GEOTECHNICS

BUILD ON CONFIDENCE

# Ground Investigation

# at

# Soldiers Point, Shoreham

Project No: PE241896

Client: JBA Consulting

Date: June 2024

## Factual Report




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## 1.0 INTRODUCTION

A geotechnical and geoenvironmental investigation was undertaken by Geotechnics Limited at Soldiers Point, Shoreham.

The investigation was carried out to the instructions of the Client, JBA Consulting. This report describes the work undertaken and presents the data obtained.

## 2.0 OBJECT AND SCOPE OF THE INVESTIGATION

The object of the investigation was to obtain information on the material properties of the beach deposits up to 1m depth to inform the design of remedial works to the existing rock revetment structure. It was also to assess the contamination status of the materials to determine the suitability of the material for disposal in the marine environment, in accordance with Marine Management Organisation (MMO) guidelines, through the characterisation of a standard set of physical and chemical determinands.

The Brief for the project is included in Appendix 1. The investigation comprised hand excavated inspection pits, laboratory testing and reporting.

An Unexploded Ordnance (UXO) Engineer with magnetometer was mobilised to scan for potentially hazardous ordnance within the vicinity of the pit locations prior to excavation.

## 3.0 PRESENTATION

A description of the site and a summary of the procedures followed during the investigation process are presented in Sections 4 to 6. The factual data obtained is presented in Appendices 3 to 6 of this report. Attention is drawn to the General Notes and Investigation Procedures presented in Appendix 7 to aid an understanding of the procedures followed and the context in which the report should be read.

In addition, the report is presented in electronic format in accordance with "The Electronic Transfer of Geotechnical Data from Ground Investigations" published by the AGS (the AGS Format) are presented separately as a digital file.

## 4.0 THE SITE

### 4.1 Location

The site is located on the River Adur estuary to the east of Shoreham Sailing Club, in Shoreham-by-Sea.

The approximate Ordnance Survey National Grid Reference for the centre of the site is TQ232048 and an extract from the relevant 1:50,000 Scale O.S. Map (Sheet No. 198) is included as Appendix 2.

### 4.2 Description

The site is located on the estuary beach of the River Adur, Soldier's Point, Shoreham. The sampling locations were sited at the base of the rock armour sea defences, located near the high water mark of the beach. The locations were decided by JBA Consulting to provide adequate information on the ground conditions at formation level of the existing revetment. The locations were evenly spaced along the beach to provide representative information across the area.

Photographs of the site taken during the fieldwork are presented in Appendix 5.

### 4.3 Site Geology

The British Geological Survey website, https://geologyviewer.bgs.ac.uk/, accessed on 29th April 2024, shows the site to be underlain by Spetisbury Chalk Member – sedimentary bedrock formed between 83.6 and 72.1 million years ago during the Cretaceous period.

Superficial sedimentary deposits are indicated to be present at this location comprising Beach and Tidal Flat Deposits – Clay, silt, sand and gravel – sedimentary superficial deposits formed between 2.588 million years ago and present during the Quaternary period.

### 4.4 Hydrogeology

Data obtained from Magic Map, https://magic.defra.gov.uk/, accessed on 29th April 2024, indicates that the bedrock geology is designated as a Secondary (A) aquifer. The superficial deposits are classified as a Secondary (A) aquifer.

The bedrock at this location has a medium-high vulnerability rating in respect of contamination risk.

## 5.0 PROCEDURE

### 5.1 Commissioning

The work was awarded following submission of a tender for a ground investigation of the site in accordance with the Client's requirements (see Appendix 1).

### 5.2 General

The procedures followed in this site investigation are based on BS 5930: 2015+A1:2020 – Code of Practice for Site Investigations and BS 10175:2011+A2:2017 – Investigation of Potentially Contaminated Sites. The soils encountered have been described in accordance with BS5930:2015+A1:2020, BS EN ISO 14688-1:2018. The sampling records are included in Appendix 4 and their approximate positions are shown on the Exploratory Hole Location Plan in Appendix 3.

Due to a moderate UXO risk identified in a UXO risk assessment disseminated to Geotechnics within the supporting information provided by the client, a survey by a UXO Engineer using a surface scanning magnetometer was commissioned which targeted proposed sampling locations – this was undertaken ahead of intrusive works in accordance with CIRIA guides C681 and C754, and *'Dealing with munitions in marine sediments'* published by The Crown Estate. The locations were also scanned for underground services using a CAT and Genny in accordance with guidance set out in HSG47 (Avoiding Danger from Underground Services).

The locations of all 6 no. pits were specified by the Engineer. Precise locations and levels were measured by Geotechnics using a Leica Geosystems GNSS/GPS survey device. The depths quoted on the exploratory hole records are in metres below ground level.

The works had to be co-ordinated around favourable tide states as the locations are submerged at high tide. An approximate 2-hour window was available around the time of low tide to carry out the sampling. The sampling type and

frequency was determined by the client's specification and the requirements of the laboratory testing. Upon recovery, samples were removed from the sampling area and placed inside coolboxes pending dispatch under chain of custody to the nominated UKAS accredited laboratories. Upon completion, the pits were reinstated prior to moving on to the next location.

### 5.3 Sampling

Between 24th and 25th April 2024, 6 no. pits (HP101-HP106) were excavated by hand at evenly spaced intervals to depths ranging from 0.7m to 0.9m below ground level. The locations were specified by the JBA Engineer and subject to the findings of a UXO survey. The pits measured approximately 0.3m by 0.3m and were progressed until refusal. Pit termination depths were decided based on ground stability during excavation and testing considerations with the agreement of the JBA Engineer in attendance. The pits were shored with a plastic bottomless 'bucket' to prevent collapse. Water seepages were recorded in all the pits at an approximate depth of 0.4m. Due to the low fines content of the stratum at depth and seawater ingress it was agreed that progression of the pits to the original specified depth (1.0m below ground level) was not required.

Samples were recovered for subsequent laboratory analysis at depths specified by the Client, which included ground level to 0.2m, 0.2m-0.5m, and 0.6m-0.9m (or base depth).

No visual or olfactory evidence of contamination was noted in any of the samples. However, some samples exhibited a slight organic odour indicative of decaying plant matter.

The hand pits typically encountered marine beach deposits consisting of sand or gravel with a low fines content.

All of the pits were backfilled with the excavated arisings and the site was reinstated, as far is practicable, to the same condition as found prior to the start of the works.

Photographs of all 6 no. pits are presented in Appendix 3.

