ROBERTS
ENVIRONMENTAL LTD

Phase II Geo-Environmental Assessment

Proposed Drive Through, Downlands Retail Park

July 2025

Worthing Retail Ltd

Reference: 250509.SI.01

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Client: Worthing Retail Ltd

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Executive Summary

Scope	
Purpose of the Report	This report has been prepared to provide environmental and geotechnical information to allow for a more robust risk assessment, to inform foundation design and to satisfy associated conditions of planning (if required).
Future Site End-use	It is our understanding that a proposed commercial scheme is under consideration, which is likely to include the construction of a new single-storey drive-through unit. The southern extremity of the site area will become an access road surrounding the unit. The access road extends into areas of existing soft landscaping to maximise the use of the area. A retaining feature is proposed along the southern and south-western boundary to facilitate this. Based on the nature of the proposed development and the current and intended use of the site, a Commercial end-use sensitivity is considered appropriate.
Site Information	
Grid Reference	515290, 105200
Current Site Status	The site is an irregularly shaped parcel of land currently occupied by a car park associated with B&Q and Curry's to the north. The majority of the site consists of hardstanding, with small areas of soft landscaping around the car park, typically featuring hedges and trees. Along the southern boundary, there is a line of trees. No issues of environmental significance were identified in connection with the current use of the site.
History	From the earliest mapping dated 1875, the site was undeveloped and likely used for agricultural purposes. By 1912, it had become an orchard and (plant)nursery before being gradually cleared by the early 1970s. From 1978 onwards, the site was developed as part of the Downlands Retail Park, where it remains in commercial use. Surrounding land use has evolved from predominantly agricultural to mixed residential and commercial, with several potentially contaminative features identified nearby. These include historical gravel and sand pits, a garage, multiple tanks, an electric substation, and a gas governor.
Geology	The site surface predominantly consists of black asphalt across the car park area, found in all boreholes except WS104, where grass overlying topsoil was recorded at the proposed car park entrance to the south. Beneath the surface, a brown sandy gravel granular sub-base was encountered in all boreholes except WS104, characterized by angular to subangular, fine to coarse gravel with fine sand. Immediately below the sub-base in boreholes WS101, WS102, and WS106, brown gravelly reworked clay was recorded, containing angular to subangular flint gravel. The underlying Head Formation comprises light brown gravelly fine sand in WS101, WS102, WS104, and WS106, situated either below the reworked natural or directly under topsoil in WS106, with gravel similarly angular to subangular flint. Deeper deposits include brown gravelly clay extending to the base of these boreholes, also containing angular to subangular flint gravel. Bedrock (Tarrant Chalk Member) was not encountered during the investigation. No relict foundations, obstructions, or evidence of contamination were recorded.
Hydrogeology	The superficial and bedrock geology are classified as a Secondary (Undifferentiated) and Principal Aquifer, respectively. The site is also located within a Groundwater Source Protection Zone III (Total Catchment). Within a 1 km radius, there are 15 groundwater abstraction licences, six of which are for potable use. The nearest potable groundwater abstraction point is approximately 561 m to the south.
Hydrology	The site is within Flood Zone 1, indicating a less than 0.1% annual probability of river or sea flooding, and there are no significant surface watercourses or culverted watercourses near the site. While the majority of the site is not at risk of surface water flooding, medium risk is present near the southern boundary adjacent to the Sompting Bypass, and a low-risk zone slightly encroaches on the eastern boundary. The site is also in an area with limited potential for groundwater flooding and is not within an area benefitting from flood defences. No surface water abstraction licences are recorded within 1 km. However, given the scale of the proposed development, a Flood Risk Assessment (FRA) may be required, and appropriate surface water management should be incorporated into the redevelopment plans.

RISK ASSESSMENT (POTENTIALLY SIGNIFICANT POLLUTANT LINKAGES) COMMERCIAL END USE SCENARIO		
Hazard Identification	*Source*	No olfactory or visual evidence of contamination was encountered during the advancement of the boreholes. Laboratory analysis has identified no contamination exceedances within any of the samples tested for a commercial end-use scenario.
	Pathway	• Direct contact or inhalation/ingestion pathways could exist where landscaped areas and/or permeable surfacing is present at the site. • Mobile contaminants (where present) have the potential to migrate vertically and laterally via permeable strata. Where present, contamination may impact foundations and services placed on site via direct contact. • Ground gas/vapours (where present) have the potential to migrate vertically and laterally via permeable strata. Where present, gases/vapours may impact human health and/or properties/services.
	Receptor	• *Human Health*: - Current site users, Adjacent site users, Future groundworkers, Future site users. • *Built Environment*: - Current structures and services, Adjacent properties and services, Future properties including services. • *Flora and Fauna:* - Current and future vegetation. • *Controlled Waters*: - Secondary Undifferentiated) and Principal Aquifer.
Foundation Design		Two foundation options have been identified as potentially suitable for the site: shallow strip or trench fill foundations founded at a minimum depth of 1.2 m within granular Head Deposits, and a raft foundation subject to further assessment of settlement performance and site level adjustments. A ground-bearing floor slab is also considered feasible, provided unsuitable materials are removed and a suitably compacted, engineered formation is achieved beneath the slab.

CONCLUSIONS	
Risk Estimation	During this site investigation, no significant evidence of contamination has been identified across the site. The results of the geo-environmental site investigation and risk assessment indicate that **a significant source - pathway – receptor pollutant linkage does not exist at this site** with respect to soil and groundwater contamination. Based on the findings of this report, it is concluded that the environmental risk arising from the ground conditions at the subject site when considering the current site status will be **LOW**. Provided the recommendations presented in this report are undertaken, it is concluded that the environmental risk to the proposed redevelopment of the site, arising from the ground conditions will be **LOW**. As such, based on the information obtained during the compilation of this report, REL have not identified any material environmental risks that would affect the future occupation and redevelopment for the proposed use of the property.
Recommendations	As part of the proposed redevelopment, we recommend that the client undertake the following action: As part of the proposed redevelopment, we recommend that the client undertake the following action: • A ground gas remediation strategy will be required, which outlines the scope of the gas protection to be installed within the property. • It may be prudent to consider further raft foundation assessment, cognisant of nearby proposed retaining features and a level uplift subject to future requirements. • REL recommend that any excavations on this site should remain open for as short a period as possible, since some of these materials may be susceptible to deterioration if left open to the natural elements for any significant period of time. • Construction and maintenance work should be subject to risk assessment. Workers should use appropriate procedures and to manage residual risk from exposure to materials on site. • A Preliminary Waste Assessment is provided in **Section 14.**

1. Instructions & Project Brief

Roberts Environmental Limited ("**REL**") were instructed on 15 May 2025 by Worthing Retail Ltd ("**the Client**") to undertake a Phase II Geo-Environmental Assessment ("**the Services**") Downlands Retail Park, Worthing BN14 9FB ("**the Property**"). Part of the Services included the production of this document ("**the Report**").

REL have previously undertaken the following desk study for the site, which has informed the scope of works and should be read in conjunction with this Phase II Geo-Environmental Assessment:

- Phase I Geo-Environmental Risk Assessment. Proposed Drive Through, Downlands Retail Park. Ref: 250509.PI.01. Dated May 2025.

A summary review of this report is included in **Section 4.**

Scope of Works

The scope of the investigation and this Report has been designed with consideration of guidance on Land Contamination: Risk Management (LCRM) – July 2023 pages of the GOV.UK web pages, the relevant requirements of the National Planning Policy Framework (NPPF) (as revised December 2023), specifically paragraphs 180 & 189-190) and the Planning Practice Guidance (Land Affected by Contamination). The detailed scope of works is set out in **Section 5.0.**

Specific sections of this Report may generally follow guidance as set out in Eurocode 7 (EC7) for a Ground Investigation Report (GIR) as defined in BS EN 1997-1:2004 and BS EN 1997-2:2007. EC7 includes specific guidance on the number and spacing of investigation positions, methods of investigation and sample quality to be achieved, which may not have been met by this investigation. Unless otherwise explicitly stated, the investigation has not been undertaken in full accordance with EC7.

Proposed Development

It is our understanding that a proposed commercial scheme is under consideration, which is likely to include the construction of a new single-storey drive-through unit. The southern extremity of the site area will become an access road surrounding the unit. The access road extends into areas of existing soft landscaping to maximise the use of the area. A retaining feature is proposed along the southern and south-western boundary to facilitate this. Based on the nature of the proposed development and the current and intended use of the site, a Commercial end-use sensitivity is considered appropriate.

2. Information Sources

Information Sources		
(Where appropriate documents are contained in the appendices with data extracts provided and summarised within pertinent sections of this report. List not exhaustive)	**Online Source**	British Geological Survey, Database and Mapping
		BGS Geoindex web mapping service
		British Geological Survey. (BGS) 1: 50,000 scale Provisional Series, Geological Map, England and Wales, Sheet 318 (Brighton), available on the BGS map portal.
	Documentation Source	Envirocheck Report (377543687_1_1) purchased from Landmark
	Third Party Reports	N/A
	Third Party Drawings	• Downlands Retail Park. Ground Investigation Brief. Ref: 3453-EVE-00-XX-DS-S-0001. Dated 24/04/25. • Downlands Retail Park, Worthing. Geo-Environmental Investigation and Reporting Enquiry Document. Evolve Consulting Structural & Civil Engineers. Ref: 3453-EVE-XX-XX-T-S-0001_Rev C. Dated 24/04/25.
	Previous REL Reports	• Phase I Geo-Environmental Risk Assessment. Proposed Drive Through, Downlands Retail Park. Ref: 250509.PI.01. Dated May 2025
	Site Investigation	Undertaken and supervised on 16 June 2025 by Christian Dean of REL.
	Laboratory Results (Appendix III)	• Eurofins Chemtest Ltd – Reference 25-20582-1. • Envirolab Ltd – Reference 25/06853. • Ian Farmer Associates Final Test Report Reference: 2282553 / 1.

3. Site Details

National Grid Ref.	515290, 105200
Ground Level Topography	The car parking area of the site is generally flat; however, ground levels range from 16.59 m AOD in the south of the site to 17.70 m AOD at the northern boundary. Comparatively, the nearby A27 carriageway is situated at approximately ~15.00 m AOD.
Site Area	0.12 hectares
Occupancy	Active Retail Park
Location	The site is located within Downlands Business Park, more specifically within the southern car park area, south of the B&Q and Curry's stores on the site. It is approximately 20 m north of the Sompting Bypass (A27) and about 2 km north of central Worthing.



Figure 1: Approximate Site Location Highlighted in Red

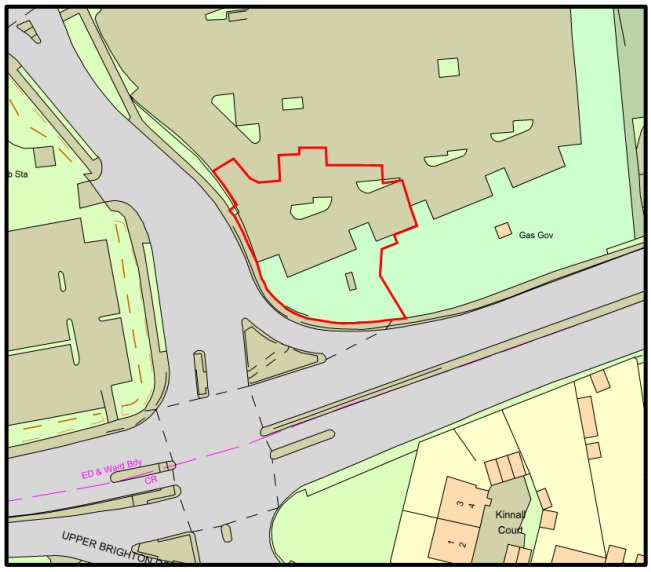


Figure 2: Site Boundary highlighted in Red

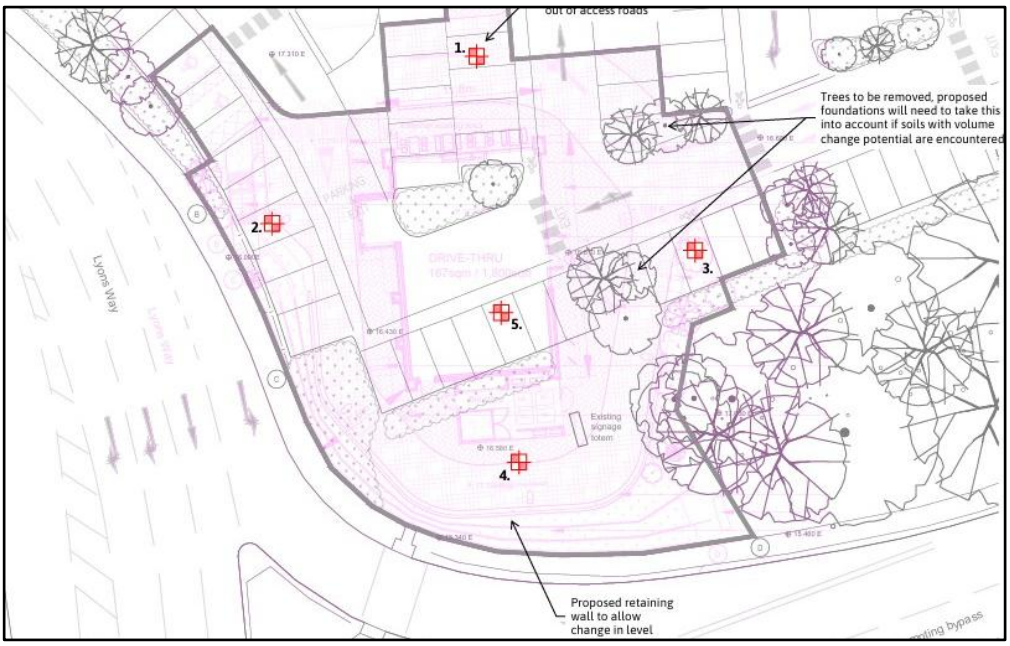


Figure 3: Extract of Proposed Site Plan. Drawing ref: 3453-EVE-00-XX-DS-S-0001 Ground Investigation Brief. REL have endeavoured to target the proposed intrusive locations shown above, cognisant of the proposed drive through footprint.

4. Phase I Desk Study Summary

A summary of pertinent information obtained during the compilation of the REL Phase I Report is presented in the table below.

SITE INFORMATION	
Grid Reference	515290, 105200
Current Site Status	The site is an irregularly shaped parcel of land currently occupied by a car park associated with B&Q and Curry's to the north. The majority of the site consists of hardstanding, with small areas of soft landscaping around the car park, typically featuring hedges and trees. Along the southern boundary, there is a line of trees.
History	From the earliest mapping dated 1875, the site was undeveloped and likely used for agricultural purposes. By 1912, it had become an orchard and (plant)nursery before being gradually cleared by the early 1970s. From 1978 onwards, the site was developed as part of the Downlands Retail Park, where it remains in commercial use. Surrounding land use has evolved from predominantly agricultural to mixed residential and commercial, with several potentially contaminative features identified nearby. These include historical gravel and sand pits, a garage, multiple tanks, an electric substation, and a gas governor.
Geology	According to published BGS data, the site and adjacent areas are mapped to be free of significant depths of Made Ground. Due to the developed nature of the site, the potential for areas of Made Ground to be present on the site must be assumed. Published BGS data indicate that the site is underlined by superficial deposits of a Head formation and bedrock deposits of the Tarrant Chalk Member.
Economic Geology	According to the Mining Remediation Authority (Formerly the Coal Authority) Interactive Mapping tool, the site is not positioned in a Coal Mining Reporting Area. The Envirocheck report records no man-made mining cavities, or BGS recorded mineral sites within 100m of the site boundary; as such, the site is not deemed to be at significant risk from coal mining or mineral extraction.
Hydrogeology	The superficial and bedrock geology were classified as a Secondary (Undifferentiated) and Principal Aquifer, respectively. The site was also recorded to be located within a Groundwater Source Protection Zone III (Total Catchment). Within a 1 km radius, 15 no. groundwater abstraction licences were recorded, six of which are for potable use. The nearest potable groundwater abstraction point was noted to be located approximately 561 m to the south.
Hydrology	The site was recorded to be within Flood Zone 1, indicating a less than 0.1% annual probability of river or sea flooding, and there were no significant surface watercourses or culverted watercourses identified near to the site. While the majority of the site was not at risk of surface water flooding, a medium risk was noted, proximal to the southern boundary adjacent to the Sompting Bypass, and a low-risk zone slightly was recorded to encroach on the eastern boundary. The site is also recorded to be within an area with limited potential for groundwater flooding and is not within an area benefitting from flood defences. No surface water abstraction licences were recorded within 1 km.
Environmental Sensitivity	Based on the information discussed above, the site location was deemed to be of **Low to Medium** environmental sensitivity.
Regulatory Consultation	A review of the Adur and Worthing Planning Portal identified three planning applications associated with the site, including the current proposal (AWDM/0333/22) for the construction of a drive-through coffee shop within the Downlands Retail Park car park. Previous applications related to retail park extensions, refurbishment works, and associated infrastructure. No pertinent information affecting the proposed development was identified.

RISK ASSESSMENT (POTENTIALLY SIGNIFICANT POLLUTANT LINKAGES)		
Hazard Identification	*Source*	No significant sources of contamination were identified; however, residual contamination may have been present due to historic land uses on the site and in the surrounding area. Any Made Ground underlying the site was considered to be of an unknown depth and composition and therefore potentially represented a potential source of contamination and ground gas.
	Pathway	• Direct contact or inhalation/ingestion pathways could exist where landscaped areas and/or permeable surfacing are present at the site. • Mobile contaminants (where present) can potentially migrate vertically and laterally via permeable strata. • Ground gas and vapours (where present) have the potential to migrate vertically and laterally via permeable strata.
	Receptor	• *Human Health* - Current site users, Adjacent site users and residents, Future groundworkers, and Future residents. • *Built Environment* – Current properties and services, Adjacent properties and services, Future properties and services. • *Flora and Fauna* - Current vegetation and Future planting within landscaped areas. • *Controlled Waters* - Groundwaters Secondary (Undifferentiated) and Principal Aquifer.
CONCLUSIONS		
Risk Estimation		Based on the information obtained during the desk study, it is concluded that the environmental risk arising from the ground conditions at the subject site when taking into account the site's current status and usage, is **LOW**. When considering the proposed redevelopment of the site for a Commercial end use, it is concluded that the potential environmental risk to arising from the ground condition at the subject site would be **LOW.** Based on assumption that the recommendations outlined in the report are to be undertaken, it is the opinion of Roberts Environmental Ltd, that the issues identified should not preclude the future redevelopment of the site.
Recommendations		For the redevelopment of the site, we recommend the following actions: • An intrusive ground investigation would be required to allow for the collection of geotechnical data, to be used to inform future foundation design. During any such investigation, it may be prudent to obtain environmental samples from soils to confirm the absence of a significant risk to human health or sensitive receptors. • Based on available information, the site has a low overall flood risk. However, due to the size of the site, a Flood Risk Assessment may be required as part of any planning application. Surface water management must be considered during and after redevelopment. • Construction and maintenance work should be subject to risk assessment. Workers should use appropriate procedures to manage residual risk from exposure to materials on site.

5. Site Investigation Design

The site investigation has been designed in order to provide further information and quantification of the risk associated with contaminated land and geotechnical issues. The table below summarises the overall design rationale of the site investigation.

	Contamination	Geotechnical
Objectives	1) Characterisation of Made Ground (if present) and natural deposits across the site; 2) To undertake a range of chemical analyses on representative and targeted soil samples, to determine the presence or otherwise of significant contamination; 3) To determine the presence or otherwise of shallow groundwater; and 4) To allow for the refinement of the Phase I preliminary CSM and allow for the production of a more robust and informed risk assessment.	1) To refine the preliminary ground model by undertaking ground investigation; 2) To characterise the geological ground conditions successions beneath the site and the proposed development; 3) To undertake in-situ and laboratory testing to enable the compilation of geotechnical material properties to assess the strength and compressional properties of the ground model; and 4) To allow for the production of a Geotechnical Assessment to inform future design consideration and, if necessary, highlight areas for supplementary investigation.
Design Reference Documents	• Site Investigation Steering Group (2012) UK Specification for Ground Investigation; • British Standard (BS) 5930:2015+A1:2020 Code of Practice for Ground Investigations; • BS 10175:2011+A2:2015 Investigation of Potentially Contaminated Sites – Code of Practice; • BS EN ISO 15175:2018 Soil Quality – Characterisation of Contaminated Soil Related to Groundwater Protection; • Environment Agency (EA) (2000). Technical Report P5-066/TR - Secondary Model Procedures for the Development of Appropriate Soil Sampling Strategies for Land Contamination; • Environment Agency - Land Contamination: Risk Management (2020); • EA (2021) Land Contamination: Risk Management; • CIRIA (2007) C665: Assessing the Risks Posed by Hazardous Ground Gases to Buildings; and	• Site Investigation Steering Group (2012) UK Specification for Ground Investigation; • British Standard (BS) 5930:2015+A1:2020 Code of Practice for Ground Investigations; • BS 8004:2015 Code of practice for foundations (+A1:2020); • BS 1377-2:2022 – Methods of test for soils for civil engineering purposes – Classification tests and determination of geotechnical properties; • BS EN ISO 14688:2018 Geotechnical Investigation and Testing – Identification and Classification of Soil; • BS EN ISO 22475-1:2006 Geotechnical Investigation and Testing – Sampling Methods and Groundwater Measurements; • BS EN ISO 22476:2012 Geotechnical Investigation and Testing – Field Testing; • NHBC Chapter 4.2. (*Best practice for volume change potential);* • Design Manual for Roads and Bridges, CD225. Design for new pavement foundations (formerly IAN 73/06);

	• RB 17 A Pragmatic Approach to Ground Gas Risk Assessment.	• CIRIA R 143 The Standard Penetration Test (SPT): Methods and Use; • BRE 412 Desiccation in Clay Soils; • BRE SD1 (2005) Concrete in Aggressive Ground; and • BS EN 1997-1:2004+A1:2013 Eurocode 7 - Geotechnical Design.

Site Investigation Scope of Works

The site investigation works completed by REL on 16 June 2025 comprised the following:

- Site supervision and logging of soils in general accordance with BS5930:2015+A1:2020.
- Service clearance of borehole locations prior to drilling.
- Advancement of six windowless sampling (WS) boreholes (WS101 to WS106) to a maximum depth of 5.45 meters below current ground level (bcgl).
- In-situ testing in the form of Standard Penetration Testing (SPT) at 1m intervals was undertaken during the advancement of the boreholes.
- Sampling of disturbed soil arisings and submission of samples for chemical and geotechnical laboratory testing.
- Ground gas and groundwater monitoring wells were installed in three of the six boreholes (WS101, WS102 and WS106) to provide sufficient coverage across the footprint of the proposed building.
- An Exploratory Location Plan presenting intrusive locations undertaken is included in **Appendix II.**

Limitations & Constraints

The ground conditions reported relate only to the point of excavation and do not necessarily guarantee continuity of these conditions across the non-investigated areas of the site.

Additionally, the following specific data gaps and uncertainties apply to this assessment:

- Sampling that is dependent on moisture content is representative of the ground conditions at the time of sampling/testing. The geotechnical analysis does not necessarily account for seasonal variations or isolated meteorological events such as heatwaves.
- Observations relating to groundwater are based on specific conditions recorded during the ground investigation. The depth to groundwater may fluctuate with seasonal changes.
- Full coverage of the site was not possible due to buried utilities along the southern portion of the site. Boreholes were therefore positioned to achieve the best general coverage possible given these constraints.

Quality Control

All environmental samples were dispatched under a chain of custody procedure to Eurofins Chemtest Environmental Testing Limited, who are a UKAS-accredited laboratory (MCERTS certified), for subsequent chemical analysis.

All geotechnical samples were dispatched under a chain of custody procedure to Ian Farmer Associates Ltd, who are UKAS-accredited (MCERTS certified), for subsequent geotechnical analysis.

Health and Safety

All work carried out on site was in accordance with REL Health and Safety Policy. In addition, a risk assessment was produced prior to the works beginning on site. Prior to any excavations being undertaken, REL staff instructed a utility clearance specialist, RSP Underground Services, to ensure any proposed exploratory locations would not interfere with the working practices of the subject site and buried utilities. All boreholes were positioned in areas free from services.

Utility clearance operations utilised Ground Penetrating Radar (GPR) and Cable Avoidance Tool (CAT) methodologies to confirm the presence of known utilities and, where required, identify where anomalies were encountered.

Geo-Environmental Laboratory Sampling & Testing Strategy

Environmental soil samples representative of the underlying conditions were collected and submitted to be tested for a suite of determinants at an appointed United Kingdom Accreditation Service (UKAS) accredited laboratory.

Intrusive Locations	Strata	Rationale	Potential Contaminants of Concern
WS102	Site Surfacing - Asphalt	To determine the presence or otherwise of coal tar binder within the hardstanding.	Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAH), Semi-Volatile Organic Compounds (SVOC) and Volatile Organic Compounds (VOC).
WS101, WS102 , WS103,WS104, WS105 and WS106	MadeGround	To provide general coverage of the site and confirm the absence of unacceptable levels of common contaminants of concern.	Heavy metals, Inorganics, PAH, TPH, SVOC & VOC.
WS104	Head Formation		
WS101 and WS106	MadeGround	To confirm the absence of significant leachable contaminants within soils at the subject site and allow for a more informed Controlled waters risk assessment.	Heavy metals, Inorganics, PAH, TPH.
WS104	Head Formation		

As a result of the above geo-environmental rationale and associated contaminants of concern, the following environmental soil analysis was carried out as summarised below:

- 6 No. soil samples tested for Roberts Environmental Full Suite 1 - suite includes: pH, Heavy Metals, Inorganics, Organics and Asbestos identification;
- 3 No. Soil samples tested for leachability of Heavy Metals, Inorganics, Sulphate, pH, USEPA 16 Polycyclic Aromatic Hydrocarbons (PAH's) and Total Petroleum Hydrocarbons (C5-C44).
- 3 No. Soil samples tested for Semi-Volatile Organic Compounds (SVOC) and Volatile Organic Compounds (VOC).

The laboratory test results sheet for Chemtest Limited (Ref: 25-20582-1) is attached in **Appendix III.**

Geotechnical Laboratory Testing & Sampling Strategy

A selection of soil samples comprised of disturbed tub and bulk was submitted to a UKAS-accredited laboratory for a range of geotechnical testing, the results of which are presented in **Appendix III**. The rationale for the laboratory tests undertaken is provided in the table below:

Laboratory Test	Test Standard	Number of Samples Tested	Rationale
Classification			
Bulk & Dry Density (by Linear Measurement)	BS EN ISO 17892:Part 1:2014	1	To provide information on the total mass of the soil per unit volume versus the mass of soil solids only per unit volume.
Water content	BS1377-2:3 or BS EN ISO 17892:2014	5	To assess the potential for cohesive soils to shrink and swell due to changes in the water content of a soil. Often associated with the presence, removal or addition of trees and shrubs.
Liquid and Plastic Limits	BS1377-2:4 or BS EN ISO 17892:2018	4	
Geochemical – Soil Samples			
pH	BRE Special Digest 1 or other	9	To assess the soil conditions of the site in accordance with BRE Special Digest 1 Concrete in Aggressive Ground (2005), in order to specify an appropriate concrete class to resist chemical attack.
Water Soluble Sulphate (2:1 water / soil extract)		9	
Acid Soluble (Total) Sulphate		3	
Total Sulphur		3	

The laboratory test results sheet for Ian Farmer Associates (Ref: 2282553/1), Chemtest Limited (Ref: 25-20582-1) and Envirolab Ltd (Ref: 25/06853) are attached in **Appendix III**.

Geotechnical In-Situ Testing

The following in-situ testing was utilised to support laboratory analysis:

- Standard Penetration Testing (SPT) recorded at 1.00 m intervals until borehole completion / refusal. The SPT N values are included on borehole logs included as **Appendix II,** together with the SPT Calibration Certificate(s), in accordance with BS EN ISO 22476-3:2005+A1:2011, Geotechnical investigation and testing – Field testing – Part 3: Standard penetration test for trip hammers.

- In-situ CBR testing using Dynamic Cone Penetration (DCP) to obtain equivalent and derived CBR values.

- In-situ Falling Head Infiltration testing to determine the infiltration properties of the shallow ground conditions for consideration as part of future drainage design.

6. Encountered Physical Ground Conditions

Site Surfacing

The site surface generally comprises black asphalt across the car park area. However, WS104 was located in the southern part of the site, where the surface consisted of grass overlying Topsoil. This area is understood to be the proposed entrance to the car park.

	Depth encountered (m bcgl)	Base of Statum (m bcgl)	Stratum Thickness (m)	Encountered Geology
Site Surfacing (Black Asphalt)	Ground Level	0.10 - 0.15	0.10 - 0.15	Found in all boreholes except WS104, recorded as black asphalt hardstanding.
Site Surfacing (Topsoil)	Ground Level	0.10	0.10	Found within WS104 recorded as reworked natural: grass overlaying topsoil.
Made Ground (Granular sub-base)	0.10 – 0.15	0.30 – 1.20	0.20 - 1.08	Brown sandy GRAVEL subbase was encountered in all boreholes except WS104. The gravel is angular to subangular, fine to coarse, and the sand component is fine-grained.
Made Ground (Cohesive Reworked Natural)	0.30 – 1.00	0.8 – 1.30	0.30 – 0.70	Brown gravelly reworked CLAY was encountered in boreholes WS101, WS102, and WS106 immediately beneath the sub-base layer. The gravel component comprises angular to subangular, fine to coarse flint.
Head Formation (Gravelly Sand)	0.20 - 1.30	1.40 – 2.00	0.20 – 1.3	Light brown gravelly fine SAND was encountered in boreholes WS101, WS102, WS104, and WS106. In WS101, WS102, and WS104, it was observed directly beneath the reworked natural material, whereas in WS106, it was recorded immediately below the Topsoil. The gravel component comprises angular to subangular, fine to coarse flint.
Head Formation (Gravelly Clay)	1.40 – 2.00	2.50 – 5.45	1.10 - 3.95	Brown gravelly CLAY was encountered in boreholes WS101, WS102, WS104, and WS106 to the base of each borehole. The gravel component comprises angular to subangular, fine to coarse flint.
Bedrock Deposits (Tarrant Chalk Member)	N/A	N/A	N/A	Bedrock deposits were not encountered during ground investigation works.

Groundwater Strikes & Monitoring

During intrusive investigation works, a continuous groundwater body was not identified, with no groundwater strikes being recorded.

Following completion of the gas and groundwater monitoring program, no groundwater was recorded, and all installed monitoring wells were observed to remain dry. This correlates with no groundwater strikes being recorded during drilling and the lack of precipitation observed during the time of the investigation and monitoring program generally.

Underground Structures and Obstructions
During the ground investigation, the following notable records of obstructions during the investigation works were recorded. No underground structures were, however, encountered during drilling: • WS103 @ 1.20 m bcgl – Borehole refused at the base of the hand-excavated pit upon an unknown obstruction. An SPT was undertaken, confirming a refusal and upon attempts to recover arisings for inspection, no progress was achieved. The borehole was terminated and backfilled as a result. • WS104 @2.50 m bcgl – Borehole refused during drilling at a depth of 2.50 m bcgl. An SPT was undertaken to confirm refusal in natural superficial geology. It is inferred that the refusal was due to a natural obstruction, such as a cobble or boulder. • WS105 @ 1.20 m bcgl – Similarly to WS103, the borehole refused at the base of the hand-excavated pit upon an unknown obstruction. An SPT was undertaken confirming refusal and no success was achieved attempting to recover limited arisings for inspection. The borehole was terminated and backfilled as a result. • Historic mapping indicates the presence of a buried floor slab in the central portion of the site in 1974; however, based on the findings from WS101 and WS102—both located within this area and showing no refusal—it is REL's opinion that the slab may have been removed during the development of the Downlands Retail Park.
Olfactory and Visible Evidence of Contamination
No olfactory or visible evidence of contamination was encountered during the ground investigation.

7. Geotechnical Material Properties

The material properties generated from both the in-situ and laboratory test results is summarised in the table below. It should be noted that the values presented are summary ranges of the data collected to inform this assessment. Unless otherwise stated, the ranges presented do not constitute characteristic design values:

Material Parameter	Unit	Value or Range	Justification
Made Ground (Sub-Base)			
CBR (California Bearing Ratio)	%	11 – 50	CBR values calculated from TRL Dynamic Cone Penetrometer to inform preliminary road/pavement and hardstanding design.
Made Ground (Reworked Natural)			
CBR (California Bearing Ratio)	%	6 – 80	CBR values calculated from TRL Dynamic Cone Penetrometer to inform preliminary road/pavement and hardstanding design.
Head Deposits: Gravelly Clay			
γ (Bulk Density)	Mg/m^3	2.02	Bulk density and dry density were derived using linear measurement.
γ_d (Dry Density)	Mg/m^3	1.50	
w (Water Content)	%	4.4 – 12.3	Laboratory classification testing.
IP (Plasticity Index)	%	6 – 14	
IP' (Modified Plasticity Index)	%	1 – 7	Derived using the relationship: *IP' = (IP x %passing 425um)/100*
PL (Plastic Limit)	%	16 - 21	Laboratory classification testing.
LL (Liquid Limit)	%	23 – 35	
Volume Change Potential	-	Low	Derived using NHBC Chapter 4.2.4, considered industry best practice.
Uncorrected SPT 'N'	Blows	10 – 31 *50	In-situ testing. * = N value of 50 recorded where obstructions were encountered, either natural or anthropogenic.
Corrected SPT 'N_{60}'	-	10 – 31	SPT N values corrected for energy ratio (Er) after BS EN ISO 22476-3:2005. SPT Hammer ID Dart 212, Er = 60%.
Cu (Inferred Undrained Shear Strength)	kPa	50 – 155	Inferred Cu calculated using Stroud (1975) empirical relationship: *$Cu = f_1 \times N^{60}$* *IP* assumed of 21%.
Head Deposits: Gravelly Sand			
Uncorrected SPT 'N'	Blows	9 – 19	In-situ testing.
Corrected SPT 'N_{60}'	-	9 – 19	SPT N values corrected for energy ratio (Er) after BS EN ISO 22476-3:2005. SPT Hammer ID Dart 212, Er = 60%
CBR (California Bearing Ratio)	%	35	CBR values calculated from TRL Dynamic Cone Penetrometer to inform preliminary road/pavement and hardstanding design.

Standard Penetration Test Data Trend

Standard Penetration Test (SPT) results across all boreholes recorded a consistent increase in N-values with depth when assessing the data distribution across both granular and cohesive Head deposits. Values of N=50 were recorded; however, these are generally due to shallow anthropogenic or natural obstructions and cannot be relied upon when informing future design.

The data within shallow deposits of granular Head Deposits suggest loose to medium dense deposits, which REL consider generally favourable for future load bearing and settlement performance.

Undrained Shear Strength Data Trend

When assessing the relationship between SPT values and plasticity indices of shallow soils, inferred shear strength within the Head Deposits of gravelly clays has recorded values of between 50 – 155 kPa, which is indicative of medium becoming very high strength clays. The impact of gravel within the clay must be considered and is likely to be a contributing factor to the strength of the deposit overall.

Generally, however, REL consider the data trend within cohesive Head Deposits to be favourable for future load bearing and settlement performance, particularly when considering the impact of gravels within the clay, limiting the compressibility of soils.

Dynamic Cone Penetrometer CBR Trend

Preliminary DCP assessment has been undertaken in three locations (WS101, WS102 and WS106). Generally, high CBR values have been recorded, likely due to the gravel content with natural clays and the density of the gravelly sands recorded at shallower depth. Favourable values appear to have been recorded in shallow Made Ground deposits, which *may* suggest a form of control over the placement of shallow deposits. REL cannot confirm this, however. Further commentary on future road and pavement design is included in **Section 8**.

Suggested Outline Retaining Wall Material Parameters

REL understand that a retaining feature is proposed along the southern and south-western boundary of the site to facilitate an elevation change between the site, soft landscaping and the carriageway of the A27 (indirectly).

When referring to drawing 3453-EVE-00-XX-DS-S-0001, the proposed elevation along the southern drive-through road is to increase from an approximate existing level of 16.58 m AOD to 17.15 m AOD, resulting in a net uplift in site level by +0.57 m. WS104 recorded Made Ground to an elevation of 16.11 m AOD, underlain by gravelly sand to 14.91 m AOD. It is assumed that the retaining feature will not influence soils below this approximate elevation, and the upper horizons of placed material will be engineered accordingly for a specific retaining wall design.

Outline conservative material parameters are therefore provided for granular Head Deposits at this time to inform preliminary retaining wall analyses:

Parameter	Units	Value(s)
Head Deposits (Granular)		
Undrained Scenario		
Undrained Shear Strength (C_U)	kPa	0
Angle of Internal Friction (Φ)	°	30
Drained Scenario		
Cohesion (C')	kPa	0
Drained Angle of Internal Friction (*Φ'*)	°	30

The above parameters are considered proportionately conservative. Based on the above conservative parameters, the following coefficients of earth pressure are suggested.

