP01 Spoil

Title	Date
Figures 3 & 4	July 2025
Project	
Jubilee Park, Knowsley	
Client	
Steve Wells Associates	

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Figure 5: TP02



Figure 6: TP02 Spoil

Title	Date
Figures 5 & 6	July 2025
Project	
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Client	
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Figure 7: TP03



Figure 8: TP03 Spoil

Title	Date
Figures 7 & 8	July 2025
Project	
Jubilee Park, Knowsley	
Client	
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Figure 9: TP04



Figure 10: TP04 Spoil

Title	Date
Figures 9 & 10	July 2025
Project	
Jubilee Park, Knowsley	
Client	
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Figure 11: TP05



Figure 12: TP05 Spoil

Title	Date
Figures 11 & 12	July 2025
Project	
Jubilee Park, Knowsley	
Client	
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Figure 13: TP06



Figure 14: TP06 Spoil

Title	Date
Figures 13 & 14	July 2025
Project	
Jubilee Park, Knowsley	
Client	
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Figure 15: TP07



Figure 16: TP07 Spoil

Title	Date
Figures 15 & 16	July 2025
Project	
Jubilee Park, Knowsley	
Client	
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Figure 17: TP08



Figure 18: TP08 Spoil

Title	Date
Figures 17 & 18	July 2025
Project	
Jubilee Park, Knowsley	
Client	
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Figure 19: TP09



Figure 20: TP09 Spoil

Title	Date
Figures 19 & 20	July 2025
Project	
Jubilee Park, Knowsley	
Client	
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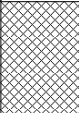
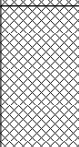
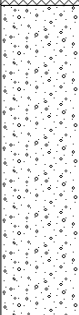
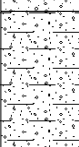
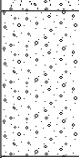
Figure 21: TP10

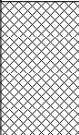
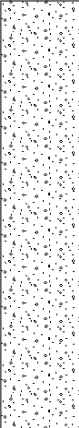


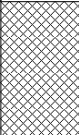
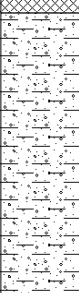
Figure 22: TP10 Spoil

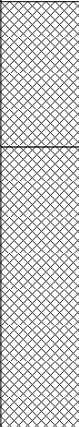
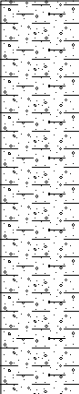
Title	Date	Solmek Ltd. 12 Yarm Road Stockton-on-Tees TS18 3NA Tel: +44 (0) 1642 607083 Fax: +44 (0) 1642 612355 e-mail: south@solmek.com www.solmek.com  SOLMEK
Figures 21 & 22	July 2025	
Project		
Jubilee Park, Knowsley		
Client		
Steve Wells Associates		

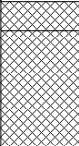
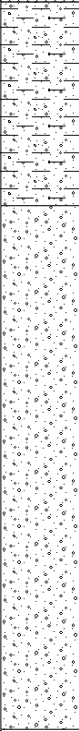
Appendix B

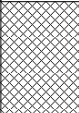
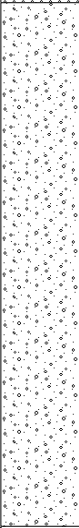
 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP01 Sheet 1 of 1	
Project Name: Jubilee Park, Knowsley				Project No. S250705		Co-ords: E - N Level:		Date 08/07/2025	
Plant Used: JCB 3X ECO				Dimensions (m): 0.50 2.00		Scale 1:26			
Client: SWA				Depth 3.00		Logged AS			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	B+ES					MADE GROUND. Light brown, very sandy, slightly gravelly TOPSOIL. Sand is fine to coarse grained. Gravel is fine to coarse grained, angular to sub-angular of mudstone, sandstone, limestone and brick.		
	0.40 - 0.50	B+ES		0.40			MADE GROUND. Orangeish brown, clayey, slightly gravelly san. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-angular to angular of mudstone, sandstone and limestone.		
	0.90 - 1.00	B+ES		0.90			Orange, sandy GRAVEL. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-rounded to rounded of mudstone, sandstone and limestone.	1	
	2.00 - 2.10	B		2.00			Orange, slightly clayey, slightly gravelly SAND. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-rounded to rounded of mudstone, sandstone and limestone.	2	
	2.90 - 3.00	B		3.00			Orange, sandy GRAVEL. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-rounded to rounded of mudstone, sandstone and limestone.		
	End of Pit at 3.000m							3	
								4	
								5	
Remarks: No groundwater encountered. PBT @ 0.10m bgl. Limestone slab @ 0.30m bgl.									
Stability: Pit wall stable.									

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP02 Sheet 1 of 1	
Project Name: Jubilee Park, Knowsley				Project No. S250705		Co-ords: E - N Level:		Date 08/07/2025	
Plant Used: JCB 3X ECO				Dimensions (m):		0.50		Scale 1:26	
Client: SWA				Depth 3.00		Logged AS			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	B+ES		0.50			MADE GROUND. Light brown, very sandy, slightly gravelly TOPSOIL. Sand is fine to coarse grained. Gravel is fine to coarse grained, angular to sub-angular of mudstone, sandstone and limestone.	1	
	0.50 - 0.60	B+ES					MADE GROUND. Orange slightly clayey, slightly gravelly sand. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-angular to sub-rounded of mudstone, sandstone and limestone.		
	1.50 - 1.60	B+ES		1.50			Bright orange, slightly gravelly SAND. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-rounded to sub-angular of mudstone, sandstone and limestone.	2	
	2.10 - 2.20	B							
	2.90 - 3.00	B		3.00					
	End of Pit at 3.000m						3		
							4		
							5		
Remarks: No groundwater encountered. PBT @ 0.10mbgl.									
Stability: Pit wall stable.									

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP03 Sheet 1 of 1	
Project Name: Jubilee Park, Knowsley				Project No. S250705		Co-ords: E - N Level:		Date 08/07/2025	
Plant Used: JCB 3X ECO				Dimensions (m): Depth 3.00		2.00 0.50		Scale 1:26	
Client: SWA								Logged AS	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	B+ES		0.50			MADE GROUND. Light brown, very sandy, slightly gravelly TOPSOIL. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-rounded to sub-angular of mudstone, sandstone, limestone and brick. Infrequent rootlets present.		1
	0.50 - 0.60	B+ES					Orangeish brown, sandy, slightly gravelly CLAY. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-angular to sub-rounded of mudstone, sandstone and limestone.		
	1.50 - 1.60	B+ES		1.50			Orange SAND. Sand is fine to coarse grained.		2
	2.50 - 2.60	B		3.00			End of Pit at 3.000m		3
	2.90 - 3.00	B							
									4
									5
Remarks: No groundwater encountered. Soakaway performed in this pit.									
Stability: Pit wall stable.									

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP04 Sheet 1 of 1	
Project Name: Jubilee Park, Knowsley				Project No. S250705		Co-ords: E - N Level:		Date 08/07/2025	
Plant Used: JCB 3X ECO				Dimensions (m):		0.50		Scale 1:26	
Client: SWA				Depth 3.00		Logged AS			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	B+ES		0.50			MADE GROUND. Light brown, very sandy, slightly gravelly TOPSOIL with low cobble content. Sand is fine to coarse grained. Gravel is fine to coarse grained, angular to sub-angular of mudstone, sandstone, limestone and brick. Cobbles are angular to sub-angular of brick.		
	0.50 - 0.60	B+ES					MADE GROUND. Multicoloured (orange, grey, brown), sandy, slightly gravelly clay. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-angular to sub-rounded of mudstone, sandstone, limestone and brick.		
	1.00 - 1.10	B+ES							
	2.10 - 2.20	B		1.50			Orangeish brown, sandy, slightly gravelly CLAY. Sand is fine to coarse grained. Gravel is fine to coarse grained, of mudstone, sandstone and limestone.		
	2.90 - 3.00	B					Orange SAND. Sand is fine to coarse grained.		
				2.90 3.00			End of Pit at 3.000m		
Remarks: No groundwater encountered. PBT @ 0.10mbgl.									
Stability: Pit wall stable.									

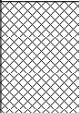
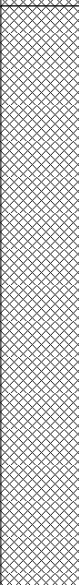
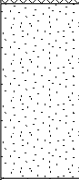
 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP05 Sheet 1 of 1	
Project Name: Jubilee Park, Knowsley				Project No. S250705		Co-ords: E - N Level:		Date 08/07/2025	
Plant Used: JCB 3X ECO				Dimensions (m):		2.00 		Scale 1:26	
Client: SWA				Depth 3.00		0.50 		Logged AS	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	B+ES		0.10			MADE GROUND. Light brown, very sandy, slightly gravelly TOPSOIL. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-rounded to sub-angular of mudstone, sandstone, limestone and glass.	1	
	0.50 - 0.60	B+ES		0.50			MADE GROUND. Orangeish brown, slightly gravelly sand. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-angular to sub-rounded of mudstone, sandstone, limestone and brick.		
	1.30 - 1.40	B+ES		1.20			Orangeish brown, sandy, slightly gravelly CLAY. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-rounded to rounded of mudstone, sandstone and limestone.	2	
	1.90 - 2.00	B							
	2.50 - 2.60	B							
	2.90 - 3.00	B		3.00			Brownish orange, sandy GRAVEL. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-rounded to rounded of mudstone, sandstone and limestone	3	
							End of Pit at 3.000m		
								4	
								5	
Remarks: No groundwater encountered. PBT @ 0.10mbgl. Land drain @ 0.80mbgl									
Stability: Pit wall stable.									