## 6.0 LABORATORY TESTING

### 6.1 Contamination

The chain of custody was sent to JBA to complete with chosen testing requirements. Selected samples of soil were tested at the laboratories of ChemTest for a number of determinands in order to check on potential site contamination. The determinands were specified by the Client and are detailed on the results sheets in Appendix 5 together with the test result as well as the test method, accreditation and detection limit.

Four (4 no.) samples were tested for a general contamination suite including heavy metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Zn, pH, water soluble sulphate, total sulphur, organic matter, speciated EPH/VPH, speciated PAH (USPEA 16), Total Phenols, Total Cyanide and an asbestos screen with ID.

Waste Acceptance Criteria (WAC) analyses were carried out on 4 no. selected samples including tests on solid waste and two stage leaching tests on eluates. The determinands tested are detailed on the results sheets in Appendix 5.

In addition, 4 no. samples were sent to Socotec and analysed for an MMO suite to CEFAS accreditation which comprised heavy metals, organotins, PAHs, total hydrocarbon content, 25 polychlorinated biphenyls, polybrominated

diphenyl ethers and organochlorine pesticides. 2 no. samples were tested for particle size distribution. The results are presented in Appendix 5.

Signed for and on behalf of Geotechnics Limited.

Prepared by:

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**Engineer**

Reviewed by:

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**Principal Engineer**

# APPENDIX 1

## The Brief

# SPECIFICATION

The specification shall be the UK Specification for Ground Investigation, 3rd Edition published by ICE Publishing, with information, amendments and additions as described in the Schedules.

Schedule 1. Information and site-specific requirements

Schedule 2. Exploratory holes

Schedule 3. Investigation Supervisor's facilities

Schedule 4. Specification amendments

Schedule 5. Specification additions

# Schedule 1: Information and site-specific requirements

## S1.1 Name of Contract

Shoreham Solders Point Detailed Design (Ground Investigation).

## S1.2 Investigation Supervisor

Adam Noakes of JBA Consulting will be the Investigation Supervisor.

Office address: JBA Consulting

35 Perrymount Road, Haywards Heath

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The Investigation Supervisor shall appoint an assistant to supervise the ground investigation works on site. The name and contact details of that assistant will be advised prior to commencement of the investigation site works.

## S1.3 Description of site

The site is located within the mouth of the River Adur, close to Shoreham Sailing Club, West Sussex (postcode BN43 5HZ; OS grid reference TQ 23215 04824). The investigation area is shown bounded in yellow in Figure 1-1. Note this photo was taken at low tide. The yellow-bordered investigation area and much of the rock revetment is submerged at high tide.




Figure 1-1: Shoreham Solders Point: General area of investigation in yellow box (Note: Image taken at low tide)

A detailed Unexploded Ordnance (UXO) desk study and risk assessment identified a moderate risk of UXO hazards at the site.

### S1.4 Main works proposed and purpose of this contract

The purpose of the ground investigation is to provide samples of the beach material from near the toe of the existing rock revetment for use in contamination testing, in anticipation of remedial works to the rock revetment involving excavation below existing formation level.

### S1.5 Objectives and Scope of investigation

The objectives of the ground investigation are as detailed in S1.4 above.

The ground investigation will comprise:

- 6 No Hand dug trial pits (HP101-HP106) to a depth of 1m below ground level in beach deposits at evenly spaced intervals, as close to the toe of the existing rock revetment as is practicable and safe to do so without disturbing any of the existing rock armour blocks.
    - Environmental samples collected for subsequent laboratory chemical (contaminated land) analysis taken between ground level and 0.2m, 0.2m to 0.6m and 0.6m to 1m depth in each pit.

All works will be completed within an intertidal zone and will be completed under an MMO exemption (Ref. EXE/2024/00025). The works will need to coincide with a receding tidal window to ensure favourable tidal working conditions.

Full time supervision (minimum 5 yrs experience) of the investigation site works, to include logging of all exploratory holes to BS EN 5930:2015+A1:2020, taking pre & post investigation site photographs and the preparation and submission of preliminary logs of all exploratory holes to the Investigation Supervisor. All exploratory hole locations to be surveyed to OS Grid & level to better than 0.05m accuracy on position and elevation.

Except as otherwise agreed with the Investigation Supervisor, hand dug pits shall be backfilled with the excavated arisings.

The proposed exploratory hole locations are shown on the attached drawing, but all locations are subject to confirmation on site on commencement of the GI. All the proposed borehole locations are to be scanned with a CAT or CAT & Genny as appropriate prior to commencement.

The following documentation and laboratory testing are required from all exploratory holes. Laboratory testing will be scheduled by the Investigation Supervisor:

- Environmental laboratory testing
- A report presenting the Factual Report section of a Ground Investigation Report (GIR), in PDF format, in accordance with the relevant parts (relating to factual reporting) of BS EN 1997-1:2004+A1:2013, BS EN 5930:2015+A1:2020 and BS 10175:2011+A2:2017.
    - Digital data, in accordance with AGS 4.0.4 or higher, as a single combined .ags file.
    - Draft copies of the report and AGS data file to be submitted to the Investigation Supervisor within 1 week of the completion of laboratory testing, who shall approve the draft report (or instruct on any required revisions) within 2 weeks after receipt. Final copies of the report and AGS data file to be submitted within 1 week of the Investigation Supervisors approval / comments on the draft report.

## S1.6 Geology and ground conditions

The following general assessment of the geology of the site and ground conditions has been inferred from available information. No assurance is given to its accuracy.

The geology of the site and surrounding area has been derived from the 1:50,000 British Geological Survey (BGS) geology map sheet 2 318/333 Brighton and Worthing, 1:10,000 BGS geology map sheet, and from the BGS GeoIndex (Onshore) website.

The BGS GeoIndex indicates that the superficial deposits comprise Storm Beach Deposits (Sand and Gravel) and Beach and Tidal Flat Deposits (Clay, Silt, Sand and Gravel). The bedrock has been identified as the Tarrant Chalk Member.