As part of this process, the parameters suggested above and below should be reviewed and confirmed as suitable for use by the appointed designer. In addition, the impacts upon nearby infrastructure, such as buried utilities, should be considered.

Based on the above conservative parameters, the following Earth Pressure calculations have been undertaken using empirical formulae as specified:

K_0 (Coefficient of Earth Pressure at Rest)

Lateral earth pressure at rest estimated using Jaky's equation $K_0 = 1 - Sin(\Phi)$.

K_a (Active Earth Pressure Coefficient)

Using Rankines earth pressure theory for soils $K_a = tan^2 (45° - \Phi/2)$.

K_p (Passive Earth Pressure Coefficient)

Using Rankines earth pressure theory for soils $K_a = tan^2 (45° + \Phi/2)$.

Summary of Coefficients

The following preliminary/indicative Earth Pressure Coefficients are proposed, for confirmation by an appropriately qualified designer:

Stratum	K_0	K_a	K_p
Head Deposits (Granular)	0.500	0.333	3.00

Geochemical Testing

Geochemical analysis was undertaken upon six soil samples of Made Ground and three samples of natural Head Deposits, tested for selected contaminants as part of a suite deemed suitable for the ground model (BRE Special Digest 1: 2005 (3rd Edition), Concrete in Aggressive Ground). The results are summarised in the table below:

The results are shown in the table above and are also contained within the Chemtest Limited Analytical Report (reference: 25-20582-1) and Envirolab Limited Report (reference: 25/06853), copies of which can be seen in **Appendix III.**

Test Analyte	No. of Tests	Minimum	Maximum
Made Ground			
Soil - pH	6	7.8	9.6
Soil – Water soluble sulphate (g/L)	6	< 0.010	0.52
Head Deposits			
Soil - pH	3	7.7	8.1
Soil – Water soluble sulphate (g/L)	3	<0.010	0.021
Soil – Total Sulphate (%)	3	<0.02	<0.20
Total Sulphur (%)	3	0.02	0.11

Falling Head Infiltration Testing (FHT)

REL undertook three FHT's in each respective installed monitoring well location.

Borehole Location	Response Zone	Infiltration Rate	Observations
WS101	Made Ground (Sub-Base)	No Rate Produced	Water drained faster than could be recorded at the time of testing.
WS102	Head Deposits (Granular)		
WS106	Head Deposits		

Upon commencement of testing, the water introduced to each borehole (<20L) drained away faster than what could be accurately recorded. A standing water level could not be achieved in the borehole.

Observations recorded by REL infer that the granular lenses, either as part of the Head Deposits or Made Ground, may have been responsible for the favourable infiltration conditions observed.

Further commentary is provided in **Section 8**.

8. Geotechnical Assessment

Summary of Development Proposals

It is our understanding that a proposed commercial scheme is under consideration, which is likely to include the construction of a new single-storey drive-through unit situated within an existing area of customer car parking in the southern extremity of the retail park. The southern extremity of the site area will become an access road for the drive-through unit. The access road extends into areas of existing soft landscaping to maximise the use of area, with proposed levels indicating a net increase to accommodate the proposed layout. A retaining feature is proposed along the southern and south-western boundary to facilitate this.

No indicative loadings have been supplied at the time of writing; however, it is assumed that loadings imposed by the future drive-through structure will be relatively light, given the anticipated one-storey proposal.

Preliminary Geotechnical Hazards

The geohazards listed below have been identified to follow guidance presented in the HE document CD622 'Managing Geotechnical Risk' (2020) which aims to identify and manage the geotechnical risks associated with a scheme throughout its lifespan, from planning to construction to maintenance.

The following geohazards are considered to represent substantial ground related risks associated with the proposed development:

- Obstructions within Made Ground: Made Ground was identified as associated with previous and current site uses. Made Ground is typically variable in nature and strength with a potentially variable bearing capacity and unacceptable levels of total / differential settlement may occur. Obstructions have been identified within the Made Ground in some locations but not others. It cannot be determined from the investigation alone as to how the Made Ground has been placed historically.

- Obstructions within the Head Deposits: Natural obstructions likely related to coarse gravels, cobbles and possibly boulders may be present, resulting in variable geotechnical performance. These may require removal as the construction phase progresses to prevent differential ground conditions at future formation levels.

- Volume change potential: The Head Deposits are of a low volume change potential as inferred from the modified plasticity indices. Proposed new planting may result in desiccation of soils, leading to subsidence or conversely, the removal of vegetation may result in rehydration of soils, with the potential for limited heave.

- Enabling Works – Removal of relict features: There may be otherwise unrecorded obstructions within the Made Ground that require removal. Indications suggest a former concrete slab recorded on historical mapping is no longer present; however, it cannot be fully discounted.

- Enabling Works – Raising of site levels: It should be ensured that placed fill materials to raise levels do not settle to values outside of tolerable limits, with any settlement possible occurring in shallow cohesive Head Deposits. Given the limited thickness of any fill, this is considered low risk.

- Buried Utilities: A known gas utility is present beneath soft landscaping in the southern area of the site; this is likely to require safeguarding or relocation to facilitate proposed development plans and installation of a future retaining wall.

Enabling Earthworks

At the time of writing, accurate finished levels were not known to REL; however, it is understood that, to some degree, earthworks will be required as part of the proposed development. This may include the near-surface removal of hardstanding, grubbing out of any obstructions such as relict slabs or foundations and removal of topsoils, Made Ground and other, otherwise unsuitable engineering materials to prepare the formation level.

In the event that limited reprofiling / raising of the site is required, materials used as fill will need to be placed to a suitable engineering specification, with the degree of compaction required dependent on end-usage and serviceability criteria. For example, a lesser degree of compaction may be suitable for paved areas in comparison to building platforms supporting foundations and ground bearing slabs.

On the basis that significant earthworks are not anticipated at the site, earthworks testing and associated detailed specifications are unlikely to be required.

Volume Change Potential

Based on the modified plasticity index, a low volume change potential should be assumed.

For shallow foundations, and in reference to applicable guidance, the minimum founding depth for foundations cast outside the zone of influence of trees is recommended as 1.00 m bcgl. The volume change potential should be considered as part of any future foundation design.

The above only applies to cohesive soils and is not applicable where granular soils are encountered at or beneath the founding depth. Additionally, the above minimum depth does not take into consideration load-bearing performance.

Preliminary Desiccation Assessment

As described in BRE Digest 412 "Desiccation in Clay Soils", one method of determining the likely desiccation status of soils is using an empirical criterion for the onset of desiccation can be considered where the soil moisture content is 40% of the Liquid Limit, and where this is less than 40%, soils may be considered to be in a significantly desiccated condition. Likewise, assessment of Liquidity Index; where a value of zero or greater indicates the soils water content to be at or above the Plastic Limit, while negative values indicate the soil to be drier than the Plastic Limit can be used to assess whether the soils are artificially deficient in natural moisture content.

Analysis of the four samples obtained from the Head Deposits has been undertaken to determine, if present, the degree of desiccation within cohesive soils:

Sample & Depth (m bgl)	Natural Water Content (%)	Liquid Limit (LL) (%)	Plastic Limit (PL) (%)	Deficit from LL (%)	40% of LL (%)	Classification
WS101 (1.60)	4.40	23	17	20.6	10.0	Significant Desiccation
WS101 (4.20)	12.30	27	18	14.7	10.8	Artificially Desiccated
WS102 (3.00)	7.50	35	21	27.5	14.0	Significant Desiccation
WS104 (2.40)	2.30	26	16	23.7	10.4	Significant Desiccation.

Three of the eight samples indicate 'Significant Desiccation', whereby soils are in a state of more permanent moisture deficiency. One sample, WS101, indicated 'Artificial Desiccation', indicating a temporary state of moisture deficiency.

Development proposals suggest that limited vegetation removal may be undertaken. With hardstanding likely to remain present and the possibility that SuDS are to be implemented, limited rehydration of soils may occur.

However, with the raising of site levels, the risk of ground movement impacting future foundations from moisture content variation in the Head Deposits reduces further as the relative depth of the Head Deposits increases below the proposed ground surface.

Foundation Assessment Assumptions

The assessment below, in reference to Eurocode 7, has assessed both the Ultimate Limit State (ULS) bearing capacity and Serviceable Limit State (SLS) for subsequent consideration for the preliminary and outline design of shallow foundations. Combination 2 has been assumed for foundations assessment which applies partial factors to soil parameters only:

- Design Approach 1 (DA1) Combination 2 (A2 + M2).

Parameter / Action	Partial Factors	
	A2	M2
Angle of Internal Friction	-	1.25
Unit Weight of Soil	-	1.00
Live Load (variable unfavourable)	1.30	-
Weight of Foundation (permanent unfavourable action)	1.00	-

Verification of the SLS will be undertaken as a check calculation of the acceptable settlement.

Foundation Options

Spread Foundations – Strip / Trench Fill

The ground investigation has identified that competent natural deposits of Head Deposits are within reach of a shallow strip or trench fill foundation solution. The following recommendations are based upon site levels in their current form and do not account for any raising of levels at this time.

Assuming a strip or trench fill foundation with a width of up to 1.0 m, founded at a minimum depth of 1.20 m within granular Head Deposits of gravelly sand and a minimum angle of internal friction of 30 degrees, an SLS bearing capacity of 150 kN/m^2 may be feasible (limited to less than 25 mm of total settlement).

Foundations may require locally deepening depending on the thickness of Made Ground identified beneath the proposed building footprint.
It is assumed that strip / trench fill foundations would be cast beneath any Made Ground deposits or unsuitable engineering materials, within the Head Deposits.

Consideration should be given to ensuring that foundations across the structure are founded within homogeneous and consistent material with respect to achieving the minimal geotechnical parameters specified in order to reduce the likelihood of differential settlement. Where softer zones and / or differing ground conditions are encountered, foundations should be over-deepened to ensure competent strata is reached.

Spread Foundations – Preliminary High Level Raft Assessment

Based on the ground conditions encountered and proposed increase in levels, it may be feasible to utilise a raft foundation for the structure, instead of a strip / trench foundations.

Raft foundations' feasibility requires a focus upon settlement performance for a given loading, as opposed to the maximal bearing capacity that the soils supporting the raft can withstand. As such, the following has been assumed to determine an approximate Uniformly Distributed Loading (UDL) for further consideration:

- Removal of Made Ground or partial removal of Made Ground with either replacement with engineered granular fill and / or improvement of residual Made Ground granular soils to a medium density. Additional placement of granular fill to a medium density to achieve the required formation level. The granular fill is assumed to achieve a constrained modulus (E') of 10 MPa.
- The underlying cohesive Head Deposits are assumed to achieve a minimum E' of 5 MPa, assumed to depth.
- A floor slab dimension of approximately 15 m x 15 m (for the purpose of preliminary raft assessment) and a thickness of 300 mm.
- A self-weight of concrete calculated as 7 kN/m^2, based on a thickness of 300 mm.
- A self-weight of placed granular fill to raise levels by approximately +0.5 m of 10 kPa (to consider on a worst-case basis the impact of a minor surcharge from placed material).
- An imposed loading across the raft of 5 kN/m^2, taking into consideration live and dead loadings.
- A combined loading of 22 kN/m^2 is assumed as a "worst case" UDL to indicate potential feasibility.

When considering the above, a UDL of 22 kN/m^2 distributed evenly across an area of 225 m^2 is likely to be feasible based on the ground conditions encountered at the site, the conservative

compressibility parameters assumed, and the assumptions made regarding any uplift in site levels.

A raft solution, in reality, may have an element of differential loading, whereby loadings may be concentrated to certain areas as opposed to maintaining a certain even distribution. It is recommended that a more detailed Ground Movement Assessment be undertaken to confirm and expand on the above, should a raft solution be of interest, particularly to determine any potential interaction with the proposed retaining wall. Such a solution would mitigate against ensuring strip / trench fill footings are founded within homogenous strata, thereby avoiding over-deepening and keeping off-site disposal of soils to a minimum.

It is assumed that the formation is suitably engineered and proof-rolled prior to the placement of a raft foundation.

A raft foundation, spreading loadings across an area, may assist with retaining wall considerations along the southern boundary, depending on the proximity to the retaining feature and the proposed design.

General Comments

For conventional strip / trench fill foundations, the raising of levels may, in any event, reduce the likelihood of encountering cohesive Head Deposits at or below the minimum founding level stated. In the event clay is encountered at the founding level instead of natural granular soils, and to avoid the potential for differential settlement, foundations otherwise placed in granular deposits may require over-deepening to the clay to avoid potential differential settlement constraints. This would be to ensure foundations are cast within a homogenous soil type. A reduction in bearing capacity may be required to ensure settlement tolerances are maintained.

Regardless of the adopted approach, prior to casting, it would be prudent and recommended to ensure that the formation is verified by a suitably qualified geotechnical engineer to ensure the minimum geotechnical parameters have been achieved.

Floor Slabs (Use with Strip / Trench Fill)

On the basis that a proposed Uniformly Distributed Load (UDL) has not been provided, preliminary floor slab advice can only be provided at this stage.

In principle, a ground bearing floor is may be feasible for the proposed development based on the ground conditions encountered underlying the proposed structures as well as the proposed increase in site levels. It is assumed that foundation loadings would not be transferred via the floor slab, and as such, the floor slab is independent of foundations when considering load distribution.

All unsuitable soils should be removed, such as thin deposits of Made Ground and topsoil, prior to ensuring a consistent formation has been achieved by way of proof-rolling and excavation / replacement of any identified softer zones. Given the uplift in levels, this process is likely to be undertaken, allowing the design of a suitable specification to which the placed fill material must achieve. Allowance should be made for a suitable thickness of sub-grade / sub-base as part of the raising of site levels to ensure a suitable construction build-up is achieved, subject to floor slab dimensions and the required UDL.

Infiltration Testing

Based on the infiltration observations provided in **Section 7**, REL suggest that the use of SuDS at the site may be feasible, particularly for permeable paving. It should be ensured that the future drainage design utilising drainage to land does not adversely impact the load-bearing performance of the ground conditions beneath the proposed structure or the free draining of nearby retaining features.

The commentary provided by this assessment should be provided to qualified drainage design engineers for further consideration. For a more accurate interpretation of the infiltration properties of shallow soils, full BRE DG 365 infiltration testing may be required at a later date.

Excavations & Obstructions

It is expected that conventional mechanical excavators will readily remove Made Ground and natural deposits likely to be encountered in shallow excavations although a breaker may be required to remove any existing hardstanding.

All shallow foundation or services excavations at the site should be considered unstable, therefore temporary support of all excavations should as a minimum, be considered as part of risk assessments when excavating on-site, in general accordance with CIRIA R 97 – Trenching Practice.

Roadway and Pavement Design

The in-situ CBR testing was carried out using Dynamic Cone Penetrometer methodology and recorded with wide-ranging values, generally increasing with depth. CBR values are highly dependent on the moisture content of the soil.

For preliminary design purposes, a preliminary CBR value of <5 % should be assumed for granular Head Deposits strata to inform preliminary pavement design.

In accordance with the Design Manual for Roads and Bridges (DMRB) document CD 225, 'Design for New Pavement Foundations', a CBR of >2.5% would equate to design subgrade surface modulus (E) of >30MPa.

A design subgrade surface modulus of >30MPa indicates that the subgrade is likely to be suitable to support the construction of a pavement foundation without ground improvement being undertaken.

Given that a raising of site levels are to take place, it is recommended that the formation beneath any relevant areas of hardstanding or access roads is designed to a suitable CBR value to provide adequate performance for the expected end-use. Plate CBR tests or an equivalent validation technique may need to be undertaken once formation levels are achieved to verify performance.

As a matter of precaution, if potential soft spots are encountered during the construction phase, (i.e. during proof rolling), soft zones if feasible should be excavated and replaced with suitably engineered granular fill. If ground conditions vary from what has been identified from investigation works to date, then advice from a suitably qualified and experienced engineer should be sought.

All materials within 450 mm of final finished levels in roads or pavement should comprise non-frost susceptible soils in accordance with BS 812-124.

Retaining Structures

Outline retaining structure material parameters have been provided in **Section 7**. At this stage, the dimensions and type of structure to be employed is unknown to REL. As a general recommendation, it should be ensured that a future design does not allow the accumulation of pore water pressure behind the structure and that free draining is facilitated in this regard. Based on the ground investigation undertaken, an end-bearing retaining solution may encounter cohesive Head Deposits at a particular founding level.

Concrete Classification

Based on the geochemical data summarised in **Section 7**, and known characteristic properties of the geology / ground conditions recorded, the ground model is of a non pyritic condition.

In accordance with the recommendations as set out in BRE Special Digest 1, 'Concrete in Aggressive Ground' (2005), the condition of the shallow soils and groundwater at the site can be classified as Design Sulphate **Class DS-1 and ACEC Class AC-1**, when considering the most appropriate type of concrete to be used at the site in order to resist chemical attack from elevated sulphates present in soils (assuming mobile groundwater in non-pyritic soils).

9. Chemical Assessment

Human Health

The soil chemical results have been assessed against available authoritative and commercially derived assessment criteria comprising:

- Defra's Category 4 Screening Levels (2014).
- LQM / CIEH S4ULs (2015).
- Atkins ATRISK SOIL SSV Values (2011).
- EIC, AGS, CL: AIRE (Assessment Criteria 2010).

The results of the laboratory analysis have been used to carry out a Level 1 Quantitative Human Health Risk Assessment for the proposed development. Due to the nature of the development, i.e., a commercial end use, it is appropriate to apply human health risk assessment criteria values developed for the Commercial Land Use Scenario, taking into account the relevant receptor and exposure characteristics.

Determinant Group	Contaminant	No. of exceedances	Location and depth (m bcgl)	Concentration Recorded (mg/l)	Assessment Criteria Value (mg/l)
Metals	N/A	No Exceedances	N/A	N/A	N/A
Inorganics	N/A	No Exceedances	N/A	N/A	N/A
Organics	N/A	No Exceedances	N/A	N/A	N/A
Asbestos	N/A	N/A	N/A	N/A	N/A

N/A – Not Applicable. N/A* - No quantification testing has been undertaken at this stage. Concentrations below the limit of detection have not been considered in the contamination assessment.

Controlled Waters

The Leachate samples have been assessed against the General Controlled Waters combination of available authoritative assessment criteria comprising derived from the following standards.

- Environmental Quality Standards (EQS).
- Drinking Water Standards (DWS) (2000).
- World Health Organisation (WHO) Guidelines for Drinking-Water Quality (GDWQ).

Please note: Due to the lack of authoritative assessment criteria values, designed to assess the Controlled Water receptors subject to this assessment, the soil samples have been compared against available DWS, EQS and WHO values. These assessment criteria were developed for more sensitive receptors, as such, it is the opinion of REL that any assessment of risk would be overly conservative and would likely overstate the actual risk. With regard the DWS, many of these are related to levels that must be met at a consumer's tap and/or post treatment and as such, it is highly unlikely that shallow groundwaters beneath this site would be suitable as a drinking water without treatment.

Within the CL: AIRE Petroleum in Hydrocarbons report, the following is stated: 'Laboratory analysis for use in hydrogeological risk assessment also needs to report results at concentrations that have value within the risk assessment context. Notably, the laboratory reporting limit should be below the relevant water quality criteria, although this is sometimes difficult to implement. For example, some PAH environmental quality standards (EQS) are lower than the practicable analytical reporting limits for groundwater/surface water samples.' Taking the above into consideration, please find the results of the Controlled Waters assessment below: -

Determinant	Contaminant / Indicator	No. of exceedances	Location and depth (m bcgl)	Concentration Recorded (µg/l)	Assessment Criteria Value (µg/l)
Metals	N/A	No Exceedances or Results Below Limit of Detection	N/A	N/A	N/A
Inorganics	Ph	2	WS101 at 0.2 m WS106 at 0.2 m	9.2/9.3	9
Organics	N/A	No Exceedances or Results Below Limit of Detection	N/A	N/A	N/A

N/A – Not Applicable.

10. Ground Gas and Vapour Monitoring

Based on the proposed development, comprising a Commercial end use, a ground gas monitoring program comprised of **four** gas monitoring rounds over **one** month was deemed sufficient to provide an assessment of the ground gas regime beneath the site in accordance with guidance presented in CIRIA C665 and BS8485.

At the time of writing all gas monitoring rounds have been undertaken at the site. The current worst-case gas monitoring results recorded are shown in the table below.

Exploratory Borehole Reference	Response zone strata	Peak Carbon Dioxide (% v/v)	Peak Methane (% v/v)	Minimum Oxygen (% v/v)	Gas flow rate (l/hr)	Atmospheric Pressure (mbars)
WS101	Made Ground	0.90	0.00	18.10	10.10	1010 - 1018
WS102	Natural deposits	2.60	0.00	16.70	0.00	
WS106		1.70	0.00	17.90	1.50	

The ground gas monitoring results to date have identified peak concentrations of Carbon Dioxide (CO_2) at 2.2% v/v, with minimum Oxygen concentrations recorded to date at 16.7%. Both results were recorded within WS102. During the visit, Methane (CH4), Hydrogen Sulphide (H_2S) and Carbon Monoxide were not recorded during the visit.

All flow rates have been recorded between 0.88– 10.10 l/hr, during the monitoring visits. Please refer to **Section 11** for the Ground Gas Risk Assessment.

Groundwater monitoring was also undertaken within all boreholes during the gas monitoring rounds; all installed monitoring wells were dry when measured.

11. Ground Gas & Vapour Risk Assessment

Ground Gas Sources

No significant sources of ground gas or mine gas have been identified on-site or within a plausible migration distance of the site.

Gas Screening Value & Characteristic Situation

In order to undertake a ground gas risk assessment reference should be made to the document CIRIA C665, in particular Table 8.5, page 88. In accordance with CIRIA C665 the following equation is used to determine the Gas Screening Value (GSV) and subsequently the Characteristic Situation (CS):

GSV (l/hr) = gas concentration (% v/v) / 100 x measured borehole flow rate (l/hr)

Therefore, based on the gas monitoring data obtained, the maximum gas concentration of 2.20% v/v Carbon Dioxide (WS102) divided by 100 and the worst-case flow rate of 1.5 l/hr is used to make the equation viable. The equation therefore should read:

= (2.6 (% v/v) / 100) x 10.1 (l/hr)
= 0.2626 l/hr

The calculated GSV of 0.2626 l/hr exceeds the upper limit of 0.07 l/hr defined for Characteristic Situation 1 (CS1) but remains within the threshold for CS2. This would therefore indicate a classification of CS2, where ground gas protection measures are required.

Vapours

Following completion of laboratory analysis undertaken on soil samples, for Volatile and Semi Volatile Organics (VOCs and SVOCs), no significant or elevated concentrations of were recorded. As such, it is the opinion of REL that a significant and/or unacceptable vapour generation risk has not been identified. Therefore, hydrocarbon vapour protection is not likely to be required.

12. Revised Conceptual Ground Model

A revised Conceptual Site Model (CSM) has been developed taking into consideration information presented within previous reports and following completion of the intrusive ground investigation. This information has been used to aid with the identification and partial quantification of contamination sources within the site and to undertake an assessment of potential exposure patterns of current and future site users.

Encountered ground conditions	The site surface predominantly consists of black asphalt across the car park area, found in all boreholes except WS104, where grass overlying topsoil was recorded at the proposed car park entrance to the south. Beneath the surface, a brown sandy gravel granular sub-base was encountered in all boreholes except WS104, characterised by angular to subangular, fine to coarse gravel with fine sand. Immediately below the sub-base in boreholes WS101, WS102, and WS106, brown gravelly reworked clay was recorded, containing angular to subangular flint gravel. The underlying Head Formation comprises light brown gravelly fine sand in WS101, WS102, WS104, and WS106, situated either below the reworked natural or directly under topsoil in WS106, with gravel similarly angular to subangular flint. Deeper deposits include brown gravelly clay extending to the base of these boreholes, also containing angular to subangular flint gravel. Bedrock (Tarrant Chalk Member) was not encountered during the investigation. No relict foundations, obstructions, or evidence of contamination were recorded.
Proposed Ground Conditions	As part of the proposed redevelopment, levels are to be raised and the majority of the surfacing surrounding the new building is intended to comprise hardstanding. This includes the access roads which are proposed to be surfaced with a layer of black asphalt.
Groundwater	During intrusive investigation works, a continuous groundwater body was not encountered beneath the site. Groundwater monitoring was also undertaken within all boreholes during the gas monitoring rounds, with groundwater was also not encountered.
Pathways	The following pathways have been identified: • Direct contact with contaminated soils and groundwaters. • Ingestion of contaminated soils and groundwaters. • Inhalation of translocated contaminated soils, dusts and fibres. • Direct contact of contaminated soils and groundwaters with foundations and services. • Lateral and vertical migration of mobile contaminants to groundwaters or surface waters; and • Upward and lateral migration of ground gas/vapours via permeable ground and service runs into above / below ground structures and excavations.

Receptors	The key receptors that have been identified for this site are: • Current and future site users (Human Health). • Current and Future site properties and associated Services (Built Environment). • Occupant/users of adjacent residential properties (Human Health). • Adjacent residential and commercial properties (Built Environment). • Future groundworkers (Human Health). • Surface water feature onsite (Controlled Waters); and • Superficial Secondary Undifferentiated and bedrock Principal Aquifers underlying the site (Controlled Waters).
Specific Contamination	No visual or olfactory evidence of contamination was discovered during the ground investigation. Soils Testing There were no chemical exceedances identified in any of the tested soil samples when compared against the Commercial assessment criteria. Leachate Testing There were no chemical exceedances identified in any of the tested soil samples when compared against a General controlled waters end use.
Ground Gas Sources	No significant sources of ground gas or mine gas have been identified on-site or within a plausible migration distance of the site.

13. Environmental Risk Assessment

The risk of significant harm to human health or of pollution of controlled waters, given the current and proposed future site uses, has been assessed qualitatively as low, medium or high, see **Appendix III**. A risk estimation matrix for all pollutant linkages identified is shown below, as very low to high:

Potential related sources	Pathways	Receptors	Risk	Discussion	Mitigation
Shallow Soils and Groundwaters	Direct contact/ ingestion /inhalation	**Human Health:** Construction and maintenance workers/current users of the site.	**Low**	No visual or olfactory evidence of contamination was observed across the site. Furthermore, laboratory analysis results indicate no unacceptable levels of potential contaminants of concern.	Construction workers must be subject to a suitable and sufficient risk assessment and be provided with and make use of appropriate PPE as necessary. Should evidence of currently unrecorded evidence of contamination be identified during ground works, works must cease, and advice be sought from a suitably qualified consultant. A generalised watching brief should be undertaken during groundworks, which is considered best practice.
		Human Health: Future site users/adjacent users.	**Low**	No visual or olfactory evidence of contamination was observed across the site. Furthermore, laboratory analysis results indicate no exceedances of the adopted assessment criteria for a commercial end-use scenario.	No remedial measures are considered necessary due to the absence of recorded contamination. Widespread hardstanding is proposed, breaking any future direct contact / ingestion / inhalation pathway for future end-users. Any materials imported to the site must be subject to suitability for use inspection and testing.
	Root contact and uptake.	**Flora and Fauna:** Plants /Landscaping.	**Low**	No significant phytotoxic contamination has been recorded. No vegetation stress was noted during the site inspection or intrusive works.	
	Soil leaching	**Controlled Waters:**	**Low**	Following the completion of the leachability testing, all contaminant	During future groundworks, should evidence of gross/mobile

and migration.	Bedrock Aquifers (groundwater)		concentrations fell below the assessment criteria and/or the laboratory limit of detection. pH, however, within sample WS101 at 0.2 m bcgl and WS106 at 0.2 m bcgl exceeded the adopted assessment criteria. When taking into account the site setting and the lack of significant sources of leachable contamination, there is not considered to be a viable source of leachable contamination or significant potential for migration to surface water and groundwater receptors.	contamination be identified, advice must be sought from a suitably qualified consultant. Where groundwaters accumulate into excavations, groundwater pumping equipment and off-site removal of extracted groundwaters may be required. Construction works must be undertaken with care to avoid contamination of site soils or groundwaters.
	Property: Adjacent properties	**Low**	Following the completion of the leachability testing, all contaminant concentrations fell below the assessment criteria and/or the laboratory limit of detection. pH, however, within sample WS101 at 0.2 m bcgl and WS106 at 0.2 m bcgl exceeded the adopted assessment criteria. When taking into account the site setting and the lack of significant sources of leachable contamination, there is not considered to be a viable source of leachable contamination or significant potential for migration to surface water and groundwater receptors.	During future groundworks, should evidence of gross/mobile contamination be identified, advice must be sought from a suitably qualified consultant. Future construction works must be designed to control the off-site migration of soils, dusts, fibres and water including ground and surface waters.

	Direct contact	**Property:** Site structures and services.	**Low**	No significant concentrations of contaminants considered to represent a significant risk to structures and services (such as sulphate) have been recorded.	The results of chemical test data included within this report can be utilised to partly inform future water supply infrastructure selection. However, if a bespoke assessment is required, additional targeted sampling and specific testing suites may be required.
Ground gas and vapours.	Migration Accumulation and risk of explosion Inhalation	**Human Health:** Construction and maintenance workers / Current users of the site.	**Low**	During development, groundworks may include significant soil disturbance, including temporary excavations and confined spaces.	Construction workers must be subject to a suitable and sufficient risk assessment and be provided with and make use of appropriate PPE. No further mitigation measures such as gas protection are considered necessary for current site users.
		Human Health: Future site users / Adjacent users.	**Low**	No significant sources of ground gas or mine gas have been identified on-site or within a plausible migration distance of the site. Gas monitoring undertaken to date has not identified unacceptable concentrations of ground gas. However, an anomalous flow rate was recorded on one occasion at WS101, the cause of which has not yet been determined. As such, it has not been possible to fully discount the potential for elevated gas risk at this stage.	REL considers that precautionary gas protection measures would be appropriate in this instance. These measures should be installed in accordance with BS 8485:2015+A1:2019 – *Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings*.
		Property: Site structures and services.	**Low**		

				Consequently, a precautionary Characteristic Situation 2 (CS2) classification has been attributed to the site.	
		Property: Adjacent properties.	**Low**	No significant sources of ground gas or mine gas have been identified on-site or within a plausible migration distance of the site. Gas monitoring undertaken to date has not identified unacceptable concentrations of ground gas. However, an anomalous flow rate was recorded on one occasion at WS101, the cause of which has not yet been determined. As such, it has not been possible to fully discount the potential for elevated gas risk at this stage. Consequently, a precautionary Characteristic Situation 2 (CS2) classification has been attributed to the site.	
		Overall Risk			**Low**

14. Preliminary Waste Assessment

Materials likely to be considered a waste, whether intended for disposal off site or intended for an 'end of waste' scenario through other means such as under the *Definition of Waste Code of Practice* (DoWCoP), must be classified to determine whether they either contain 'Hazardous' properties or do not. EA WM3 technical guidance (WM3) sets out the requirements for the classification. It also provides the basis for the methodology to employ in order to ensure compliance with the regulations.

In total, five Made Ground samples and one natural sample taken from the site (total 6 No. samples) recovered from the ground investigation were subject to a preliminary waste classification assessment. On the basis of the assessment undertaken, the samples were analysed to assess if the materials contained 'Hazardous' properties in accordance with WM3, as detailed in the table below.

List of Waste (LoW) Code(s)

Based on the ground conditions encountered, the soil arisings at the site are likely to be considered as:

'*17 05 04 Soil and stones other than those mentioned in 17 05 03*'.

This LoW code has been considered the most appropriate under the current ground conditions scenario, however it is the waste producer's responsibility to check that the arisings from the site are correctly classified.

Preliminary Waste Classification

Sample	Depth (m bcgl)	Geological Stratum	Hazardous Properties* (Y/N)	Comment / Likely Hazardous Property
WS101	0.2 – 0.30	Made Ground	N	Non-Hazardous
WS102	0.5 – 0.6		N	Non-Hazardous
WS103	0.0 – 0.5		N	Non-Hazardous
WS105	0.6 – 0.7		N	Non-Hazardous
WS106	0.9 – 1.0		N	Non-Hazardous
WS104	0.9 – 1.0	Head Formation	N	Non-Hazardous

Preliminary Waste Assessment Conclusion

The results of the HazWasteOnlineTM assessment have identified that one of the samples obtained were found to contain 'Hazardous' properties, as detailed in the table above.

However, these results are not guaranteed to be representative of the final waste stream, as groundworks may impact or alter it.

Where off-site disposal takes place, additional analysis of waste materials arising during construction may be required to demonstrate that materials intended for disposal are adequately characterised

under WM3. Further Waste Classification and WAC analysis may be required prior to any off-site disposal to determine the exact waste streams for material.

The minimum frequency of testing will need to be agreed with individual landfill operators and must meet the requirements of current UK legislation and guidance.

These classifications were concluded using the HazWasteOnlineTM software and are shown on the HazWasteOnlineTM summary sheets, which are included in **Appendix IV**.

Hardstanding Coal Tar Assessment

The composition of asphalt hardstanding can vary depending on its age, as different binders have been used historically, some of which included coal tar. Coal tar can be classified as hazardous when considering waste disposal options. To assess this, REL carried out a single laboratory test on the black asphalt hardstanding present on site to better understand its composition and to inform future waste disposal considerations.

The results indicated that all tested contaminants were below the limit of detection, except for total TPH (Total Petroleum Hydrocarbons), which was recorded at 1,200 mg/kg which is consistent with asphalt. Importantly, the sample did not contain any detectable coal tar, suggesting that the material is unlikely to be classified as hazardous waste.

Further testing may be required upon excavation and removal to determine the final waste stream.

15. Conclusion

Current site description	The site is an irregularly shaped parcel of land currently occupied by a car park associated with B&Q and Curry's to the north. The majority of the site consists of hardstanding, with small areas of soft landscaping around the car park, typically featuring hedges and trees. Along the southern boundary, there is a line of trees. No issues of environmental significance were identified in connection with the current use of the site.
Proposed Development	It is our understanding that a proposed commercial scheme is under consideration, which is likely to include the construction of a new single-storey drive-through unit. The southern extremity of the site area will become an access road surrounding the unit. The access road extends into areas of existing soft landscaping to maximise the use of the area. A retaining feature is proposed along the southern and south-western boundary to facilitate this. Based on the nature of the proposed development and the current and intended use of the site, a Commercial end-use sensitivity is considered appropriate.
Encountered Geology	The site surface predominantly consists of black asphalt across the car park area, found in all boreholes except WS104, where grass overlying topsoil was recorded at the proposed car park entrance to the south. Beneath the surface, a brown sandy gravel granular sub-base was encountered in all boreholes except WS104, characterized by angular to subangular, fine to coarse gravel with fine sand. Immediately below the sub-base in boreholes WS101, WS102, and WS106, brown gravelly reworked clay was recorded, containing angular to subangular flint gravel. The underlying Head Formation comprises light brown gravelly fine sand in WS101, WS102, WS104, and WS106, situated either below the reworked natural or directly under topsoil in WS106, with gravel similarly angular to subangular flint. Deeper deposits include brown gravelly clay extending to the base of these boreholes, also containing angular to subangular flint gravel. Bedrock (Tarrant Chalk Member) was not encountered during the investigation. No relict foundations, obstructions, or evidence of contamination were recorded.
Groundwater	During intrusive investigation works, a continuous groundwater body was not encountered during the investigation. Groundwater monitoring was also undertaken within all boreholes during the gas monitoring program, and no standing groundwater table was recorded.
Specific Contamination - Soils	No exceedances of the adopted human health criteria assessment for Commercial end use have been identified. No asbestos was encountered during the investigation.
Specific Contamination - Ground Gases/Vapours	No visual or olfactory evidence of significant quantities of ground gas-generating materials has been noted during the intrusive investigation. The ground gas monitoring results to date have identified peak concentrations of Carbon Dioxide (CO_2) at 2.2% v/v with minimum Oxygen concentrations recorded to date at 16.7%. Both results recorded within WS102. During the visit Methane (CH4). Hydrogen Sulphide (H_2S) and carbon monoxide were not recorded during the visit. All flow rates have been recorded between 0.88– 10.10 l/hr, during the monitoring visits. The calculated GSV of 0.2626 l/hr exceeds the upper limit of 0.07 l/hr defined for Characteristic Situation 1 (CS1) but remains within the threshold for CS2. This would therefore indicate a classification of CS2, where ground gas protection measures are required. There is no significant vapour risk identified on site.

Environmental Risk Assessment	The environmental risk arising from the ground condition at the subject site when taking into account the sites current status and usage is **Low**. When considering the proposed redevelopment of the site, and assuming the recommendations in **Section 16** are adopted, the potential environmental risk to arising from the ground conditions is **Low**. As such, based on the information obtained during the compilation of this report, REL have not identified any material environmental risks that would affect the future occupation and redevelopment for the proposed use of the property.
Foundations Options	Two foundation options have been identified as potentially suitable for the site: shallow strip or trench fill foundations founded at a minimum depth of 1.2 m within granular Head Deposits, and a raft foundation subject to further assessment of settlement performance and site level adjustments. A ground-bearing floor slab is also considered feasible, provided unsuitable materials are removed and a suitably compacted, engineered formation is achieved beneath the slab.