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP06 Sheet 1 of 1	
Project Name: Jubilee Park, Knowsley				Project No. S250705		Co-ords: E - N Level:		Date 08/07/2025	
Plant Used: JCB 3X ECO				Dimensions (m):		2.00 		Scale 1:26	
Client: SWA				Depth 3.00		0.50 		Logged AS	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	B+ES		0.40			MADE GROUND. Light brown, very sandy, slightly gravelly TOPSOIL. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-rounded to sub-angular of mudstone, sandstone, limestone and brick. Infrequent rootlets.		
	0.40 - 0.50	B+ES					MADE GROUND. Orangeish brown, slightly clayey, slightly gravelly sand. Sand is fine to coarse grained. Gravel is fine to coarse grained, angular to sub-angular of mudstone, sandstone, limestone and brick.		
	1.20 - 1.30	B+ES		1.20		Brownish orange, sandy GRAVEL. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-rounded to rounded of mudstone, sandstone and limestone.			
	2.10 - 2.20	B							
	2.60 - 2.70	B							
	2.90 - 3.00	B		3.00					
						End of Pit at 3.000m		3	
								4	
								5	

Remarks: No groundwater encountered.
 Land drain @1.00mbgl. PBT @ 0.10mbgl.

Stability: Pit wall stable.

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP07 Sheet 1 of 1	
Project Name: Jubilee Park, Knowsley				Project No. S250705		Co-ords: E - N Level:		Date 08/07/2025	
Plant Used: JCB 3X ECO				Dimensions (m): Depth 2.00 0.50 3.00		Scale 1:26			
Client: SWA						Logged AS			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	B+ES					MADE GROUND. Light brown, very sandy, slightly gravelly TOPSOIL. Sand is fine to coarse grained. Gravel is fine to coarse grained, angular to sub-angular of mudstone, sandstone and limestone.		
	0.60 - 0.70	B+ES		0.60			MADE GROUND. Brown/orange, slightly gravelly sand. Sand is fine to coarse grained. Gravel is fine to coarse grained, angular to sub-angular of mudstone, sandstone and limestone.	1	
	1.10 - 1.20	B+ES		1.10			MADE GROUND. Brown/orange slightly sandy, slightly gravelly clay. Sand is fine to coarse grained. Gravel is fine to coarse grained, angular to sub-angular of mudstone, sandstone and limestone.		
	1.40 - 1.50	B		1.40			MADE GROUND. Brownish orange, sandy gravel. Sand is fine to coarse grained. Gravel is fine to coarse grained, rounded to sub-rounded of mudstone, sandstone, limestone and concrete.		
	2.00 - 2.10	B		2.00			Brownish orange, gravelly SAND with low cobble content. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-angular to sub-rounded of mudstone, sandstone and limestone. Cobbles are rounded to sub-rounded of granite.	2	
	2.50 - 2.60	B							
	2.90 - 3.00	B		3.00					
	End of Pit at 3.000m							3	
								4	
								5	
Remarks: No groundwater encountered. PBT @ 0.10mbgl.									
Stability: Pit wall stable.									

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log			TrialPit No TP08 Sheet 1 of 1		
Project Name: Jubilee Park, Knowsley				Project No. S250705		Co-ords: E - N Level:		Date 08/07/2025	
Plant Used: JCB 3X ECO				Dimensions (m): Depth 3.00		2.00 0.50		Scale 1:26	
Client: SWA								Logged AS	
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	B+ES		0.40			MADE GROUND. Light brown, very sandy, slightly gravelly TOPSOIL. Sand is fine to coarse grained. Gravel is fine to coarse grained, angular to sub-angular of mudstone, sandstone, limestone and brick.		
	0.40 - 0.50	B+ES					MADE GROUND. Multicoloured (orange, grey, brown), sandy, slightly gravelly clay. Sand is fine to coarse grained. Gravel is fine to coarse grained, angular to sub-angular of mudstone, sandstone and limestone.		
	1.20 - 1.30	B+ES		2.40					
	1.80 - 1.90	B							
	2.40 - 2.50	B							
	2.90 - 3.00	B							
			3.00			Orange/red SAND. Sand is fine to coarse grained.			
						End of Pit at 3.000m			
Remarks: No groundwater encountered. PBT @ 0.10mbgl.									
Stability: Pit wall stable.									



TrialPit No
TP09
Sheet 1 of 1

Date
08/07/2025

Scale
1:26

Logged
AS

[illegible]

Stability: Pit wall stable.

 SOLMEK Solmek Ltd 12-16 Yarm Road Stockton on Tees TS18 3NA Tel: 01642 607083 Email: info@solmek.com				Trial Pit Log				TrialPit No TP10 Sheet 1 of 1	
Project Name: Jubilee Park, Knowsley				Project No. S250705		Co-ords: E - N Level:		Date 08/07/2025	
Plant Used: JCB 3X ECO				Dimensions (m): 0.50		Scale 1:26			
Client: SWA				Depth 3.00		Logged AS			
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.10 - 0.20	B+ES		0.20			MADE GROUND. Light brown, very sandy, slightly gravelly TOPSOIL. Sand is fine to coarse grained. Gravel is fine to coarse grained, angular to sub-angular of mudstone, sandstone, limestone and brick.		
	0.30 - 0.40	B+ES					MADE GROUND. Very dark brown/orange tarmac.		
	0.90 - 1.00	B		0.80			Very dark brown/orange, slightly sandy, slightly gravelly CLAY. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-angular to sub-rounded of mudstone, sandstone and limestone.	1	
	1.90 - 2.00	B+ES					Orange/slightly sandy CLAY. Sand is fine to coarse grained.	2	
	2.60 - 2.70	B		2.60			Bright orange, slightly gravelly SAND. Sand is fine to coarse grained. Gravel is fine to coarse grained, sub-angular to sub-rounded of mudstone, sandstone and limestone.		
	2.90 - 3.00	B					End of Pit at 3.000m		3
								4	
								5	
Remarks: No groundwater encountered. Soakaway performed in this pit.									
Stability: Pit wall stable.									

Appendix C

Certificate of Analysis

Certificate Number 25-16402

Issued: 28-Jul-25

Client SOLMEK
12 Yarm Road
Stockton On Tees
Cleveland
TS18 3NA

Our Reference 25-16402

Client Reference ~ S250705

Order No ~ SOL9834

Contract Title ~ JUBILEE PARK, KNOWSLEY

Description 8 Soil samples, 2 Leachate prepared by DETS samples.

Date Received 17-Jul-25

Date Started 17-Jul-25

Date Completed 28-Jul-25

Test Procedures Identified by prefix DETSn (details on request).

Notes 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.

Approved By



Reyhan Irfan
Operations Manager



Summary of Chemical Analysis

Matrix Descriptions

Our Ref 25-16402

Client Ref ~ S250705

Contract Title ~ JUBILEE PARK, KNOWSLEY

Sample ID	Depth	Lab No	Completed	Matrix Description
TP03	0.10-0.20	2540437	28/07/2025	Brown very gravelly, sandy CLAY including odd rootlets
TP04	0.10-0.20	2540438	28/07/2025	Brown very gravelly, sandy CLAY including odd rootlets
TP09	0.20-0.30	2540439	28/07/2025	Dark brown very gravelly, sandy CLAY including odd rootlets
TP10	0.30-0.40	2540440	28/07/2025	Dark brown very gravelly, sandy CLAY (Possible made ground - slag)
TP01	0.40-0.50	2540441	28/07/2025	Dark brown gravelly, sandy CLAY including odd rootlets
TP07	0.10-0.20	2540442	28/07/2025	Dark brown gravelly, sandy CLAY including odd rootlets
TP09	0.10-0.20	2540443	28/07/2025	Dark brown very gravelly, sandy CLAY including odd rootlets (Possible made ground - slag)
TP10	0.10-0.20	2540444	28/07/2025	Dark brown gravelly, sandy CLAY including odd rootlets