## S1.7 Schedule of drawing(s) and documents

| Drawing / Document Ref | Description |
|---|---|
| **Contract documents for ground investigation** | |
| ISU-JBAU-XX-XX-DR-GT-1000 | Proposed Exploratory Hole Locations and Hazards and Constraints Plan |
| EXE/2024/00025 | MMO marine licence exemption notification |
| Shoreham Port Tides 2024.pdf | 2024 tide tables for Shoreham Port.<br>Tabulated levels for Shoreham Port relative to Chart Datum (CD). At Shoreham Port CD is 3.27m below Ordnance Datum (OD)<br>(i.e. 0mCD = -3.27mOD). |
| **Supporting Pre-Construction Information (PCI)** | |
| 424994 Shoreham Adur Full Utility Search.pdf | Apogee Property & Utility Consultants report 424994 utilities search |
| ISU-JBAU-XX-XX-RP-EN-0008-A3-C01-Contaminated_Land_Desk_Study.zip | JBA Phase 1 desk study (and appendices) for proposed revetment remediation works (includes discussion of historical GI and contamination information and a recent Envirocheck report) |
| 10785-RAM-XX-XX-CW-0005_extract.pdf | Extract from the Design Statement for proposed rock revetment remedial works showing summary of tidal levels and summary stratigraphy in historical boreholes CP101 and WB1-BH1, WB1-BH2. |

| Drawing / Document Ref | Description |
|---|---|
| 341293-SATW-Vol-3-App-11.1-Soils-and-GC-P3.pdf | Historical Phase 1 Desk Study for the existing revetment by Mott MacDonald. Key information is given on the following PDF file pages:<br>- p.25-30 – Contamination assessment for Reach 1 (the site), with summaries of testing and findings for historical holes CP101 and WB1-BH1<br>- p.121 – Drawing DC-ADUR-DD-GIW-0001 location plan for historical holes/tests CP101, WS07, WS07A, DP102, DP103, WB1-BH1 and WB1-BH2 |
| EES0592-R-01-00 UXO assessment.pdf | UXO assessment date February 2015. Site location included on plan in Appendix 005 Sheets 1 to 3. Moderate UXO risk indicated. |
| Fugro 2014 Borehole WB1-BH1 – SPT Summary.pdf | SPT results summary for historical borehole WB1-BH1 (carried out by Fugro in 2013) |
| Fugro 2014 Borehole WB1-BH1.pdf | Log for historical hole WB1-BH1 (carried out by Fugro in 2013) |
| Fugro 2014 Borehole WB1-BH2 – SPT Summary.pdf | SPT results summary for historical borehole WB1-BH2 (carried out by Fugro in 2013) |
| Fugro 2014 Borehole WB1-BH2.pdf | Log for historical hole WB1-BH2 (carried out by Fugro in 2013) |
| IMSO000648-TVO-XX-00-RP-GT-A1000 8-A5-0-A1000-EA5-LOD6-FUGRO West Bank _ Shoreham_Factual_GI_Report_Iss1 (WAL090074) (1) (1).pdf | Historical ground investigation report by Fugro made in 2010 including full information of historical holes/tests CP101, DP102 and DP103<br>- p.26 – CP101 borehole log<br>- p.81 – CP101 SPT result summary.<br>- p.96-97 DP102 and DP103 dynamic probe result summary<br>- p.234 onwards – CP101 soil contamination tests |
| WS07.pdf | Log for historical hole WS07 (carried out by Soil Mechanics in 2006) |
| WS07A.pdf | Log for historical hole WS07A (carried out by Soil Mechanics in 2006) |

## S1.8 General requirements (Specification Sections 3 and 4) - particular restrictions/relaxations

The Contractor for the ground investigation is to act as Principal Contractor under the Construction (Design and Management) Regulations 2015 (CDM 2015) and shall be appointed in writing by the Client. They shall prepare the Construction Phase Plan (CPP) and Risk Assessment Method Statement (RAMS) for the specified investigation activities, and manage the works. No other construction activities will be taking place at the site during the ground investigation. The CPP and RAMS are site-specific documents and shall be issued to the Principal Designer and Investigation Supervisor not less than 10 working days prior to the commencement of the ground investigation site works.

### S1.8.1 Data Management Plan (Clause 3.2)

A Data Management Plan shall be prepared by the Contractor in accordance with BS 8574:2014, ‘Code of practice for the management of geotechnical data for ground engineering projects,' and used throughout the project.

### S1.8.2 Quality management system (Clause 3.3)

All work shall be carried out in accordance with a quality management system(s) established in accordance with BS EN ISO 9001:2015, BS EN ISO 14001:2015 and BS OHSAS 18001:2007/BS ISO 45001:2018. Records to demonstrate compliance shall be made available to the Investigation Supervisor on request.

Chemical tests of samples should be carried by UKAS accredited laboratories.

### S1.8.3 Project management, supervision and execution personnel (Clauses 3.2, 4.4 and 4.5)

Full-time supervision by the Contractor is required. The Contractor shall provide suitably qualified personnel for the roles and activities detailed in this specification.

The Site Agent shall be in overall charge of the day-to-day running of the works and shall ensure that tasks detailed in the Specification, together with the health, safety and environmental requirements are fulfilled.

All site staff provided by the Contractor shall have skills, knowledge and experience relevant to their role and the activities they will undertake and will hold a valid competency card provided by the Construction Skills Certification Scheme (CSCS) or Mineral Products Qualifications Council (MPQC) or demonstrate equivalent competency for their required role. The Contractor shall provide CV's and evidence of competency for all the proposed works personnel to the Investigation Supervisor for approval at least 10 working days before the site work commences.

All Users of Electromagnetic Locating (EML) equipment such as the CAT and Genny and lightweight portable magnetometer are required to have successfully completion of Energy & Utility Skills Register (EUSR) or equivalent training as a minimum.

Anyone physically involved in hand digging must be given training in safe digging practices. The industry has the following course available - Energy & Utility Skills Register (EUSR) category 2 in safe digging practices.

### S1.8.4 Provision of ground practitioners and other personnel for technical support (Clauses 4.3.6, 4.4.7 and 4.5.4)

Staff required for access and enabling works, shall be included within the given Bill of Quantities items. The Contractor shall provide details of the roles and responsibilities, numbers and qualifications / competencies of such other personnel shall be provided to the Investigation Supervisor for approval at least 10 working days before site work commences.

### S1.8.5 Hazardous ground, land affected by contamination and notifiable and invasive weeds (Clauses 3.5.2 and 3.5.4)

A detailed UXO risk assessment indicates that the site has moderate UXO risk. All staff to be trained in UXO awareness, identification, and emergency management procedures. Hand dug pitting will be used exclusively as part of UXO risk minimisation. Pits to be scanned using a lightweight portable magnetometer prior to excavation and regularly during advancement. Reference should be made to CIRIA guides C681 and C754, and to 'Dealing with munitions in marine sediments' published by The Crown Estate.

Control measures for BDA category yellow sites are to be used. The Contractor will implement safe handling procedures for samples in accordance with the contaminants being tested for as set out in Schedules 1.23.3 and 1.23.5. Arisings are to be monitored for perceptible leachates, strong odours and asbestos. Public access working areas/arisings to be prevented with fencing and warning signage.

No invasive species have been identified at the site.