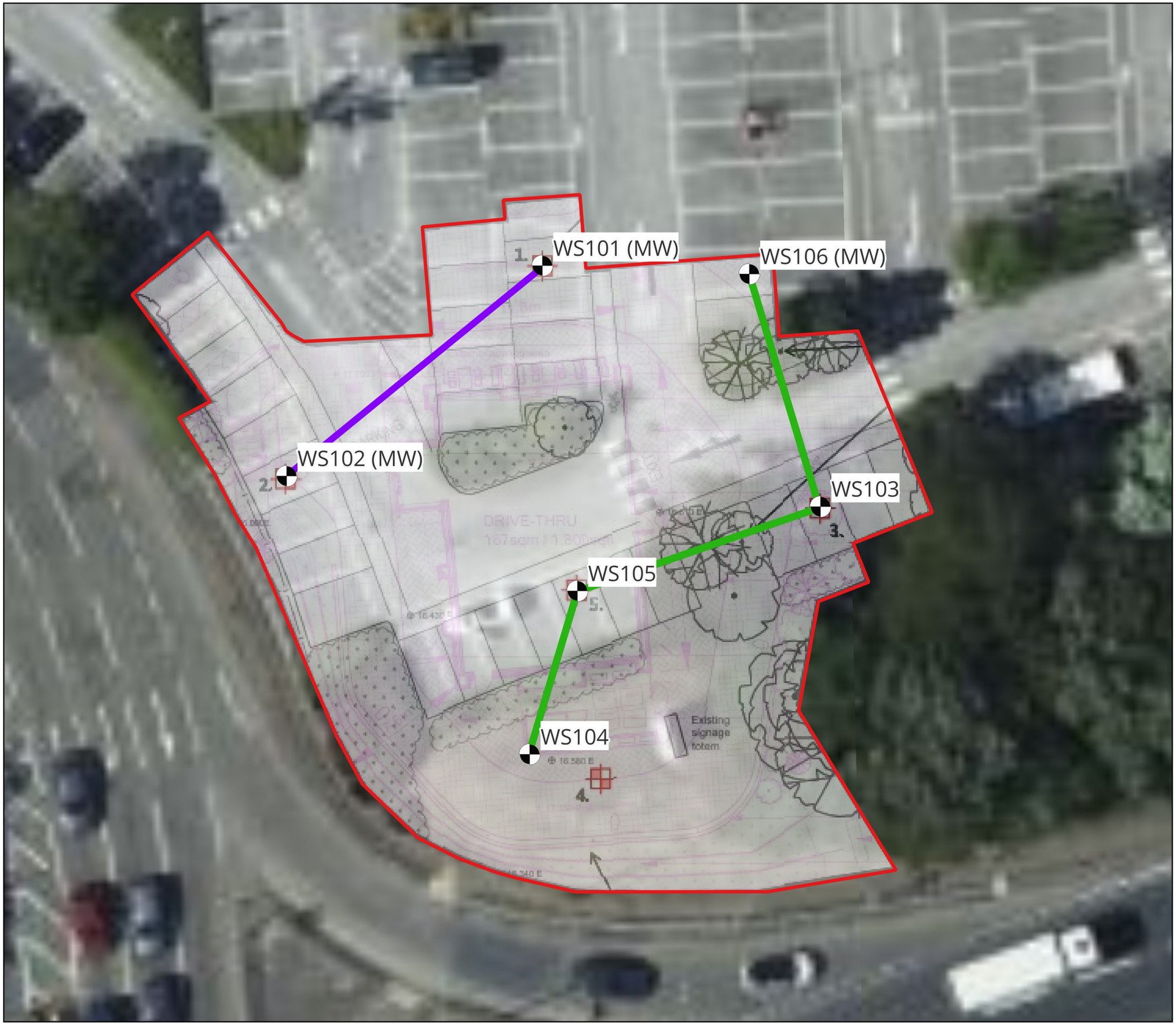
16. Recommendations

As part of the proposed redevelopment, we recommend that the client undertake the following action:

- A ground gas remediation strategy will be required, which outlines the scope of the gas protection to be installed within the proposed structure.
- It may be prudent to consider further raft foundation assessment, cognisant of nearby proposed retaining features and a level uplift subject to future requirements.
- REL recommend that any excavations on this site should remain open for as short a period as possible, since some of these materials may be susceptible to deterioration if left open to the natural elements for any significant period of time.
- Construction and maintenance work should be subject to risk assessment. Workers should use appropriate procedures to manage residual risk from exposure to materials on site.
- A Preliminary Waste Assessment is provided in **Section 14**.

Definitions and Reservations used in this report are presented in **Appendix VI**

APPENDIX I INDICATIVE EXPLORATORY HOLE LOCATION PLAN



Legend

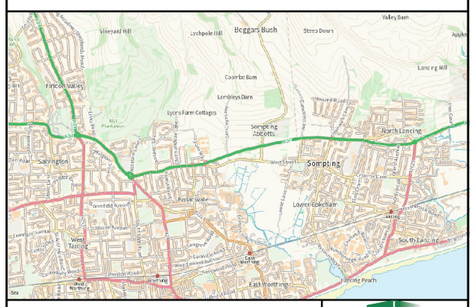
- Windowless Sampler Boreholes
- Cross Section Location WS104 - WS106
- Cross Section Location WS101 - WS102
- Site Boundary

0 2 4 6 8 10 m

Figure	Exploratory Borehole Location Plan
Job	Proposed Drive Through, Downlands Retail Park, Worthing
Client	Worthing Retail Ltd

Figure No.	Revision	Date
1	1	29 July 2025
Drawn by	**Checked by**	**Scale**
CD	BB	1:200.861

Job No. 250509



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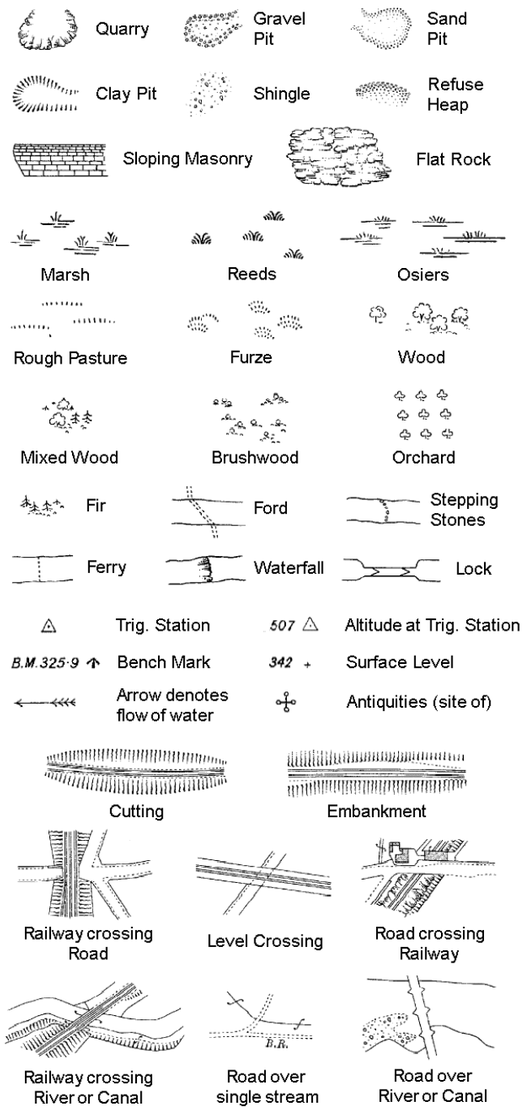
C:\Users\Roberts-Lap-03\Dropbox\002.Roberts Environmental\Projects\2025-26\250509.Proposed Drive Through, Downlands Retail Park, Worthing\Reporting\3.Data\GIS...\250509.Downlands Retail Park, Worthing.qgz

Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



County Boundary (Geographical)

County & Civil Parish Boundary

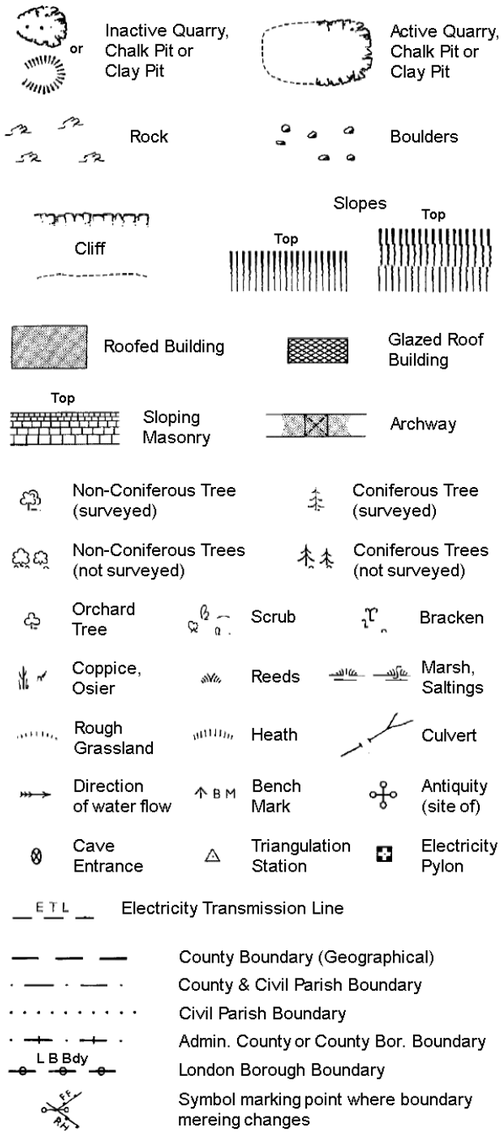
Administrative County & Civil Parish Boundary

Co. Boro. Bdy. County Borough Boundary (England)

Co. Burgh Bdy. County Burgh Boundary (Scotland)

B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



County Boundary (Geographical)

County & Civil Parish Boundary

Civil Parish Boundary

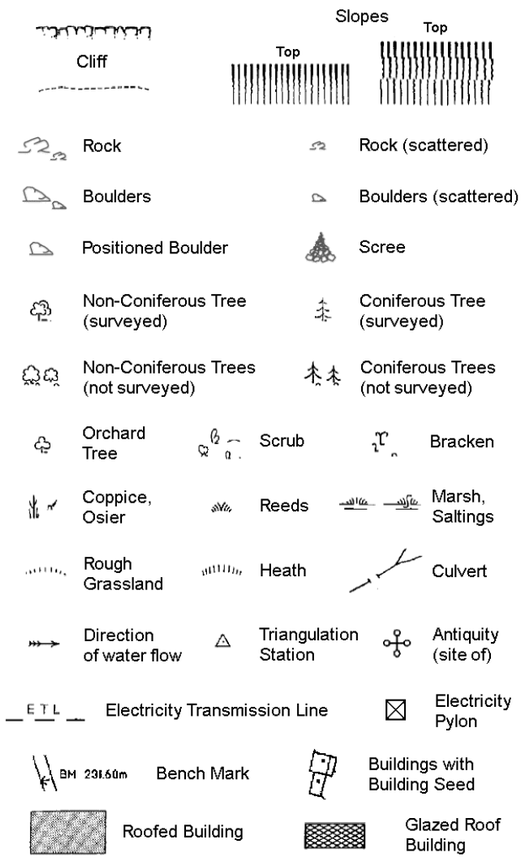
Admin. County or County Bor. Boundary

L B Bdy London Borough Boundary

Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



Civil parish/community boundary

District boundary

County boundary

Boundary post/stone

Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

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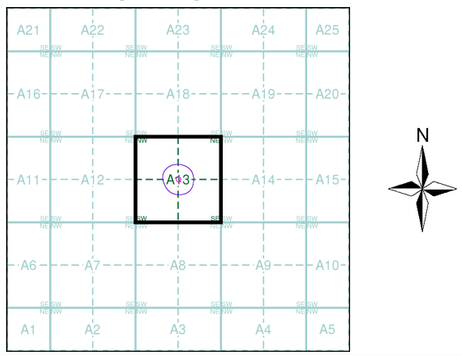
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Sussex	1:2,500	1875 - 1876	2
Sussex	1:2,500	1898	3
Sussex	1:2,500	1912	4
Sussex	1:2,500	1932	5
Ordnance Survey Plan	1:1,250	1953 - 1973	6
Ordnance Survey Plan	1:2,500	1954	7
Ordnance Survey Plan	1:1,250	1960 - 1971	8
Ordnance Survey Plan	1:1,250	1974 - 1988	9
Supply of Unpublished Survey Information	1:1,250	1974	10
Additional SIMs	1:1,250	1978 - 1992	11
Additional SIMs	1:1,250	1988	12
Large-Scale National Grid Data	1:1,250	1994	13
Large-Scale National Grid Data	1:1,250	1995	14
Large-Scale National Grid Data	1:1,250	1996	15
Historical Aerial Photography	1:2,500	1999	16

Historical Map - Segment A13



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Slice:	A
Site Area (Ha):	0.12
Search Buffer (m):	100

Site Details

Downlands Retail Park, WORTHING, BN14 9FB

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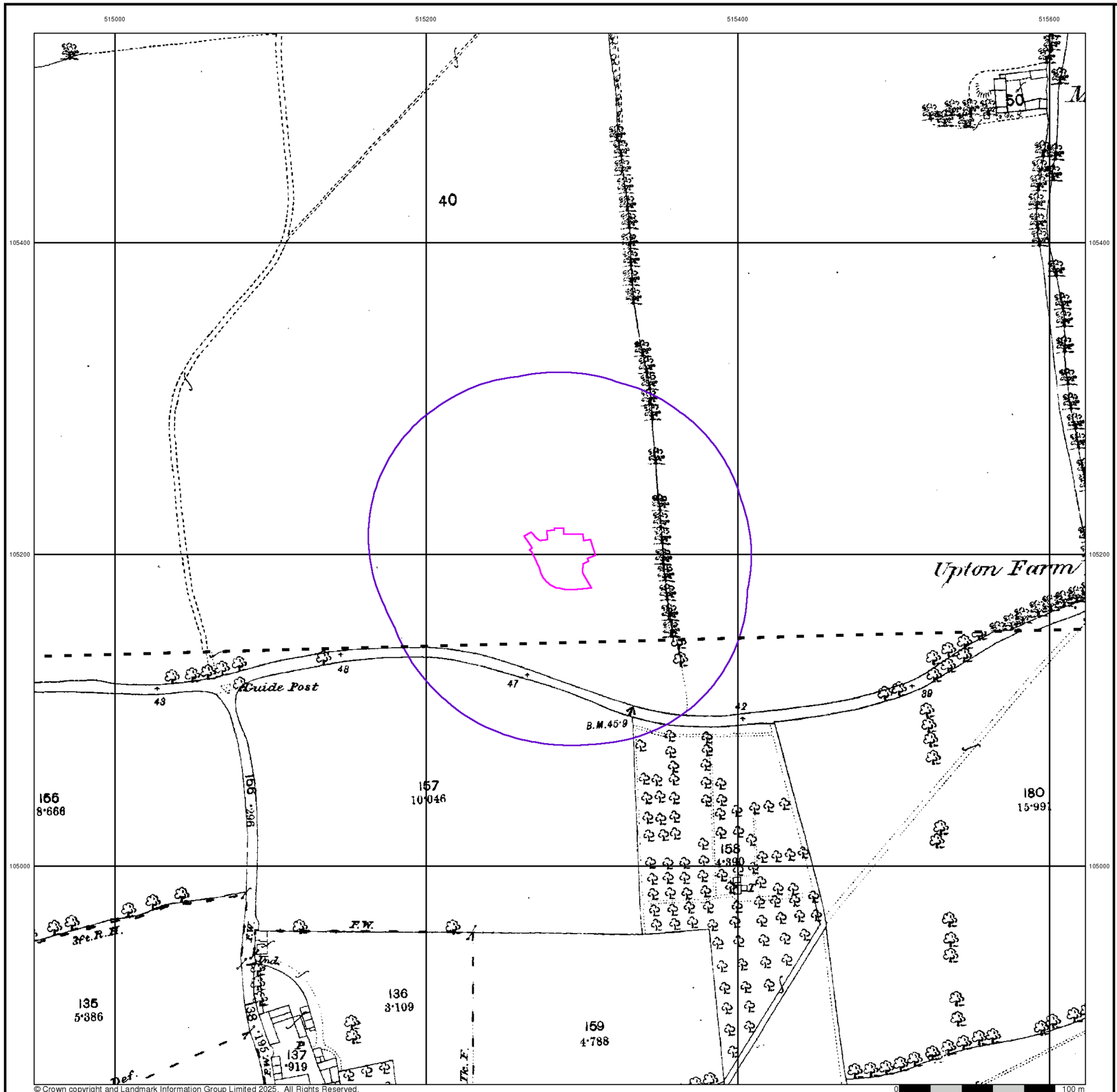

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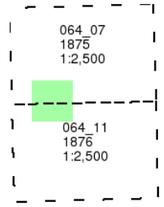

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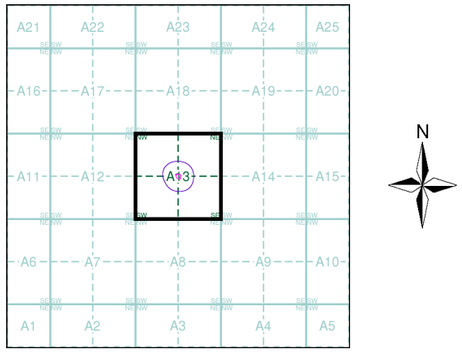

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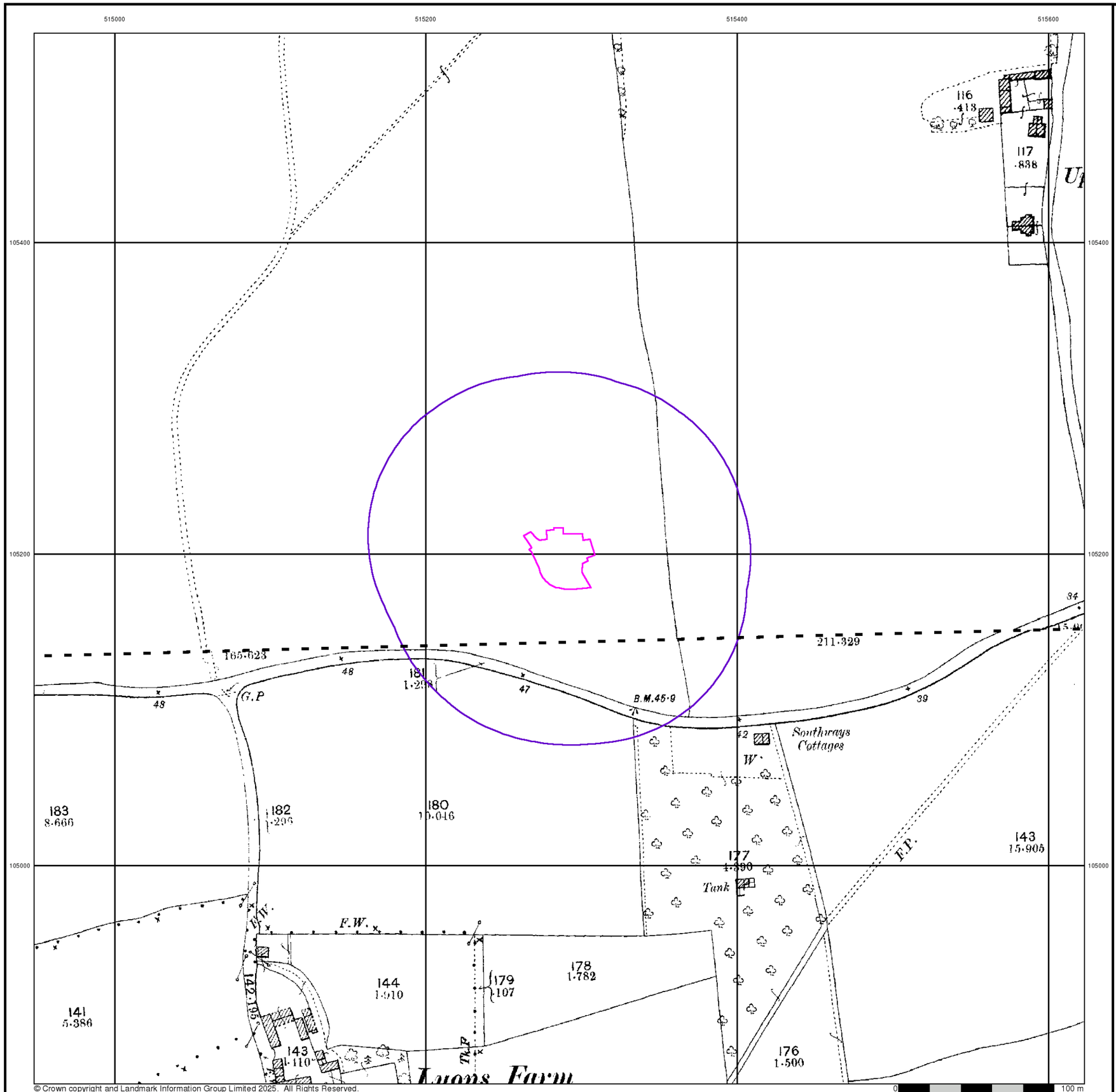

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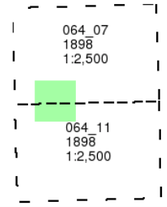

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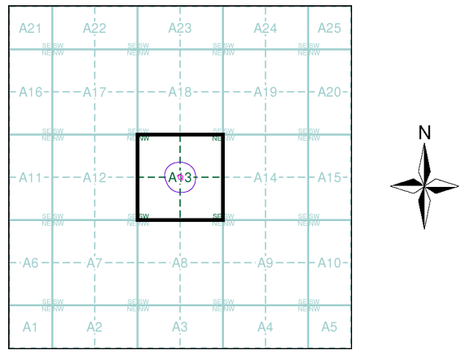

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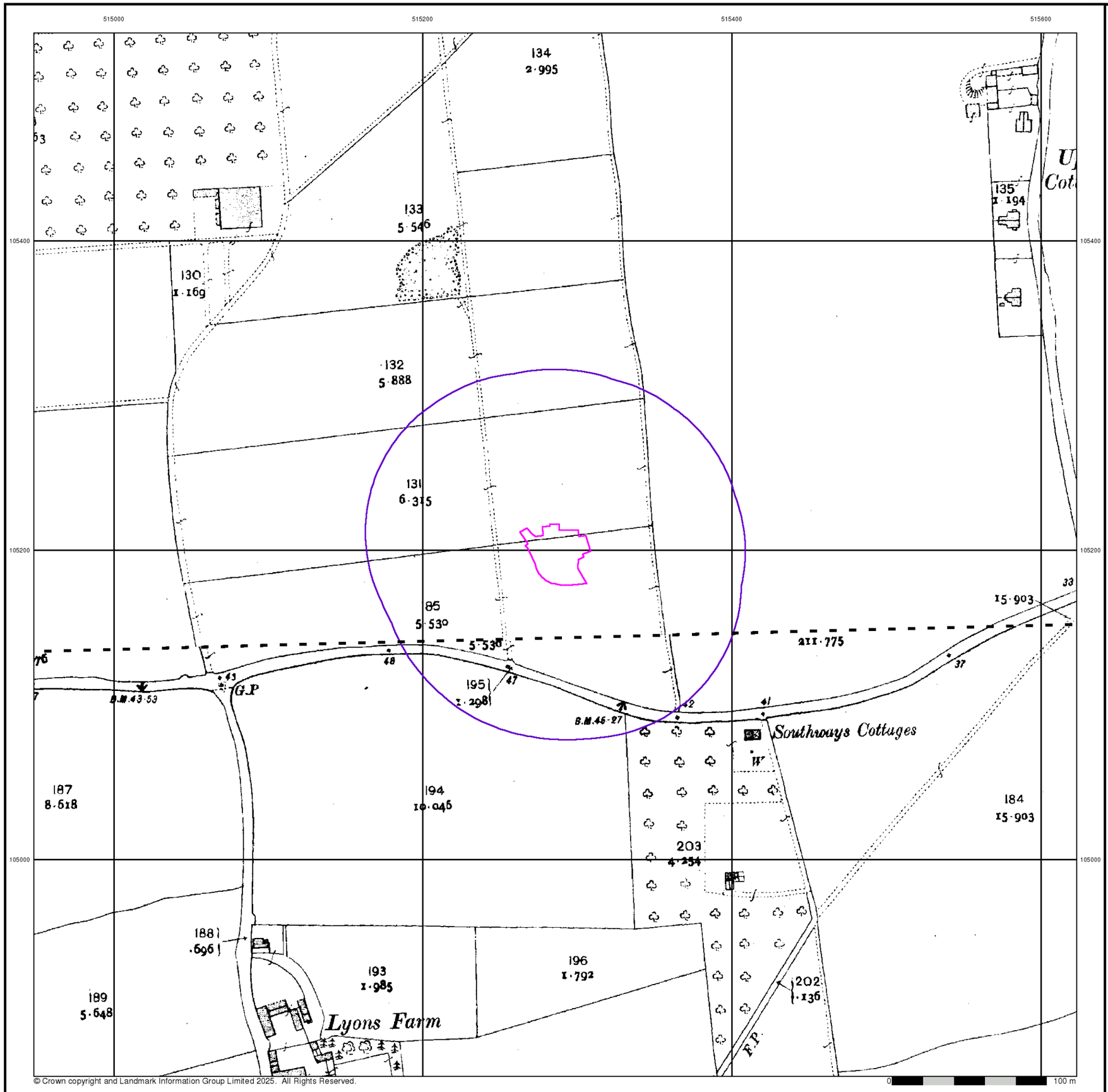

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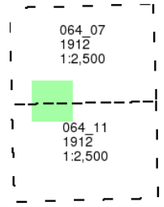
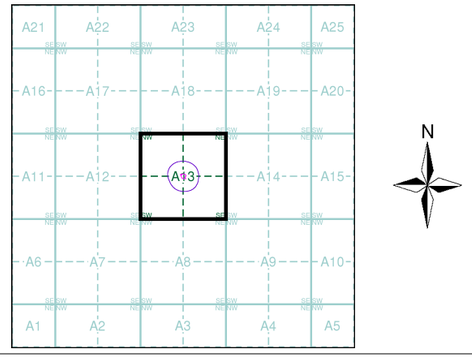
Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	377543687_1_1
Customer Ref:	250509
National Grid Reference:	515290, 105200
Slice:	A
Site Area (Ha):	0.12
Search Buffer (m):	100

Site Details

Downlands Retail Park, WORTHING, BN14 9FB

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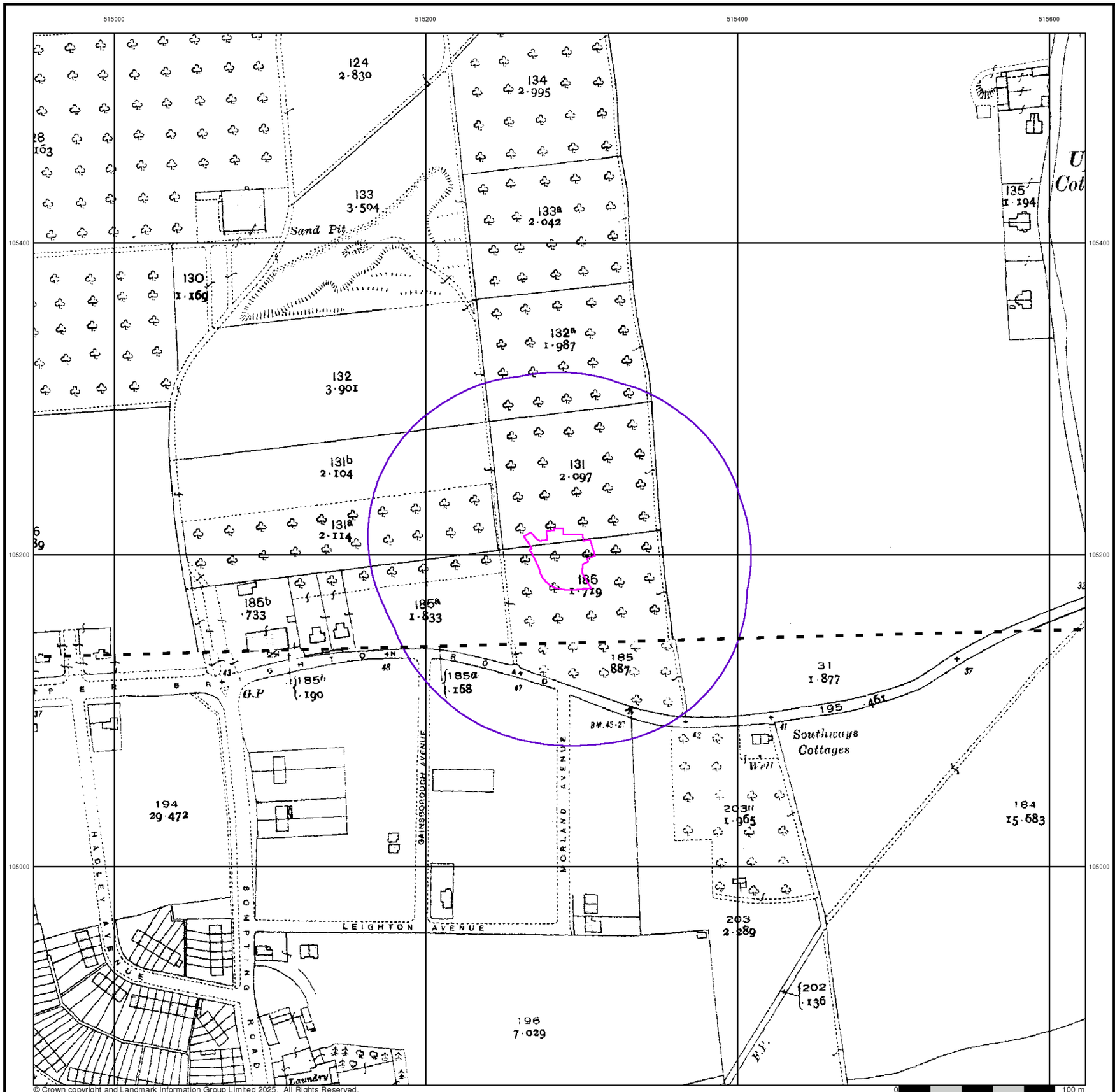

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ROBERTS ENVIRONMENTAL LTD

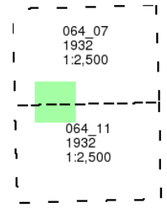
Sussex

Published 1932

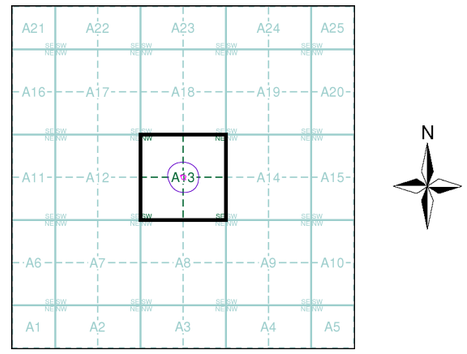
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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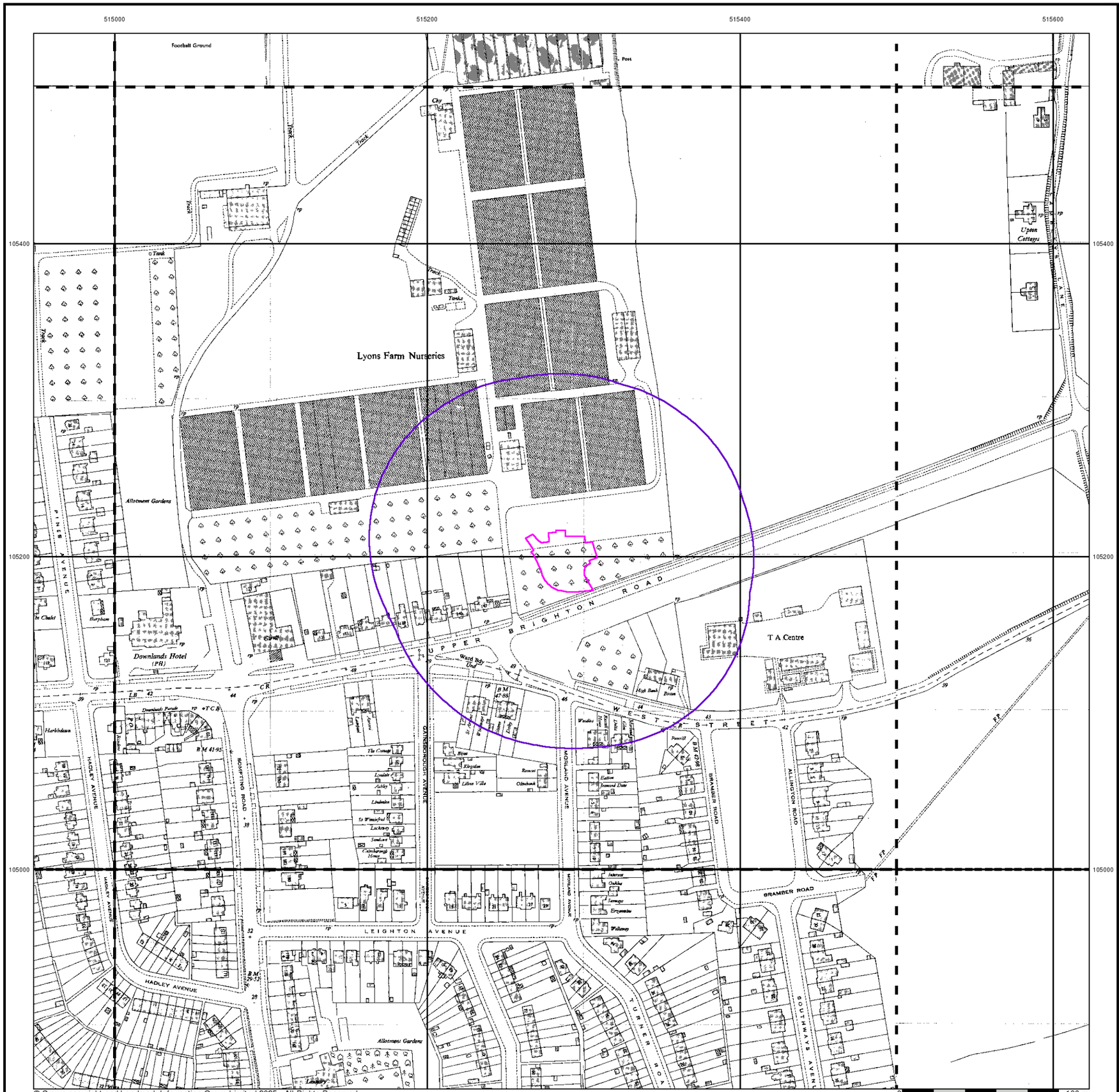
Site Details

Downlands Retail Park, WORTHING, BN14 9FB



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ROBERTS ENVIRONMENTAL LTD

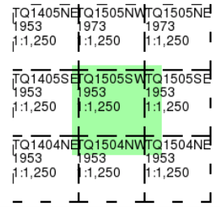
Ordnance Survey Plan

Published 1953 - 1973

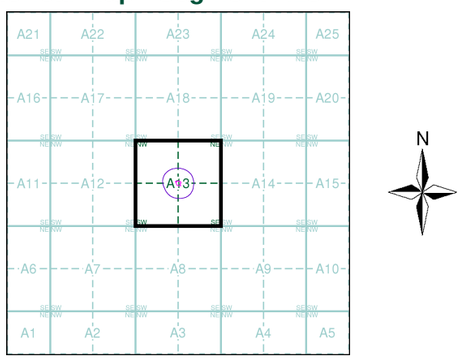
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	377543687_1_1
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National Grid Reference:	515290, 105200
Slice:	A
Site Area (Ha):	0.12
Search Buffer (m):	100