Summary of Chemical Analysis

Soil Samples

Our Ref 25-16402

Client Ref ~ S250705

Contract Title ~ JUBILEE PARK, KNOWSLEY

	Deviating	Deviating	Deviating	Deviating	Deviating	Deviating
Lab No	2540437	2540438	2540439	2540440	2540441	2540442
Sample ID ~	TP03	TP04	TP09	TP10	TP01	TP07
Depth ~	0.10-0.20	0.10-0.20	0.20-0.30	0.30-0.40	0.40-0.50	0.10-0.20
Other ID ~						
Sample Type ~	ES	ES	ES	ES	ES	ES
Sampling Date ~	08/07/2025	08/07/2025	08/07/2025	08/07/2025	07/07/2025	07/07/2025
Sampling Time ~	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	9.0	19	6.3	8.2	5.0	13
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.5	0.5	0.3	0.4	0.4	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.5	0.2	0.4	< 0.1	0.6
Chromium	DETSC 2301#	0.15	mg/kg	19	23	20	12	19	21
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	28	48	68	52	14	59
Lead	DETSC 2301#	0.3	mg/kg	50	67	82	49	18	90
Mercury	DETSC 2325#	0.05	mg/kg	0.11	0.18	0.08	< 0.05	< 0.05	0.18
Nickel	DETSC 2301#	1	mg/kg	14	21	21	18	15	17
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	0.9	< 0.5	1.2	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	61	78	64	72	41	85
Inorganics									
pH	DETSC 2008#		pH	6.7	7.0	7.7	8.7	7.6	6.4
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	1.6	3.2	2.5	4.9	1.3	5.7
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	15	42	38	56	16	26
Petroleum Hydrocarbons									
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		
Aliphatic >EC10-EC12: EH_2D_AL	DETSC 3521#	1.5	mg/kg			< 1.50	< 15.00		
Aliphatic >EC12-EC16: EH_2D_AL	DETSC 3521#	1.2	mg/kg			< 1.20	< 12.00		
Aliphatic >EC16-EC21: EH_2D_AL	DETSC 3521#	1.5	mg/kg			< 1.50	< 15.00		
Aliphatic >EC21-EC35: EH_2D_AL	DETSC 3521#	3.4	mg/kg			< 3.40	< 3.40		
Aliphatic >EC35-EC40: EH_2D_AL	DETSC 3521*	3.4	mg/kg			< 3.40	< 34.00		
Aliphatic C5-C40: EH_2D+HS_1D_AL	DETSC 3521*	10	mg/kg			< 10.00	82.84		
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg			< 0.01	< 0.01		
Aromatic >EC10-EC12: EH_2D_AR	DETSC 3521#	0.9	mg/kg			< 0.90	< 9.00		
Aromatic >EC12-EC16: EH_2D_AR	DETSC 3521#	0.5	mg/kg			4.77	16.91		
Aromatic >EC16-EC21: EH_2D_AR	DETSC 3521#	0.6	mg/kg			55.12	490.8		
Aromatic >EC21-EC35: EH_2D_AR	DETSC 3521#	1.4	mg/kg			184.1	889.3		
Aromatic >EC35-EC40: EH_2D_AR	DETSC 3521*	1.4	mg/kg			40.50	33.62		
Aromatic C5-C40: EH_2D+HS_1D_AR	DETSC 3521*	10	mg/kg			284.5	1440		
TPH Ali/Aro C5-C40: EH_2D+HS_1D_Total	DETSC 3521*	10	mg/kg			284.5	1523		
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.10	0.20	0.14	0.67	< 0.10	< 0.10
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.11	3.9	0.46	2.3	0.17	0.12
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.10	1.2	1.6	8.6	0.10	0.16
Fluorene	DETSC 3301	0.1	mg/kg	0.22	3.4	1.8	12	0.18	0.24

Summary of Chemical Analysis

Soil Samples

Our Ref 25-16402

Client Ref ~ S250705

Contract Title ~ JUBILEE PARK, KNOWSLEY

	Deviating	Deviating	Deviating	Deviating	Deviating	Deviating
Lab No	2540437	2540438	2540439	2540440	2540441	2540442
Sample ID ~	TP03	TP04	TP09	TP10	TP01	TP07
Depth ~	0.10-0.20	0.10-0.20	0.20-0.30	0.30-0.40	0.40-0.50	0.10-0.20
Other ID ~						
Sample Type ~	ES	ES	ES	ES	ES	ES
Sampling Date ~	08/07/2025	08/07/2025	08/07/2025	08/07/2025	07/07/2025	07/07/2025
Sampling Time ~	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Phenanthrene	DETSC 3301	0.1	mg/kg	0.40	33	16	100	0.19	0.79
Anthracene	DETSC 3301	0.1	mg/kg	< 0.10	9.3	4.5	27	< 0.10	0.17
Fluoranthene	DETSC 3301	0.1	mg/kg	0.63	78	27	210	0.12	1.7
Pyrene	DETSC 3301	0.1	mg/kg	0.69	68	27	190	< 0.10	1.7
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.35	40	12	86	< 0.10	0.90
Chrysene	DETSC 3301	0.1	mg/kg	0.30	41	13	91	< 0.10	0.93
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.27	25	8.6	69	< 0.10	0.69
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.21	15	5.0	38	< 0.10	0.47
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	0.29	31	12	89	0.17	0.90
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.10	24	9.0	64	< 0.10	2.0
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.10	3.4	1.3	8.0	< 0.10	0.32
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.10	12	5.0	44	< 0.10	0.53
PAH 16 Total	DETSC 3301	1.6	mg/kg	3.4	390	140	1000	< 1.6	12
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.7	0.8	0.5	< 0.3	1.8

Summary of Chemical Analysis

Soil Samples

Our Ref 25-16402

Client Ref ~ S250705

Contract Title ~ JUBILEE PARK, KNOWSLEY

	Deviating	Deviating
Lab No	2540443	2540444
Sample ID ~	TP09	TP10
Depth ~	0.10-0.20	0.10-0.20
Other ID ~		
Sample Type ~	ES	ES
Sampling Date ~	08/07/2025	08/07/2025
Sampling Time ~	n/s	n/s

Test	Method	LOD	Units		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	6.9	10
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.5	0.3
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.4
Chromium	DETSC 2301#	0.15	mg/kg	11	20
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	30	60
Lead	DETSC 2301#	0.3	mg/kg	63	3400
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.10
Nickel	DETSC 2301#	1	mg/kg	13	16
Selenium	DETSC 2301#	0.5	mg/kg	0.7	< 0.5
Zinc	DETSC 2301#	1	mg/kg	52	110
Inorganics					
pH	DETSC 2008#		pH	11.3	7.9
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%		
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	55	54
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic >EC10-EC12: EH_2D_AL	DETSC 3521#	1.5	mg/kg	< 1.50	
Aliphatic >EC12-EC16: EH_2D_AL	DETSC 3521#	1.2	mg/kg	< 1.20	
Aliphatic >EC16-EC21: EH_2D_AL	DETSC 3521#	1.5	mg/kg	< 1.50	
Aliphatic >EC21-EC35: EH_2D_AL	DETSC 3521#	3.4	mg/kg	< 3.40	
Aliphatic >EC35-EC40: EH_2D_AL	DETSC 3521*	3.4	mg/kg	< 3.40	
Aliphatic C5-C40: EH_2D+HS_1D_AL	DETSC 3521*	10	mg/kg	< 10.00	
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	
Aromatic >EC10-EC12: EH_2D_AR	DETSC 3521#	0.9	mg/kg	< 0.90	
Aromatic >EC12-EC16: EH_2D_AR	DETSC 3521#	0.5	mg/kg	0.97	
Aromatic >EC16-EC21: EH_2D_AR	DETSC 3521#	0.6	mg/kg	7.13	
Aromatic >EC21-EC35: EH_2D_AR	DETSC 3521#	1.4	mg/kg	14.40	
Aromatic >EC35-EC40: EH_2D_AR	DETSC 3521*	1.4	mg/kg	< 1.40	
Aromatic C5-C40: EH_2D+HS_1D_AR	DETSC 3521*	10	mg/kg	22.49	
TPH Ali/Aro C5-C40: EH_2D+HS_1D_Total	DETSC 3521*	10	mg/kg	22.49	
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.10	< 0.10
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.18	0.25
Acenaphthene	DETSC 3301	0.1	mg/kg	0.15	0.30
Fluorene	DETSC 3301	0.1	mg/kg	0.41	0.43

Summary of Chemical Analysis

Soil Samples

Our Ref 25-16402

Client Ref ~ S250705

Contract Title ~ JUBILEE PARK, KNOWSLEY

	Deviating	Deviating
Lab No	2540443	2540444
Sample ID ~	TP09	TP10
Depth ~	0.10-0.20	0.10-0.20
Other ID ~		
Sample Type ~	ES	ES
Sampling Date ~	08/07/2025	08/07/2025
Sampling Time ~	n/s	n/s

Test	Method	LOD	Units		
Phenanthrene	DETSC 3301	0.1	mg/kg	1.1	2.0
Anthracene	DETSC 3301	0.1	mg/kg	0.24	0.49
Fluoranthene	DETSC 3301	0.1	mg/kg	2.4	2.9
Pyrene	DETSC 3301	0.1	mg/kg	2.8	3.3
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	1.6	1.4
Chrysene	DETSC 3301	0.1	mg/kg	1.7	1.5
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	1.3	1.2
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.82	0.67
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	1.7	1.5
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	2.7	2.3
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.55	0.35
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.75	0.66
PAH 16 Total	DETSC 3301	1.6	mg/kg	18	19
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.6	1.5

Summary of Chemical Analysis

Leachate Samples

Our Ref 25-16402

Client Ref ~ S250705

Contract Title ~ JUBILEE PARK, KNOWSLEY

	Deviating	Deviating
Lab No	2540445	2540446
Sample ID ~	TP09	TP10
Depth ~	0.10-0.20	0.10-0.20
Other ID ~		
Sample Type ~	ES	ES
Sampling Date ~	08/07/2025	08/07/2025
Sampling Time ~	n/s	n/s