### S1.8.6 Additional information on utilities not shown on Contract drawings (Clause 3.5.1 and 5.5)

Utilities drawings have been obtained from report 424994 by Apogee Property & Utility Consultants, dated January 2023, combined with observations from past works and site reconnaissance surveys (in accordance with PAS128:2022 Type C). No buried services have been identified within the investigation area.

2No. Southern Water 250mm diameter foul water rising mains were reported approximately 15 to 20m to the north of the northern end of the existing rock revetment. The alignments of these mains are included on contract drawing ISU-JBAU-XX-XX-DR-GT-1000.

Prior to the commencement of the pits, the locations should be scanned with a cable avoidance tool with a signal generator (CAT and Genny) operated by a suitably trained and qualified person, with further scans at regular intervals during hole advancement.

A permit to dig system must be operated and this must record the details of any surveys and checks undertaken prior to intrusive works at each exploratory hole.

### S1.8.7 Known/suspected mine workings, mineral extractions, etc. (Clause 3.5.2 and 3.5.5)

No recorded mine workings are present at or in the immediate vicinity of the site.

### S1.8.8 Protected species (Clause 3.5.3)

The Contractor shall not cross any vegetated areas of beach shingle. All hand-dug pits shall be located away from any vegetated areas of beach shingle.

### S1.8.9 Archaeological remains (Clause 3.5.6)

There are no known heritage constraints regarding the proposed ground investigation. If suspected archaeological remains are encountered, the GI Contractor shall immediately advise the Investigation Supervisor.

### S1.8.10 Security of site (Clause 4.3.5)

The Contractor shall make suitable arrangements to provide security at the compound to ensure that their plant and equipment are secured and that there is no unauthorised access. Neither the Client or the Investigation Supervisor shall be held responsible for any loss of or damage to the Contractors plant and / or equipment.

Members of the public can access the general vicinity of the site (a public beach). Restriction to access of working areas should be managed pro-actively by the Contractor in advance of the works taking place. All exploratory hole locations shall be demarcated with safety fencing and signage to prevent public access. Each hole to be completed and reinstated before moving to the next hole. No holes shall be left unreinstated at end of shift.

Site access shall be via accepted routes agreed in advance with the landowner and Investigation Supervisor.

### S1.8.11 Traffic safety and management (Clause 4.3.6)

Formal traffic management arrangements are not required, but the Contractor shall plan the works to allow for safe plant-people interface and pedestrian segregation.

### S1.8.12 Working hours (Clause 4.3.6)

Site works to be carried out between 08.00-17.00 hrs on weekdays in safe tidal windows. No weekend working is allowed.

### S1.8.13 Trainee site operatives (Clause 4.5.2)

Not permitted.

### S1.8.14 Contamination avoidance and/or aquifer protection measures required (Clauses 3.6.7, 3.6.8 and 6.1)

All equipment shall be thoroughly cleaned before being used on site.

Clean sampling equipment shall be used to collect soil samples for geoenvironmental testing, to be cleaned between samples where multiple samples are taken.

### S1.8.15 Maximum period for boring, pitting or trenching through hard material or obstruction (Clauses 2.11, 6.3.5 and 7.5)

1 hour.

### S1.8.16 Reinstatement requirements (Clause 3.6.5 and 4.3.2)

The site shall be reinstated, as far as practicable, to the same condition as found prior to the start of the works using the hand-dug arisings. The Contractor shall take pre-condition and post-condition photographs in accordance with S1.8.20. The Contractor shall ensure that reinstatement is appropriately levelled and compacted to avoid an uneven surface or soft spots remaining post-reinstatement. Reinstatement of each hand-dug pit shall be completed to the satisfaction of the Investigation Supervisor prior to moving to the next pit location.

### S1.8.17 Welfare and other facilities required (Clauses 2.25, 4.3.2 and 4.3.4)

A welfare van shall be provided by the Contractor for their own staff and the Investigation Supervisor. Temporary storage of the Contractor's materials, equipment and samples shall be provided by the Contractor.

### S1.8.18 Unavoidable damage to be reinstated by Contractor (Clause 4.3.1 and 13.1)

All unavoidable damage shall be reinstated by the Contractor.

### S1.8.19 Surveys (Clauses 5.1, 5.2, 5.3, 5.4, 5.6, 5.7, 5.8 and 5.9)

The Contractor is responsible for setting out each exploratory hole and for the surveying of the as-built locations of each exploratory hole to within 0.02m positional accuracy relative to Ordnance Survey Grid Coordinates and Datum.

### S1.8.20 Inspection and survey records requirements (Clauses 5.2 and 5.10)

Photographs are required to show the general condition of the site prior to the start, and following completion of, each exploratory hole and the investigation, as well as of any significant features, such as below ground features or potential contaminants.

Photographs are also required of all pits and arisings.

Photographs shall be made available electronically to the Investigation Supervisor within 1 working day of being taken and shall be provided as part of the daily records of the site works.

## S1.14 Pitting and trenching (Specification Section 7) – particular restrictions/relaxations

Contract specific restrictions/relaxations, if any, shall be inserted below.

### S1.14.1 Pitting and trenching (Clause 7.2)

All exploratory hole locations are to be scanned with a CAT & Genny prior to commencement.

All pits are to be hand dug pits with insulated tools to a maximum of 1m depth, with CAT & Genny scanning to be undertaken as these excavations proceed.

The Contractor shall ensure that a safe system of work following the guidance set out in HSG47 (Avoiding Danger from Underground Services) is in place during the ground investigation works.

The Contractor shall consult all utility drawings of existing utilities.

### S1.14.6 Backfilling (Clauses 6.1.2 and 7.10)

Refer to requirements stated in S1.8.16.

### S1.14.7 Photographic requirements (Clauses 7.8 and 7.12)

Each photograph of a pit or of pit arisings shall include a stout, clearly legible photographic board with details of the project name, project ID, exploratory hole number and date, and include a visible colour separation chart, grey scale, length scale and the address and logo of the Contractor.

See also S1.8.20.

## S1.15 Sampling and monitoring during intrusive investigation (Specification Section 8) – particular restrictions/relaxations

All environmental samples shall be removed from the vicinity of the exploratory holes at the end of each day's work and shall be protected from frost damage or excessive heat by being stored on or near the site in a structure that is under cover and is secure from interference.

Sampling shall, at a minimum, conform to Section 25.11 of BS 5930:2015+A1:2020. No standing time shall be applicable in the event that suitable containers for samples are not available on site during sampling. For any sampling that is not undertaken in accordance with this technical specification: (a) the Investigation Supervisor may require the Contractor to repeat the relevant pitting and sampling operations so as to provide samples that are in conformance with this technical specification; and (b) the Contractor is responsible for the cost and programme impacts of any such repeated drilling and sampling.