Site Details

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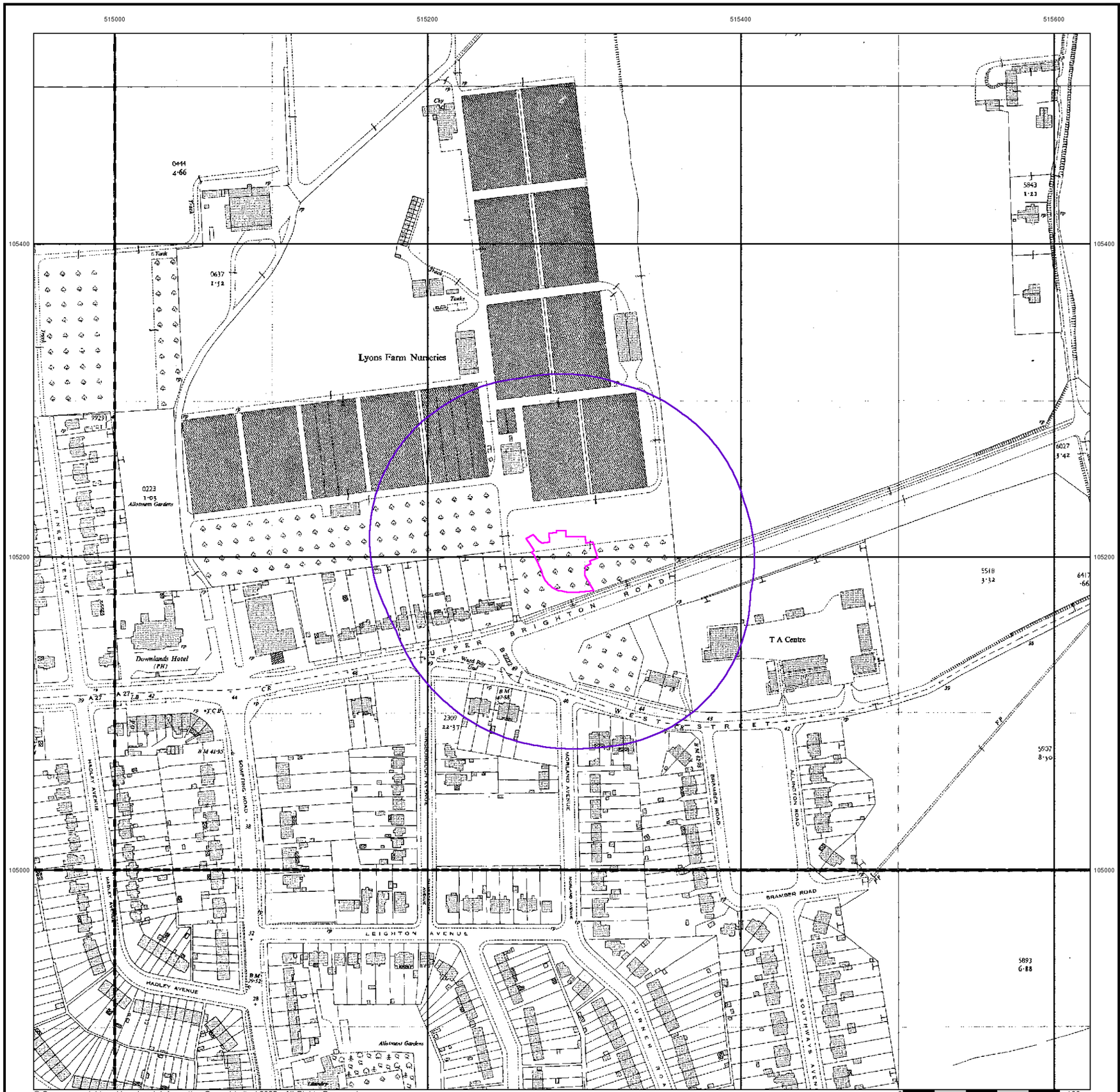

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ROBERTS ENVIRONMENTAL LTD

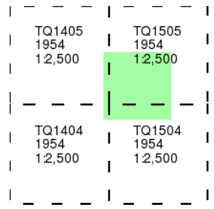
Ordnance Survey Plan

Published 1954

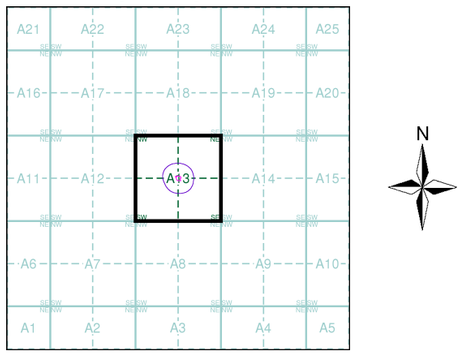
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	377543687_1_1
Customer Ref:	250509
National Grid Reference:	515290, 105200
Slice:	A
Site Area (Ha):	0.12
Search Buffer (m):	100

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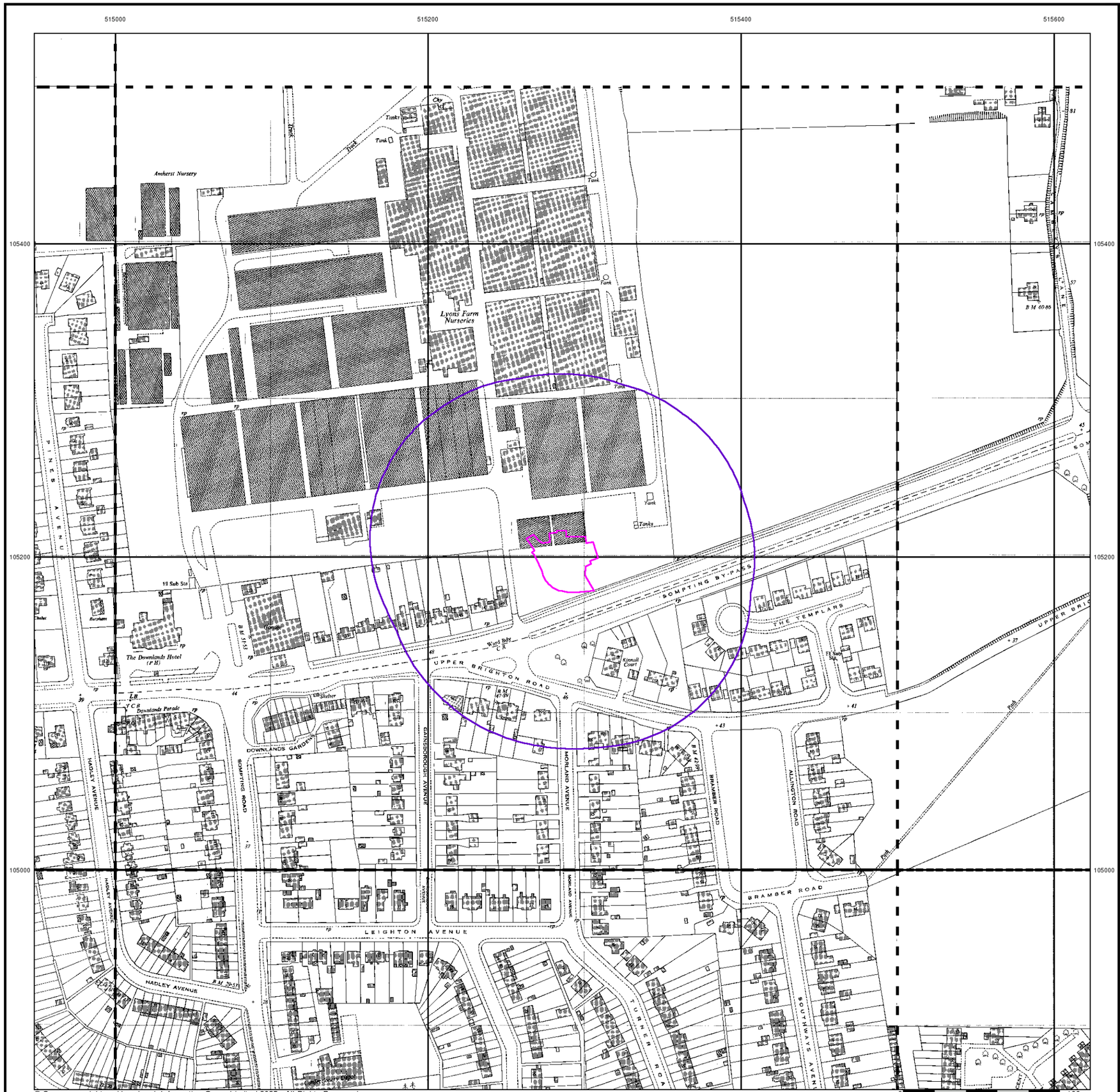


ROBERTS ENVIRONMENTAL LTD

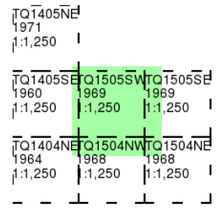
Ordnance Survey Plan

Published 1960 - 1971

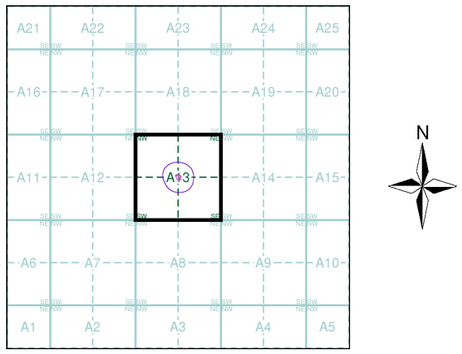
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	377543687_1_1
Customer Ref:	250509
National Grid Reference:	515290, 105200
Slice:	A
Site Area (Ha):	0.12
Search Buffer (m):	100

Site Details

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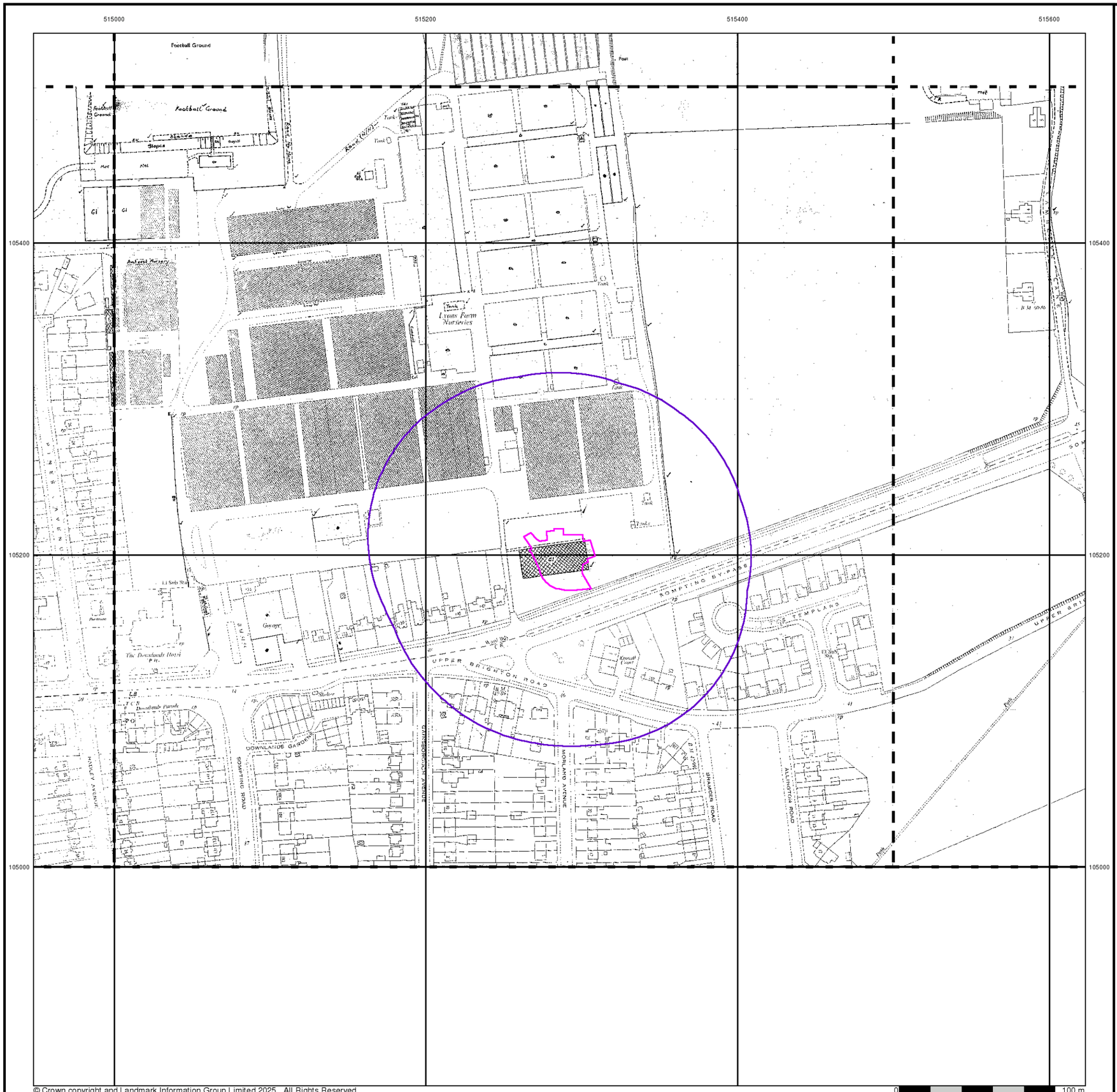

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ROBERTS ENVIRONMENTAL LTD

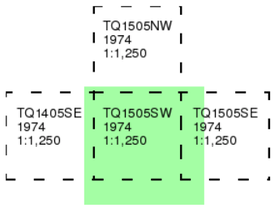
Supply of Unpublished Survey Information

Published 1974

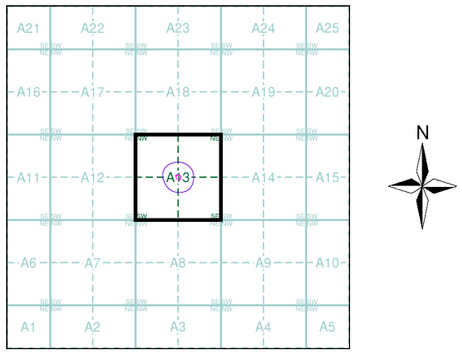
Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a `work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	377543687_1_1
Customer Ref:	250509
National Grid Reference:	515290, 105200
Slice:	A
Site Area (Ha):	0.12
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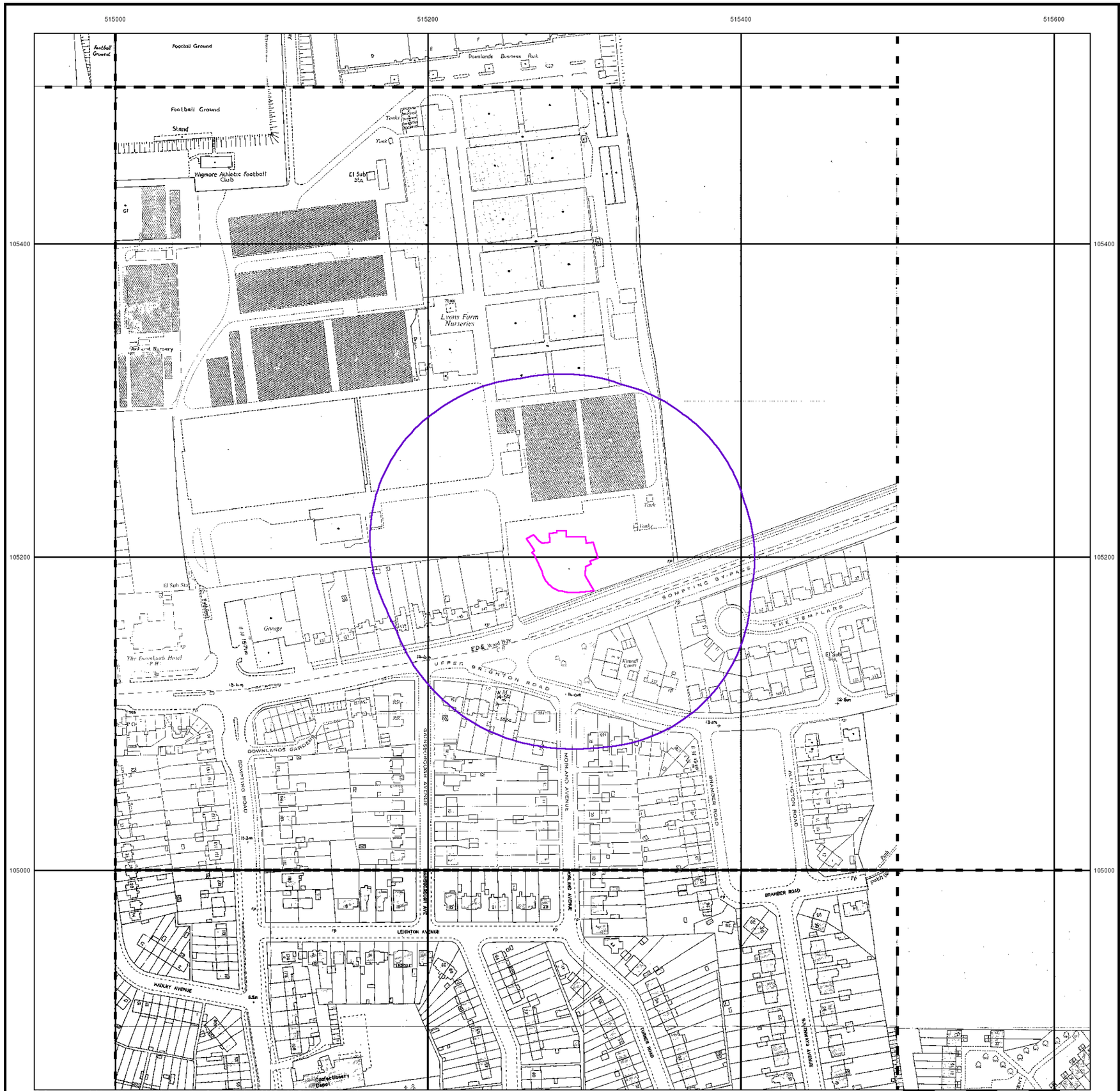

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ROBERTS ENVIRONMENTAL LTD

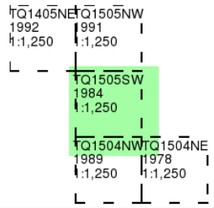
Additional SIMs

Published 1978 - 1992

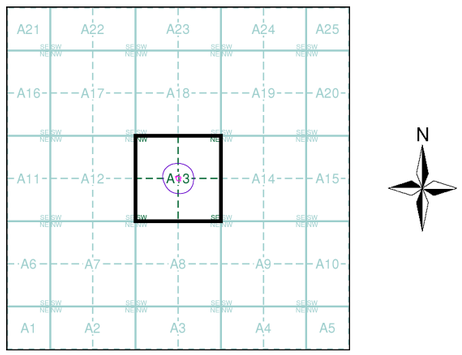
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	377543687_1_1
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National Grid Reference:	515290, 105200
Slice:	A
Site Area (Ha):	0.12
Search Buffer (m):	100

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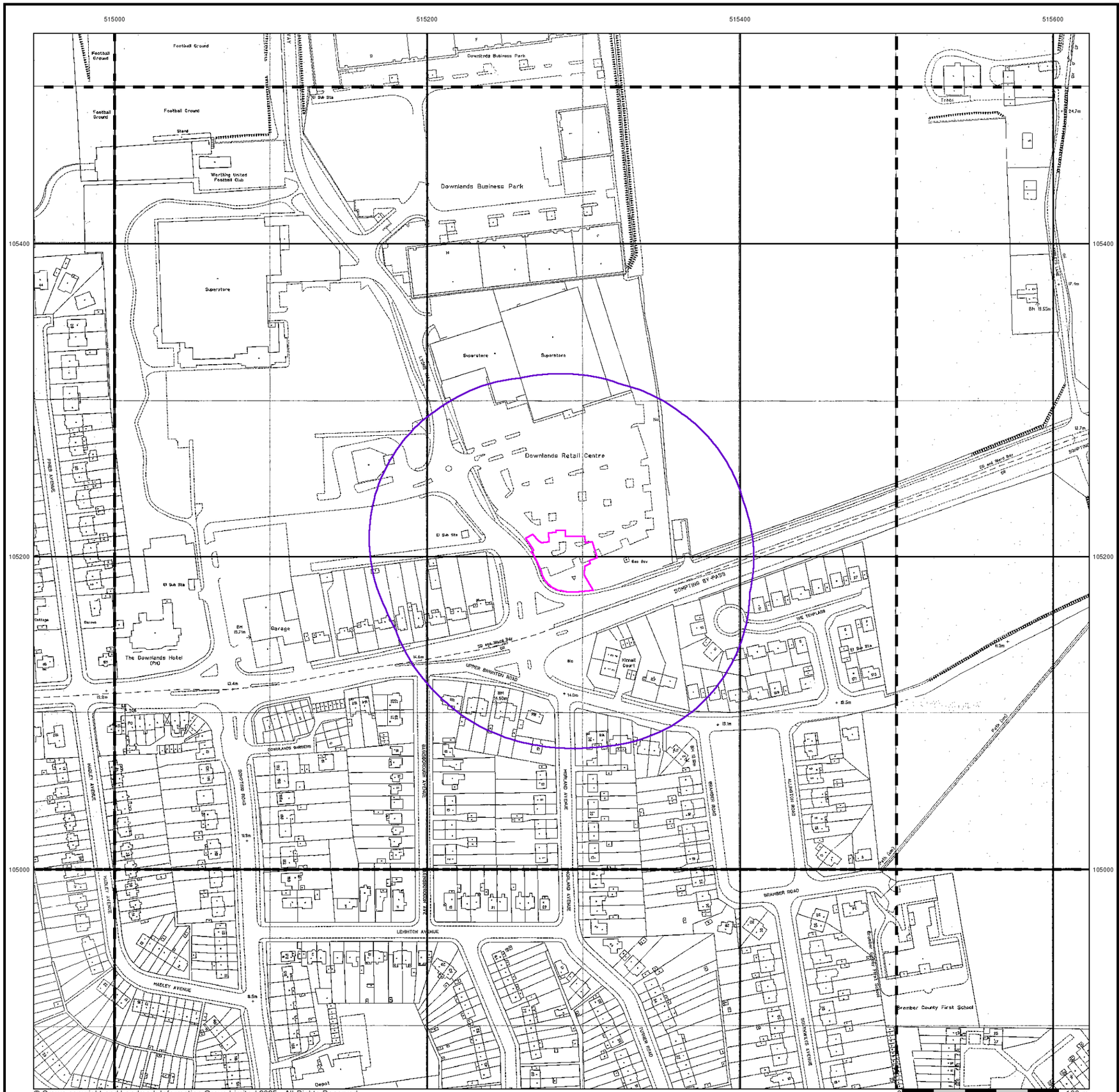

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ROBERTS ENVIRONMENTAL LTD

Large-Scale National Grid Data

Published 1994

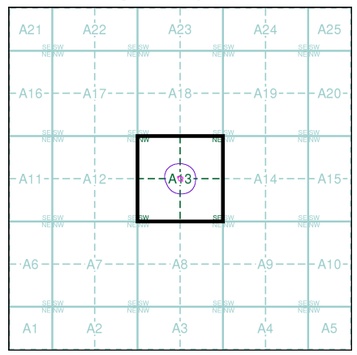
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TQ1405NE 1994 1:1,250	TQ1505NW 1994 1:1,250	TQ1505NE 1994 1:1,250
TQ1405SE 1994 1:1,250	TQ1505SW 1994 1:1,250	TQ1505SE 1994 1:1,250
TQ1404NE 1994 1:1,250	TQ1504NW 1994 1:1,250	TQ1504NE 1994 1:1,250

Historical Map - Segment A13



Order Details

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National Grid Reference:	515290, 105200
Slice:	A
Site Area (Ha):	0.12
Search Buffer (m):	100

Site Details

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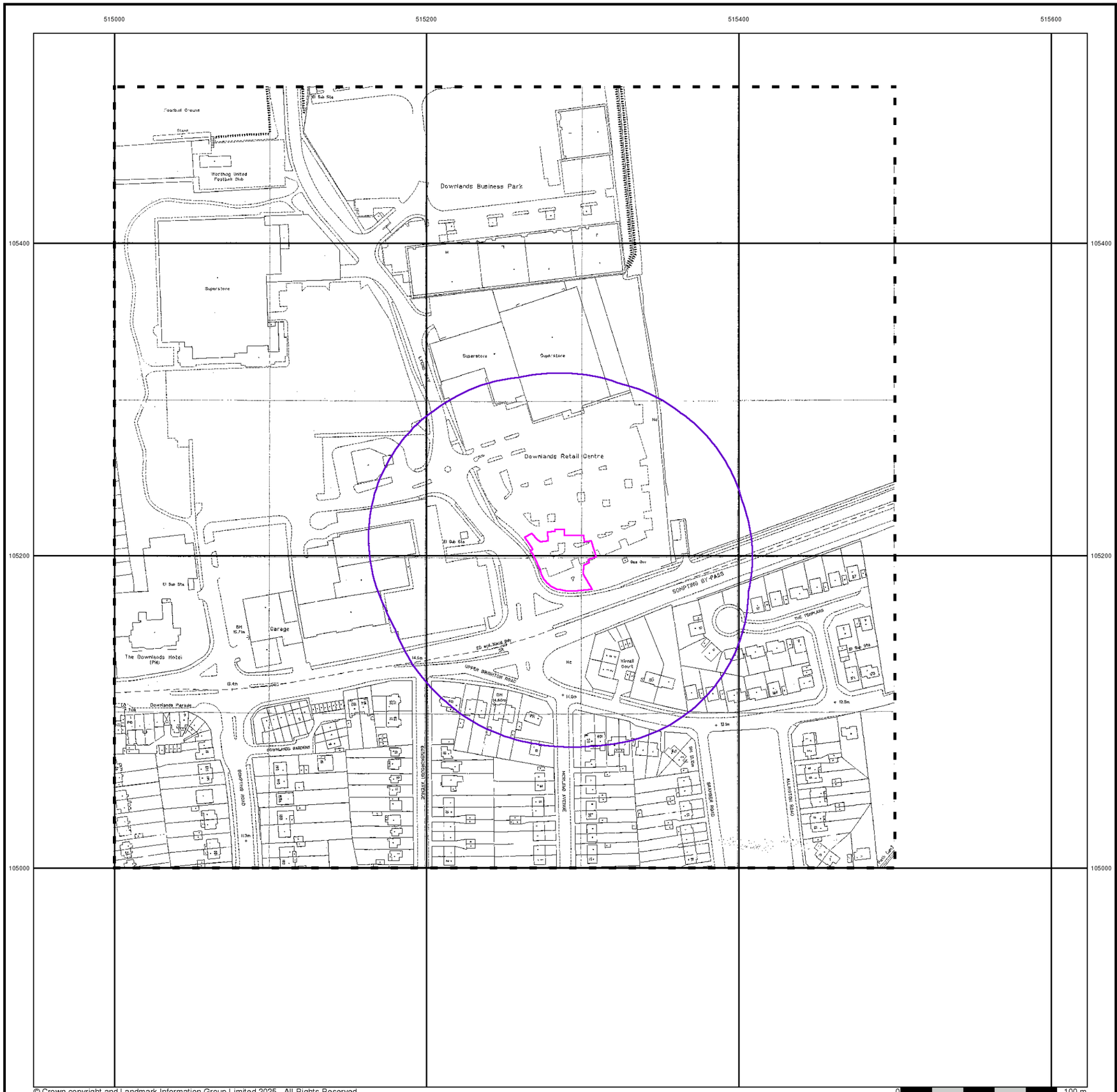


ROBERTS ENVIRONMENTAL LTD

Large-Scale National Grid Data

Published 1995

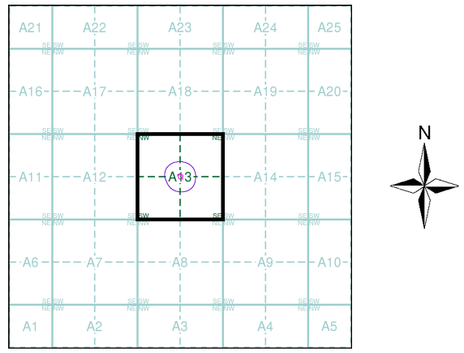
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

TQ1505SW
1995
1:1,250

Historical Map - Segment A13



Order Details

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Customer Ref:	250509
National Grid Reference:	515290, 105200
Slice:	A
Site Area (Ha):	0.12
Search Buffer (m):	100

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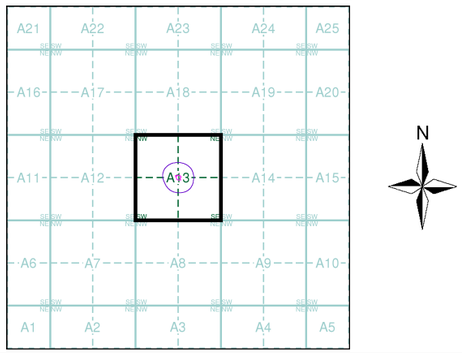
ROBERTS ENVIRONMENTAL LTD

Historical Aerial Photography

Published 1999

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A13



Order Details

Order Number:	377543687_1_1
Customer Ref:	250509
National Grid Reference:	515290, 105200
Slice:	A
Site Area (Ha):	0.12
Search Buffer (m):	100

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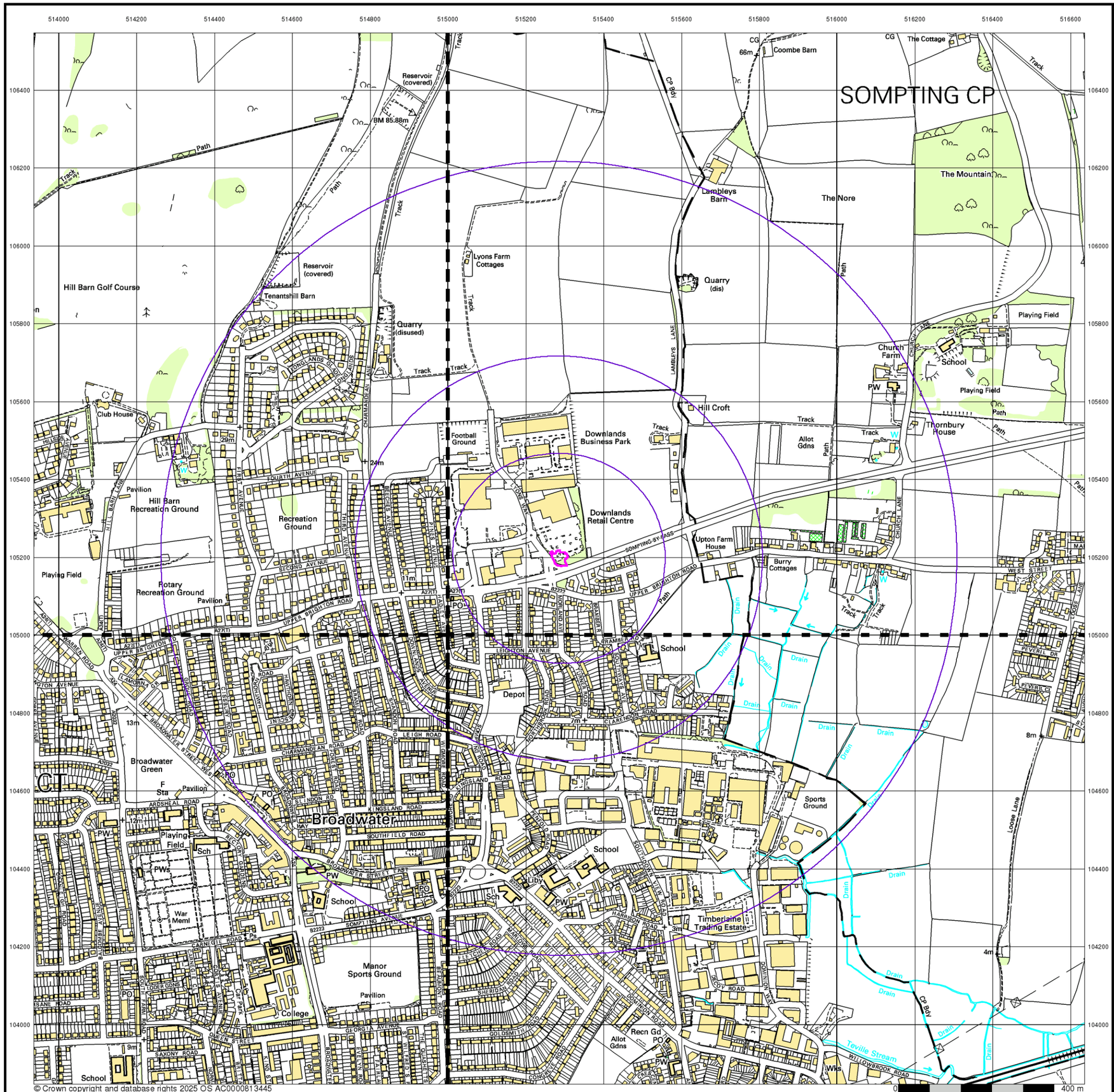


ROBERTS ENVIRONMENTAL LTD

10k Raster Mapping

Published 2000

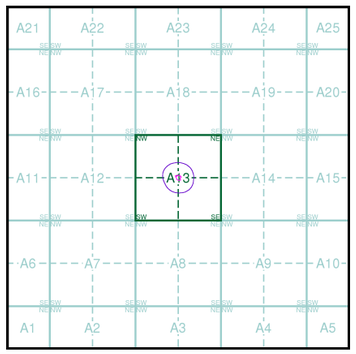
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

TQ10NW 2000 1:10,000	TQ10NE 2000 1:10,000
TQ10SW 2000 1:10,000	TQ10SE 2000 1:10,000

Historical Map - Slice A



Order Details

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Customer Ref:	250509
National Grid Reference:	515290, 105200
Slice:	A
Site Area (Ha):	0.12
Search Buffer (m):	1000

Site Details

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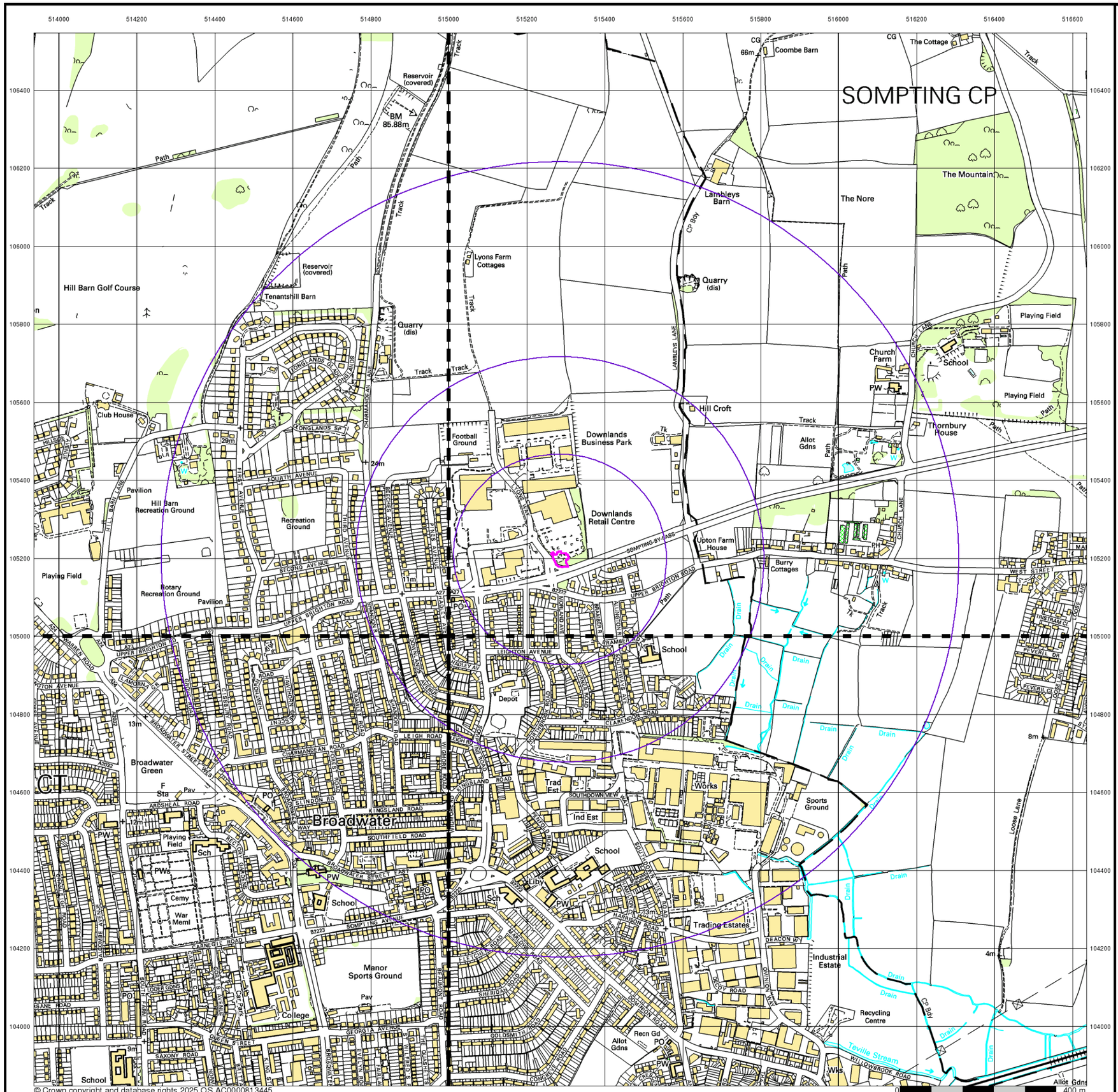