Test	Method	LOD	Units		
Preparation					
NRA Leachate Preparation	DETSC 1009*			Y	Y
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	2.4	1.7
Boron, Dissolved	DETSC 2306*	12	ug/l	< 12.0	< 12.0
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.43	1.0
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.6	5.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	3.1	6.3
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.6	1.1
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.26	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	5.2	11
Inorganics					
pH	DETSC 2008		pH	7.9	7.5
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20
Phenol - Monohydric Low Level	DETSC 2131	1.5	ug/l	< 1.5	< 1.5
Sulphate as SO4	DETSC 2055	0.1	mg/l	2.5	4.0
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	
Aliphatic C6-C8: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	
Aliphatic C8-C10: HS_1D_AL	DETSC 3322	0.1	ug/l	< 0.1	
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	
Aliphatic C35-C40: EH_CU_1D_AL	DETSC 3072*	1	ug/l	< 1.0	
Aliphatic C5-C40: EH_CU+HS_1D_AL	DETSC 3072*	10	ug/l	< 10	
Aromatic C5-C7: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	
Aromatic C7-C8: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	
Aromatic C8-C10: HS_1D_AR	DETSC 3322	0.1	ug/l	< 0.1	
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	
Aromatic C35-C40: EH_CU_1D_AR	DETSC 3072*	1	ug/l	< 1.0	
Aromatic C5-C40: EH_CU+HS_1D_AR	DETSC 3072*	10	ug/l	< 10	
TPH Ali/Aro C5-C40: EH_CU+HS_1D_Total	DETSC 3072*	10	ug/l	< 10	
PAHs					
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	0.03	< 0.01

Summary of Chemical Analysis

Leachate Samples

Our Ref 25-16402

Client Ref ~ S250705

Contract Title ~ JUBILEE PARK, KNOWSLEY

	Deviating	Deviating
Lab No	2540445	2540446
Sample ID ~	TP09	TP10
Depth ~	0.10-0.20	0.10-0.20
Other ID ~		
Sample Type ~	ES	ES
Sampling Date ~	08/07/2025	08/07/2025
Sampling Time ~	n/s	n/s

Test	Method	LOD	Units		
Acenaphthene	DETSC 3304	0.01	ug/l	0.02	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.12	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	0.08	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.51	0.02
Pyrene	DETSC 3304	0.01	ug/l	0.53	0.01
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.31	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	0.27	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.52	0.02
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.20	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.46	0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	0.33	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	0.06	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	0.38	0.01
PAH Total	DETSC 3304	0.2	ug/l	3.8	< 0.20

Summary of Asbestos Analysis

Soil Samples

Our Ref 25-16402

Client Ref ~ S250705

Contract Title ~ JUBILEE PARK, KNOWSLEY

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2540437	TP03 0.10-0.20	SOIL	NAD	none	Jason Barsby
2540438	TP04 0.10-0.20	SOIL	NAD	none	Jason Barsby
2540439	TP09 0.20-0.30	SOIL	NAD	none	Jason Barsby
2540440	TP10 0.30-0.40	SOIL	NAD	none	Jason Barsby
2540441	TP01 0.40-0.50	SOIL	NAD	none	Jason Barsby
2540442	TP07 0.10-0.20	SOIL	NAD	none	Jason Barsby

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 25-16402
 Client Ref ~ S250705
 Contract ~ JUBILEE PARK, KNOWSLEY

Containers Received & Deviating Samples

Lab No	Sample ID ~	Date Sampled ~	Containers Received	Holding time exceeded for tests	Incorrect container for tests
2540437	TP03 0.10-0.20 SOIL	08/07/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	
2540438	TP04 0.10-0.20 SOIL	08/07/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	
2540439	TP09 0.20-0.30 SOIL	08/07/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	
2540440	TP10 0.30-0.40 SOIL	08/07/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	
2540441	TP01 0.40-0.50 SOIL	07/07/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	
2540442	TP07 0.10-0.20 SOIL	07/07/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	
2540443	TP09 0.10-0.20 SOIL	08/07/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	
2540444	TP10 0.10-0.20 SOIL	08/07/25	GJ 250ml, GJ 60ml, PT 1L x2	pH + Conductivity (7 days)	
2540445	TP09 0.10-0.20 LEACHATE	08/07/25	GJ 250ml, GJ 60ml, PT 1L x2	Aliphatics/Aromatics (5 days), Chromium, Hexavalent (4 days), Kone (4 days), pH/Cond (1 days), PAH MS (4 days)	
2540446	TP10 0.10-0.20 LEACHATE	08/07/25	GJ 250ml, GJ 60ml, PT 1L x2	Chromium, Hexavalent (4 days), Kone (4 days), pH/Cond (1 days), PAH MS (4 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

Normec DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 250µm sieve

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

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

Aliphatic C5-C6

Acronym

HS_1D_AL

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETS 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETS 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETS 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETS 2076	Sulphate Aqueous Extract as SO ₄	mg/l	10	Air Dried	No	Yes	Yes
DETS 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETS 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETS 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETS 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETS 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETS 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETS 2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETS 2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETS 2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETS 2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETS 2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETS 2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETS 2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETS 2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETS 2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETS 2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETS 2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETS 2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETS 2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETS 2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETS 2311	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETS 2321	Total Sulphate as SO ₄	%	0.01	Air Dried	No	Yes	Yes
DETS 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETS 3049	Sulphur (free)	mg/kg	0.75	As Received	No	Yes	Yes
DETS 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETS 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETS 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETS 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETS 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETS 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETS 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETS 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETS 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETS 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETS 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETS 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3321	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3521	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3521	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3521	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3521	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3521	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
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Key:

~ Sample details are provided by the client and can affect the validity of the results

* -not accredited.

-MCERTS (accreditation only applies if report carries the MCERTS logo).

\$ -subcontracted.

n/s -not supplied.

I/S -insufficient sample.

U/S -unsuitable sample.

t/f -to follow.

nd -not detected.

End of Report

Appendix D

Site Investigations



Geologists



Environmental &
Geotechnical
Engineers



Solmek Ltd.

12 Yarm Road
Stockton on Tees
TS18 3NA
www.solmek.com

Tel: 01642 607083
E-mail: info@solmek.com

Alex Stretton

Date: 23rd July 2025

PLATE BEARING TEST REPORT

**Jubilee Park, Knowsley
S250705**

INTRODUCTION

Solmek were commissioned by Steve Wells Associates to carry out plate load bearing tests to determine ground CBR strength.

The tests were undertaken on 22nd July 2025 and test results are presented as an addendum to this report.

FIELDWORK AND RESULTS

A series of Plate Load Bearing Tests (PBTs) were undertaken. All fieldwork and site testing were carried out in accordance with BS1377: Part 9 In Situ Tests.

California Bearing Ratio (CBR) Results

The following table outlines the tests that were carried out using a 305mm diameter plate and were executed to a maximum pressure of 150kPa; applied in increasing increments. The test positions were determined by a representative of the Client and are appended to this letter (Figure 1).

The following table outlines the results. Full testing details have been appended to this report.

SUMMARY OF PLATE BEARING TESTS

Test Number	Ground Conditions	Depth (mbgl)	Maximum Applied Load (kPa)	Measured Plate Penetration (mm)	CBR (%)
PBT01	MG. Very sandy TOPSOIL	0.10	150	4.47	1.49
PBT02	MG. Very sandy TOPSOIL	0.10		2.07	10
PBT04	MG. Very sandy TOPSOIL	0.10		5.14	1.67
PBT05	MG. SAND	0.10		4.02	2.07
PBT06	MG. Very sandy TOPSOIL	0.10		5.27	1.99
PBT07	MG. Very sandy TOPSOIL	0.10		2.90	5.01
PBT08	MG. Very sandy TOPSOIL	0.10		5.95	2.32
PBT09	MG. Very sandy TOPSOIL	0.10		2.88	7.21

Yours sincerely,

Alex Stretton
Graduate Engineering Geologist

On behalf of Solmek Ltd

Appendix E

Laboratory Report Front Sheet		G2M Testing (Stockton) 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 033318 info@g2mtesting.co.uk	 10258
Site name	Job number		
Jubilee Park, Knowsley	S250705		

Client details:

Reference: S250705
 Name: Solmek
 Address: 12 Yarm Road,
 Stockton-on-tees,
 TS18 3NA

Telephone: 01642 607083
 Email: astretton@solmek.com

FAO: Alex Stretton

Samples received: 14/07/2025

Date commenced: 15/07/2025

Date reported: 22/07/2025

Observations and interpretations are outside of the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. 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 in full, without the prior written approval of the laboratory.

Samples will be held at the laboratory for a period of 4 weeks after the report date. After the above reporting date the samples will be disposed of. Should further testing be required then the office should be informed before the above date.