### S1.15.1 Retention and disposal of geotechnical samples (Clauses 8.10.3 and 8.10.4)

All untested samples and remaining sample portions shall be kept for a period of 28 days after submission of the approved final report.

### S1.15.2 Frequency of sampling for geotechnical purposes (Clauses 8.2 and 8.7.2)

Not required.

### S1.15.3 Open-tube and piston sampler diameters (Clauses 8.7.3.1, 8.7.3.2 and 8.7.3.3)

Not required.

### S1.15.6 Groundwater samples and groundwater level measurements during exploratory hole formation (Clauses 8.7.11 and 8.8.1)

Not required.

### S1.15.10 Frequency of sampling for geoenvironmental purposes (Clause 8.9.2)

Refer to S1.5.

### S1.15.11 Sampling method (Clause 8.9.3)

Samples taken from hand dug pits shall use the procedures identified in BS 10175:2011+A2:2017 to avoid cross-contamination between samples, spreading of existing contamination and the introduction of external contamination.

Samples for laboratory testing shall be taken using a stainless-steel trowel, which shall be decontaminated between sampling events and on completion of each exploratory location to avoid cross-contamination between samples.

Samples shall be taken by a suitably trained and competent person.

## S1.21 Daily records (Specification Section 14) – particular restrictions/relaxations

### S1.21.1 Information for daily records (Clause 14.2)

The Contractor shall record and report information on site and ground hazards that they become aware of during the works, and appropriate information on methods that will assist future contractors working in the same materials for inclusion in the CDM 2015 Health and Safety File.

The Contractor shall prepare for pit a daily record, preferably in digital format, which shall be submitted to the Investigation Supervisor within 24 hours of completion of the exploratory hole.

The following is to be delivered by the Contractor in the noted timescales:

- Hand-dug pit logs, the engineer's site records, and digital photographic records of each hole shall be produced daily and provided to the Investigation Supervisor by the start of the next day/shift.
- Preliminary engineer's logs to be provided to Investigation Supervisor within 2 working days of completion of the exploratory holes

- Blank, sample populated, geoenvironmental testing schedule to be provided to Investigation Supervisor within 24 hours of completion of each exploratory hole.

### S1.21.2 Chain of custody (Clause 14.3)

Chain of custody shall be maintained for all geoenvironmental samples.

The chain of custody records shall be kept by the Contractor until acceptance of the final report.

The minimum information to be included on the form is listed below:

- name of organisation carrying out the sampling
- name of organisation receiving samples
- time and date of sampling
- Contractor name and contact details
- Contract identifier and site name
- details of the samples (location, depth, etc.).

Additional chain of custody information required:

- other information for the safe handling of potentially hazardous samples, (e.g. special safety precautions) samples that might contain high levels of substances that might interfere with analysis (if known)
- test turnaround times

## S1.22 Geotechnical laboratory testing (Specification Section 15) – particular restrictions/relaxation

### S1.22.1 Investigation Supervisor or Contractor to schedule testing (Clause 15.1)

The Investigation Supervisor shall schedule the laboratory testing.

The Contractor shall inform the Investigation Supervisor within 5 working days from the receipt of the testing schedule if a sample referred to in the schedule is not available for testing.

### S1.22.2 Tests required (Clause 15.4)

Soil testing shall be carried out and reported in accordance with the applicable part of the testing standard within BS EN ISO 17892/BS 1377 as appropriate.

### S1.22.4 Accreditation to be adopted (Clauses 3.3 and 15.3).

UKAS accreditations are required for all tests where available.

CEFAS accreditations are required for E2 suites.

Unaccredited testing is not permitted without prior agreement of the Investigation Supervisor.

### S1.22.6 Geoenvironmental testing for aggressive ground/groundwater for concrete (Clause 15.6) (Test Suites A–D)

Not required.

### S1.22.9 Specimen preparation and abortive tests (Clause 15.10)

If, for whatever reason, a test specimen is found to be unsuitable for testing, the laboratory shall prepare a record of the unsuitable sample.

A photographic record of the unsuitable sample shall be taken and presented alongside a geological description of the material on the relevant laboratory test result sheet. The reason why the test sample is unsuitable and a suggested resolution shall be immediately notified to the Investigation Supervisor so that an alternative test or sample may be scheduled.

## S1.23 Geoenvironmental laboratory testing (Specification Section 16) - particular restrictions/relaxations

### S1.23.1 Investigation Supervisor or Contractor to schedule testing (Clause 16.1)

The Investigation Supervisor shall specify the testing upon receipt of blank schedules. The testing schedules shall be provided to the testing laboratory within 24 hrs of the samples being taken.

The Contractor shall inform the Investigation Supervisor within a further 24 hrs if a sample referred to in the schedule is not available or unsuitable for testing.

### S1.23.2 Accreditation required (Clauses 3.3 and 16.2)

UKAS accreditations are required for all contamination tests and CEFAS is required for E2 suites.

Unaccredited testing is not permitted without prior agreement of the Investigation Supervisor.

### S1.23.3 Chemical testing for contamination (Clauses 8.9.4 and 16.3) (Test suites E-I)

Selected samples are to be scheduled by the Investigation Supervisor for Suite E and Suite E2 testing.

Contractor to confirm available limits of detection, test method and accreditation offered.