ROBERTS ENVIRONMENTAL LTD

10k Raster Mapping

Published 2006

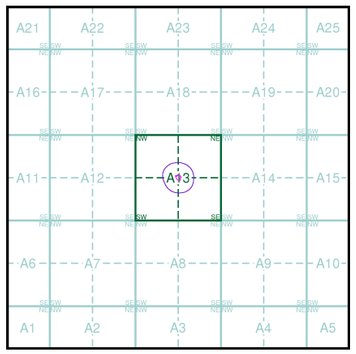
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

TQ10NW 2006 1:10,000	TQ10NE 2006 1:10,000
TQ10SW 2006 1:10,000	TQ10SE 2006 1:10,000

Historical Map - Slice A



Order Details

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Customer Ref:	250509
National Grid Reference:	515290, 105200
Slice:	A
Site Area (Ha):	0.12
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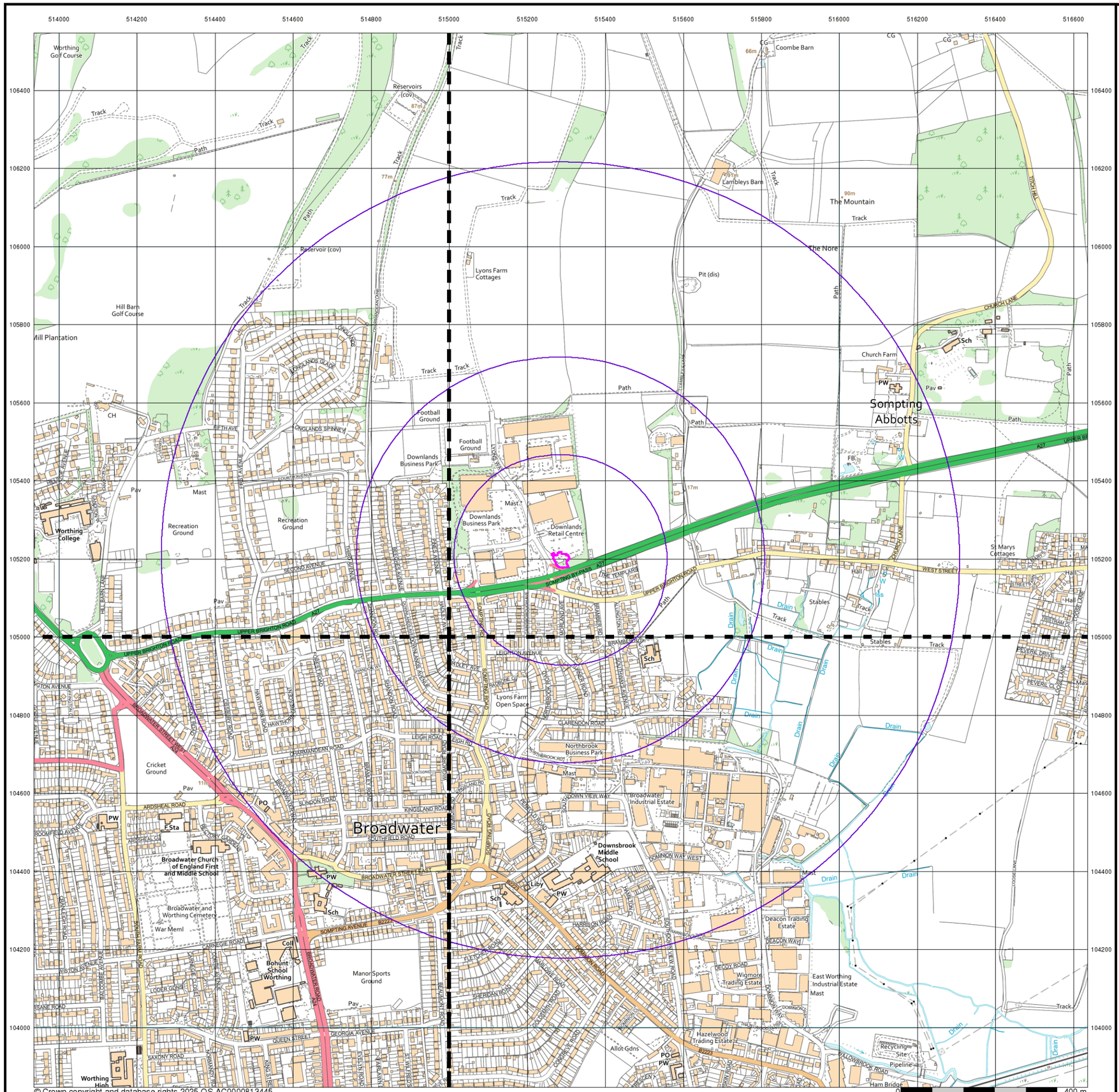


ROBERTS ENVIRONMENTAL LTD

VectorMap Local

Published 2024

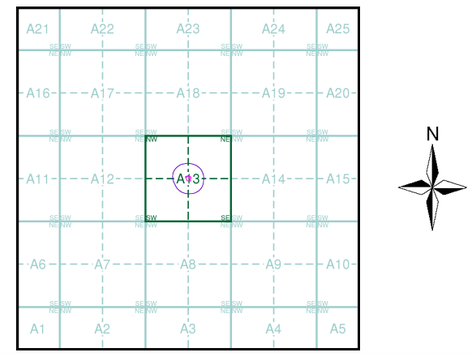
Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities),1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

TQ10NW 2024 Variable	TQ10NE 2024 Variable
TQ10SW 2024 Variable	TQ10SE 2024 Variable

Historical Map - Slice A



Order Details

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APPENDIX II EXPLORATORY Borehole LOGS

Key to exploratory hole symbols and abbreviations

SAMPLE TYPES

ACM - Asbestos sample
AMAL - Amalgamated sample
B - Bulk disturbed sample
BLK - Block sample
C - Core sample
CBR - CBR test sample
D - Disturbed sample
ES - Environmental sample
EW - Environmental water sample
G - Gas sample
J - Jar sample
L - Liner sample
TW - Pushed thin wall sample
U - Undisturbed sample
UT - Undisturbed thin wall sample
W - Water sample

IN-SITU TESTS

HV - Hand shear vane
HV(r) - Hand shear vane residual
PID - Photo ionisation detector
PP - Hand penetrometer
SPT - Standard penetration test
SPT(C) - SPT using cone

GROUNDWATER

Groundwater strike
Groundwater rest level

ROTARY CORE DETAILS

TCR - Total core recovery (%)
SCR - Solid core recovery (%)
RQD - Rock quality designation (%)
FI - Fracture index
NI - Non-intact core
AZCL - Assumed zone of core loss

LEGEND

Topsoil
Peat
Made ground
Concrete
Wood
Brick
Bituminous material
Gypsum
Coal
Void
Clay
Silt
Sand
Gravel
Cobbles
Boulders
Mudstone
Siltstone
Sandstone
Limestone
Chalk
Breccia
Conglomerate
Metamorphic
Igneous
Sand backfill
Gravel backfill
Arisings
Bentonite
Concrete
Grout
Plain pipe
Slotted pipe

Created using Pebble Geo

Dynamic (Windowless) Sampler

WS101

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515286.71	105226.13	17.70	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client
Worthing Retail Ltd

Consultant
Christian Dean

Contractor
AB Site Investigation Ltd

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.20-0.30	ES		17.58	(0.12) 0.12		MADE GROUND [HARDSTANDING] *Black Asphalt Hardstanding. (0.00 - 0.12m)*
		0.70-0.80	ES			(0.88)		MADE GROUND GRANULAR [SUB-BASE] *Brown sandy angular to subangular fine to coarse GRAVEL. Sand is fine. (0.12 - 1.00m)*
		1.00-1.10	ES		16.70	1.00		
		1.20	SPT(C)	N=20 (3,3/4,6,5,5)		(0.30)		
		1.30-1.40	D		16.40	1.30		
		1.60-1.70	D		16.20	(0.20) 1.50		MADE GROUND COHESIVE [REWORKED NATURAL] *Brown gravelly CLAY. Gravel is angular to subangular fine to coarse of flint. (1.00 - 1.30m)*
		2.00	SPT	N=25 (5,5/5,6,7,7)		(1.00)		Gravelly SAND [HEAD FORMATION] *Light brown gravelly fine SAND. Gravel is angular to subangular fine to coarse of flint. (1.30 - 1.50m)*
		3.00	SPT	N=28 (6,6/8,9,6,5)	15.20	2.50		Gravelly CLAY [HEAD FORMATION] *Orange gravelly CLAY. Gravel is angular to subangular fine to coarse of flint. (1.50 - 2.50m)*
		4.00	SPT	N=28 (4,5/6,7,7,8)		(2.95)		Gravelly CLAY [HEAD FORMATION] *Brown gravelly CLAY. Gravel is angular to subangular fine to coarse of flint. (2.50 - 5.45m)*
		4.20-4.50	D					
		5.00	SPT	N=19 (2,3/3,4,6,6)	12.25	5.45		*End of Borehole at 5.45m*

Remarks
1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole installed as return ground gas and groundwater monitoring well.

Method, Plant, Stability, Dimensions
0.00 - 5.45m WLS Premier 110

Logger
C Dean

Checked By: CD **Approved By:** BB

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

Created using Pebble Geo

Dynamic (Windowless) Sampler

WS101

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515286.71	105226.13	17.70	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client	Consultant	Contractor
Worthing Retail Ltd	Christian Dean	AB Site Investigation Ltd

SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.20 (C)					N=20 (3,3/4,6,5,5)
2.00 (S)					N=25 (5,5/5,6,7,7)
3.00 (S)					N=28 (6,6/8,9,6,5)
4.00 (S)					N=28 (4,5/6,7,7,8)
5.00 (S)					N=19 (2,3/3,4,6,6)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
	ES		
	ES		
	ES		
	D		
	D		
	D		

Remarks

1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole installed as return ground gas and groundwater monitoring well.

Method, Plant, Stability, Dimensions

0.00 - 5.45m WLS Premier 110

Logger

C Dean

Checked By: CD **Approved By:** BB

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

Dynamic (Windowless) Sampler

WS102

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515270.92	105206.95	17.09	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client
Worthing Retail Ltd

Consultant
Christian Dean

Contractor
AB Site Investigation Ltd

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.05-0.15	ES		16.94	(0.15) 0.15		MADE GROUND [HARDSTANDING]
		0.30-0.45	ES			(0.30)		*Black Asphalt Hardstanding. (0.00 - 0.15m)*
		0.60-0.70	ES		16.64	0.45		MADE GROUND GRANULAR [SUB-BASE]
		1.00-1.20	D			(0.70)		*Brown sandy angular to subangular fine to coarse GRAVEL. Sand is fine. (0.15 - 0.45m)*
		1.20	SPT(C)	N=9 (3,2/2,2,2,3)	15.94	1.15		MADE GROUND COHESIVE [REWORKED NATURAL]
		1.40-1.60	D			(0.85)		*Brown gravelly CLAY. Gravel is angular to subangular fine to coarse of flint. (0.45 - 1.15m)*
		2.00	SPT	N=22 (3,4/4,5,7,6)	15.09	2.00		Gravelly SAND [HEAD FORMATION]
		3.00	SPT	N=31 (4,8/7,7,7,10)				*Light brown gravelly fine SAND. Gravel is angular to subangular fine to coarse of flint. (1.15 - 2.00m)*
		3.00-3.20	D			(2.10)		Gravelly CLAY [HEAD FORMATION]
		4.00	SPT	N=21 (2,3/4,6,5,6)	12.99	4.10		*Orange gravelly CLAY. Gravel is angular to subangular fine to coarse of flint. (2.00 - 4.10m)*
		5.00	SPT	N=50 for 0mm (12,8/5 for 0mm)		(1.35)		Gravelly CLAY [HEAD FORMATION]
					11.64	5.45		*Brown gravelly CLAY. Gravel is angular to subangular fine to coarse of flint. (4.10 - 5.45m)*
								End of Borehole at 5.45m

Remarks
1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole installed as return ground gas and groundwater monitoring well.

Method, Plant, Stability, Dimensions
0.00 - 5.45m WLS Premier 110

Logger
C Dean

Checked By: CD **Approved By:** BB

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

Created using Pebble Geo

ROBERTS ENVIRONMENTAL LTD

Dynamic (Windowless) Sampler

WS102

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515270.92	105206.95	17.09	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client	Consultant	Contractor
Worthing Retail Ltd	Christian Dean	AB Site Investigation Ltd

SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.20 (C)					N=9 (3,2/2,2,2,3)
2.00 (S)					N=22 (3,4/4,5,7,6)
3.00 (S)					N=31 (4,8/7,7,7,10)
4.00 (S)					N=21 (2,3/4,6,5,6)
5.00 (S)					N=50 for 0mm (12,8/5 for 0mm)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
	ES		
	ES		
	ES		
	D		
	D		
	D		

Remarks

1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole installed as return ground gas and groundwater monitoring well.

Method, Plant, Stability, Dimensions		Logger
0.00 - 5.45m	WLS Premier 110	C Dean

Checked By: CD **Approved By:** BB

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

Dynamic (Windowless) Sampler

WS103

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515304.37	105200.30	16.57	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client
Worthing Retail Ltd

Consultant
Christian Dean

Contractor
AB Site Investigation Ltd

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.20-0.30	ES		16.45	(0.12) 0.12		MADE GROUND [HARDSTANDING]
								Black Asphalt Hardstanding. (0.00 - 0.12m)
						(1.08)		MADE GROUND GRANULAR [SUB-BASE]
		1.00-1.20	ES					*Brown sandy angular to subangular fine to coarse GRAVEL. Sand is fine. (0.12 - 1.20m)*
		1.20	SPT(C)	N=50 for 150mm (3,4/5,50,0 for 0mm)	15.37	1.20		*End of Borehole at 1.20m*

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0

Remarks
1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole refused on unknown obstruction and was terminated as a result.
5. Borehole backfilled with arisings and reinstated at surface.

Method, Plant, Stability, Dimensions
0.00 - 1.20m WLS Premier 110

Logger
C Dean

Checked By: CD **Approved By:** BB

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

Created using Pebble Geo

ROBERTS ENVIRONMENTAL LTD

Dynamic (Windowless) Sampler

WS103

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515304.37	105200.30	16.57	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client	Consultant	Contractor
Worthing Retail Ltd	Christian Dean	AB Site Investigation Ltd

SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.20 (C)					N=50 for 150mm (3,4/5,50,0 for 0mm)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
	ES		
	ES		

Remarks

1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole refused on unknown obstruction and was terminated as a result.
5. Borehole backfilled with arisings and reinstated at surface.

Method, Plant, Stability, Dimensions

0.00 - 1.20m WLS Premier 110

Logger

C Dean

Checked By: CD **Approved By:** BB

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

Dynamic (Windowless) Sampler

WS104

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515286.59	105185.27	16.61	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client
Worthing Retail Ltd

Consultant
Christian Dean

Contractor
AB Site Investigation Ltd

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
		0.20-0.30	ES		16.51	(0.10) 0.10		TOPSOIL [REWORKED NATURAL] *Grass overlying topsoil. (0.00 - 0.10m)*
		0.70-0.90	ES			(1.30)		Gravelly SAND [HEAD FORMATION] *Light brown gravelly fine SAND. Gravel is angular to subangular fine to coarse of flint. (0.10 - 1.40m)*
		1.00-1.20	ES					
		1.20	SPT(C)	N=21 (3,5/4,4,6,7)				
		1.40-1.50	D		15.21	1.40		Gravelly CLAY [HEAD FORMATION] *Orange gravelly CLAY. Gravel is angular to subangular fine to coarse of flint. (1.40 - 2.50m)*
		1.90-2.00	D			(1.10)		
		2.00	SPT	N=26 (5,6/6,6,6,8)				
		2.40-2.50	D					
		2.50	SPT	N=56 (7,10/12,13,15,16)	14.11	2.50		*End of Borehole at 2.50m*

Remarks
1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole refused on suspected natural obstruction, possible cobble / boulder.
5. Borehole backfilled with arisings and reinstated at surface.

Method, Plant, Stability, Dimensions
0.00 - 2.50m WLS Premier 110

Logger
C Dean

Checked By: CD **Approved By:** BB

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

Created using Pebble Geo

ROBERTS ENVIRONMENTAL LTD

Dynamic (Windowless) Sampler

WS104

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515286.59	105185.27	16.61	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client	Consultant	Contractor
Worthing Retail Ltd	Christian Dean	AB Site Investigation Ltd

SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.20 (C)					N=21 (3,5/4,4,6,7)
2.00 (S)					N=26 (5,6/6,6,6,8)
2.50 (S)					N=56 (7,10/12,13,15,16)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
	ES		
	ES		
	ES		
	D		
	D		
	D		

Remarks

1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole refused on suspected natural obstruction, possible cobble / boulder.
5. Borehole backfilled with arisings and reinstated at surface.

Checked By: CD **Approved By:** BB

Method, Plant, Stability, Dimensions		Logger
0.00 - 2.50m	WLS Premier 110	C Dean

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

Dynamic (Windowless) Sampler

WS105

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515290.43	105195.27	16.59	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client
Worthing Retail Ltd

Consultant
Christian Dean

Contractor
AB Site Investigation Ltd

Inst/ Backfill	Water Levels	Samples and Tests: Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Strata: Legend	Description
					16.45	(0.14) 0.14		MADE GROUND [HARDSTANDING]
		0.50-0.60	ES					*Black Asphalt Hardstanding. (0.00 - 0.14m)*
						(1.06)		MADE GROUND GRANULAR [SUB-BASE]
		1.20	SPT(C)	N=50 for 75mm (4,5/50,0 for 0mm)	15.39	1.20		*Brown sandy angular to subangular fine to coarse GRAVEL. Sand is fine. (0.14 - 1.20m)*
								End of Borehole at 1.20m

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0

Remarks
1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole refused on unknown obstruction and was terminated as a result.
5. Borehole backfilled with arisings and reinstated at surface.

Method, Plant, Stability, Dimensions
0.00 - 1.20m WLS Premier 110

Logger
C Dean

Checked By: CD **Approved By:** BB

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

ROBERTS ENVIRONMENTAL LTD

Dynamic (Windowless) Sampler

WS105

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515290.43	105195.27	16.59	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client	Consultant	Contractor
Worthing Retail Ltd	Christian Dean	AB Site Investigation Ltd

SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.20 (C)					N=50 for 75mm (4,5/50,0 for 0mm)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
	ES		

Remarks

1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole refused on unknown obstruction and was terminated as a result.
5. Borehole backfilled with arisings and reinstated at surface.

Method, Plant, Stability, Dimensions

0.00 - 1.20m WLS Premier 110

Logger

C Dean

Checked By: CD **Approved By:** BB

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

Dynamic (Windowless) Sampler

WS106

Sheet 1 of 1

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515302.71	105213.45	16.91	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client
Worthing Retail Ltd

Consultant
Christian Dean

Contractor
AB Site Investigation Ltd

Inst/ Backfill	Water Levels	Depth (m)	Type/ Ref	Results	Level (m)	Depth (thickness) (m)	Legend	Description
		0.20-0.30	ES		16.81	(0.10) 0.10		MADE GROUND [HARDSTANDING]
					16.61	(0.20) 0.30		*Black Asphalt Hardstanding. (0.00 - 0.10m)*
		0.50-0.60	ES			(0.50)		MADE GROUND GRANULAR [SUB-BASE]
		0.80-0.90	ES		16.11	0.80		*Brown sandy angular to subangular fine to coarse GRAVEL. Sand is fine. (0.10 - 0.30m)*
		1.20	SPT(C)	N=19 (3,5/6,5,4,4)				MADE GROUND COHESIVE [REWORKED NATURAL]
		1.40-1.50	D			(1.20)		*Brown gravelly CLAY. Gravel is angular to subangular fine to coarse of flint. (0.30 - 0.80m)*
		2.00	SPT	N=26 (3,6/5,6,7,8)	14.91	2.00		Gravelly SAND [HEAD FORMATION]
		2.00-2.20	D					*Light brown gravelly fine SAND. Gravel is angular to subangular fine to coarse of flint. (0.80 - 2.00m)*
		3.00	SPT	N=31 (3,6/9,8,8,6)		(1.50)		Gravelly CLAY [HEAD FORMATION]
								Orange gravelly CLAY. Gravel is angular to subangular fine to coarse of flint. (2.00 - 3.50m)
		3.90-4.00	D		13.41	3.50		Gravelly CLAY [HEAD FORMATION]
		4.00	SPT	N=10 (3,2/3,3,2,2)				*Brown gravelly CLAY. Gravel is angular to subangular fine to coarse of flint. (3.50 - 5.45m)*
						(1.95)		
		5.00	SPT	N=45 (6,7/7,11,12,15)				
					11.46	5.45		*End of Borehole at 5.45m*

Remarks
1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole installed as return ground gas and groundwater monitoring well.

Method, Plant, Stability, Dimensions
0.00 - 5.45m WLS Premier 110

Logger
C Dean

Checked By: CD **Approved By:** BB

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

Created using Pebble Geo

ROBERTS ENVIRONMENTAL LTD

Dynamic (Windowless) Sampler

WS106

SUPPLEMENTARY INFO

Hole Type	Easting	Northing	Ground Level (m)	Scale
WLS	515302.71	105213.45	16.91	1:50

Project Name	Project No.	Start Date	End Date
Proposed Drive Thru, Downlands Retail Park	250509	2025-06-16	2025-06-16

Client	Consultant	Contractor
Worthing Retail Ltd	Christian Dean	AB Site Investigation Ltd

SPT - Details

Top Depth (m) (Type)	Casing Depth (m)	Water Depth (m)	Hammer Serial No.	Energy Ratio (%)	Results
1.20 (C)					N=19 (3,5/6,5,4,4)
2.00 (S)					N=26 (3,6/5,6,7,8)
3.00 (S)					N=31 (3,6/9,8,8,6)
4.00 (S)					N=10 (3,2/3,3,2,2)
5.00 (S)					N=45 (6,7/7,11,12,15)

Sample Details

Sample ID	Type	Water Level (m)	Remarks
	ES		
	ES		
	ES		
	D		
	D		
	D		

Remarks

1. Logged in general accordance with BS5930:2015+A1:2020.
2. Borehole location cleared of buried utilities prior to commencement.
3. Hand pit excavated to 1.20 m bcgl prior to drilling.
4. Borehole installed as return ground gas and groundwater monitoring well.

Method, Plant, Stability, Dimensions

0.00 - 5.45m WLS Premier 110

Logger

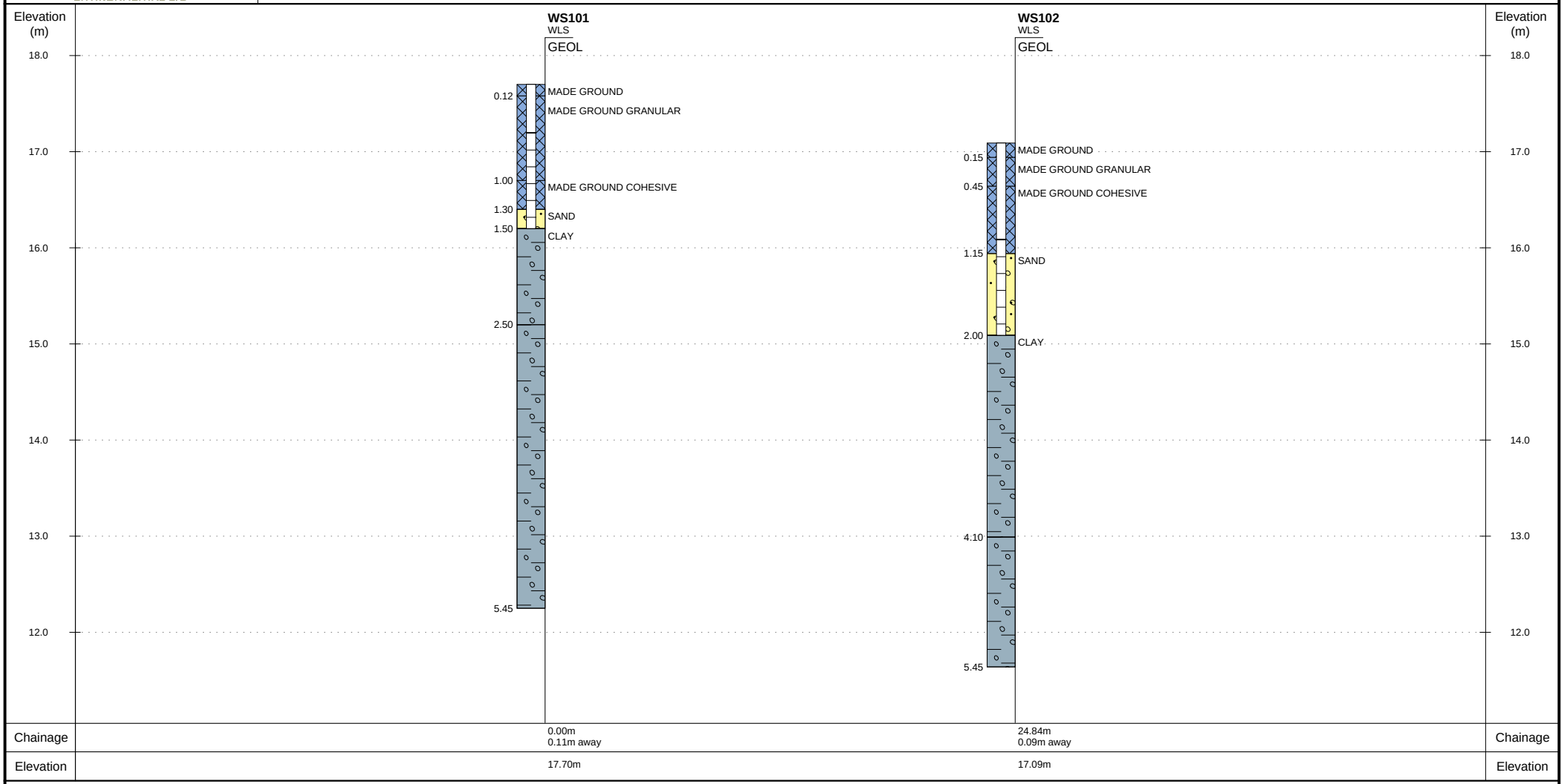
C Dean

Checked By: CD **Approved By:** BB

SPT N60 = N(raw) * (Hammer Energy Ratio / 60) to nearest whole number

250509

Project Name Proposed Drive Thru, Downlands Retail Park	**Project No.** 250509	**Vertical Scale** 1:58	**Horizontal Scale** NOT SCALED
Client Worthing Retail Ltd	**Consultant** Christian Dean	**Contractor** AB Site Investigation Ltd	



MADE GROUND CLAY SAND

WATER LEVELS

REST

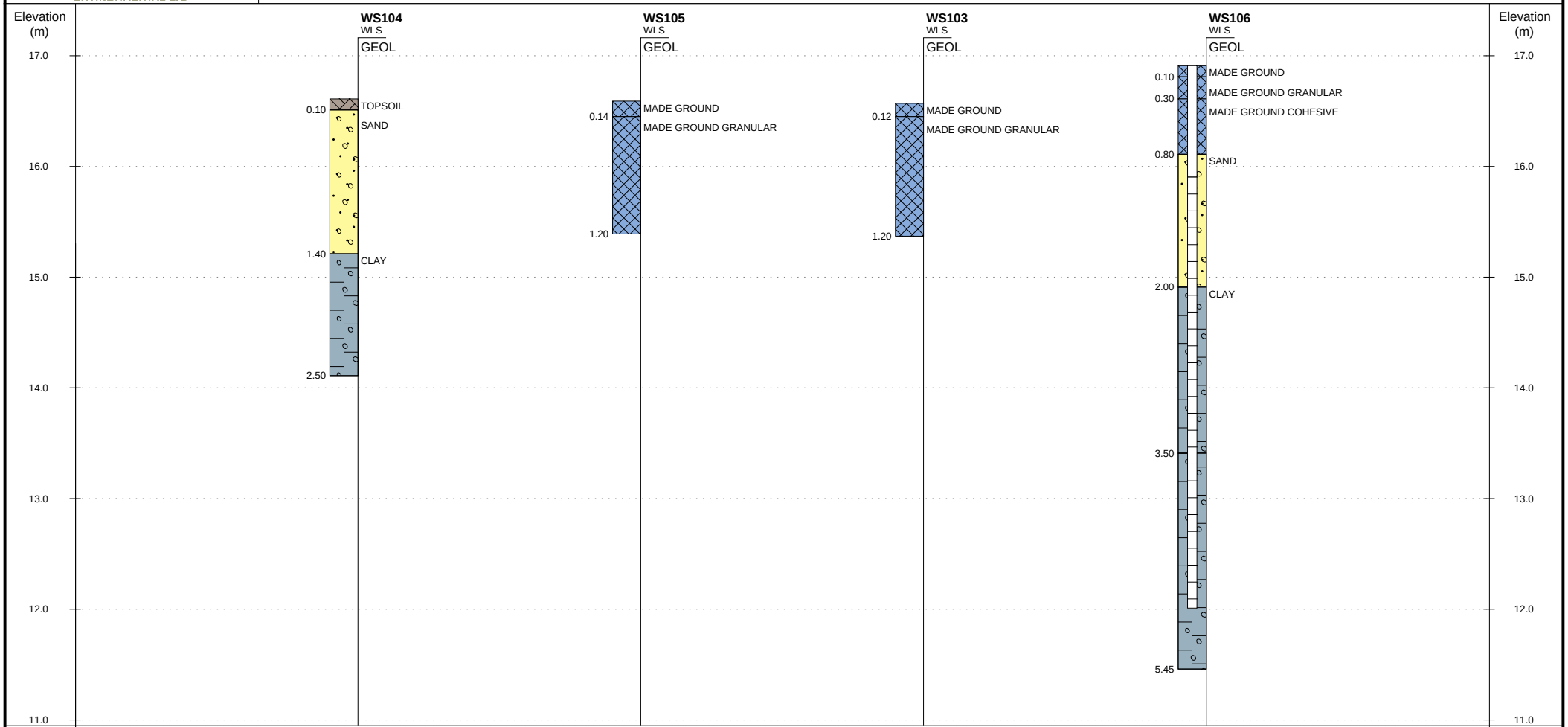
STRIKE

Checked By: CD **Approved By:** BB

Created using Pebble Geo

250509

Project Name Proposed Drive Thru, Downlands Retail Park	**Project No.** 250509	**Vertical Scale** 1:51	**Horizontal Scale** NOT SCALED
Client Worthing Retail Ltd	**Consultant** Christian Dean	**Contractor** AB Site Investigation Ltd	



TOPSOIL MADE GROUND CLAY SAND

WATER LEVELS

REST

STRIKE

Checked By: CD **Approved By:** BB

Created using Pebble Geo

UK DCP V3.1

DCP Layer Strength Analysis Report

Project Name: DCP test

Chainage (km)	101.000	Surface Type	Unpaved
Direction		Thickness (mm)	0
Location/Offset	Carriageway	Base Type	
Cone Angle (degrees)	60	Thickness (mm)	
Zero Error (mm)	0	Surface Moisture	Dry
Test Date	16/06/2025 11:58:44	Moisture Adjustment Factor	Not adjusted




Layer Boundaries Chart **CBR Chart**

Layer Properties

No.	Strength (mm/blow)	CBR	Thickness (mm)	Depth (mm)
1	22.50	11.24	710	710
2	14.00	18.56	42	752
3	4.33	64.10	13	765
4	10.00	26.49	20	785
5	2.43	118.22	17	802
6	5.43	50.52	38	840
7	0.20	1655.05	2	842

CBR Relationship: TRL

Chainage (km)	102.000	Surface Type	Unpaved
Direction		Thickness (mm)	0
Location/Offset	Carriageway	Base Type	
Cone Angle (degrees)	60	Thickness (mm)	
Zero Error (mm)	0	Surface Moisture	Dry
Test Date	16/06/2025 11:58:44	Moisture Adjustment Factor	Not adjusted




Layer Boundaries Chart **CBR Chart**

Layer Properties

No.	Strength (mm/blow)	CBR	Thickness (mm)	Depth (mm)
1	15.00	17.25	575	575
2	9.00	29.61	36	611
3	19.00	13.44	19	630
4	40.00	6.12	80	710
5	10.00	26.49	10	720
6	5.83	46.82	35	755
7	9.82	26.99	167	922
8	4.25	65.43	17	939

CBR Relationship: TRL

Chainage (km)	106.000	Surface Type	Unpaved
Direction		Thickness (mm)	0
Location/Offset	Carriageway	Base Type	
Cone Angle (degrees)	60	Thickness (mm)	
Zero Error (mm)	0	Surface Moisture	Dry
Test Date	16/06/2025 11:58:44	Moisture Adjustment Factor	Not adjusted




Layer Boundaries Chart **CBR Chart**

Layer Properties

No.	Strength (mm/blow)	CBR	Thickness (mm)	Depth (mm)
1	15.00	17.25	305	305
2	10.00	26.49	10	315
3	8.33	32.11	225	540
4	11.43	23.00	80	620
5	6.36	42.71	70	690
6	3.58	78.36	43	733
7	7.64	35.19	107	840
8	0.45	694.93	5	845

CBR Relationship: TRL

Date of Report: 28-Jul-2025

Appendix III Results of Laboratory Analysis

envirolab
Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 25/06853
Issue Number: 1 **Date:** 09 July, 2025

Client:
Ian Farmer Associates (Newcastle) Lab
Unit 4, Faraday Close
Pattinson North Industrial Estate
Washington
Tyne and Wear
NE38 8QJ

Project Manager: Washington
Project Name: Proposed Costa Drive Thru. Downlands Retail Park, Worthing
Project Ref: 2282553
Order No: P7545159
Date Samples Received: 26/06/25
Date Instructions Received: 26/06/25
Date Analysis Completed: 09/07/25

Approved by:

[redacted]
Gemma Berrisford
Deputy Client Services Supervisor

Envirolab Job Number: 25/06853

Client Project Name: Proposed Costa Drive Thru. Downlands Retail Park, Worthing

Client Project Ref: 2282553

Lab Sample ID	25/06853/1	25/06853/2	25/06853/3					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS102	WS104	WS106							
Depth to Top	1.00	1.90	2.00							
Depth To Bottom	1.20	2.00	2.20							
Date Sampled	16-Jun-25	16-Jun-25	16-Jun-25							
Sample Type	SOIL - D	SOIL - D	SOIL - D							
Sample Matrix Code	6A	4A	6A							
% Stones >10mm$_A$	<0.1	39.3	<0.1					% w/w	0.1	A-T-044
pH BRE$_D$$^{M\#}$	7.73	7.89	8.18					pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1)$_D$$^{M\#}$	21	<20	10					mg/l	10	A-T-026s
Sulphate BRE (acid sol)$_D$$^{M\#}$	<0.20	<0.10	<0.02					% w/w	0.02	A-T-028s
Sulphur BRE (total)$_D$	0.11	<0.05	0.02					% w/w	0.01	A-T-024s

Report Notes

General

•This report shall not be reproduced, except in full, without written approval from Envirolab.
•The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
•The results reported herein relate only to the material supplied to the laboratory.
•The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
•Analytical results reflect the quality of the sample at the time of analysis only.
•Opinions and Interpretations expressed are outside our scope of accreditation.
•A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
•If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
•Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript "#"	Accredited to ISO 17025
Superscript "M"	Accredited to MCertS
Superscript "U"	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript "D" on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript "^"	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis
"Trace Asbestos Identified" will be reported if there is not enough present to verify the type.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH by method A-T-007:
For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:
EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any IDs from "TPH CWG with clean up" please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:
Results greater than 12900µS/cm @ 25^0C / 11550µS/cm @ 20^0C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Ian Farmer Associates (Newcastle) Lab, Unit 4, Faraday Close, Pattinson North Industrial Estate, Washington, Tyne and Wear, NE38 8QJ

Project: Proposed Costa Drive Thru. Downlands Retail Park, Worthing

Clients Project No: 2282553

Project No: 25/06853

Date Received: 26/06/2025 (am)

Cool Box Temperatures (°C): 18.5

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	25/06853/1	25/06853/2	25/06853/3
Client Sample No			
Client Sample ID/Depth	WS102 1.00-1.20m	WS104 1.90-2.00m	WS106 2.00-2.20m
Date Sampled	16/06/25	16/06/25	16/06/25
A-T-024s	09/07/2025	09/07/2025	09/07/2025
A-T-026s	08/07/2025	08/07/2025	08/07/2025
A-T-028s	09/07/2025	09/07/2025	09/07/2025
A-T-031s	08/07/2025	08/07/2025	08/07/2025
A-T-044	09/07/2025	09/07/2025	09/07/2025

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

IAN FARMER ASSOCIATES

Unit 4, Faraday Close, Pattinson North Industrial Estate, Washington, NE38 8QJ Tel: 0191 482 8500
washington@ianfarmer.co.uk www.ianfarmer.co.uk

Roberts Environmental Ltd
1 Croft Stairs,
Newcastle upon Tyne
NE1 2HG
Tel 0191 230 4521

F.A.O. Christian Dean

Final Test Report - 2282553 / 1

Site:	Proposed Costa Drive Thru, Downlands Retail Park, Worthing
Job Number:	2282553
Originating Client:	Roberts Environmental Ltd
Originating Reference:	250509
Date Sampled:	Not Given
Date Scheduled:	24/06/2025
Date Testing Started:	25/06/2025
Date Testing Finished:	27/06/2025

Previous Reports		Amendments	Date Issued

Amendments:

Authorised By: [redacted]

Tim Robinson
Quality Supervisor

Report Issue Date: 07/07/2025

Constructionline Part of Capita plc

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Newcastle upon Tyne (0191) 482 8500. Motherwell (01698) 230231. Warrington (01925) 855440. Washington (0191) 482 8500.