Signature:	Approved Signatories:
	☐ D.Anderson (Managing Director) ☒ J. Brischuk (Laboratory Manager) ☐

Summary of Classification Tests

G2M Testing (Stockton)

12-16 Yarm Road
Stockton on Tees
TS18 3NA

01642 033318

info@g2mtesting.co.uk



10258

Site name	Job number
Jubilee Park, Knowsley	S250705

Hole	Depth		Type	w %	Oven temp. oc	wa %	Pa %	Pr %	wL %	wP %	IP %	IL	Plasticity class	Preparation method
	Top m	Base m												
TP03	0.50		B	17	105	20	85	15	36-s	15	21	0.238	CI	Tested after >425µm removed by hand
TP04	2.10		B	16	105	18	89	11	38-s	15	23	0.130	CI	Tested after >425µm removed by hand
TP05	0.50		B	11	105	13	87	13	33-s	15	18	-0.111	CL	Tested after >425µm removed by hand
TP09	1.00		B	16	105	19	84	16	35-s	15	20	0.200	CI	Tested after >425µm removed by hand
TP10	0.90		B	20	105	23	88	12	28-s	18	10	0.500	CL	Tested after >425µm removed by hand

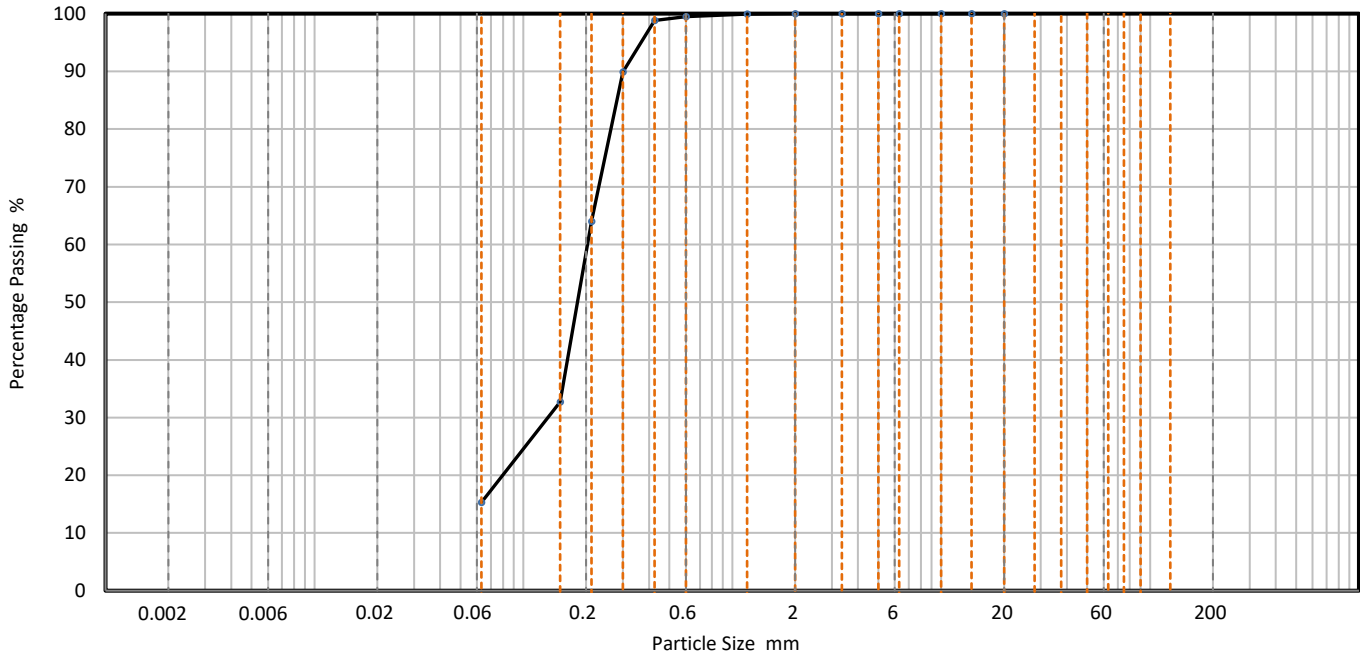
All tests found in G2M Testing UKAS Schedule of Accreditation are tested to standard unless otherwise indicated

Key	Description	Category	BS Test Code
w	Moisture content		BS 1377:1990 Part 2 Clause 3.2
wa	Equivalent moisture content passing 425µm sieve		BS 1377:1990 Part 2 Clause 3.2
wL	Liquid limit Single point Four point	-s	BS 1377:1990 Part 2 Clause 4.4
		-f	BS 1377:1990 Part 2 Clause 4.3
wP	Plastic limit		BS 1377:1990 Part 2 Clause 5.2
Pa	Percentage passing 425um sieve		
Pr	Percentage retained 425um sieve		
IP	Plasticity index		BS 1377:1990 Part 2 Clause 5.4
IL	Liquidity index		BS 1377:1990 Part 2 Clause 5.4
	Suffix indicating test is "Not UKAS Accredited"	*	

Approved by	D Anderson
Approval date	22/07/2025 09:58
Date report generated	
Report Number	

PARTICLE SIZE DISTRIBUTION		G2M Testing (Stockton) 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 033318 info@g2mtesting.co.uk	 10258
Site name		Job number	
Jubilee Park, Knowsley		S250705	

Hole		TP02	Lab sample ID	G2MT2025071510
Depth (Top)	m	1.50	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m		Soil Description	Clayey/Silty, SAND
Sample type		B		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99		
0.3	90		
0.212	64		
0.15	33		
0.063	15		

Dry Mass of sample, g	950
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Sample Proportions	% dry mass
Very coarse	0.0
Gravel	0.0
Sand	84.7
Fines <0.063mm	15.0

Grading Analysis		
D100	mm	
D60	mm	0.203
D30	mm	0.131
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

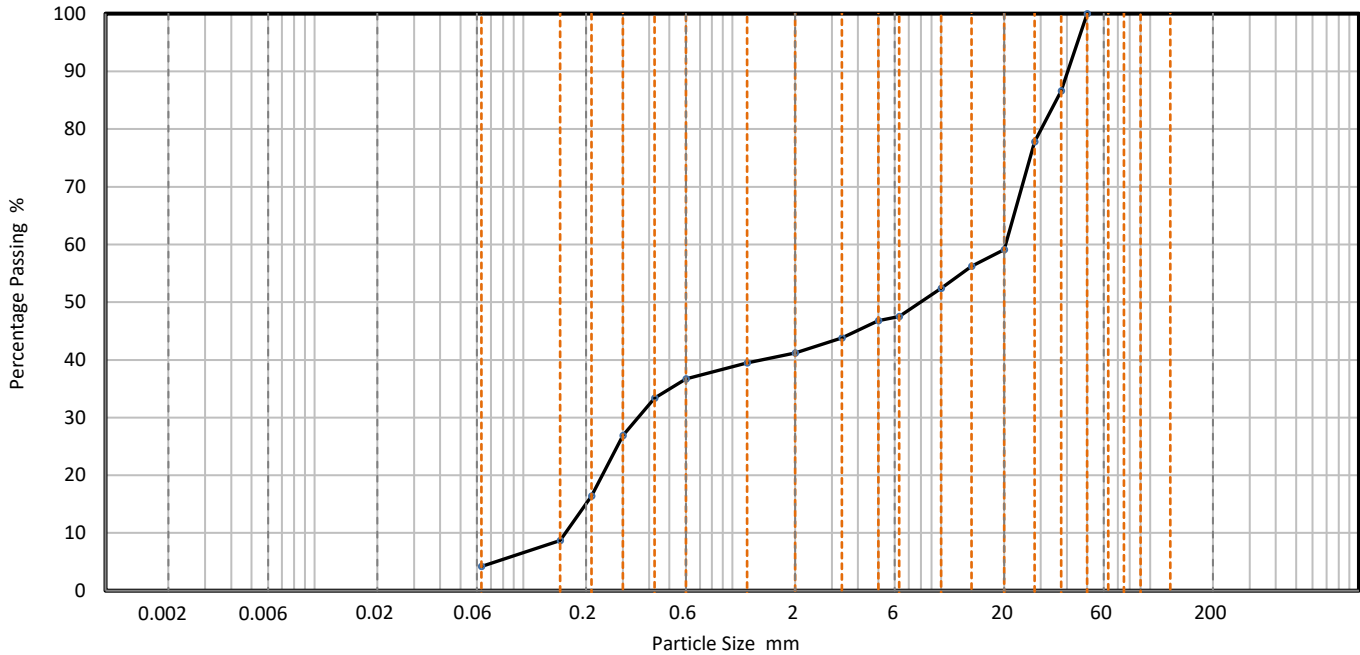
Remarks
Preparation and testing in accordance with test method unless noted below

Accreditation status
Hydrometer is the usual Sedimentation method carried out by G2M Testing and is part of the G2M Testing UKAS accreditation schedule.