## SCHEDULE 1.23.3 Chemical laboratory testing for contamination

**Suite E**

### Technical Information

Accreditation # = MCERTS, * = UKAS

| Description | Suite/ Det code | Method Ref | Limit of detection | Units | Accreditation |
|---|---|---|---|---|---|
| **Suite E - Soils** | 2711231020 | | | | |
| Dry Soil DCM/Docosane Pre | DRYDCM_SP | | N/A | - | |
| pH at 20C | PH_SZ | 2010 | 4.0 | | # |
| Soil Colour | COL_SZ | 2040 | N/A | | |
| Other Material | OTH_SZ | 2040 | N/A | | |
| Soil Texture | TEXT_SZ | 2040 | N/A | | |
| Boron (Hot Water Soluble) | HWB_SZ | 2120 | 0.40 | mg/kg | # |
| Sulphate (2:1 Water Soluble) as SO4 | HWSO4_SZ | 2120 | 0.010 | g/l | # |
| Total Sulphur | TOTS_SZ | 2175 | 0.010 | % | * |
| ACM Type | ASBACM_SZ | 2192 | N/A | | * |
| Asbestos Identification | ASBID_SZ | 2192 | N/A | | * |
| Cyanide (Total) | CN1_SZ | 2300 | 0.50 | mg/kg | # |
| Chromium | TOTCR_SZ | 2455 | 0.5 | mg/kg | # |
| Cadmium | TOTCD_SZ | 2455 | 0.10 | mg/kg | # |
| Arsenic | TOTAS_SZ | 2455 | 0.5 | mg/kg | # |
| Copper | TOTCU_SZ | 2455 | 0.50 | mg/kg | # |
| Mercury | TOTHG_SZ | 2455 | 0.05 | mg/kg | # |
| Nickel | TOTNI_SZ | 2455 | 0.50 | mg/kg | # |
| Lead | TOTPB_SZ | 2455 | 0.50 | mg/kg | # |
| Selenium | TOTSE_SZ | 2455 | 0.25 | mg/kg | # |
| Zinc | TOTZN_SZ | 2455 | 0.50 | mg/kg | # |
| Organic Matter | OMCALC_SZ | 2625 | 0.40 | % | # |
| Aliphatic EPH >C10-C12 | EHL1012_SZ | 2690 | 2.00 | mg/kg | # |
| Aliphatic EPH >C12-C16 | EHL1216_SZ | 2690 | 1.00 | mg/kg | # |
| Aliphatic EPH >C16-C21 | EHL1621_SZ | 2690 | 2.00 | mg/kg | # |
| Aliphatic EPH >C21-C35 | EHL2135_SZ | 2690 | 3.00 | mg/kg | # |
| Aliphatic EPH >C35-C40 | EHL3540_SZ | 2690 | 10.00 | mg/kg | |
| Total Aliphatic EPH >C10-C35 | EHL1035_SZ | 2690 | 5.00 | mg/kg | # |
| Total Aliphatic EPH >C10-C40 | EHL1040_SZ | 2690 | 10.00 | mg/kg | |
| Aromatic EPH >C10-C12 | EHR1012_SZ | 2690 | 1.00 | mg/kg | * |
| Aromatic EPH >C12-C16 | EHR1216_SZ | 2690 | 1.00 | mg/kg | * |
| Aromatic EPH >C16-C21 | EHR1621_SZ | 2690 | 2.00 | mg/kg | * |
| Aromatic EPH >C21-C35 | EHR2135_SZ | 2690 | 2.00 | mg/kg | * |
| Aromatic EPH >C35-C40 | EHR3540_SZ | 2690 | 1.00 | mg/kg | |
| Total Aromatic EPH >C10-C35 | EHR1035_SZ | 2690 | 5.00 | mg/kg | * |
| Total Aromatic EPH >C10-C40 | EHR1040_SZ | 2690 | 10.00 | mg/kg | |
| Total EPH >C10-C35 | EHA1035_SZ | 2690 | 10.00 | mg/kg | * |
| Total EPH >C10-C40 | EHA1040_SZ | 2690 | 10.00 | mg/kg | |
| Aliphatic VPH >C5-C6 | VHL0506_SZ | 2780 | 0.05 | mg/kg | * |
| Aliphatic VPH >C6-C7 | VHL0607_SZ | 2780 | 0.05 | mg/kg | * |
| Aliphatic VPH >C7-C8 | VHL0708_SZ | 2780 | 0.05 | mg/kg | * |
| Aliphatic VPH >C6-C8 (Sum) | VHL0608_SZ | 2780 | 0.10 | mg/kg | |
| Aliphatic VPH >C8-C10 | VHL0810_SZ | 2780 | 0.05 | mg/kg | * |
| Total Aliphatic VPH >C5-C10 | VHL0510_SZ | 2780 | 0.25 | mg/kg | * |
| Aromatic VPH >C5-C7 | VHR0507_SZ | 2780 | 0.05 | mg/kg | * |
| Aromatic VPH >C7-C8 | VHR0708_SZ | 2780 | 0.05 | mg/kg | * |
| Aromatic VPH >C8-C10 | VHR0810_SZ | 2780 | 0.05 | mg/kg | * |
| Total Aromatic VPH >C5-C10 | VHR0510_SZ | 2780 | 0.25 | mg/kg | * |
| Total VPH >C5-C10 | VHA0510_SZ | 2780 | 0.50 | mg/kg | * |
| Naphthalene | PAH1M_SZ | 2800 | 0.10 | mg/kg | # |
| Acenaphthylene | PAH2M_SZ | 2800 | 0.10 | mg/kg | |
| Acenaphthene | PAH3M_SZ | 2800 | 0.10 | mg/kg | # |
| Fluorene | PAH4M_SZ | 2800 | 0.10 | mg/kg | # |
| Phenanthrene | PAH5M_SZ | 2800 | 0.10 | mg/kg | # |
| Anthracene | PAH6M_SZ | 2800 | 0.10 | mg/kg | # |
| Fluoranthene | PAH7M_SZ | 2800 | 0.10 | mg/kg | # |
| Pyrene | PAH8M_SZ | 2800 | 0.10 | mg/kg | # |
| Benzo[a]anthracene | PAH9M_SZ | 2800 | 0.10 | mg/kg | # |

| | | | | | |
|---|---|---|---|---|---|
| Chrysene | PAH10M_SZ | 2800 | 0.10 | mg/kg | # |
| Benzo[b]fluoranthene | PAH11M_SZ | 2800 | 0.10 | mg/kg | # |
| Benzo[k]fluoranthene | PAH12M_SZ | 2800 | 0.10 | mg/kg | # |
| Benzo[a]pyrene | PAH13M_SZ | 2800 | 0.10 | mg/kg | # |
| Indeno(1,2,3-c,d)Pyrene | PAH14M_SZ | 2800 | 0.10 | mg/kg | # |
| Dibenz(a,h)Anthracene | PAH15M_SZ | 2800 | 0.10 | mg/kg | |
| Benzo[g,h,i]perylene | PAH16M_SZ | 2800 | 0.10 | mg/kg | # |
| Total Of 16 PAH's | PAHS16M_SZ | 2800 | 2.0 | mg/kg | |
| Total Phenols | PHOHST_SZ | 2920 | 0.10 | mg/kg | # |