AGS

Site: Proposed Costa Drive Thru, Downlands Retail Park, Worthing **Job Number:** 2282553

Client: Roberts Environmental Ltd **Page:** 2

Determination of Water Content, Liquid Limit and Plastic Limit and Derivation of Plasticity and Liquidity Index

Borehole / Trial Pit	Depth (m)	Sample	Natural Water Content %	Sample Preparation Natural = Hand picked Sieved = Washed on 425µm			Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Class	One-point PI Only		Description / Remarks
				Natural / Sieved	Passing %	Calc. WC %						Cone Penetration (mm)	Correction Factor	
WS101	1.60	D	4.4	Sieved	17	25	23	17	6	1.37	CL			Brown clayey, sandy GRAVEL, tested with decreasing WC
WS101	4.20	D	12.3	Sieved	60	21	27	18	9	0.29	CL			Brown sandy, gravelly CLAY
WS102	3.00	D	7.5	Sieved	52	14	35	21	14	-0.47	CL/CI			Brown sandy, gravelly CLAY
WS104	2.40	D	2.3	Sieved	23	10	26	16	10	-0.59	CL	20.1 20.2	0.998	Brown sandy, clayey GRAVEL

Method of Preparation: BS EN ISO 17892-1 : 2014 + A1 : 2022 : Clause 5.1 Water content test preparation
BS EN ISO 17892-12 : 2018 + A2 : 2022 : Clause 5.2 Specimen preparation for liquid and plastic limits

Method of Test: BS EN ISO 17892-1 : 2014 + A1 : 2022 : Clause 5.2 Water content test execution
BS EN ISO 17892-12 : 2018 + A2 : 2022 : Clause 5.3 Determination of liquid limit by the fall cone method. 80g / 30° Cone
BS EN ISO 17892-12 : 2018 + A2 : 2022 : Clause 5.5 Determination of plastic limit

UKAS TESTING 1464

General Remarks: All samples tested with increasing water content, unless otherwise stated.
All samples tested to four-point method, unless the extra 'One-point PI Only' data is reported.

Results reported relate only to the samples tested.

Site: Proposed Costa Drive Thru, Downlands Retail Park, Worthing **Job Number:** 2282553

Client: Roberts Environmental Ltd **Page:** 3

Density by Measurement - Summary of Results

Borehole / Trial Pit	Depth (m)	Sample	Soil description	Linear Measurement			Remarks
				Bulk density Mg/m3	Dry density Mg/m3	Water Content %	
WS106	3.90	D	Brown sandy, gravelly CLAY	2.02	1.50	34.9	Disturbed

Method of Preparation: BS EN ISO 17892 : Part 1 : 2014 : Clause 5.1. Water content test specimen preparation
BS EN ISO 17892 : Part 2 : 2014 : Clause 5.1. Density by linear measurement method

Method of Test: BS EN ISO 17892 : Part 1 : 2014 : Clause 5.2. Water content test execution
BS EN ISO 17892 : Part 2 : 2014 : Clause 5.1. Density by linear measurement method

UKAS TESTING 1464

Results reported relate only to the samples tested.

Final Test Report - 2282553 / 1

Site:	Proposed Costa Drive Thru, Downlands Retail Park, Worthing
Job Number:	2282553
Originating Client:	Roberts Environmental Ltd

All opinions and interpretations contained within this report are outside of our Scope of Accreditation.

This test report shall not be reproduced, except in full and only with the written permission of Ian Farmer Associates Ltd.

Samples will be retained for 28 days from date of issue of the final test report before being disposed of, unless we receive written instruction to the contrary.

Report End

Report Issue Date: 07/07/2025

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	25-20582-1
Initial Date of Issue:	09-Jul-2025
Re-Issue Details:	
Client	*Roberts Environmental Limited*
Client Address:	*1 Croft Stairs* *Newcastle Upon Tyne* *Tyne & Wear* *NE1 2HG*
Contact(s):	*Christian Dean*
Project	*250509 Proposed Drive Through*
Quotation No.:	*Q25-38722*
Order No.:	250509.CHEM
No. of Samples:	*13*
Turnaround (Wkdays):	5
Date Approved:	09-Jul-2025
Approved By:	[redacted]
Details:	David Smith, Technical Director

Date Received:	20-Jun-2025
Date Instructed:	30-Jun-2025
Results Due:	04-Jul-2025

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Leachate

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited						**Chemtest Job No.:**	25-20582	25-20582	25-20582
Quotation No.: Q25-38722						**Chemtest Sample ID.:**	1989632	1989636	1989641
						Client Reference:	*WS106*	*WS101*	*WS104*
						Sample Type:	*SOIL*	*SOIL*	*SOIL*
						Top Depth (m):	*0.20*	*0.20*	*1.10*
						Bottom Depth (m):	*0.30*	*0.30*	*1.20*
						Date Sampled:	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**				
Acenaphthene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Anthracene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Chrysene	N	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Fluorene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Naphthalene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Pyrene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	10:1	µg/l	2.0		< 2.0	< 2.0	< 2.0
pH at 20C	U	1010	10:1		4.0		9.3	9.2	8.6
Sulphate	U	1220	10:1	mg/l	1.0		1.5	< 1.0	< 1.0
Cyanide (Free)	U	1300	10:1	mg/l	0.050		< 0.050	< 0.050	< 0.050
Arsenic (Dissolved)	U	1455	10:1	µg/l	0.20		1.2	0.85	2.1
Boron (Dissolved)	U	1455	10:1	µg/l	10.0		< 10	< 10	< 10
Cadmium (Dissolved)	U	1455	10:1	µg/l	0.11		< 0.11	< 0.11	< 0.11
Copper (Dissolved)	U	1455	10:1	µg/l	0.50		0.68	0.60	2.9
Mercury (Dissolved)	U	1455	10:1	µg/l	0.05		< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	10:1	µg/l	0.50		< 0.50	< 0.50	< 0.50
Lead (Dissolved)	U	1455	10:1	µg/l	0.50		< 0.50	< 0.50	1.8
Selenium (Dissolved)	U	1455	10:1	µg/l	0.50		< 0.50	< 0.50	< 0.50
Zinc (Dissolved)	U	1455	10:1	µg/l	2.5		4.1	7.1	4.9
Chromium (Total)	N	1455	10:1	µg/l	0.50		< 0.50	< 0.50	< 0.50
TPH >C5-C6	N	1670	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
TPH >C6-C7	N	1670	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
TPH >C7-C8	N	1670	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
TPH >C8-C10	N	1670	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
TPH >C10-C12	N	1670	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
TPH >C12-C16	N	1670	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
TPH >C16-C21	N	1670	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
TPH >C21-C35	N	1670	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10
TPH >C35-C44	N	1670	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10

Results - Leachate

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited						**Chemtest Job No.:**	25-20582	25-20582	25-20582
Quotation No.: Q25-38722						**Chemtest Sample ID.:**	1989632	1989636	1989641
						Client Reference:	*WS106*	*WS101*	*WS104*
						Sample Type:	*SOIL*	*SOIL*	*SOIL*
						Top Depth (m):	*0.20*	*0.20*	*1.10*
						Bottom Depth (m):	*0.30*	*0.30*	*1.20*
						Date Sampled:	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**				
Total TPH >C5-C44	N	1670	10:1	µg/l	10		< 10	< 10	< 10
Benzo[a]anthracene	U	1700	10:1	µg/l	0.10		< 0.10	< 0.10	< 0.10

Results - Miscellaneous Solid

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited		**Chemtest Job No.:**			25-20582
Quotation No.: Q25-38722		**Chemtest Sample ID.:**			1989644
		Client Reference:			*WS102*
		Sample Type:			*MISCSOLID*
		Top Depth (m):			*0.05*
		Bottom Depth (m):			*0.15*
		Date Sampled:			*16-Jun-2025*
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Chromatogram (TPH)	N			N/A	See Attached
Total TPH >C10-C40	N	2670	mg/kg	10	1200
N-Nitrosodimethylamine	N	2790	mg/kg	0.50	< 0.50
Phenol	N	2790	mg/kg	0.50	< 0.50
2-Chlorophenol	N	2790	mg/kg	0.50	< 0.50
1,3-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50
1,4-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50
1,2-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50
2-Methylphenol	N	2790	mg/kg	0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.50	< 0.50
Hexachloroethane	N	2790	mg/kg	0.50	< 0.50
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.50	< 0.50
4-Methylphenol	N	2790	mg/kg	0.50	< 0.50
Nitrobenzene	N	2790	mg/kg	0.50	< 0.50
Isophorone	N	2790	mg/kg	0.50	< 0.50
2-Nitrophenol	N	2790	mg/kg	0.50	< 0.50
2,4-Dimethylphenol	N	2790	mg/kg	0.50	< 0.50
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.50	< 0.50
2,4-Dichlorophenol	N	2790	mg/kg	0.50	< 0.50
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.50	< 0.50
Naphthalene	N	2790	mg/kg	0.50	< 0.50
4-Chloroaniline	N	2790	mg/kg	0.50	< 0.50
Hexachlorobutadiene	N	2790	mg/kg	0.50	< 0.50
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.50	< 0.50
2-Methylnaphthalene	N	2790	mg/kg	0.50	< 0.50
4-Nitrophenol	N	2790	mg/kg	0.50	< 0.50
2,4,6-Trichlorophenol	N	2790	mg/kg	0.50	< 0.50
2,4,5-Trichlorophenol	N	2790	mg/kg	0.50	< 0.50
2-Chloronaphthalene	N	2790	mg/kg	0.50	< 0.50
2-Nitroaniline	N	2790	mg/kg	0.50	< 0.50
Acenaphthylene	N	2790	mg/kg	0.50	< 0.50
Dimethylphthalate	N	2790	mg/kg	0.50	< 0.50
2,6-Dinitrotoluene	N	2790	mg/kg	0.50	< 0.50
Acenaphthene	N	2790	mg/kg	0.50	< 0.50
3-Nitroaniline	N	2790	mg/kg	0.50	< 0.50
Dibenzofuran	N	2790	mg/kg	0.50	< 0.50
4-Chlorophenylphenylether	N	2790	mg/kg	0.50	< 0.50
2,4-Dinitrotoluene	N	2790	mg/kg	0.50	< 0.50

Results - Miscellaneous Solid

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited			**Chemtest Job No.:**		25-20582
Quotation No.: Q25-38722			**Chemtest Sample ID.:**		1989644
			Client Reference:		*WS102*
			Sample Type:		*MISCSOLID*
			Top Depth (m):		*0.05*
			Bottom Depth (m):		*0.15*
			Date Sampled:		*16-Jun-2025*
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Fluorene	N	2790	mg/kg	0.50	< 0.50
Diethyl Phthalate	N	2790	mg/kg	0.50	< 0.50
4-Nitroaniline	N	2790	mg/kg	0.50	< 0.50
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50	< 0.50
Azobenzene	N	2790	mg/kg	0.50	< 0.50
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.50	< 0.50
Hexachlorobenzene	N	2790	mg/kg	0.50	< 0.50
Phenanthrene	N	2790	mg/kg	0.50	< 0.50
Anthracene	N	2790	mg/kg	0.50	< 0.50
Carbazole	N	2790	mg/kg	0.50	< 0.50
Di-N-Butyl Phthalate	N	2790	mg/kg	0.50	< 0.50
Fluoranthene	N	2790	mg/kg	0.50	< 0.50
Pyrene	N	2790	mg/kg	0.50	< 0.50
Butylbenzyl Phthalate	N	2790	mg/kg	0.50	< 0.50
Benzo[a]anthracene	N	2790	mg/kg	0.50	< 0.50
Chrysene	N	2790	mg/kg	0.50	< 0.50
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50	< 0.50
Di-N-Octyl Phthalate	N	2790	mg/kg	0.50	< 0.50
Benzo[b]fluoranthene	N	2790	mg/kg	0.50	< 0.50
Benzo[k]fluoranthene	N	2790	mg/kg	0.50	< 0.50
Benzo[a]pyrene	N	2790	mg/kg	0.50	< 0.50
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.50	< 0.50
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.50	< 0.50
Benzo[g,h,i]perylene	N	2790	mg/kg	0.50	< 0.50
Coal Tar Presence/Absence	N			N/A	Absence
Moisture	N		%	0.10	< 0.10
SVOC TIC	N	2790	mg/kg	N/A	None Detected

Results - Soil

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited				**Chemtest Job No.:**		25-20582	25-20582	25-20582	25-20582	25-20582	25-20582	25-20582
Quotation No.: Q25-38722				**Chemtest Sample ID.:**		1989631	1989634	1989635	1989638	1989639	1989640	1989642
				Client Reference:		*WS106*	*WS101*	*WS101*	*WS103*	*W1S04*	*WS104*	*WS105*
				Sample Type:		*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
				Top Depth (m):		*0.50*	*1.00*	*0.70*	*0.20*	*0.20*	*0.70*	*0.50*
				Bottom Depth (m):		*0.60*	*1.10*	*0.80*	*0.30*	*0.30*	*0.90*	*0.60*
				Date Sampled:		*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*
				Asbestos Lab:		DURHAM		DURHAM	DURHAM		DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Arsenic		M	2455	mg/kg	0.5	9.9		6.7	6.5		10	5.1
Cadmium		M	2455	mg/kg	0.10	0.94		0.18	0.20		0.86	< 0.10
Chromium		M	2455	mg/kg	0.5	30		13	10		24	8.0
Chromium (Trivalent)		N	2490	mg/kg	1.0	30		13	9.9		24	7.9
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50		< 0.50	< 0.50		< 0.50	< 0.50
Copper		M	2455	mg/kg	0.50	28		7.8	10		46	4.2
Lead		M	2455	mg/kg	0.50	17		20	33		120	22
Mercury		M	2455	mg/kg	0.05	0.07		< 0.05	0.08		0.26	0.05
Nickel		M	2455	mg/kg	0.50	32		12	8.6		20	5.1
Selenium		M	2455	mg/kg	0.25	0.66		< 0.25	< 0.25		0.43	< 0.25
Zinc		M	2455	mg/kg	0.50	66		50	89		130	33
Acenaphthene		M	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Acenaphthylene		M	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10		0.12	0.11
Anthracene		M	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10		0.31	< 0.10
Benzo[a]pyrene		M	2700	mg/kg	0.10	< 0.10		< 0.10	0.13		2.3	< 0.10
Benzo[b]fluoranthene		M	2700	mg/kg	0.10	< 0.10		< 0.10	0.37		2.7	< 0.10
Benzo[g,h,i]perylene		M	2700	mg/kg	0.10	< 0.10		< 0.10	0.53		1.6	< 0.10
Benzo[k]fluoranthene		M	2700	mg/kg	0.10	< 0.10		< 0.10	0.71		1.1	< 0.10
Chrysene		M	2700	mg/kg	0.10	< 0.10		< 0.10	0.43		2.3	< 0.10
Dibenz(a,h)Anthracene		M	2700	mg/kg	0.10	< 0.10		< 0.10	0.29		0.42	< 0.10
Fluoranthene		M	2700	mg/kg	0.10	< 0.10		< 0.10	0.37		3.1	0.32
Fluorene		M	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10		< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene		M	2700	mg/kg	0.10	< 0.10		< 0.10	0.16		1.5	< 0.10
Naphthalene		M	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10		0.22	0.13
Phenanthrene		M	2700	mg/kg	0.10	< 0.10		< 0.10	< 0.10		1.0	0.12
Pyrene		M	2700	mg/kg	0.10	< 0.10		< 0.10	0.47		3.3	0.58
Total Of 16 PAH's		M	2700	mg/kg	2.0	< 2.0		< 2.0	3.8		22	< 2.0
ACM Type		N	2192		N/A	-		-	-		-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	23	24	16	20	18	16	16
Soil Colour		N	2030		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material		N	2030		N/A	Stones, Roots and	Stones and	Stones and	Stones and	Stones, Roots and	Stones, Roots and	Stones and
Soil Texture		N	2030		N/A	Clay	Clay	Sand	Sand	Sand	Sand	Sand
Chromatogram (TPH)	EH_1D_Total	N			N/A	See Attached		See Attached	See Attached		See Attached	See Attached
pH at 20C		M	2010		4.0	7.8		9.3	9.6		8.0	9.0

Results - Soil

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited				**Chemtest Job No.:**		25-20582	25-20582	25-20582	25-20582	25-20582	25-20582	25-20582
Quotation No.: Q25-38722				**Chemtest Sample ID.:**		1989631	1989634	1989635	1989638	1989639	1989640	1989642
				Client Reference:		*WS106*	*WS101*	*WS101*	*WS103*	*W1S04*	*WS104*	*WS105*
				Sample Type:		*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
				Top Depth (m):		*0.50*	*1.00*	*0.70*	*0.20*	*0.20*	*0.70*	*0.50*
				Bottom Depth (m):		*0.60*	*1.10*	*0.80*	*0.30*	*0.30*	*0.90*	*0.60*
				Date Sampled:		*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*
				Asbestos Lab:		DURHAM		DURHAM	DURHAM		DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	< 0.010		0.11	0.52		< 0.010	0.45
Cyanide (Free)		M	2300	mg/kg	0.50	< 0.50		< 0.50	< 0.50		< 0.50	< 0.50
Organic Matter		M	2625	%	0.40	0.90		0.64	0.83		2.9	0.95
Total Organic Carbon		M	2625	%	0.20	0.52		0.37	0.48		1.7	0.55
Total TPH >C6-C40	EH_1D_Total	U	2670	mg/kg	10	< 10		< 10	880		81	150
Benzo[a]anthracene		M	2700	mg/kg	0.10	< 0.10		< 0.10	0.37		1.8	< 0.10
Dichlorodifluoromethane		N	2760	µg/kg	1.0		< 1.0			< 1.0		
Chloromethane		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Vinyl Chloride		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Bromomethane		M	2760	µg/kg	20		< 20			< 20		
Chloroethane		U	2760	µg/kg	2.0		< 2.0			< 2.0		
Trichlorofluoromethane		N	2760	µg/kg	1.0		< 1.0			< 1.0		
1,1-Dichloroethene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Trans 1,2-Dichloroethene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
1,1-Dichloroethane		M	2760	µg/kg	1.0		< 1.0			< 1.0		
cis 1,2-Dichloroethene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Bromochloromethane		U	2760	µg/kg	5.0		< 5.0			< 5.0		
Trichloromethane		M	2760	µg/kg	1.0		< 1.0			< 1.0		
1,1,1-Trichloroethane		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Tetrachloromethane		M	2760	µg/kg	1.0		< 1.0			< 1.0		
1,1-Dichloropropene		U	2760	µg/kg	1.0		< 1.0			< 1.0		
Benzene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
1,2-Dichloroethane		M	2760	µg/kg	2.0		< 2.0			< 2.0		
Trichloroethene		N	2760	µg/kg	1.0		< 1.0			< 1.0		
1,2-Dichloropropane		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Dibromomethane		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Bromodichloromethane		M	2760	µg/kg	5.0		< 5.0			< 5.0		
cis-1,3-Dichloropropene		N	2760	µg/kg	10		< 10			< 10		
Toluene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Trans-1,3-Dichloropropene		N	2760	µg/kg	10		< 10			< 10		
1,1,2-Trichloroethane		M	2760	µg/kg	10		< 10			< 10		
Tetrachloroethene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
1,3-Dichloropropane		U	2760	µg/kg	2.0		< 2.0			< 2.0		
Dibromochloromethane		U	2760	µg/kg	10		< 10			< 10		
1,2-Dibromoethane		M	2760	µg/kg	5.0		< 5.0			< 5.0		
Chlorobenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
1,1,1,2-Tetrachloroethane		M	2760	µg/kg	2.0		< 2.0			< 2.0		

Results - Soil

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited				**Chemtest Job No.:**		25-20582	25-20582	25-20582	25-20582	25-20582	25-20582	25-20582
Quotation No.: Q25-38722				**Chemtest Sample ID.:**		1989631	1989634	1989635	1989638	1989639	1989640	1989642
				Client Reference:		*WS106*	*WS101*	*WS101*	*WS103*	*W1S04*	*WS104*	*WS105*
				Sample Type:		*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
				Top Depth (m):		*0.50*	*1.00*	*0.70*	*0.20*	*0.20*	*0.70*	*0.50*
				Bottom Depth (m):		*0.60*	*1.10*	*0.80*	*0.30*	*0.30*	*0.90*	*0.60*
				Date Sampled:		*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*
				Asbestos Lab:		DURHAM		DURHAM	DURHAM		DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Ethylbenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
m & p-Xylene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
o-Xylene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Styrene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Tribromomethane		U	2760	µg/kg	1.0		< 1.0			< 1.0		
Isopropylbenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Bromobenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
1,2,3-Trichloropropane		N	2760	µg/kg	50		< 50			< 50		
N-Propylbenzene		U	2760	µg/kg	1.0		< 1.0			< 1.0		
2-Chlorotoluene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
1,3,5-Trimethylbenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
4-Chlorotoluene		U	2760	µg/kg	1.0		< 1.0			< 1.0		
Tert-Butylbenzene		U	2760	µg/kg	1.0		< 1.0			< 1.0		
1,2,4-Trimethylbenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Sec-Butylbenzene		U	2760	µg/kg	1.0		< 1.0			< 1.0		
1,3-Dichlorobenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
4-Isopropyltoluene		U	2760	µg/kg	1.0		< 1.0			< 1.0		
1,4-Dichlorobenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
N-Butylbenzene		U	2760	µg/kg	1.0		< 1.0			< 1.0		
1,2-Dichlorobenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
1,2-Dibromo-3-Chloropropane		N	2760	µg/kg	50		< 50			< 50		
1,2,4-Trichlorobenzene		M	2760	µg/kg	1.0		< 1.0			< 1.0		
Hexachlorobutadiene		N	2760	µg/kg	1.0		< 1.0			< 1.0		
1,2,3-Trichlorobenzene		U	2760	µg/kg	2.0		< 2.0			< 2.0		
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0		< 1.0			< 1.0		
N-Nitrosodimethylamine		M	2790	mg/kg	0.50		< 0.50			< 0.50		
Phenol		M	2790	mg/kg	0.50		< 0.50			< 0.50		
2-Chlorophenol		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Bis-(2-Chloroethyl)Ether		M	2790	mg/kg	0.50		< 0.50			< 0.50		
1,3-Dichlorobenzene		M	2790	mg/kg	0.50		< 0.50			< 0.50		
1,4-Dichlorobenzene		N	2790	mg/kg	0.50		< 0.50			< 0.50		
1,2-Dichlorobenzene		M	2790	mg/kg	0.50		< 0.50			< 0.50		
2-Methylphenol		M	2790	mg/kg	0.50		< 0.50			< 0.50		
Bis(2-Chloroisopropyl)Ether		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Hexachloroethane		N	2790	mg/kg	0.50		< 0.50			< 0.50		
N-Nitrosodi-n-propylamine		M	2790	mg/kg	0.50		< 0.50			< 0.50		
4-Methylphenol		M	2790	mg/kg	0.50		< 0.50			< 0.50		

Results - Soil

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited				**Chemtest Job No.:**		25-20582	25-20582	25-20582	25-20582	25-20582	25-20582	25-20582
Quotation No.: Q25-38722				**Chemtest Sample ID.:**		1989631	1989634	1989635	1989638	1989639	1989640	1989642
				Client Reference:		*WS106*	*WS101*	*WS101*	*WS103*	*W1S04*	*WS104*	*WS105*
				Sample Type:		*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
				Top Depth (m):		*0.50*	*1.00*	*0.70*	*0.20*	*0.20*	*0.70*	*0.50*
				Bottom Depth (m):		*0.60*	*1.10*	*0.80*	*0.30*	*0.30*	*0.90*	*0.60*
				Date Sampled:		*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*
				Asbestos Lab:		DURHAM		DURHAM	DURHAM		DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Nitrobenzene		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Isophorone		M	2790	mg/kg	0.50		< 0.50			< 0.50		
2-Nitrophenol		N	2790	mg/kg	0.50		< 0.50			< 0.50		
2,4-Dimethylphenol		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Bis(2-Chloroethoxy)Methane		M	2790	mg/kg	0.50		< 0.50			< 0.50		
2,4-Dichlorophenol		N	2790	mg/kg	0.50		< 0.50			< 0.50		
1,2,4-Trichlorobenzene		M	2790	mg/kg	0.50		< 0.50			< 0.50		
Naphthalene		M	2790	mg/kg	0.50		< 0.50			< 0.50		
4-Chloroaniline		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Hexachlorobutadiene		M	2790	mg/kg	0.50		< 0.50			< 0.50		
4-Chloro-3-Methylphenol		N	2790	mg/kg	0.50		< 0.50			< 0.50		
2-Methylnaphthalene		M	2790	mg/kg	0.50		< 0.50			< 0.50		
4-Nitrophenol		N	2790	mg/kg	0.50		< 0.50			< 0.50		
2,4,6-Trichlorophenol		N	2790	mg/kg	0.50		< 0.50			< 0.50		
2,4,5-Trichlorophenol		N	2790	mg/kg	0.50		< 0.50			< 0.50		
2-Chloronaphthalene		M	2790	mg/kg	0.50		< 0.50			< 0.50		
2-Nitroaniline		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Acenaphthylene		M	2790	mg/kg	0.50		< 0.50			< 0.50		
Dimethylphthalate		M	2790	mg/kg	0.50		< 0.50			< 0.50		
2,6-Dinitrotoluene		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Acenaphthene		M	2790	mg/kg	0.50		< 0.50			1.3		
3-Nitroaniline		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Dibenzofuran		M	2790	mg/kg	0.50		< 0.50			< 0.50		
4-Chlorophenylphenylether		M	2790	mg/kg	0.50		< 0.50			< 0.50		
2,4-Dinitrotoluene		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Fluorene		M	2790	mg/kg	0.50		< 0.50			0.70		
Diethyl Phthalate		M	2790	mg/kg	0.50		< 0.50			< 0.50		
4-Nitroaniline		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Azobenzene		M	2790	mg/kg	0.50		< 0.50			< 0.50		
4-Bromophenylphenyl Ether		M	2790	mg/kg	0.50		< 0.50			< 0.50		
Hexachlorobenzene		M	2790	mg/kg	0.50		< 0.50			< 0.50		
Phenanthrene		M	2790	mg/kg	0.50		< 0.50			13		
Anthracene		M	2790	mg/kg	0.50		< 0.50			4.3		
Carbazole		M	2790	mg/kg	0.50		< 0.50			< 0.50		
Di-N-Butyl Phthalate		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Fluoranthene		M	2790	mg/kg	0.50		< 0.50			30		
Pyrene		M	2790	mg/kg	0.50		< 0.50			30		

Results - Soil

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited				**Chemtest Job No.:**		25-20582	25-20582	25-20582	25-20582	25-20582	25-20582	25-20582
Quotation No.: Q25-38722				**Chemtest Sample ID.:**		1989631	1989634	1989635	1989638	1989639	1989640	1989642
				Client Reference:		*WS106*	*WS101*	*WS101*	*WS103*	*W1S04*	*WS104*	*WS105*
				Sample Type:		*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
				Top Depth (m):		*0.50*	*1.00*	*0.70*	*0.20*	*0.20*	*0.70*	*0.50*
				Bottom Depth (m):		*0.60*	*1.10*	*0.80*	*0.30*	*0.30*	*0.90*	*0.60*
				Date Sampled:		*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*
				Asbestos Lab:		DURHAM		DURHAM	DURHAM		DURHAM	DURHAM
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**							
Butylbenzyl Phthalate		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Benzo[a]anthracene		M	2790	mg/kg	0.50		< 0.50			14		
Chrysene		M	2790	mg/kg	0.50		< 0.50			13		
Bis(2-Ethylhexyl)Phthalate		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Di-N-Octyl Phthalate		N	2790	mg/kg	0.50		< 0.50			< 0.50		
Benzo[b]fluoranthene		M	2790	mg/kg	0.50		< 0.50			16		
Benzo[k]fluoranthene		M	2790	mg/kg	0.50		< 0.50			5.6		
Benzo[a]pyrene		M	2790	mg/kg	0.50		< 0.50			14		
Indeno(1,2,3-c,d)Pyrene		N	2790	mg/kg	0.50		< 0.50			7.2		
Dibenz(a,h)Anthracene		N	2790	mg/kg	0.50		< 0.50			2.0		
Benzo[g,h,i]perylene		M	2790	mg/kg	0.50		< 0.50			8.0		
SVOC TIC		N	2790	mg/kg	N/A		None Detected			None Detected		
VOC TIC		N	2760	µg/kg	N/A		None Detected			None Detected		

Results - Soil

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited				**Chemtest Job No.:**		25-20582	25-20582
Quotation No.: Q25-38722				**Chemtest Sample ID.:**		1989643	1989645
				Client Reference:		*WS102*	*WS102*
				Sample Type:		*SOIL*	*SOIL*
				Top Depth (m):		*0.60*	*0.30*
				Bottom Depth (m):		*0.70*	*0.45*
				Date Sampled:		*16-Jun-2025*	*16-Jun-2025*
				Asbestos Lab:		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**		
Arsenic		M	2455	mg/kg	0.5	7.1	
Cadmium		M	2455	mg/kg	0.10	0.66	
Chromium		M	2455	mg/kg	0.5	11	
Chromium (Trivalent)		N	2490	mg/kg	1.0	11	
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	
Copper		M	2455	mg/kg	0.50	11	
Lead		M	2455	mg/kg	0.50	57	
Mercury		M	2455	mg/kg	0.05	< 0.05	
Nickel		M	2455	mg/kg	0.50	12	
Selenium		M	2455	mg/kg	0.25	< 0.25	
Zinc		M	2455	mg/kg	0.50	81	
Acenaphthene		M	2700	mg/kg	0.10	< 0.10	
Acenaphthylene		M	2700	mg/kg	0.10	< 0.10	
Anthracene		M	2700	mg/kg	0.10	< 0.10	
Benzo[a]pyrene		M	2700	mg/kg	0.10	0.39	
Benzo[b]fluoranthene		M	2700	mg/kg	0.10	0.46	
Benzo[g,h,i]perylene		M	2700	mg/kg	0.10	0.33	
Benzo[k]fluoranthene		M	2700	mg/kg	0.10	0.15	
Chrysene		M	2700	mg/kg	0.10	0.36	
Dibenz(a,h)Anthracene		M	2700	mg/kg	0.10	< 0.10	
Fluoranthene		M	2700	mg/kg	0.10	0.49	
Fluorene		M	2700	mg/kg	0.10	< 0.10	
Indeno(1,2,3-c,d)Pyrene		M	2700	mg/kg	0.10	0.28	
Naphthalene		M	2700	mg/kg	0.10	< 0.10	
Phenanthrene		M	2700	mg/kg	0.10	< 0.10	
Pyrene		M	2700	mg/kg	0.10	0.59	
Total Of 16 PAH's		M	2700	mg/kg	2.0	3.3	
ACM Type		N	2192		N/A	-	
Asbestos Identification		U	2192		N/A	No Asbestos Detected	
Moisture		N	2030	%	0.020	21	17
Soil Colour		N	2030		N/A	Brown	Brown
Other Material		N	2030		N/A	Stones and	Stones and
Soil Texture		N	2030		N/A	Clay	Sand
Chromatogram (TPH)	EH_1D_Total	N			N/A	See Attached	
pH at 20C		M	2010		4.0	8.1	

Results - Soil

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited				**Chemtest Job No.:**		25-20582	25-20582
Quotation No.: Q25-38722				**Chemtest Sample ID.:**		1989643	1989645
				Client Reference:		*WS102*	*WS102*
				Sample Type:		*SOIL*	*SOIL*
				Top Depth (m):		*0.60*	*0.30*
				Bottom Depth (m):		*0.70*	*0.45*
				Date Sampled:		*16-Jun-2025*	*16-Jun-2025*
				Asbestos Lab:		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**		
Sulphate (2:1 Water Soluble) as SO4		M	2120	g/l	0.010	0.011	
Cyanide (Free)		M	2300	mg/kg	0.50	< 0.50	
Organic Matter		M	2625	%	0.40	1.2	
Total Organic Carbon		M	2625	%	0.20	0.71	
Total TPH >C6-C40	EH_1D_Total	U	2670	mg/kg	10	17	
Benzo[a]anthracene		M	2700	mg/kg	0.10	0.26	
Dichlorodifluoromethane		N	2760	µg/kg	1.0		< 1.0
Chloromethane		M	2760	µg/kg	1.0		< 1.0
Vinyl Chloride		M	2760	µg/kg	1.0		< 1.0
Bromomethane		M	2760	µg/kg	20		< 20
Chloroethane		U	2760	µg/kg	2.0		< 2.0
Trichlorofluoromethane		N	2760	µg/kg	1.0		< 1.0
1,1-Dichloroethene		M	2760	µg/kg	1.0		< 1.0
Trans 1,2-Dichloroethene		M	2760	µg/kg	1.0		< 1.0
1,1-Dichloroethane		M	2760	µg/kg	1.0		< 1.0
cis 1,2-Dichloroethene		M	2760	µg/kg	1.0		< 1.0
Bromochloromethane		U	2760	µg/kg	5.0		< 5.0
Trichloromethane		M	2760	µg/kg	1.0		< 1.0
1,1,1-Trichloroethane		M	2760	µg/kg	1.0		< 1.0
Tetrachloromethane		M	2760	µg/kg	1.0		< 1.0
1,1-Dichloropropene		U	2760	µg/kg	1.0		< 1.0
Benzene		M	2760	µg/kg	1.0		< 1.0
1,2-Dichloroethane		M	2760	µg/kg	2.0		< 2.0
Trichloroethene		N	2760	µg/kg	1.0		< 1.0
1,2-Dichloropropane		M	2760	µg/kg	1.0		< 1.0
Dibromomethane		M	2760	µg/kg	1.0		< 1.0
Bromodichloromethane		M	2760	µg/kg	5.0		< 5.0
cis-1,3-Dichloropropene		N	2760	µg/kg	10		< 10
Toluene		M	2760	µg/kg	1.0		< 1.0
Trans-1,3-Dichloropropene		N	2760	µg/kg	10		< 10
1,1,2-Trichloroethane		M	2760	µg/kg	10		< 10
Tetrachloroethene		M	2760	µg/kg	1.0		< 1.0
1,3-Dichloropropane		U	2760	µg/kg	2.0		< 2.0
Dibromochloromethane		U	2760	µg/kg	10		< 10
1,2-Dibromoethane		M	2760	µg/kg	5.0		< 5.0
Chlorobenzene		M	2760	µg/kg	1.0		< 1.0
1,1,1,2-Tetrachloroethane		M	2760	µg/kg	2.0		< 2.0