Approved by	D Anderson
Approval date	21/07/2025 08:25

PARTICLE SIZE DISTRIBUTION		G2M Testing (Stockton) 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 033318 info@g2mtesting.co.uk	 10258
Site name		Job number	
Jubilee Park, Knowsley		S250705	

Hole	TP06	Lab sample ID	G2MT2025071514
Depth (Top)	m	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m	Soil Description	Slightly Silty, very Sandy, GRAVEL
Sample type	B		



PARTICLE SIZE DISTRIBUTION

G2M Testing (Stockton)

12-16 Yarm Road

Stockton on Tees

TS18 3NA

01642 033318

info@g2mtesting.co.uk



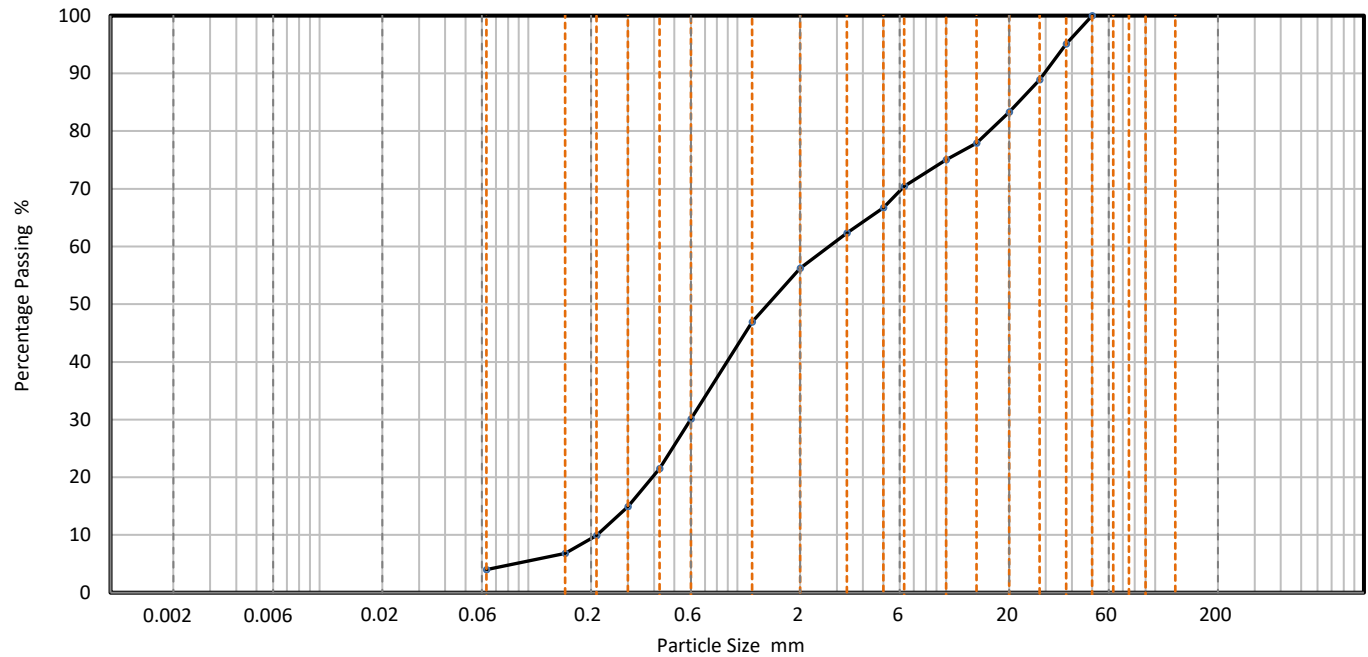
Site name

Job number

Jubilee Park, Knowsley

S250705

Hole		TP07	Lab sample ID	G2MT2025071515
Depth (Top)	m	2.00	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m		Soil Description	Slightly Silty, very Gravelly, SAND
Sample type		B		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
50	100		
37.5	95		
28	89		
20	83		
14	78		
10	75		
6.3	70		
5	67		
3.35	62		
2	56		
1.18	47		
0.6	30		
0.425	22		
0.3	15		
0.212	10		
0.15	7		
0.063	4		

Dry Mass of sample, g

1936

Sample Proportions	% dry mass
Very coarse	0.0
Gravel	43.8
Sand	52.3
Fines <0.063mm	4.0

Grading Analysis		
D100	mm	50
D60	mm	2.75
D30	mm	0.597
D10	mm	0.213
Uniformity Coefficient		13
Curvature Coefficient		0.61

Remarks
Preparation and testing in accordance with test method unless noted below
Sample tested was deviating in accordance with BS1377 test standard (Insufficient Mass)

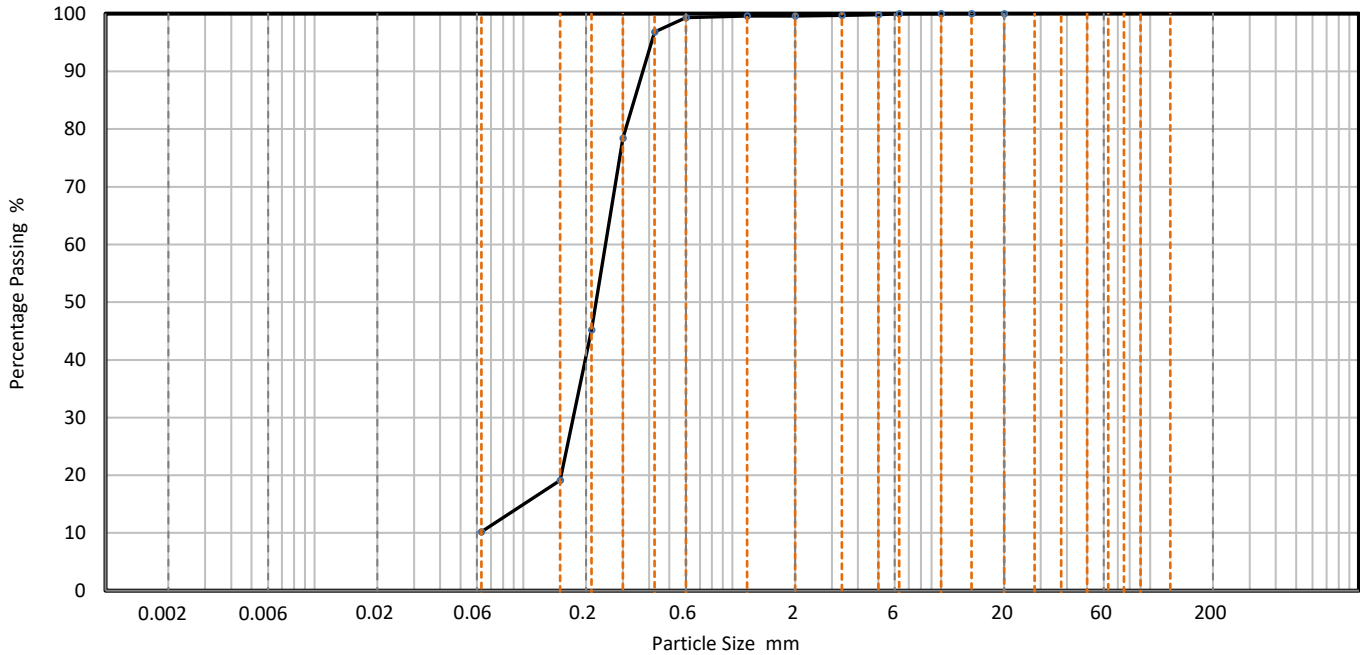
Accreditation status

Hydrometer is the usual Sedimentation method carried out by G2M Testing and is part of the G2M Testing UKAS accreditation schedule.

Approved by	D Anderson
Approval date	21/07/2025 08:31

PARTICLE SIZE DISTRIBUTION		G2M Testing (Stockton) 12-16 Yarm Road Stockton on Tees TS18 3NA 01642 033318 info@g2mtesting.co.uk	 10258
Site name		Job number	
Jubilee Park, Knowsley		S250705	

Hole		TP08	Lab sample ID	G2MT2025071516
Depth (Top)	m	2.40	Test Method	BS 1377 - 2 : 1990 Clause 9.2
Depth (Base)	m		Soil Description	Very slightly Gravelly, Clayey/Silty, SAND
Sample type		B		



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	97		
0.3	78		
0.212	45		
0.15	19		
0.063	10		

Dry Mass of sample, g	998
Sample Proportions	
Very coarse	% dry mass
Gravel	0.0
Sand	0.4
Fines <0.063mm	89.5
	10.0
Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	0.247
Curvature Coefficient	0.173
Remarks	
Preparation and testing in accordance with test method unless noted below	

Accreditation status
Hydrometer is the usual Sedimentation method carried out by G2M Testing and is part of the G2M Testing UKAS accreditation schedule.

Approved by	D Anderson
Approval date	21/07/2025 08:33

APPENDIX F

UK BACKGROUND

Environmental Protection Act 1990: Part 2A Revised Statutory Guidance (April 2012)

This revised document explains how the Local Authority should decide if land, based on a legal interpretation, is contaminated. The document replaces the previous guidance given in Annex 3 of DEFRA Circular 01/2006, issued in accordance with section 78YA of the 1990 Environmental Protection Act.

The main objectives of the Part 2A regime are to *“identify and remove unacceptable risks to human health and the environment”* and to *“seek to ensure that contaminated land is made suitable for its current use”*.

Part 2A uses a risk based approach to defining contaminated land whereby the “risk” is interpreted as *“the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land”* and by *“the scale and seriousness of such harm or pollution if it did occur”*.