Suite E2

**New CEFAS Suite**

| Matrix | Determinand | Limit of Detection | Method/Instrument | Turnaround (Working Days) | Quality Management System | SOP |
|---|---|---|---|---|---|---|
| Marine Sediment | Metals Suite (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn) | 0.01-2mg/kg | Aqua-Regia Extraction & ICP-MS | 20 | UKAS 17025 & MMO | SOCOTEC Environmental Chemistry* |
| | Organotins (DBT, TBT, MBT) | 0.001 mg/kg | Acid Digest, Solvent Extraction & GC-MS | 20 | UKAS 17025 & MMO except MBT | ASC/SOP/301 |
| | PAHs (DTI 2-6 Ring Aromatics + EPA 16) For full list of compounds see table over page | 1µg/kg | Solvent Extraction & GC-MS | 20 | UKAS 17025 & MMO | ASC/SOP/303 & 304 |
| | Total Hydrocarbon Content | 1mg/kg | Ultra-Violet Fluorescence Spectroscopy | 20 | UKAS 17025 & MMO | ASC/SOP/305 |
| | PCBs (25 Congeners inc. ICES 7) For full list of compounds see table over page | 0.00008mg/kg | Solvent Extraction & GC Triple Quad | 20 | UKAS 17025 & MMO | ASC/SOP/302 |
| | Organochlorine Pesticides For full list of compounds see table over page | 0.0001mg/kg | Solvent Extraction & GC Triple Quad | 20 | UKAS 17025 & MMO | ASC/SOP/302 |
| | Brominated Flame Retardants (inc. BDE209) For full list of compounds see table over page | 0.05µg/kg (BDE209 - 0.1 µg/kg) | Solvent Extraction & GC-MS-MS | 20 | UKAS 17025 &MMO | ASC/SOP/308 |

### S1.23.4 Waste characterisation (Clause 16.4)

The Contractor shall assess the waste characterisation status of materials based on the results of the contamination testing carried out.

### S1.23.5 Waste Acceptance Criteria testing (Clauses 8.9.4 and 16.5) (Test Suites J–L)

WAC testing to be undertaken on selected samples. WAC testing to be scheduled by Investigation Supervisor.

SCHEDULE 1.23.5 Chemical testing for waste acceptance criteria testing

**Waste Acceptance Criteria**

| Waste Acceptance Criteria Inert Single Stage (Combined) | WACINERT1S | | | | |
|---|---|---|---|---|---|
| Total Dissolved Solids | WLTDS_1Z | 1020 | 10 | mg/kg | |
| Total Dissolved Solids | WCTDS_1Z | 1020 | 1.0 | mg/l | |
| Sulphate | WLSO4_1Z | 1220 | 10 | mg/kg | * |
| Fluoride | WLF_1Z | 1220 | 1.0 | mg/kg | * |
| Chloride | WLCL_1Z | 1220 | 10 | mg/kg | * |
| Chloride | WCCL_1Z | 1220 | 1.0 | mg/l | * |
| Fluoride | WCF_1Z | 1220 | 0.050 | mg/l | * |
| Sulphate | WCSO4_1Z | 1220 | 1.0 | mg/l | * |
| Arsenic | WALAS_1Z | 1455 | 0.0020 | mg/kg | * |
| Arsenic | WACAS_1Z | 1455 | 0.0002 | mg/l | * |
| Barium | WALBA_1Z | 1455 | 0.0500 | mg/kg | * |
| Barium | WACBA_1Z | 1455 | 0.005 | mg/l | * |
| Cadmium | WALCD_1Z | 1455 | 0.00110 | mg/kg | * |
| Cadmium | WACCD_1Z | 1455 | 0.00011 | mg/l | * |
| Chromium | WALCR_1Z | 1455 | 0.0050 | mg/kg | * |
| Chromium | WACCR_1Z | 1455 | 0.0005 | mg/l | * |
| Copper | WALCU_1Z | 1455 | 0.0050 | mg/kg | * |
| Copper | WACCU_1Z | 1455 | 0.0005 | mg/l | * |
| Mercury | WALHG_1Z | 1455 | 0.00050 | mg/kg | * |
| Mercury | WACHG_1Z | 1455 | 0.00005 | mg/l | * |
| Molybdenum | WALMO_1Z | 1455 | 0.0020 | mg/kg | * |
| Molybdenum | WACMO_1Z | 1455 | 0.0002 | mg/l | * |
| Nickel | WALNI_1Z | 1455 | 0.0050 | mg/kg | * |
| Nickel | WACNI_1Z | 1455 | 0.0005 | mg/l | * |
| Lead | WALPB_1Z | 1455 | 0.0050 | mg/kg | * |
| Lead | WACPB_1Z | 1455 | 0.0005 | mg/l | * |
| Antimony | WALSB_1Z | 1455 | 0.0050 | mg/kg | * |
| Antimony | WACSB_1Z | 1455 | 0.0005 | mg/l | * |
| Selenium | WALSE_1Z | 1455 | 0.0050 | mg/kg | * |
| Selenium | WACSE_1Z | 1455 | 0.0005 | mg/l | * |
| Zinc | WALZN_1Z | 1455 | 0.025 | mg/kg | * |
| Zinc | WACZN_1Z | 1455 | 0.003 | mg/l | * |
| Dissolved Organic Carbon | WLDOC_1Z | 1610 | 50 | mg/kg | * |
| Dissolved Organic Carbon | WCDOC_1Z | 1610 | 2.5 | mg/l | * |
| Phenol Index | WLPI_1Z | 1920 | 0.30 | mg/kg | * |
| Phenol Index | WCPI_1Z | 1920 | 0.030 | mg/l | * |
| | WACTRIG | 2010 | N/A | | # |
| pH at 20C | WACPH_SZ | 2010 | 4.0 | | # |
| Acid Neutralisation Capacity | WACANC_SZ | 2015 | 0.0020 | mol/kg | |
| Loss On Ignition | WACLOI_SZ | 2610 | 0.10 | % | # |
| Total Organic Carbon | WACTOC_SZ | 2625 | 0.20 | % | # |
| TPH Total WAC | WACTPH_SZ | 2670 | 10 | mg/kg | # |
| Total (Of 17) PAH's | WACPAHF_SZ | 2700 | 2.0 | mg/kg | |
| Total BTEX | WACBTEX_SZ | 2760 | 0.010 | mg/kg | # |
| Total PCBs (7 Congeners) | WACPCB7_SZ | 2815 | 0.10 | mg/kg | # |
| Undried Mass Of Test Portion | UMA_SZ | 640 | N/A | kg | |
| CEN C10 Prep. | CEN_1P | 640 | N/A | - | |
| Volume Of C10 Leachant | VC_1Z | 640 | N/A | l | |

## S1.24 Reporting (Specification Section 17) – particular restrictions/ relaxations

### S1.24.1 Raw data (Clause 17.2.2)

Where raw data, including in situ test field sheets or laboratory work sheets is obtained, it shall be made available to the Investigation Supervisor upon request.