Results - Soil

Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited				**Chemtest Job No.:**		25-20582	25-20582
Quotation No.: Q25-38722				**Chemtest Sample ID.:**		1989643	1989645
				Client Reference:		*WS102*	*WS102*
				Sample Type:		*SOIL*	*SOIL*
				Top Depth (m):		*0.60*	*0.30*
				Bottom Depth (m):		*0.70*	*0.45*
				Date Sampled:		*16-Jun-2025*	*16-Jun-2025*
				Asbestos Lab:		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**		
Ethylbenzene		M	2760	µg/kg	1.0		< 1.0
m & p-Xylene		M	2760	µg/kg	1.0		< 1.0
o-Xylene		M	2760	µg/kg	1.0		< 1.0
Styrene		M	2760	µg/kg	1.0		< 1.0
Tribromomethane		U	2760	µg/kg	1.0		< 1.0
Isopropylbenzene		M	2760	µg/kg	1.0		< 1.0
Bromobenzene		M	2760	µg/kg	1.0		< 1.0
1,2,3-Trichloropropane		N	2760	µg/kg	50		< 50
N-Propylbenzene		U	2760	µg/kg	1.0		< 1.0
2-Chlorotoluene		M	2760	µg/kg	1.0		< 1.0
1,3,5-Trimethylbenzene		M	2760	µg/kg	1.0		< 1.0
4-Chlorotoluene		U	2760	µg/kg	1.0		< 1.0
Tert-Butylbenzene		U	2760	µg/kg	1.0		< 1.0
1,2,4-Trimethylbenzene		M	2760	µg/kg	1.0		< 1.0
Sec-Butylbenzene		U	2760	µg/kg	1.0		< 1.0
1,3-Dichlorobenzene		M	2760	µg/kg	1.0		< 1.0
4-Isopropyltoluene		U	2760	µg/kg	1.0		< 1.0
1,4-Dichlorobenzene		M	2760	µg/kg	1.0		< 1.0
N-Butylbenzene		U	2760	µg/kg	1.0		< 1.0
1,2-Dichlorobenzene		M	2760	µg/kg	1.0		< 1.0
1,2-Dibromo-3-Chloropropane		N	2760	µg/kg	50		< 50
1,2,4-Trichlorobenzene		M	2760	µg/kg	1.0		< 1.0
Hexachlorobutadiene		N	2760	µg/kg	1.0		< 1.0
1,2,3-Trichlorobenzene		U	2760	µg/kg	2.0		< 2.0
Methyl Tert-Butyl Ether		M	2760	µg/kg	1.0		< 1.0
N-Nitrosodimethylamine		M	2790	mg/kg	0.50		< 0.50
Phenol		M	2790	mg/kg	0.50		< 0.50
2-Chlorophenol		N	2790	mg/kg	0.50		< 0.50
Bis-(2-Chloroethyl)Ether		M	2790	mg/kg	0.50		< 0.50
1,3-Dichlorobenzene		M	2790	mg/kg	0.50		< 0.50
1,4-Dichlorobenzene		N	2790	mg/kg	0.50		< 0.50
1,2-Dichlorobenzene		M	2790	mg/kg	0.50		< 0.50
2-Methylphenol		M	2790	mg/kg	0.50		< 0.50
Bis(2-Chloroisopropyl)Ether		N	2790	mg/kg	0.50		< 0.50
Hexachloroethane		N	2790	mg/kg	0.50		< 0.50
N-Nitrosodi-n-propylamine		M	2790	mg/kg	0.50		< 0.50
4-Methylphenol		M	2790	mg/kg	0.50		< 0.50

Results - Soil

Project: 250509 Proposed Drive Through

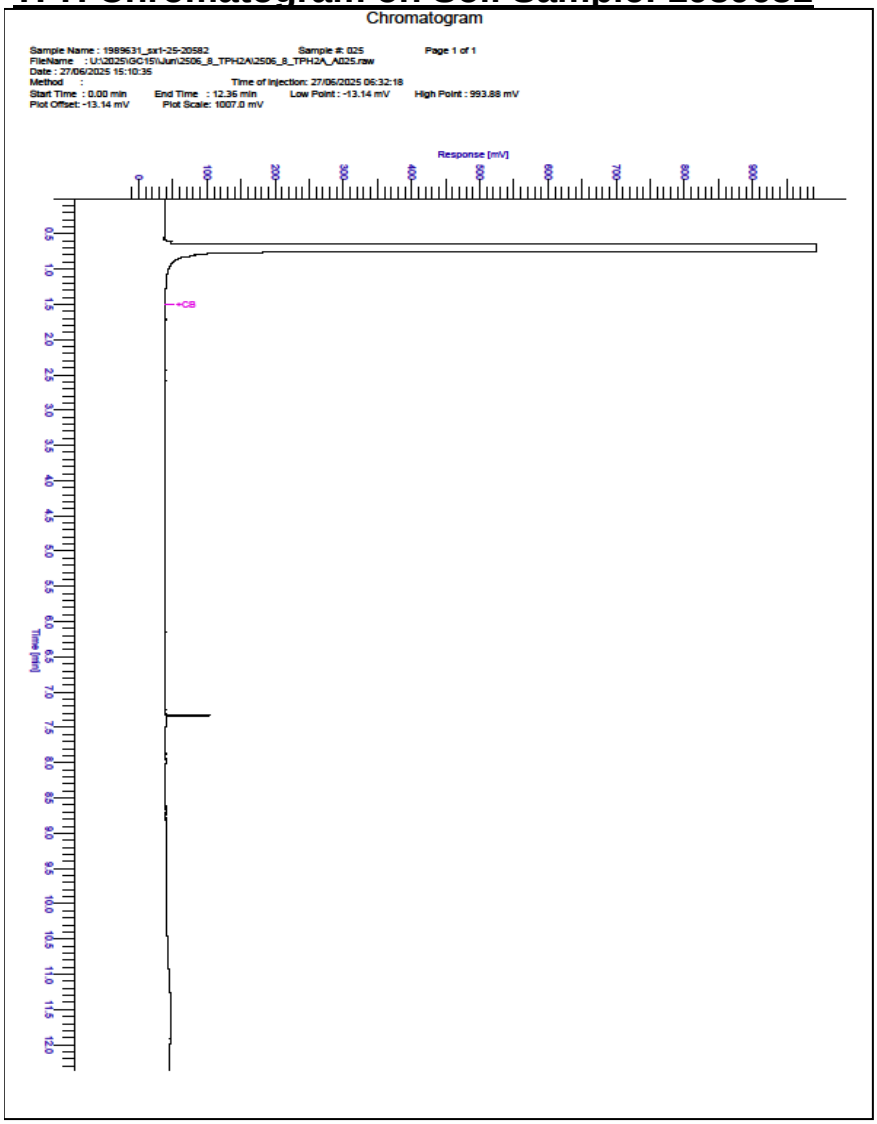
Client: Roberts Environmental Limited				**Chemtest Job No.:**		25-20582	25-20582
Quotation No.: Q25-38722				**Chemtest Sample ID.:**		1989643	1989645
				Client Reference:		*WS102*	*WS102*
				Sample Type:		*SOIL*	*SOIL*
				Top Depth (m):		*0.60*	*0.30*
				Bottom Depth (m):		*0.70*	*0.45*
				Date Sampled:		*16-Jun-2025*	*16-Jun-2025*
				Asbestos Lab:		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**		
Nitrobenzene		N	2790	mg/kg	0.50		< 0.50
Isophorone		M	2790	mg/kg	0.50		< 0.50
2-Nitrophenol		N	2790	mg/kg	0.50		< 0.50
2,4-Dimethylphenol		N	2790	mg/kg	0.50		< 0.50
Bis(2-Chloroethoxy)Methane		M	2790	mg/kg	0.50		< 0.50
2,4-Dichlorophenol		N	2790	mg/kg	0.50		< 0.50
1,2,4-Trichlorobenzene		M	2790	mg/kg	0.50		< 0.50
Naphthalene		M	2790	mg/kg	0.50		< 0.50
4-Chloroaniline		N	2790	mg/kg	0.50		< 0.50
Hexachlorobutadiene		M	2790	mg/kg	0.50		< 0.50
4-Chloro-3-Methylphenol		N	2790	mg/kg	0.50		< 0.50
2-Methylnaphthalene		M	2790	mg/kg	0.50		< 0.50
4-Nitrophenol		N	2790	mg/kg	0.50		< 0.50
2,4,6-Trichlorophenol		N	2790	mg/kg	0.50		< 0.50
2,4,5-Trichlorophenol		N	2790	mg/kg	0.50		< 0.50
2-Chloronaphthalene		M	2790	mg/kg	0.50		< 0.50
2-Nitroaniline		N	2790	mg/kg	0.50		< 0.50
Acenaphthylene		M	2790	mg/kg	0.50		< 0.50
Dimethylphthalate		M	2790	mg/kg	0.50		< 0.50
2,6-Dinitrotoluene		N	2790	mg/kg	0.50		< 0.50
Acenaphthene		M	2790	mg/kg	0.50		< 0.50
3-Nitroaniline		N	2790	mg/kg	0.50		< 0.50
Dibenzofuran		M	2790	mg/kg	0.50		< 0.50
4-Chlorophenylphenylether		M	2790	mg/kg	0.50		< 0.50
2,4-Dinitrotoluene		N	2790	mg/kg	0.50		< 0.50
Fluorene		M	2790	mg/kg	0.50		< 0.50
Diethyl Phthalate		M	2790	mg/kg	0.50		< 0.50
4-Nitroaniline		N	2790	mg/kg	0.50		< 0.50
Azobenzene		M	2790	mg/kg	0.50		< 0.50
4-Bromophenylphenyl Ether		M	2790	mg/kg	0.50		< 0.50
Hexachlorobenzene		M	2790	mg/kg	0.50		< 0.50
Phenanthrene		M	2790	mg/kg	0.50		< 0.50
Anthracene		M	2790	mg/kg	0.50		< 0.50
Carbazole		M	2790	mg/kg	0.50		< 0.50
Di-N-Butyl Phthalate		N	2790	mg/kg	0.50		< 0.50
Fluoranthene		M	2790	mg/kg	0.50		< 0.50
Pyrene		M	2790	mg/kg	0.50		< 0.50

Results - Soil

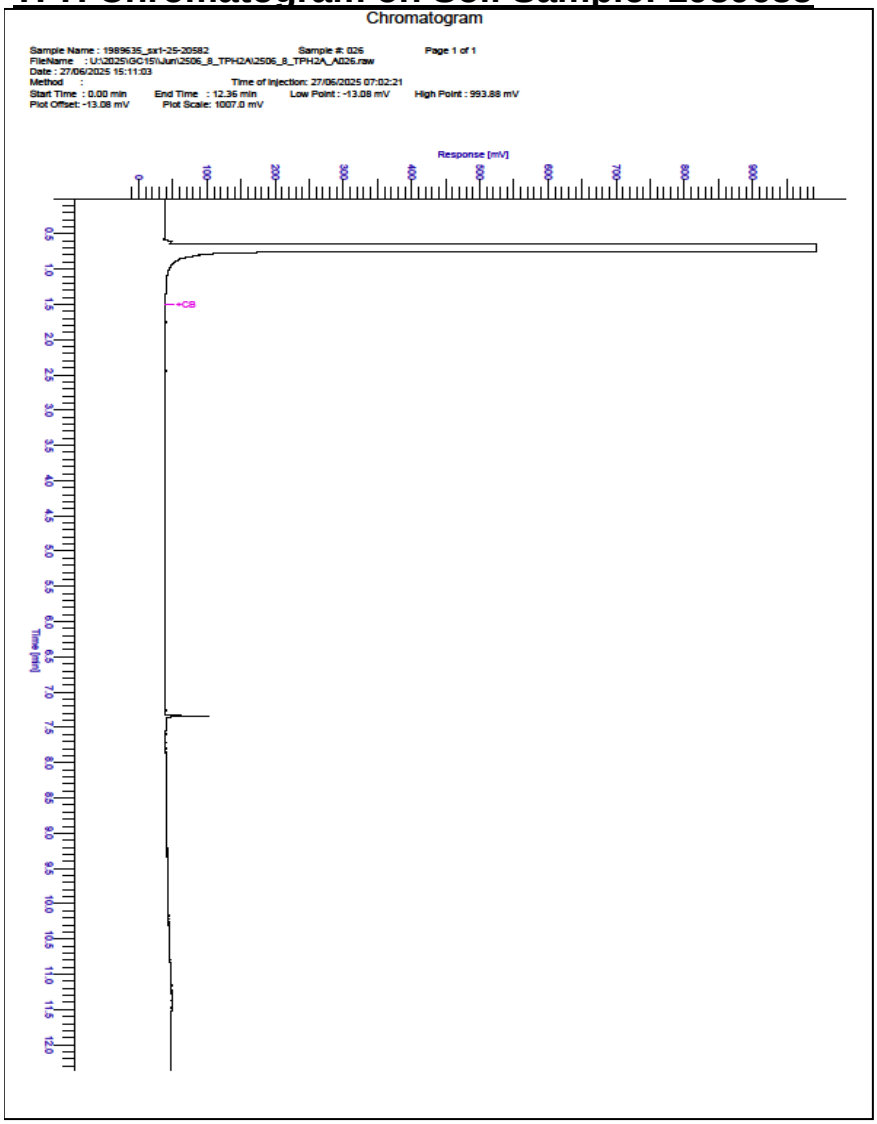
Project: 250509 Proposed Drive Through

Client: Roberts Environmental Limited				**Chemtest Job No.:**		25-20582	25-20582
Quotation No.: Q25-38722				**Chemtest Sample ID.:**		1989643	1989645
				Client Reference:		*WS102*	*WS102*
				Sample Type:		*SOIL*	*SOIL*
				Top Depth (m):		*0.60*	*0.30*
				Bottom Depth (m):		*0.70*	*0.45*
				Date Sampled:		*16-Jun-2025*	*16-Jun-2025*
				Asbestos Lab:		DURHAM	
Determinand	**HWOL Code**	**Accred.**	**SOP**	**Units**	**LOD**		
Butylbenzyl Phthalate		N	2790	mg/kg	0.50		< 0.50
Benzo[a]anthracene		M	2790	mg/kg	0.50		< 0.50
Chrysene		M	2790	mg/kg	0.50		< 0.50
Bis(2-Ethylhexyl)Phthalate		N	2790	mg/kg	0.50		< 0.50
Di-N-Octyl Phthalate		N	2790	mg/kg	0.50		< 0.50
Benzo[b]fluoranthene		M	2790	mg/kg	0.50		< 0.50
Benzo[k]fluoranthene		M	2790	mg/kg	0.50		< 0.50
Benzo[a]pyrene		M	2790	mg/kg	0.50		< 0.50
Indeno(1,2,3-c,d)Pyrene		N	2790	mg/kg	0.50		< 0.50
Dibenz(a,h)Anthracene		N	2790	mg/kg	0.50		< 0.50
Benzo[g,h,i]perylene		M	2790	mg/kg	0.50		< 0.50
SVOC TIC		N	2790	mg/kg	N/A		None Detected
VOC TIC		N	2760	µg/kg	N/A		None Detected

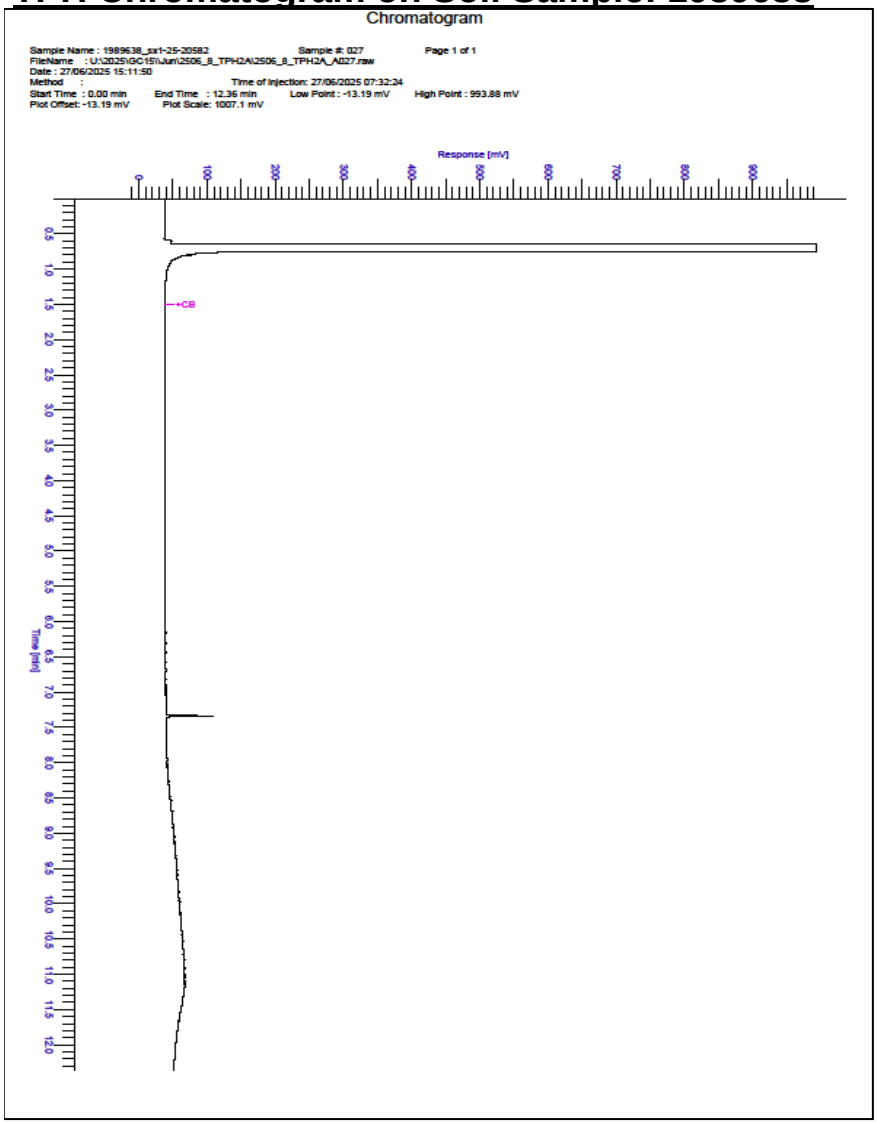
TPH Chromatogram on Soil Sample: 1989631



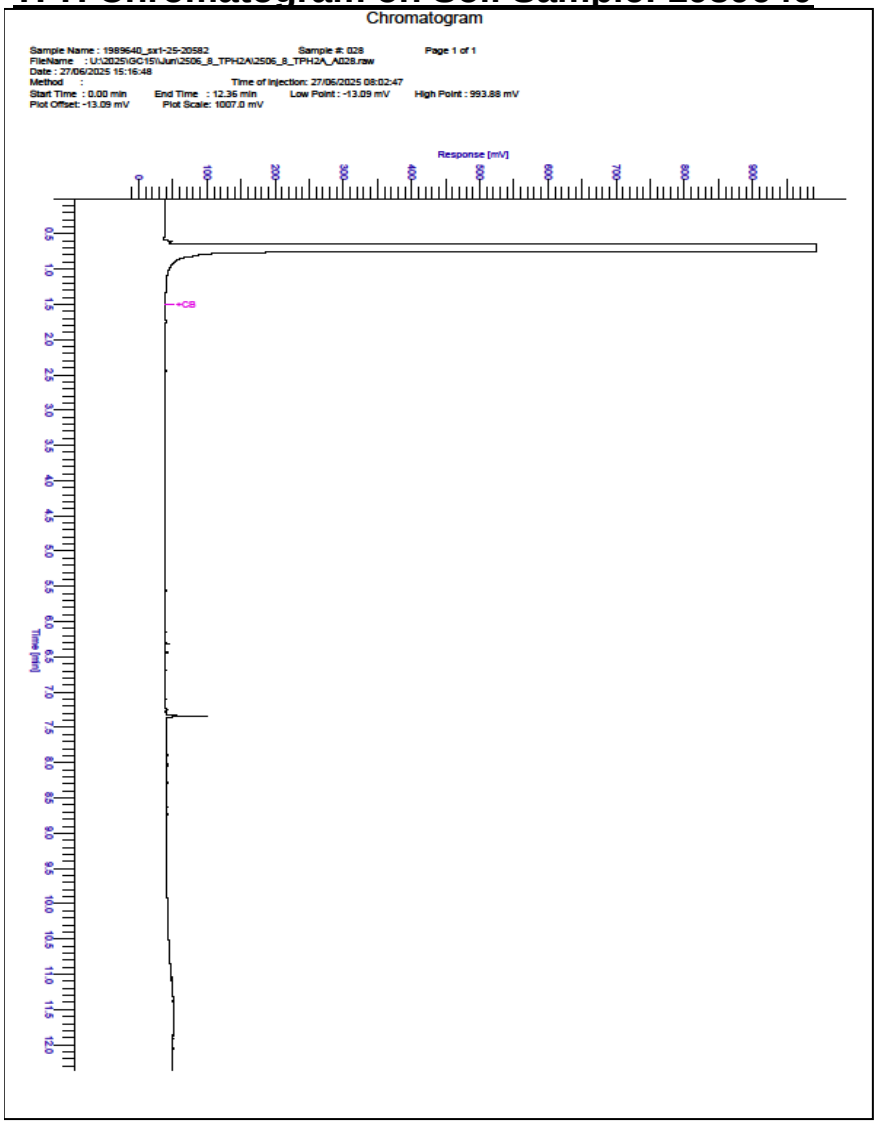
TPH Chromatogram on Soil Sample: 1989635



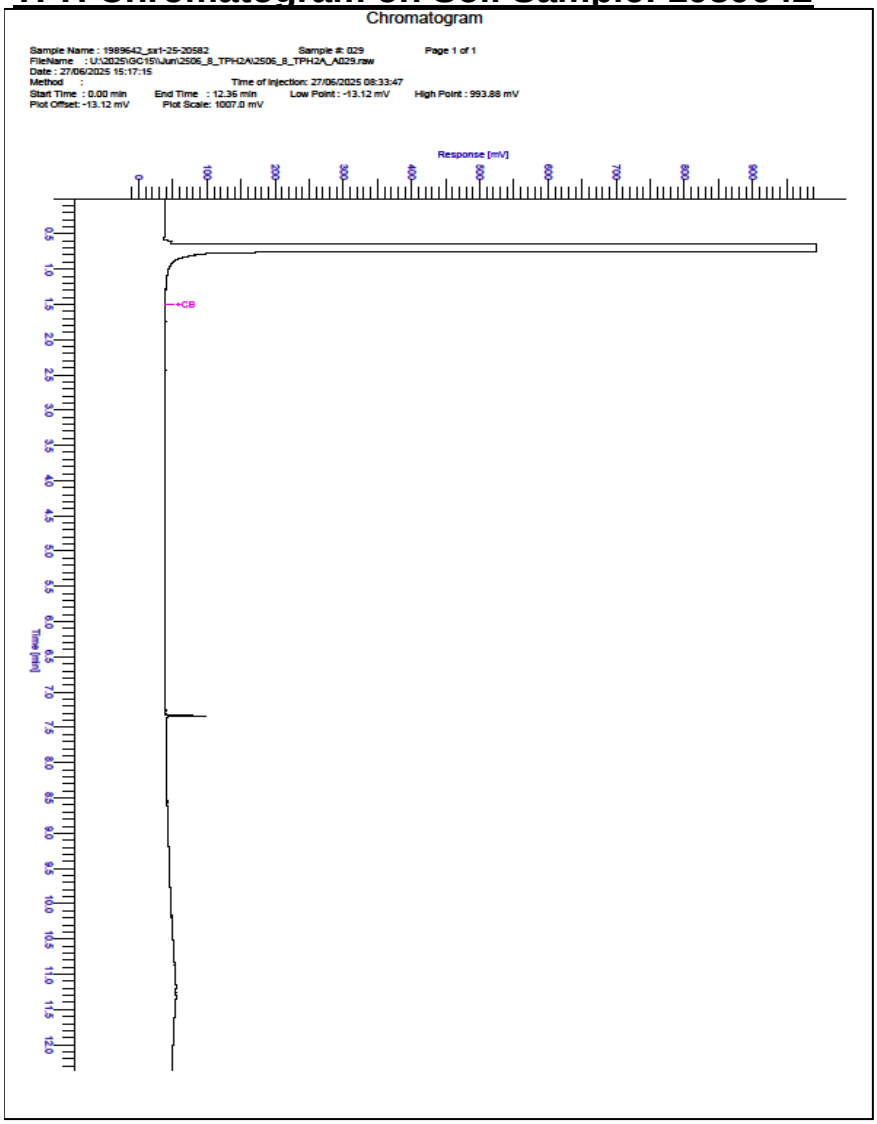
TPH Chromatogram on Soil Sample: 1989638



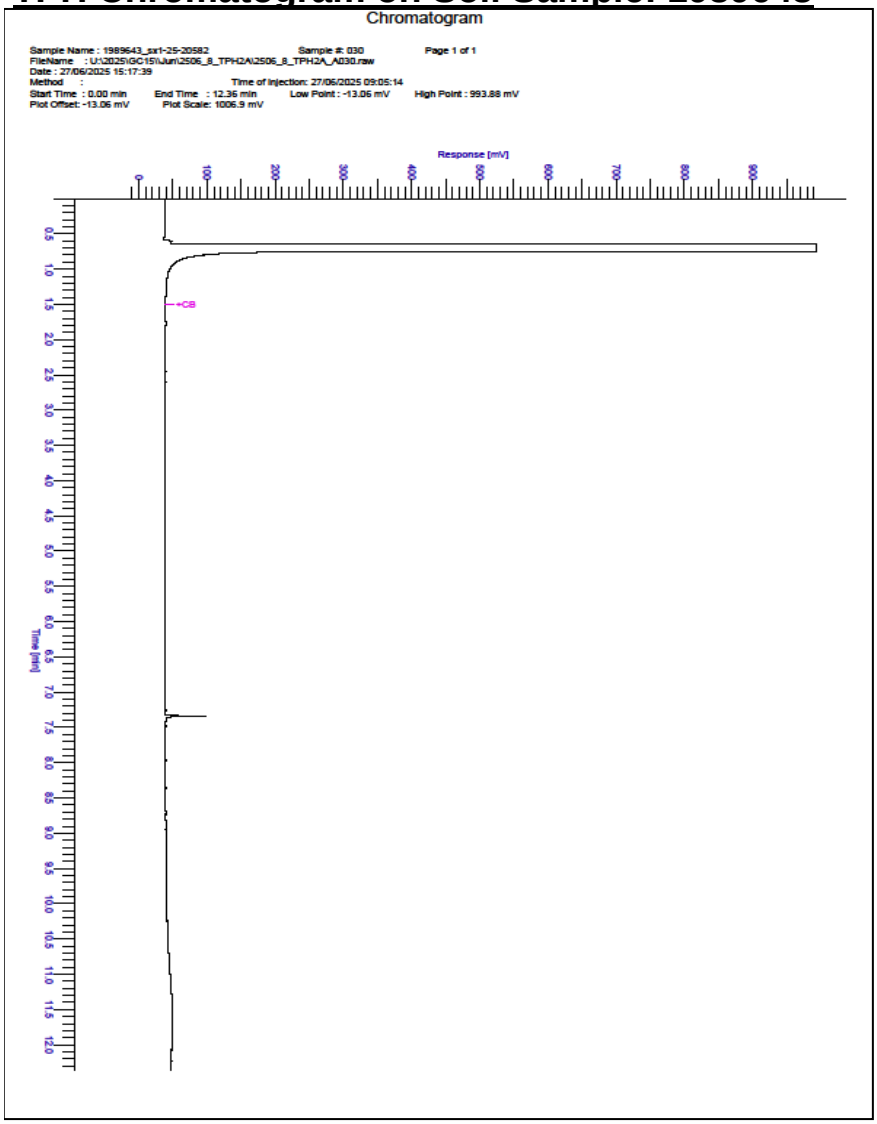
TPH Chromatogram on Soil Sample: 1989640



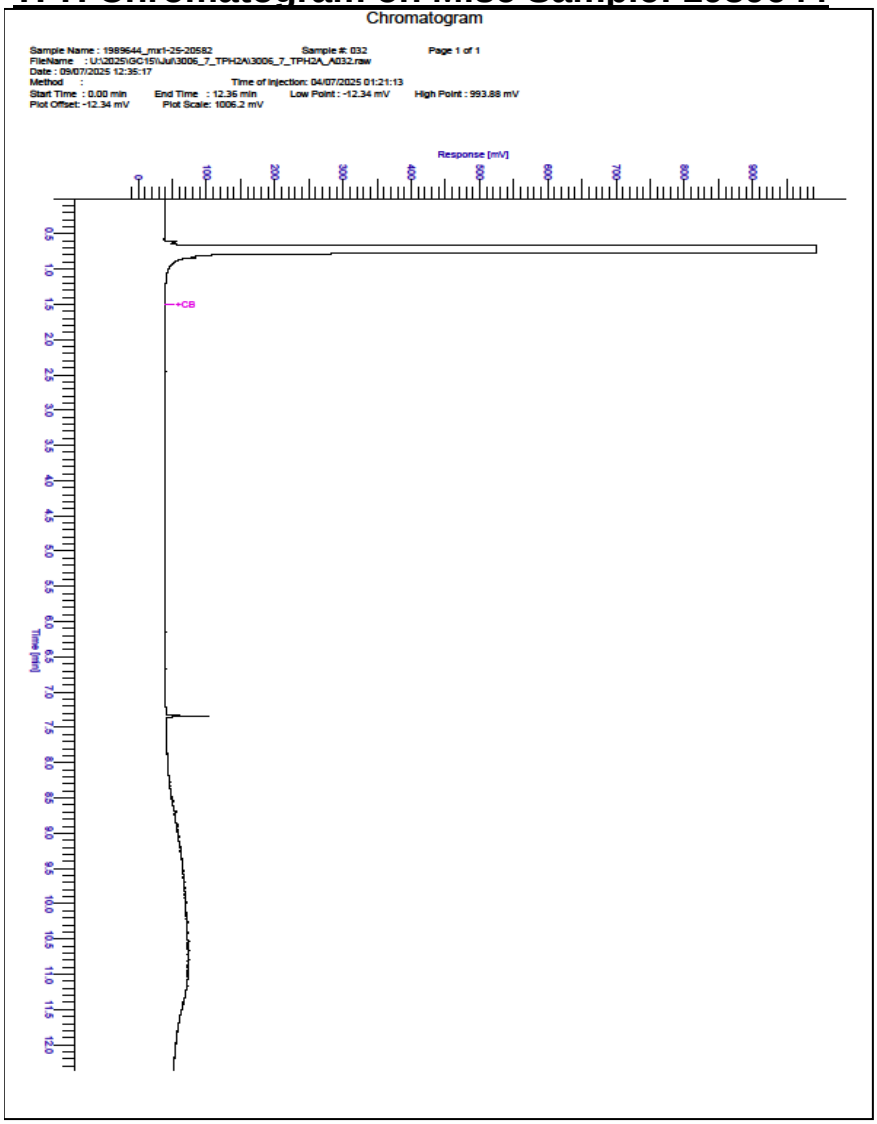
TPH Chromatogram on Soil Sample: 1989642



TPH Chromatogram on Soil Sample: 1989643



TPH Chromatogram on Misc Sample: 1989644



Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
1010	pH Value of Waters	pH at 20°C	pH Meter	RE PW TE TS PL DW GW
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.	RE PW PL LE DW GW
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.	
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).	RE PW PL SW DW GW
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection	PL GW
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)	GW PL
2010	pH Value of Soils	pH at 20°C	pH Meter	
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.	
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.	
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.	
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID	
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)	
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.	
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS	
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge	

Report Information

Key	
U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection
Text example	All items indicated in italic font represent customer-supplied information that may not be independently verified by the laboratory

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.

Any comments or interpretations are outside the scope of UKAS accreditation.

The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.

Uncertainty of measurement for the determinands tested are available upon request .

None of the results in this report have been recovery corrected.

All results are expressed on a dry weight basis.

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

For all other tests the samples were dried at ≤ 30°C prior to analysis.

All Asbestos testing is performed at the indicated laboratory .

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

NEW_ASB	Eurofins Chemtest Limited, 11 Depot Road, Newmarket, CB8 0AL
DURHAM	Eurofins Chemtest Limited, Unit A North Wing, Prospect Business Park, Crookhall Lane, Consett, Co Durham, DH8 7PW

Sample Deviation Codes

As a result of any of the below deviations applying, the test results may be unreliable

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - The required amount of sample for analysis was not received

H - Appropriate cooling measures were not taken for sample transportation

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.

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

Charges may apply to extended sample storage.

Report Information

Water Sample Category Key for Accreditation

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable
PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

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
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

Asbestos Tests LOD = LOQ

Limit of Detection = Limit of Quantification for asbestos results only

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

APPENDIX IV RESULTS OF ANALYTICAL ASSESSMENT AND HAZARDOUS WASTE REPORTS

ROBERTS ENVIRONMENTAL LTD	**Job No:**	250509					Below Assessment Criteria
	Site Name:	Downlands Retail Park, Worthing					
	Client:	Worthing Retail Ltd					Same as Assessment Criteria
	Most Sensitive Receptor:	Drinking Water Abstraction					Above Assessment Criteria
	Sample Reference:	*WS106*	*WS101*	*WS104*			Below Limit of Detection
	Top Depth:	*0.20*	*0.20*	*1.10*			
	Bottom Depth:	*0.30*	*0.30*	*1.20*			
	Date:	*16-Jun-2025*	*16-Jun-2025*	*16-Jun-2025*			
	Deposit Type:	Made Ground	Made Ground	Natural	**Units**	**Maximum Concentration**	**Assessment Criteria**	**Source**
Standard Analyes - Inorganics and pH								
pH	9.3	9.2	8.6		Unitless	9.3	6 to 9	EA EQS
Sulphate	1.5	< 1.0	< 1.0		mg/l	1.5	250	WHO GDWQ
Cyanide (Free)	< 0.050	< 0.050	< 0.050		mg/l	0	500	WHO GDWQ
Arsenic	1.2	0.85	2.1		µg/l	2.1	10	WHO GDWQ
Boron	< 10	< 10	< 10		µg/l	0	2400	WHO GDWQ
Cadmium	< 0.11	< 0.11	< 0.11		µg/l	0	3	WHO GDWQ
Copper	0.68	0.60	2.9		µg/l	2.9	2000	WHO GDWQ
Mercury	< 0.05	< 0.05	< 0.05		µg/l	0	6	WHO GDWQ
Nickel	< 0.50	< 0.50	< 0.50		µg/l	0	70	WHO GDWQ
Lead	< 0.50	< 0.50	1.8		µg/l	1.8	10	WHO GDWQ
Selenium	< 0.50	< 0.50	< 0.50		µg/l	0	40	WHO GDWQ
Zinc	4.1	7.1	4.9		µg/l	7.1	3000	WHO GDWQ
Chromium (Total)	< 0.50	< 0.50	< 0.50		µg/l	0	50	WHO GDWQ
Standard Analytes - TPH Banded								
TPH >C5-C6	< 0.10	< 0.10	< 0.10		µg/l	0	10	WHO 2008
TPH >C6-C7	< 0.10	< 0.10	< 0.10		µg/l	0	10	WHO 2008
TPH >C7-C8	< 0.10	< 0.10	< 0.10		µg/l	0	700	WHO 2008
TPH >C8-C10	< 0.10	< 0.10	< 0.10		µg/l	0	300	WHO 2008
TPH >C10-C12	< 0.10	< 0.10	< 0.10		µg/l	0	90	WHO 2008
TPH >C12-C16	< 0.10	< 0.10	< 0.10		µg/l	0	90	WHO 2008
TPH >C16-C21	< 0.10	< 0.10	< 0.10		µg/l	0	90	WHO 2008
TPH >C21-C35	< 0.10	< 0.10	< 0.10		µg/l	0	90	WHO 2008
TPH >C35-C44	< 0.10	< 0.10	< 0.10		µg/l	0	N/A	N/A
Total TPH >C5-C44	< 10	< 10	< 10		µg/l	0	N/A	N/A
Standard Analytes - PAHs								
Naphthalene	< 0.10	< 0.10	< 0.10		µg/l	0	700	USEPA DWEL
Acenaphthylene	< 0.10	< 0.10	< 0.10		µg/l	0	N/A	N/A
Acenaphthene	< 0.10	< 0.10	< 0.10		µg/l	0	2000	USEPA DWEL
Fluorene	< 0.10	< 0.10	< 0.10		µg/l	0	1000	USEPA DWEL
Phenanthrene	< 0.10	< 0.10	< 0.10		µg/l	0	N/A	N/A
Anthracene	< 0.10	< 0.10	< 0.10		µg/l	0	10000	USEPA DWEL
Fluoranthene	< 0.10	< 0.10	< 0.10		µg/l	0	4	WHO GDWQ
Pyrene	< 0.10	< 0.10	< 0.10		µg/l	0	N/A	N/A
Benzo[a]anthracene	< 0.10	< 0.10	< 0.10		µg/l	0	N/A	N/A
Chrysene	< 0.10	< 0.10	< 0.10		µg/l	0	N/A	N/A
Benzo[b]fluoranthene	< 0.10	< 0.10	< 0.10		µg/l	0	N/A	N/A
Benzo[k]fluoranthene	< 0.10	< 0.10	< 0.10		µg/l	0	N/A	N/A
Benzo[a]pyrene	< 0.10	< 0.10	< 0.10		µg/l	0	0.7	WHO GDWQ
Indeno(1,2,3-c,d)Pyrene	< 0.10	< 0.10	< 0.10		µg/l	0	N/A	N/A
Dibenz(a,h)Anthracene	< 0.10	< 0.10	< 0.10		µg/l	0	N/A	N/A
Benzo[g,h,i]perylene	< 0.10	< 0.10	< 0.10		µg/l	0	N/A	N/A
Sum of PAHs	0	0	0		µg/l	0	0.1	EU WFD

Sources:		
	EA EQS	Environment Agency (EA) Environmental Quality Standards
	USEPA WQC	US Environmental Protection Agency (USEPA) Water Quality Criteria
	WHO GDWQ	World Health Organisation (WHO) Guidelines for Drinking Water Quality
	WHO 2008	WHO Petroleum Products in Drinking-water, 2008
	USEPA NHGWS	USEPA NH Ambient Groundwater Quality Standards
	EU WFD	European Union Water Framework Directive
	USEPA DWEL	USEPA Drinking Water Equivalent Level
	USEPA NPDWR	USEPA National Primary Drinking Water Regulations
	USEPA LHA	USEPA Lifetime Health Advisories
	USEPA MAGWS	USEPA MA Method 1 GW-3 (Groundwater which has the potential to migrate to su