For a relevant risk to exist a contaminant, pathway and receptor linkage must be present before the land can be considered to be contaminated. The document explains that *“for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters.”*

A conceptual model is used to develop and communicate the risks associated with a particular site.

To determine if land is contaminated the local authority use various categories from 1 to 4. Categories 1 and 2 include *“land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health.”*

Categories 3 and 4 *“encompass land which is not capable of being determined on such grounds”*.

PRELIMINARY CONCEPTUAL MODEL

Preliminary Conceptual Models are undertaken in accordance with CIRIA C552. The Preliminary Conceptual Model assesses the consequence and the likelihood of a risk being realised to provide a risk classification, using the tables detailed below.

CONSEQUENCE OF RISK BEING REALISED (Based on C552 CIRIA, 2001)

Classification	Definition	Example
Severe	Short-term (acute) risk to human health, the environment, an element of the development or other aspect with is likely to result in <i>significant harm</i> , damage or both.	High concentrations of cyanide on the surface of an informal recreational area. Major spills of contaminants from site into controlled water. High concentrations of explosive gas in the subsurface environment that have a clear unobstructed pathway into buildings.
Moderate	Chronic damage to human health, a plausible chance that an event will occur, although the timeline is not immediate to be in the short-term.	Appreciable concentration of contamination that over the longer-term will cause significant harm i.e. high lead concentration in topsoil. Shallow mine workings that are potentially unstable but may remain in a satisfactory or stable conditions for a number of years.
Mild	Low level pollution of non-sensitive water, a feasible hazardous scenario although the timeline of such occurring can probably be considered in 10's of years.	The effect of high sulphate concentrations on structural concrete. Pollution of non-classified groundwater.
Minor	Harm, although not necessarily significant to human health, or with respect to other aspects of the development, which are considered implausible in terms of occurrence, or will have little consequential impact.	The presence of contaminants at such low concentrations that protective equipment is required during site works. Any damage to structures is minimal and will not be structural in characteristics.

PROBABILITY OF RISK BEING REALISED (C552 CIRIA, 2001)

Classification	Definition
High Likelihood	There is a viable pollutant linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence that the receptor has been harmed or polluted.
Likely	There is a viable pollutant linkage and all elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a viable pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a viable pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

RISK CLASSIFICATION MATRIX (C552 CIRIA, 2001)

Risk = Probability x Consequence		Consequence			
		Severe	Moderate	Mild	Minor
Probability	High likelihood	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

HUMAN RECEPTORS

Human exposure to contaminants present in soils can occur via several pathways. Direct exposure pathways include dermal absorption after contact with contaminated ground, inhalation of soil or dust, inhalation of volatilised compounds, and inadvertent soil ingestion (or deliberate soil ingestion in the case of some children). Other indirect pathways include human ingestion of plants grown in contaminated soil or contaminated ground or surface water. Contaminants associated with wind blown dust can affect humans on surrounding sites.

VEGETATION

Plants can be affected by soil contamination in a number of ways resulting in growth inhibition, nutrient deficiencies and yellowing of leaves. Contaminants are taken up by plants through the roots and through foliage. Contaminants identified as being highly phytotoxic include boron, cadmium, copper, lead, nickel, and zinc.

To establish if the levels of contaminants present on a site may pose a risk to vegetation the results of the contamination testing are compared to a series of threshold values published in 'Code of Good Agricultural Practice for the Protection of Soil'.

GROUNDWATER AND SURFACE WATER RECEPTORS

The principal pathway by which soil contamination may reach the water environment is through a slow seepage or leaching to groundwater or surface water. The potential for contaminants to migrate along such pathways is dependent on the chemical and physical characteristics of the contaminants and the local hydrogeology. Surface watercourses may also accumulate contamination as contaminated sediments are deposited within the water body.

Where the site investigated overlies major/principal aquifers (and in some cases minor/secondary aquifers depending on certain conditions), groundwater Source Protection Zones and areas in close proximity to groundwater abstractions, contamination test results have been compared with the Water Supply (Water Quality) Regulations 1989 and The Water Supply (Water Quality) Regulations 2000.

Should a surface water receptor, such as a fresh water environment (river, canal, stream, lake etc), or marine environment be considered sensitive in relation to a site, then test results are compared with DEFRA & SEPA Environmental Quality Standards (2004). Many of the Environmental Quality Standards are hardness (CaCO_3) depended. Where no hardness values are available, Solmek assume conservative values (of between 0 and 50mg/l).

In the absence of vulnerable ground and surface water environments, Solmek may compare any test results with the Environment Agency Leachate Quality Threshold Values.

DETAILED QUANTITATIVE RISK ASSESSMENT (DQRA)

In line with Environment Agency's guidance document Environment Agency *Land Contamination Risk Management*, which replaced the now-withdrawn *Contaminated Land Report 11 – Model Procedures for the Management of Land Contamination (2004)*, a DQRA for groundwater/human health may be required following a Phase 2 investigation and before the preparation of a Phase 3 Remediation Strategy. For human health DQRA, a site specific assessment criteria is undertaken using CLEA Software Version 1.06. For groundwater DQRA, the Environment Agency Remedial Targets Worksheet Version 3.1 is used.

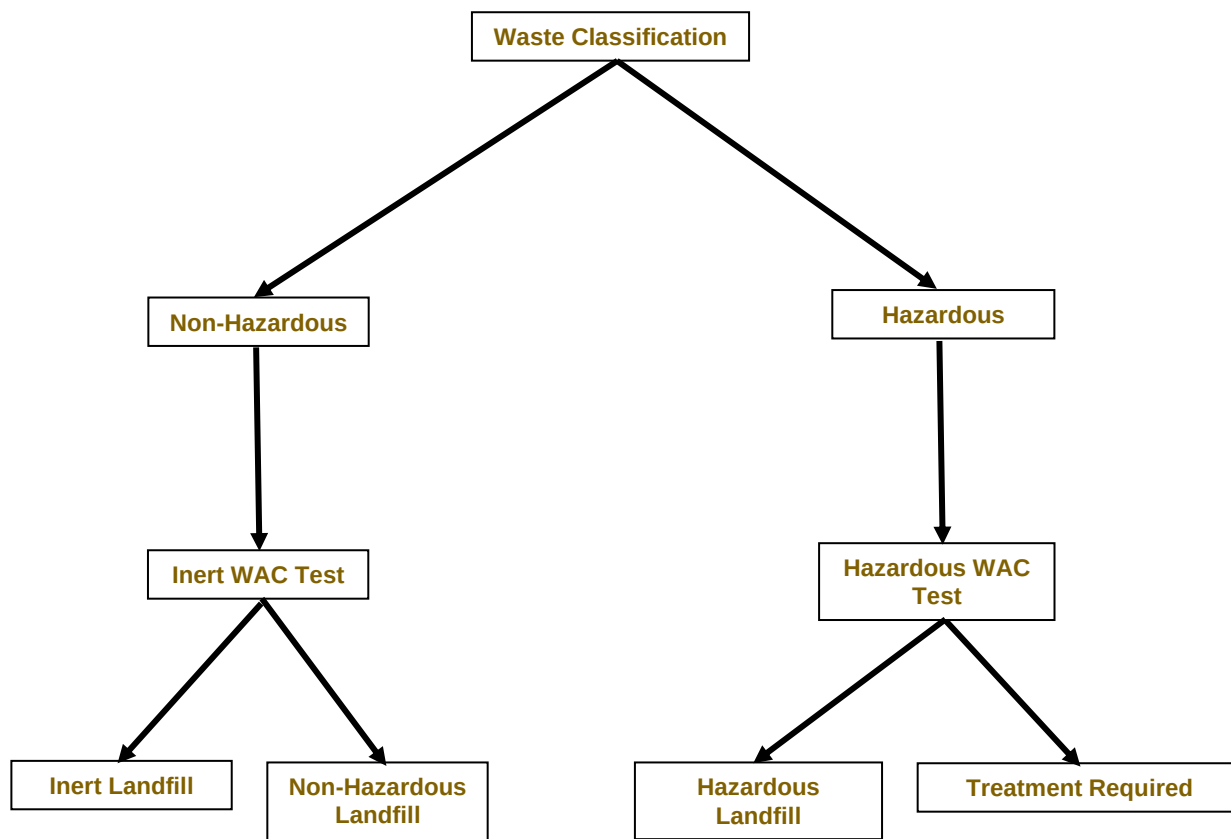
WASTE CLASSIFICATION AND WASTE ACCEPTANCE CRITERIA

During the site strip and construction activities, material may be required to be removed from site. Any such material would require classification, in line with Environment Agency Technical Guidance *Waste Classification: Guidance on the classification and assessment of waste (2015)*. This would classify the material as either Non-Hazardous or Hazardous Waste.

Once the material has been classified, determining the suitable landfill for disposal is governed by landfill directive Waste Acceptance Criteria (WAC) testing, with landfills categorized as Inert Waste, Stable Non-Reactive Hazardous Waste and Hazardous Waste. The WAC testing relates to materials that are to be exported from a site/development to landfill, and do not directly relate to human health specifically. The testing results are generally presented as certificates which can be used by site owners/contractors etc, which should be presented to the accepting waste facility or waste contractor.

If waste classification and/or WAC testing are not undertaken, material taken off site may be subject to WAC testing by the appropriate waste disposal company. The decision on whether or not to accept waste, or whether further testing is required, is at the discretion of the waste disposal company.

The below flow chart provides further information on the waste classification process.



CONSTRUCTION MATERIALS

Materials at risk from possible soil contaminants include inorganic matrices such as cement and concrete and also organic material such as plastics and rubbers. Acid ground conditions and high levels of sulphates can accelerate the corrosion of building materials. Where pH and soluble sulphate analysis has been undertaken, Solmek compare the test results with the guidelines presented within BRE Special Digest 1, 2005 (3rd Edition) 'Concrete in Aggressive Ground'. Plastics and rubbers are generally used for piping and service ducts and are potentially attacked by a range of chemicals, most of which are organic, particularly petroleum based substances. Drinking water supplies can be tainted by substances that can penetrate piping and water companies enforce stringent threshold values.

The levels of potential contaminants should be compared to thresholds supplied in the UK Water Industry Research (UKWIR) publication "Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites" (January 2011). A Brownfield Site is defined in the document as "Land or premises that have not previously been used or developed that may be vacant or derelict". It should be noted that Brownfield sites may not be contaminated. The guidance does not apply to Greenfield Sites however water companies may have their own assessment criteria which should be checked by the developer. The table below outlines the pipe material selection threshold concentrations.

Parameter group	Pipe Material (Threshold concentrations in mg/kg)					
	PE	PVC	Barrier pipe (PE-AL-PE)	Wrapped Steel	Wrapped Ductile Iron	Copper
Extended VOC suite by purge and trap or head space and GC-MS with TIC	0.5	0.125	Pass	Pass	Pass	Pass
+ BTEX + MTBE	0.1	0.03	Pass	Pass	Pass	Pass
SVOCs TIC by purge and trap or head space and GC-MS with TIC (aliphatic and aromatic C5-C10)	2	1.4	Pass	Pass	Pass	Pass
+ Phenols	2	0.4	Pass	Pass	Pass	Pass
+ Cresols and chlorinated phenols	2	0.04	Pass	Pass	Pass	Pass
Mineral oil C11-C20	10	Pass	Pass	Pass	Pass	Pass
Mineral oil C21-C40	500	Pass	Pass	Pass	Pass	Pass
Corrosive (Conductivity, Redox and pH)	Pass	Pass	Pass	Corrosive if pH <7 and conductivity >400µS/cm	Corrosive if pH <5, Eh not neutral and conductivity >400µS/cm	Corrosive if pH <5 or >8 and Eh positive
Specific suite identified as relevant following site investigation						
Ethers	0.5	1	Pass	Pass	Pass	Pass
Nitrobenzene	0.5	0.4	Pass	Pass	Pass	Pass
Ketones	0.5	0.02	Pass	Pass	Pass	Pass
Aldehydes	0.5	0.02	Pass	Pass	Pass	Pass
Amines	Fail	Pass	Pass	Pass	Pass	Pass

REQUIREMENTS OF PARTIES WITHIN THE DEVELOPMENT PROCESS

Interested parties involved in the development process may use the data in different ways and there may be varying views and interpretation of the factual data. Local Authority staff may have a view on contamination and human health and the wider environment. The Environment Agency are concerned principally with the protection of Controlled waters. Building insurers, funders and purchasers may be primarily concerned with issues of potential commercial blight. Purchasers are also not always fully informed, and perceptions on issues associated with risk can affect the decision to purchase. Developers and construction organisations will focus on financial aspects of dealing with the contamination in the context of the development and construction programme.

RISKS & LIABILITIES FROM CONTAMINATION

In simple terms, risks associated with contamination may be considered in terms of 1) statutory risks and 2) development related risks. If contamination is severe or forms a potential hazard based on its potential to affect groundwater, surface water or human health, a statutory risk may be present, and as such, if the risk is not reduced, criminal proceedings may be instigated by a government body or local authority.

If the contamination is less severe or not considered to be mobile, it may be considered a commercial liability which could, in theory remain untreated, but which may at a later date affect the value of the property, or, with changing legislation, become a statutory risk. Commercial liabilities could give rise to civil proceedings by third parties if there are grounds for action.

♣Solmek conditions of offer, notes on limitations & basis for contract (ref: version1/2025)

These conditions accompany our tender and supercede any previous conditions issued. Solmek will prepare a report solely for the use of the Client (the party invoiced) and its agent(s). No reliance should be placed on the contents of this report, in whole or in part by 3rd parties. The report, its content and format and associated data are copyright, and the property of Solmek. Photocopying of part or all of the contents, transfer or reproduction of any kind is forbidden without written permission from Solmek. A charge may be levied against such approval, the same to be made at the discretion of Solmek.

Solmek cannot be held liable and do not warrant, or otherwise guarantee the validity of information provided by third parties and subsequently used in our reports. Solmek are not responsible for the action negligent of otherwise of subcontractors or third parties.

Site investigation is a process of sampling. The scope and size of an investigation may be considered proportional to levels of confidence regarding the ground and groundwater conditions. The exploratory holes undertaken investigate only a small volume of the ground in relation to the overall size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions as encountered within each of the exploratory holes. There may be different ground conditions elsewhere on the site which have not been identified by this investigation and which therefore have not been taken into account in this report. Reports are generally subject to the comments of the local authority and Environment Agency. The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that mobile contamination, ground gas levels and groundwater levels may vary owing to seasonal, tidal and/or weather related effects. Solmek cannot be held liable for any unrecorded or unforeseen obstructions between exploratory boreholes and trial pits. This includes instances where previous structures on the site (buried man made structures) or the presence of boulder clay (cobbles and/or boulder obstructions) have been anticipated. All types of piling operations should make allowance for obstructions within the construction budget to accommodate this. Unrecorded ancient mining may occur anywhere where seams that have been worked and influence the rock and soil above. Dissolution cavities can occur where gypsum or chalk is present. Rotary drilling is the recommended technique to prove the integrity of the rock.

Where the scope of the investigation is limited via access to information, time constraints, equipment limitations, testing, interpretation or by the client or his agents budgetary constraints, elements not set out in the proposal and excluded from the report are deemed to be omitted from the scope of the investigation.

Desk studies are generally prepared in accordance with RICS guidelines. Environmental site investigations are generally undertaken as 'exploratory investigations' in accordance with the definitions provided in paragraph 5.4 of BS 10175:2011 in order to confirm the conceptual assumptions. You are advised to familiarize yourself with the typical scope of such an investigation. No pumping of water will be undertaken unless a licence or facilities/equipment have been arranged by others.

Where the type, number or/and depth of exploratory hole is specified by others, Solmek cannot and will not be responsible for any subsequent shortfall or inadequacy in data, and any consequent shortfall in interpretation of environmental and geotechnical aspects which may be required at a later date in order to facilitate the design of permanent or temporary works.

All information acquired by Solmek in the course of investigation is the property of Solmek, and, only also becomes the joint property of the Client only on the complete settlement of all invoices relating to the project. Solmek reserve the right to use the information in commercial tendering and marketing, unless the Client expressly wishes otherwise in writing. The quoted rates do not include VAT, and payment terms are 30 days from dispatch of invoice from our offices. Quotes are subject to a site visit.

We have allowed for 1 mobilisation and normal working hours unless otherwise stated. The scope of the investigation may be reviewed following the desk study and/or fieldwork. The presence or otherwise of Japanese Knotweed or other invasive plants can be difficult to identify especially during winter months. If Japanese Knotweed or other invasive species are suspect, it should be confirmed by an ecologist. We have not allowed for acquiring services information, and cannot be responsible for damage to underground services or pipes not shown to us or not clearly shown on plans. Costs incurred will be passed on to you, and in commissioning Solmek you understand and accept that you/your agent have a contractual relationship with Solmek & you accept this. Our rates assume unobstructed, reasonably level and firm access to the exploratory positions and adequate clear working areas and headroom. We have priced on the basis that you or your client have the necessary permissions, wayleaves and approvals to access land. All boreholes and pits are backfilled with arisings except where gas monitoring pipes are installed with stopcock covers. Solmek are not responsible for any uneven surfaces as a result of siteworks and rutting and backfilled excavations may require re-levelling and/or making good by others after fieldwork is complete, and Solmek has not allowed for this. No price has been provided or requested for a return visit to remove pipework and covers. Hourly rates apply to consultancy only and do not include expenses unless otherwise shown. If warranties are required, legal costs incurred will be passed on to you assuming Solmek agree to complete such warranties, modified or otherwise and you understand and agree to pay all costs.

We reserve the right to pursue full payment of the invoice prior to release of any information including reports. We advise you/your client that we may elect to pursue our statutory rights under late payment legislation, and will apply 8% to the base rate for unreasonably late payments. Solmek are exempt from the CIS Scheme. Solmek offer to undertake work only in strict accordance with conditions covered by our current insurances, which are available for inspection. Solmek are not responsible for acts, negligent or otherwise of subcontractors and as a matter of policy cannot indemnify any other parties. Professional indemnity Insurance is limited to ten times the invoice net total except where stated otherwise by Solmek. Solmek give notice that consequential loss as a direct or indirect result of Solmek's activities or omission of the same are excluded.