ROBERTS ENVIRONMENTAL LTD	**Job No:**	250509							Below Assessment Criteria			
	Site Name:	Downlands Retail Park, Worthing							Same as Assessment Criteria			
	Client:	Worthing Retail Ltd							Above Assessment Criteria			
									Below Limit of Detection			
	nd Use Scenar	Commercial						**LQM S4ULs**	Suitable 4 Use Levels			
Sample Reference:	WS106	WS101	WS103	WS104	WS105	WS102		**ATRISKSOIL**	Atkins - Soil Screening Values			
Top Depth:	0.50	0.70	0.20	0.70	0.50	0.60		**EIC/AGS/CLAIRE**	Generic Assessment Criteria			
Bottom Depth:	0.60	0.80	0.30	0.90	0.60	0.70		**CLAIRE interim C4SLs**	Category 4 Screening Levels			
Date:	16-Jun-2025	16-Jun-2025	16-Jun-2025	16-Jun-2025	16-Jun-2025	16-Jun-2025			**Assessment Criteria**			
Deposit Type	Made Ground	Made Ground	Made Ground	Natural	Made Ground	Made Ground	**Units**	**Maximum Concentration**	**1% SOM**	**2.5% SOM**	**6% SOM**	**Source**
Standard Analytes - Inorganics												
pH	7.8	9.3	9.6	8.0	9.0	8.1	-	9.6	N/A	N/A	N/A	N/A
Sulphate (2:1 Water Soluble) as SO4	< 0.010	0.11	0.52	< 0.010	0.45	0.011	g/L	0.52	N/A	N/A	N/A	N/A
Cyanide (Free)	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	mg/kg	0	34	34	34	ATRISKSOIL
Organic Matter	0.90	0.64	0.83	2.9	0.95	1.2	%	2.9	N/A	N/A	N/A	N/A
Total Organic Carbon	0.52	0.37	0.48	1.7	0.55	0.71	%	1.7	N/A	N/A	N/A	N/A
Actual SOM Calculation (TOC /0.58)	0.896551724	0.63793103	0.82758621	2.93103448	0.94827586	1.22413793	%	2.931034483	N/A	N/A	N/A	N/A
SELECT SOM (%)	1	1	1	6	1	2.5			N/A	N/A	N/A	N/A
Standard Analytes - Metals												
Arsenic	9.9	6.7	6.5	10	5.1	7.1	mg/kg	10	635	635	635	LQM S4ULs
Cadmium	0.94	0.18	0.20	0.86	< 0.10	0.66	mg/kg	0.94	190	190	190	LQM S4ULs
Chromium (Total)	30	13	10	24	8.0	11	mg/kg	30	N/A	N/A	N/A	N/A
Chromium III	30	13	9.9	24	7.9	11	mg/kg	30	8600	8600	8600	LQM S4ULs
Chromium VI	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	mg/kg	0	33	33	33	LQM S4ULs
Copper	28	7.8	10	46	4.2	11	mg/kg	46	68000	68000	68000	LQM S4ULs
Lead	17	20	33	120	22	57	mg/kg	120	2300	2300	2300	LQM S4ULs
Mercury (Elemental Hg)	0.07	< 0.05	0.08	0.26	0.05	< 0.05	mg/kg	0.26	320	320	320	LQM S4ULs
Nickel	32	12	8.6	20	5.1	12	mg/kg	32	980	980	980	LQM S4ULs
Selenium	0.66	< 0.25	< 0.25	0.43	< 0.25	< 0.25	mg/kg	0.66	12000	12000	12000	LQM S4ULs
Zinc	66	50	89	130	33	81	mg/kg	130	730000	730000	730000	LQM S4ULs
Standard Analytes - PAHs												
Acenaphthene	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	mg/kg	0	84000	97000	100000	LQM S4ULs
Acenaphthylene	< 0.10	< 0.10	< 0.10	0.12	0.11	< 0.10	mg/kg	0.12	83000	97000	100000	LQM S4ULs
Anthracene	< 0.10	< 0.10	< 0.10	0.31	< 0.10	< 0.10	mg/kg	0.31	520000	540000	540000	LQM S4ULs
Benzo[a]anthracene	< 0.10	< 0.10	0.37	1.8	< 0.10	0.26	mg/kg	1.8	170	170	180	LQM S4ULs
Benzo[a]pyrene	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	mg/kg	0	35	35	36	LQM S4ULs
Benzo[b]fluoranthene	< 0.10	< 0.10	< 0.10	0.12	0.11	< 0.10	mg/kg	0.12	44	44	45	LQM S4ULs
Benzo[ghi]perylene	< 0.10	< 0.10	< 0.10	0.31	< 0.10	< 0.10	mg/kg	0.31	3900	4000	4000	LQM S4ULs
Benzo[k]fluoranthene	< 0.10	< 0.10	0.13	2.3	< 0.10	0.39	mg/kg	2.3	1200	1200	1200	LQM S4ULs
Chrysene	< 0.10	< 0.10	0.37	2.7	< 0.10	0.46	mg/kg	2.7	350	350	350	LQM S4ULs
Dibenz[ah]anthracene	< 0.10	< 0.10	0.53	1.6	< 0.10	0.33	mg/kg	1.6	3.5	3.6	3.6	LQM S4ULs
Fluoranthene	< 0.10	< 0.10	0.71	1.1	< 0.10	0.15	mg/kg	1.1	23000	23000	23000	LQM S4ULs
Fluorene	< 0.10	< 0.10	0.43	2.3	< 0.10	0.36	mg/kg	2.3	63000	68000	71000	LQM S4ULs
Indeno[123-cd]pyrene	< 0.10	< 0.10	0.29	0.42	< 0.10	< 0.10	mg/kg	0.42	500	510	510	LQM S4ULs
Napthalene	< 0.10	< 0.10	0.37	3.1	0.32	0.49	mg/kg	3.1	190	460	1100	LQM S4ULs
Phenanthrene	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	mg/kg	0	22000	22000	23000	LQM S4ULs
Pyrene	< 0.10	< 0.10	0.16	1.5	< 0.10	0.28	mg/kg	1.5	54000	54000	54000	LQM S4ULs
Standard Analytes - TPH Total Only												
TPH Total >C6-C40	<10	<10	880	81	150	17	mg/kg	880	2000	4800	11000	Lowest of LQM S4ULs
Standard Analytes - Asbestos												
Asbestos	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	-		N/A	N/A	N/A	N/A

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

1D53D-AD0RD-GPDX4

This Waste Classification Report contains user defined substances. See Appendix A for details.

Report is invalid if pages are removed.

Job name

250509

Description/Comments

Project

Site

Classified by

Name:
Andrew Cuthbert
Date:
24 Jul 2025 13:39 GMT
Telephone:
0191 230 4521

Company:
Roberts Environmental Ltd
1 Croft Stairs
Newcastle upon Tyne
NE1 2HG

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: -

Course	Date
Hazardous Waste Classification	-

Purpose of classification

2 - Material Characterisation

Address of the waste

Proposed Drive Through, Downlands Retail Park, Worthing **Post Code** BN14 9FB

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Development

Description of the specific process, sub-process and/or activity that created the waste

Excavation of soils

Description of the waste

Made Ground and natural deposits

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS106	0.50	Non Hazardous		3
2	WS101	0.70	Non Hazardous		5
3	WS103	0.20	Non Hazardous		7
4	WS104	0.70	Non Hazardous		10
5	WS105	0.50	Non Hazardous		13
6	WS102	0.60	Non Hazardous		16

Related documents

#	Name	Description
1	Roberts Environmental 2022	waste stream template used to create this Job

Report

Created by: Andrew Cuthbert

Created date: 24 Jul 2025 13:39 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	19
Appendix B: Rationale for selection of metal species	20
Appendix C: Version	21

Classification of sample: WS106

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS106
Sample Depth:
0.50 m
Moisture content:
23%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 23% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		9.9 mg/kg		9.9 mg/kg	0.00099 %		
2	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.94 mg/kg		0.94 mg/kg	0.000094 %		
3	Chromium Total					30 mg/kg		30 mg/kg	0.003 %		
4	chromium in Cr(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		30 mg/kg	1.462	43.847 mg/kg	0.00438 %		
5	chromium in Cr(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<**LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		28 mg/kg	1.126	31.525 mg/kg	0.00315 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	17 mg/kg	1.56	26.517 mg/kg	0.0017 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.07 mg/kg	1.353	0.0947 mg/kg	0.00000947 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		32 mg/kg	2.976	95.24 mg/kg	0.00952 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.66 mg/kg	1.405	0.927 mg/kg	0.0000927 %		
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		66 mg/kg	2.774	183.094 mg/kg	0.0183 %		
12	pH			PH		7.8 pH		7.8 pH	7.8 pH		
13	Sulphate (2:1 water soluble)					<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
15		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
16		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
17		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
18		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
19		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
20		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
21		benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
22		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
23		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
25		fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
26		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
27		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
28		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
29		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
30		pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
31		TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
											Total:	0.0413 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Determinand defined by classifier (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS101

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS101
Sample Depth:
0.70 m
Moisture content:
16%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 16% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		6.7 mg/kg		6.7 mg/kg	0.00067 %		
2	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.18 mg/kg		0.18 mg/kg	0.000018 %		
3	Chromium Total					13 mg/kg		13 mg/kg	0.0013 %		
4	chromium in Cr(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		13 mg/kg	1.462	19 mg/kg	0.0019 %		
5	chromium in Cr(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<**LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		7.8 mg/kg	1.126	8.782 mg/kg	0.000878 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	20 mg/kg	1.56	31.196 mg/kg	0.002 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		12 mg/kg	2.976	35.715 mg/kg	0.00357 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.25 mg/kg	1.405	<0.351 mg/kg	<0.0000351 %		<**LOD**
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		50 mg/kg	2.774	138.707 mg/kg	0.0139 %		
12	pH			PH		9.3 pH		9.3 pH	9.3 pH		
13	Sulphate (2:1 water soluble)					0.11 mg/kg		0.11 mg/kg	0.000011 %		

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
15		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
16		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
17		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
18		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
19		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
20		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
21		benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
22		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
23		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
25		fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
26		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
27		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
28		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
29		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
30		pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
31		TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
											Total:	0.0242 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Determinand defined by classifier (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS103

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS103
Sample Depth:
0.20 m
Moisture content:
20%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		6.5 mg/kg		6.5 mg/kg	0.00065 %		
2	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.2 mg/kg		0.2 mg/kg	0.00002 %		
3	Chromium Total					10 mg/kg		10 mg/kg	0.001 %		
4	chromium in Cr(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		9.9 mg/kg	1.462	14.469 mg/kg	0.00145 %		
5	chromium in Cr(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<**LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		10 mg/kg	1.126	11.259 mg/kg	0.00113 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	33 mg/kg	1.56	51.474 mg/kg	0.0033 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.08 mg/kg	1.353	0.108 mg/kg	0.0000108 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		8.6 mg/kg	2.976	25.596 mg/kg	0.00256 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.25 mg/kg	1.405	<0.351 mg/kg	<0.0000351 %		<**LOD**
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		89 mg/kg	2.774	246.899 mg/kg	0.0247 %		
12	pH			PH		9.6 pH		9.6 pH	9.6 pH		
13	Sulphate (2:1 water soluble)					0.52 mg/kg		0.52 mg/kg	0.000052 %		

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
15		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
16		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
17		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
18		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.37	mg/kg		0.37	mg/kg	0.000037 %		
19		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.13	mg/kg		0.13	mg/kg	0.000013 %		
20		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.37	mg/kg		0.37	mg/kg	0.000037 %		
21		benzo[ghi]perylene		205-883-8	191-24-2		0.53	mg/kg		0.53	mg/kg	0.000053 %		
22		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.71	mg/kg		0.71	mg/kg	0.000071 %		
23		chrysene	601-048-00-0	205-923-4	218-01-9		0.43	mg/kg		0.43	mg/kg	0.000043 %		
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.29	mg/kg		0.29	mg/kg	0.000029 %		
25		fluoranthene		205-912-4	206-44-0		0.37	mg/kg		0.37	mg/kg	0.000037 %		
26		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
27		indeno[123-cd]pyrene		205-893-2	193-39-5		0.16	mg/kg		0.16	mg/kg	0.000016 %		
28		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
29		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
30		pyrene		204-927-3	129-00-0		0.47	mg/kg		0.47	mg/kg	0.000047 %		
31		TPH (C6 to C40) petroleum group			TPH		880	mg/kg		880	mg/kg	0.088 %		
											Total:	0.123 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Determinand defined by classifier (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 2000 mg/kg (0.2%) because: Not a Liquid

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group (conc.: 0.088%)

Classification of sample: WS104

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS104
Sample Depth:
0.70 m
Moisture content:
16%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 16% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		10 mg/kg		10 mg/kg	0.001 %		
2	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.86 mg/kg		0.86 mg/kg	0.000086 %		
3	Chromium Total					24 mg/kg		24 mg/kg	0.0024 %		
4	chromium in Cr(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		24 mg/kg	1.462	35.077 mg/kg	0.00351 %		
5	chromium in Cr(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<**LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		46 mg/kg	1.126	51.791 mg/kg	0.00518 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	120 mg/kg	1.56	187.178 mg/kg	0.012 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.26 mg/kg	1.353	0.352 mg/kg	0.0000352 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		20 mg/kg	2.976	59.525 mg/kg	0.00595 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.43 mg/kg	1.405	0.604 mg/kg	0.0000604 %		
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		130 mg/kg	2.774	360.639 mg/kg	0.0361 %		
12	pH			PH		8 pH		8 pH	8pH		
13	Sulphate (2:1 water soluble)					<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
15		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
16		acenaphthylene		205-917-1	208-96-8		0.12	mg/kg		0.12	mg/kg	0.000012 %		
17		anthracene		204-371-1	120-12-7		0.31	mg/kg		0.31	mg/kg	0.000031 %		
18		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.8	mg/kg		1.8	mg/kg	0.00018 %		
19		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		2.3	mg/kg		2.3	mg/kg	0.00023 %		
20		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		2.7	mg/kg		2.7	mg/kg	0.00027 %		
21		benzo[ghi]perylene		205-883-8	191-24-2		1.6	mg/kg		1.6	mg/kg	0.00016 %		
22		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		1.1	mg/kg		1.1	mg/kg	0.00011 %		
23		chrysene	601-048-00-0	205-923-4	218-01-9		2.3	mg/kg		2.3	mg/kg	0.00023 %		
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.42	mg/kg		0.42	mg/kg	0.000042 %		
25		fluoranthene		205-912-4	206-44-0		3.1	mg/kg		3.1	mg/kg	0.00031 %		
26		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
27		indeno[123-cd]pyrene		205-893-2	193-39-5		1.5	mg/kg		1.5	mg/kg	0.00015 %		
28		naphthalene	601-052-00-2	202-049-5	91-20-3		0.22	mg/kg		0.22	mg/kg	0.000022 %		
29		phenanthrene		201-581-5	85-01-8		1	mg/kg		1	mg/kg	0.0001 %		
30		pyrene		204-927-3	129-00-0		3.3	mg/kg		3.3	mg/kg	0.00033 %		
31		TPH (C6 to C40) petroleum group			TPH		81	mg/kg		81	mg/kg	0.0081 %		
											Total:	0.0766 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Determinand defined by classifier (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 2000 mg/kg (0.2%) because: Not a Liquid

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group (conc.: 0.0081%)

Classification of sample: WS105

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS105
Sample Depth:
0.50 m
Moisture content:
16%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 16% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		5.1 mg/kg		5.1 mg/kg	0.00051 %		
2	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
3	Chromium Total					8 mg/kg		8 mg/kg	0.0008 %		
4	chromium in Cr(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		7.9 mg/kg	1.462	11.546 mg/kg	0.00115 %		
5	chromium in Cr(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<**LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		4.2 mg/kg	1.126	4.729 mg/kg	0.000473 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	22 mg/kg	1.56	34.316 mg/kg	0.0022 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.05 mg/kg	1.353	0.0677 mg/kg	0.00000677 %		
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		5.1 mg/kg	2.976	15.179 mg/kg	0.00152 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.25 mg/kg	1.405	<0.351 mg/kg	<0.0000351 %		<**LOD**
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		33 mg/kg	2.774	91.547 mg/kg	0.00915 %		
12	pH			PH		9 pH		9 pH	9pH		
13	Sulphate (2:1 water soluble)					0.45 mg/kg		0.45 mg/kg	0.000045 %		

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<**LOD**
15		acenaphthene		201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
16		acenaphthylene		205-917-1	208-96-8		0.11 mg/kg		0.11 mg/kg	0.000011 %		
17		anthracene		204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
18		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
19		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
20		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
21		benzo[ghi]perylene		205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
22		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
23		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
25		fluoranthene		205-912-4	206-44-0		0.32 mg/kg		0.32 mg/kg	0.000032 %		
26		fluorene		201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
27		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
28		naphthalene	601-052-00-2	202-049-5	91-20-3		0.13 mg/kg		0.13 mg/kg	0.000013 %		
29		phenanthrene		201-581-5	85-01-8		0.12 mg/kg		0.12 mg/kg	0.000012 %		
30		pyrene		204-927-3	129-00-0		0.58 mg/kg		0.58 mg/kg	0.000058 %		
31		TPH (C6 to C40) petroleum group			TPH		150 mg/kg		150 mg/kg	0.015 %		
									Total:	0.031 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Determinand defined by classifier (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 2000 mg/kg (0.2%) because: Not a Liquid

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group (conc.: 0.015%)

Classification of sample: WS102

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:
WS102
Sample Depth:
0.60 m
Moisture content:
21%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 21% No Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		7.1 mg/kg		7.1 mg/kg	0.00071 %		
2	cadmium { cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex }	048-001-00-5			1	0.66 mg/kg		0.66 mg/kg	0.000066 %		
3	Chromium Total					11 mg/kg		11 mg/kg	0.0011 %		
4	chromium in Cr(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		11 mg/kg	1.462	16.077 mg/kg	0.00161 %		
5	chromium in Cr(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<**LOD**
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		11 mg/kg	1.126	12.385 mg/kg	0.00124 %		
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	57 mg/kg	1.56	88.909 mg/kg	0.0057 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
9	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		12 mg/kg	2.976	35.715 mg/kg	0.00357 %		
10	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<0.25 mg/kg	1.405	<0.351 mg/kg	<0.0000351 %		<**LOD**
11	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		81 mg/kg	2.774	224.706 mg/kg	0.0225 %		
12	pH			PH		8.1 pH		8.1 pH	8.1 pH		
13	Sulphate (2:1 water soluble)					0.011 mg/kg		0.011 mg/kg	0.0000011 %		

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<**LOD**
15		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
16		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
17		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
18		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.26	mg/kg		0.26	mg/kg	0.000026 %		
19		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.39	mg/kg		0.39	mg/kg	0.000039 %		
20		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.46	mg/kg		0.46	mg/kg	0.000046 %		
21		benzo[ghi]perylene		205-883-8	191-24-2		0.33	mg/kg		0.33	mg/kg	0.000033 %		
22		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.15	mg/kg		0.15	mg/kg	0.000015 %		
23		chrysene	601-048-00-0	205-923-4	218-01-9		0.36	mg/kg		0.36	mg/kg	0.000036 %		
24		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
25		fluoranthene		205-912-4	206-44-0		0.49	mg/kg		0.49	mg/kg	0.000049 %		
26		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
27		indeno[123-cd]pyrene		205-893-2	193-39-5		0.28	mg/kg		0.28	mg/kg	0.000028 %		
28		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
29		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
30		pyrene		204-927-3	129-00-0		0.59	mg/kg		0.59	mg/kg	0.000059 %		
31		TPH (C6 to C40) petroleum group			TPH		17	mg/kg		17	mg/kg	0.0017 %		
											Total:	0.0385 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Determinand defined by classifier (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 2000 mg/kg (0.2%) because: Not a Liquid

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group (conc.: 0.0017%)

Appendix A: Classifier defined and non GB MCL determinands

arsenic (EC Number: 231-148-6, CAS Number: 7440-38-2)

GB MCL index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex

GB MCL index number: 048-001-00-5
Description/Comments: Worst Case: IARC considers cadmium compounds Group 1; Carcinogenic to humans
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

Chromium Total

Description/Comments:
Data source: N/A
Data source date: 25 Sep 2018
Hazard Statements: None.

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

Sulphate (2:1 water soluble)

Description/Comments:
Data source: N/A
Data source date: 25 Sep 2018
Hazard Statements: None.

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2; H351

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Unknown Oil

Hazard statements taken from WM3 1st Edition 2015
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

arsenic {arsenic}

Arsenic TOTAL

cadmium {cadmium compounds, with the exception of cadmium sulphoselenide (xCdS.yCdSe), reaction mass of cadmium sulphide with zinc sulphide (xCdS.yZnS), reaction mass of cadmium sulphide with mercury sulphide (xCdS.yHgS), and those specified elsewhere in this Annex}

Cadmium TOTAL

chromium in Cr(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in Cr(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide] (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2025.203.6718.12184 (22 Jul 2025)
HazWasteOnline Database: 2025.203.6718.12184 (22 Jul 2025)

This classification utilises the following guidance and legislation:
WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
GB MCL List - version 1.1 of 09 June 2021
GB MCL List v2.0 - version 2.0 of 20th October 2023
GB MCL List v3.0 - version 3.0 of 11th January 2024
GB MCL List v4.0 - version 4.0 of 2nd March 2024
GB MCL List v5.0 - version 5.0 of 26th June 2024
GB MCL List v6.0 - version 6.0 of 15th February 2025

APPENDIX V GROUND GAS MONITORING RESULTS

Site	Downlands Retail Park, Worthing					BH Depth	1.6		
Date	07.07.2025					Water Lvl	DRY		
Hole ID	WS101					Weth/°C	21 degrees, Sunny		
Tech	TC					Atm Press	1011		
Gas (%)	Time (seconds)							Flow Min (l/hr)	0
	10	20	30	60	120	180	Atm (%)		
O_2	20.10	19.30	19.30	19.20	19.20	19.10	na	Flow Max (l/hr)	0.88
CO_2	0.30	0.40	0.40	0.40	0.40	0.40	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	0.25
H_2S	-	-	-	-	-	-	na		
LEL	-	-	-	-	-	-	na	VOC	na

Site	Downlands Retail Park, Worthing					BH Depth	2.01		
Date	07.07.2025					Water Lvl	DRY		
Hole ID	WS102					Weth/°C	21 degrees, Sunny		
Tech	TC					Atm Press	1011		
Gas (%)	Time (seconds)							Flow Min (l/hr)	0
	10	20	30	60	120	180	Atm (%)		
O_2	18.60	17.90	17.90	17.90	17.80	17.80	na	Flow Max (l/hr)	0
CO_2	1.40	2.20	2.20	2.20	2.20	2.20	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	16.38
H_2S	-	-	-	-	-	-	na		
LEL	-	-	-	-	-	-	na	VOC	na

Site	Downlands Retail Park, Worthing					BH Depth	4.5		
Date	07.07.2025					Water Lvl	DRY		
Hole ID	WS106					Weth/°C	21 degrees, Sunny		
Tech	TC					Atm Press	1011		
Gas (%)	Time (seconds)							Flow Min (l/hr)	0
	10	20	30	60	120	180	Atm (%)		
O_2	20.20	19.80	19.70	19.70	19.70	19.70	na	Flow Max (l/hr)	1.5
CO_2	0.60	0.80	0.80	0.80	0.80	0.80	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	22.1
H_2S	-	-	-	-	-	-	na		
LEL	-	-	-	-	-	-	na	VOC	na

Site	Downlands Retail Park, Worthing					BH Depth	1.6		
Date	14.07.2025					Water Lvl	DRY		
Hole ID	WS101					Weth/°C	20 degrees, Sunny/Part Cloudy		
Tech	TC					Atm Press	1014		
Gas (%)	Time (seconds)							Flow Min (l/hr)	
	10	20	30	60	120	180	Atm (%)		0
O_2	19.7	19.4	19.4	19.3	19.2	19.2	na	Flow Max (l/hr)	
CO_2	0.4	0.6	0.6	0.6	0.6	0.6	na		0
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	
H_2S	-	-	-	-	-	-	na		28.4
LEL	-	-	-	-	-	-	na	VOC	na

Site	Downlands Retail Park, Worthing					BH Depth			
Date	14.07.2025					Water Lvl			
Hole ID	WS102					Weth/°C	20 degrees, Sunny/Part Cloudy		
Tech	TC					Atm Press	1014		
Gas (%)	Time (seconds)							Flow Min (l/hr)	
	10	20	30	60	120	180	Atm (%)		
O_2							na	Flow Max (l/hr)	
CO_2							na		
CH_4							na	Hole Press (mb)	
H_2S	-	-	-	-	-	-	na		
LEL	-	-	-	-	-	-	na	VOC	

Site	Downlands Retail Park, Worthing					BH Depth	4.50		
Date	14.07.2025					Water Lvl	DRY		
Hole ID	WS106					Weth/°C	20 degrees, Sunny/Part Cloudy		
Tech	TC					Atm Press	1014		
Gas (%)	Time (seconds)							Flow Min (l/hr)	
	10	20	30	60	120	180	Atm (%)		0
O_2	19.2	18.0	18.0	18.0	18.0	17.9	na	Flow Max (l/hr)	
CO_2	0.9	1.4	1.4	1.4	1.4	1.4	na		0
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	
H_2S	-	-	-	-	-	-	na		1.4
LEL	-	-	-	-	-	-	na	VOC	na

Site	Downlands Retail Park, Worthing					BH Depth	1.60		
Date	22.07.2025					Water Lvl	DRY		
Hole ID	WS101					Weth/°C	21 degrees, Sunny/Part Cloudy		
Tech	TC					Atm Press	1010		
Gas (%)	Time (seconds)							Flow Min (l/hr)	0
	10	20	30	60	120	180	Atm (%)		
O_2	19.4	18.3	18.2	18.2	18.2	18.2	na	Flow Max (l/hr)	10.1
CO_2	0.7	0.8	0.9	0.9	0.9	0.9	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	22.6
H_2S	-	-	-	-	-	-	na		
LEL	-	-	-	-	-	-	na	VOC	na

Site	Downlands Retail Park, Worthing					BH Depth	2.0		
Date	22.07.2025					Water Lvl	DRY		
Hole ID	WS102					Weth/°C	21 degrees, Sunny/Part Cloudy		
Tech	TC					Atm Press	1011		
Gas (%)	Time (seconds)							Flow Min (l/hr)	0
	10	20	30	60	120	180	Atm (%)		
O_2	18.2	16.8	16.7	16.7	16.7	16.7	na	Flow Max (l/hr)	0.26
CO_2	1.8	2.6	2.6	2.6	2.7	2.7	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	0
H_2S	-	-	-	-	-	-	na		
LEL	-	-	-	-	-	-	na	VOC	n/a

Site	Downlands Retail Park, Worthing					BH Depth	4.50		
Date	22.07.2025					Water Lvl	DRY		
Hole ID	WS106					Weth/°C	21 degrees, Sunny/Part Cloudy		
Tech	TC					Atm Press	1011		
Gas (%)	Time (seconds)							Flow Min (l/hr)	0
	10	20	30	60	120	180	Atm (%)		
O_2	19.1	18.0	17.9	17.8	17.8	17.8	na	Flow Max (l/hr)	0
CO_2	1.1	1.6	1.7	1.7	1.7	1.7	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	1.1
H_2S	-	-	-	-	-	-	na		
LEL	-	-	-	-	-	-	na	VOC	na

Site	Downlands Retail Park, Worthing					BH Depth	1.60		
Date	28.07.2025					Water Lvl	DRY		
Hole ID	WS101					Weth/°C	20 degrees, Mostly Cloudy		
Tech	TC					Atm Press	1018		
Gas (%)	Time (seconds)								
	10	20	30	60	120	180	Atm (%)	Flow Min (l/hr)	0
O_2	19.6	18.2	18.1	18.1	18.1	18.1	na	Flow Max (l/hr)	3.1
CO_2	0.7	0.8	0.8	0.8	0.8	0.8	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	1.6
H_2S	-	-	-	-	-	-	na		
LEL	-	-	-	-	-	-	na	VOC	na

Site	Downlands Retail Park, Worthing					BH Depth	2.0		
Date	28.07.2025					Water Lvl	DRY		
Hole ID	WS102					Weth/°C	20 degrees, Mostly Cloudy		
Tech	TC					Atm Press	1018		
Gas (%)	Time (seconds)								
	10	20	30	60	120	180	Atm (%)	Flow Min (l/hr)	0
O_2	19.0	17.6	17.4	17.4	17.4	17.4	na	Flow Max (l/hr)	0.31
CO_2	2.0	2.5	2.5	2.6	2.6	2.6	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	0
H_2S	-	-	-	-	-	-	na		
LEL	-	-	-	-	-	-	na	VOC	n/a

Site	Downlands Retail Park, Worthing					BH Depth	4.50		
Date	28.07.2025					Water Lvl	DRY		
Hole ID	WS106					Weth/°C	20 degrees, Mostly Cloudy		
Tech	TC					Atm Press	1018		
Gas (%)	Time (seconds)								
	10	20	30	60	120	180	Atm (%)	Flow Min (l/hr)	0
O_2	20.3	19.8	19.8	19.7	19.7	19.7	na	Flow Max (l/hr)	0
CO_2	0.7	0.8	0.8	0.8	0.8	0.8	na		
CH_4	0.00	0.00	0.00	0.00	0.00	0.00	na	Hole Press (mb)	2.1
H_2S	-	-	-	-	-	-	na		
LEL	-	-	-	-	-	-	na	VOC	Na

APPENDIX VI DEFINITIONS AND RESERVATIONS

For the avoidance of doubt, Roberts Environmental has prepared the following alphabetical list of definitions and reservations to aid the client in understanding the content of our advice and or written reports(s):

Accuracy	Level of agreement between true value and observed value.
ACM's	Asbestos Containing Materials
Conceptual Exposure model	Textual and or schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the base of the information form the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process. **Note 1:** The conceptual exposure model is initially derived from the information obtained by the preliminary investigation. This conceptual model is used to focus subsequent investigations, where these are considered to be necessary, in order to meet the objectives of the investigations and the risk assessment. The results of the field investigation can provide additional data that can be used to further refine the conceptual model.
Contamination	Presence of a substance which is in, on or under land, and which has the potential to cause significant harm or to cause significant pollution of controlled water. **Note 1:** There is no assumption in this definition that harm results from the presence of the contamination. **Note 2:** Naturally enhanced concentrations of harmful substances can fall within this definition of contamination. **Note 3:** Contamination may relate to soils, groundwater or ground gas.
Controlled water	Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three-mile limit of territorial waters. **Note 1:** See Section 104 of The Water Resources Act 1991.
Enquiries	Any enquiries undertaken by Roberts Environmental of local authorities and statutory undertakers are made verbally in respect of environmental issues. Local searches are not undertaken, and no responsibility is accepted for any inaccurate information provided.
Harm	It is further assumed unless otherwise stated that all necessary licences, permits etc. either run with the property or are transferable to a new occupier as appropriate. Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case humans, including property.
Hazard	Inherently dangerous quality of a substance, procedure or event.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
Precision	Level of agreement within a series of measurements of a parameter.
Receptor	Persons, living organisms, ecological systems, controlled water, atmosphere, structures and utilities that could be adversely affected by the contaminant(s).
Risk	Probability of the occurrence, magnitude and consequences of an unwanted adverse effect on a receptor.
Risk assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
Soil	Upper layer of the earth's crust composed of mineral parts, organic substance, water, air and living matter. **Note 1:** In accordance with BS 10175:2001 the term soil has the meaning ascribed to it through general use in civil engineering and includes topsoil and subsoil; deposits such as clays, silt, sand, gravel, cobbles, boulders and organic deposits such as peat; and material of natural or human origin (e.g. fills and deposited wastes). The term embraces

	all components of soil, including mineral matter, organic matter, soil gas and moisture, and living organisms.
Source	Location from which contamination is, or was, derived.
	Note 1: This could be the location of the highest soil or groundwater concentration of the contaminant(s).
Uncertainty	Parameter, associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurement.

Relevant Guidance and Policy documents.

Regulatory Regime Environmental Risk Assessment

REL's approach is compliant with the *National Planning Policy Framework* but in the absence of further detailed guidance we have continued to maintain an approach in accordance with *Planning Policy Statement 23: Annex 2*, "Development on Land Affected by Contamination", (Office of the Deputy Prime Minister, 2004) for robustness. Therefore, we have provided this desk-based assessment of the likelihood of the presence of land contamination, its nature and potential risk to the proposed development, and what further measures are required to ensure the site is 'suitable for use'. This report is provided as supporting environmental information to the planning application.

In order to assess the risks associated with the presence of ground contamination, the linkages between the sources and potential receptors need to be established and evaluated. This is in accordance with *Part 2A of the Environmental Protection Act (EPA) 1990*, which provides a statutory definition of Contaminated Land and as revised under *The Contaminated Land (England) (Amendment) Regulations 2012*. To fall within this definition it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that:

- Significant harm is being caused or there is a significant possibility of such harm being caused; or
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.
- Risk from contamination is assessed by consideration of possible linkages between contaminant sources and potential receptors which could be harmed or polluted, and the potential pathways between them. A contaminant linkage must exist in relation to particular land before the land can be considered potentially to be contaminated land under Part 2A, including evidence of the actual presence of contaminants.

Asbestos

In accordance with the *Control of Asbestos Regulations 2012*, owners, occupiers, managers and/or those who have responsibilities for premises have a legal duty to either manage the risk of asbestos or a duty to co-operate with whoever manages that risk.

Invasive Plant Species

The Wildlife and Countryside Act 1981 (as amended) is the principal legislation which regulates the release of non-native species. **Section 14(2)** prohibits the release of certain invasive non-native plants into the wild in Great Britain; it is an offence under **Section 14(2)** to "plant or otherwise cause to grow in the wild" any plants listed on **Part II of Schedule 9**. The most common plant species found on brownfield and urban sites include Japanese Knotweed, Giant Hogweed and Himalayan Balsam.

Conseptual Site Model Background

In order to assess the risks associated with the presence of ground contamination, the linkages between the sources and potential receptors need to be established and evaluated. This is in accordance with Part 2A of the Environmental Protection Act (EPA) 1990, which provides a statutory definition of Contaminated Land and as revised under The Contaminated Land (England) (Amendment) Regulations 2012. To fall within this definition, it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that:

- Significant harm is being caused or there is a significant possibility of such harm being caused; or
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.

Risk from contamination is assessed by consideration of possible linkages between contaminant sources and potential receptors which could be harmed or polluted, and the potential pathways between them. A contaminant linkage must exist in relation to particular land before the land can be considered potentially to be contaminated land under Part 2A, including evidence of the actual presence of contaminants.

Environmental risk assessment is a systematic, staged process, which generally comprises the following stages:

1. Formulation of a Conceptual Site Model.
2. Hazard identification.
3. Hazard assessment.
4. Risk estimation; and
5. Risk evaluation.

Risk Classification

In line with current UK guidance, the Environmental Assessment has been undertaken using a risk based approach, with the potential environmental risk assessed qualitatively using the 'source-pathway-receptor' scenario. In consideration of the information gathered an overall risk rating has been provided for the site based on the following definitions:

Very Low	Low	Low to Medium	Medium	Medium to High	High

Very Low/Low Risk

The site is considered suitable for present use and environmental setting. It is unlikely that any issues will arise as a liability/cost for the freehold owner of the site.

Medium Risk

The site may not be suitable for present use and environmental setting. Contaminants are probably or certainly present and are likely to have an unacceptable impact on the identified receptors. It is possible that the issue(s) could arise as a liability/cost for the freehold owner of the site. Further work is usually required to clarify the risk.

High Risk

The site is not suitable for present use and environmental setting. Contaminants are probably or certainly present and are very likely to have an unacceptable impact on the identified receptors. It is likely that the issue(s) will arise as a liability/cost for the freehold owner of the site. Further work is urgently needed.

Waste Acceptance Criteria (WAC)

The Waste Classification assesses the composition of the material and determines the concentrations of the 'Hazardous' substances in the material. The assessment of material (excavated soil) to determine whether it is 'Hazardous' waste is dependent on the presence of 'Hazardous Substances', as determined by WM3, exceeding particular thresholds.

The basic characterisation requires total soils concentrations (solid state) testing for potential contaminants based upon the site history. The characterisation also determines the most appropriate List of Waste (LoW) code(s) for the waste. *The List of Wastes (England) Regulations 2005* shows those wastes that are 'Absolute' entries (hazardous waste regardless of their concentration) and 'Mirror' entries (hazardous waste only if dangerous substances are present above threshold concentrations).

Non-Hazardous Waste does not normally require WAC analysis unless it is intended to dispose of materials to an Inert landfill.

It should be noted that certain hard surfacing materials, for example Tarmac, will fall into a separate waste stream if they require off-site removal, should coal-tar or other deleterious materials be found to be present within them. No coal tar analysis has been undertaken as part of this report.