### S1.24.2 Preliminary exploratory hole logs (Clause 17.2.3)

Refer to S1.21.1.

### S1.24.3 Exploratory hole logs (Clause 17.2.4)

All logs shall be presented to a consistent vertical scale.

Contractor to submit a proforma or example record with their tender return for approval by the Investigation Supervisor. AGS format is expected.

### S1.24.4 Field results (Clause 17.2.5)

Not applicable.

### S1.24.5 Laboratory test results (Clause 17.2.6)

Laboratory test results shall be submitted in the AGS 4.0.4 (or higher) format as well as in PDF or excel form to the Investigation Supervisor once the results are available in full.

### S1.24.6 Plans and drawings (Clause 17.2.7)

Plans and drawings shall be provided in CAD and PDF format to the Investigation Supervisor.

The Contractor shall provide, as a minimum, an Exploratory Hole Location Plan.

### S1.24.7 Type of reports required (Clause 17.3)

The contractor is to provide the factual section of the GIR. This shall be submitted to the Investigation Supervisor as a digital copy in Portable Document Format (PDF).

### S1.24.9 Ground Investigation Report (GIR) (or specified part thereof) (Clauses 4.4.7, 17.3.3 and 17.3.5)

The contractor is to provide the factual section of the GIR.

The information to be included in the factual account of the GIR shall, as a minimum, comprise.

- A statement on the purpose and rationale of the investigation;
- A description of the work carried out, including reference to the Specification and standards adopted and any deviations from them;
- Site location plan;
- Exploratory hole location plan;
- Exploratory hole logs, including details of any instruments installed;
- Measurements, observations and test results (where separate from other exploratory holes);
- Laboratory test results;
- Monitoring data, plus details of any outstanding monitoring visits;
- Photographs.

The factual account of the GIR shall be provided in PDF format.

### S1.24.10 Geotechnical Design Report (GDR) (or specified part thereof) (Clauses 4.4.7 and 17.3.4)

Not required.

### S1.24.11 Report approval (Clause 17.3.6)

The draft report shall be submitted to the Investigation Supervisor for approval before submission of the final version. The Investigation Supervisor shall approve the draft report (or instruct on any required revisions) within 1 week following its receipt. The final version of the factual report is required within 5 working days of the Investigation Supervisor's approval/instruction.

The draft report is to be submitted within 5 working days of the completion of laboratory testing. Any delays should be communicated to the Investigation Supervisor/Designer as soon as the Contractor is aware of them.

The post-field-work monitoring shall be supplied as an addendum report once monitoring is completed.

All digital data submitted to the Investigation Supervisor for approval shall include or be accompanied by the following information in associated digital documentation.

- a title that defines the media contents
- project identification number
- date of issue to the Investigation Supervisor
- name of the Contractor
- name of the Investigation Supervisor
- unique issue sequence number.

The final copy of the report shall be the final report in digital form that has been issued and approved by the Investigation Supervisor.

### S1.24.12 Digital data (Clauses 5.10 and 17.4.1)

The digital copy of the report shall consist of two parts.

- Part 1. The digital data shall be provided in accordance with the AGS publication Electronic Transfer of Geotechnical and Geoenvironmental Data.
- Part 2. The digital information shall be in a PDF format.

The digital information (i.e. PDF report) and digital data (e.g. AGS Data Format data) shall be produced from the same source.

PDF files shall be created directly from the source documents rather than scanned. Where no other digital information exists, scanning of paper into digital form is acceptable.

### S1.24.13 Data format (Clauses 17.2.7, 17.3.1, 17.3.5, 17.4.1 and 17.4.2)

All AGS files must be 4.0.4 (or higher).

### S1.24.14 Preliminary data (Clause 17.4.3)

Preliminary data from the investigation site works is to be provided to the Investigation Supervisor within 2 weeks of completion of site works.

AGS Data Format files shall be validated to check the structure and rules of the file using validation software. The specified validation software shall be available to all parties.

The AGS Data Format files provided by the Contractor with the Factual Report shall be a complete version of all digital data, and supersede previous digital data submissions.

### S1.24.15 Data submissions (Clause 17.4.4)

All AGS format data shall be checked using AGS format-checking software.

The digital data provided by the Contractor with the Factual Report is required to be complete and a total replacement of any previously submitted data, with the exception of monitoring data collected after the field work period.

All sampling and monitoring results that are produced up to submission of the draft report shall be included within the draft report and subsequent final report, and those obtained afterwards, during the long-term monitoring period, shall be provided as a separate monitoring report.

### S1.24.16 Timing for submission of digital information files (Clause 17.4.5)

The Contractor shall issue copies of preliminary digital data to match the requirements in Clause 17.4.1, as specified in Schedule S1.24.14. Interim digital data including, but not limited to, long-term monitoring data, shall normally be issued as preliminary digital data, unless otherwise specified.

Long-term monitoring data shall be provided after each monitoring visit.

### S1.24.17 File transfer (Clause 17.4.6)

File transfer is to be completed electronically via email, or alternatively, where the size of the files requires it, file transfer software may be used.

Physical media are not required for issuing of digital data.

All media shall be checked for viruses by virus-detection software before issue, and a statement verifying this shall be made by the Contractor in the associated data files.

# Schedule 2: Exploratory Holes

| Hole number | Type | Scheduled depth: mbgl | National Grid Reference: Easting & Northing, m | | Approx ground level: mAOD | Remarks |
|---|---|---|---|---|---|---|
| HP101 | HP * | 1.0 | 523253 | 104843 | -0.5 | |
| HP102 | HP * | 1.0 | 523256 | 104834 | -0.7 | |
| HP103 | HP * | 1.0 | 523259 | 104826 | -0.9 | |
| HP104 | HP * | 1.0 | 523262 | 104816 | -0.9 | |
| HP105 | HP * | 1.0 | 523264 | 104808 | -0.9 | |
| HP106 | HP * | 1.0 | 523267 | 104798 | -0.9 | |

*HP - Hand Pitting

Actual exploratory hole as-dug coordinates and ground levels to be confirmed on site at hole commencement.

# Schedule 3: Investigation Supervisor's facilities

## S3.1 Accommodation

Use of the Contractors welfare van on site.

## S3.2 Furnishings

Not required

## S3.3 Utilities

Not required

## S3.4 Equipment

Not required

## S3.5 Transport

Not required

## S3.6 Personal protective equipment (PPE) for the Investigation Supervisor

Not required

# Schedule 4 – List and details of specification amendments

| The following clauses are amended: | | | |
|---|---|---|---|
| Section number | Clause number | Delete the following | Substitute the following |
| | | | |
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# Schedule 5 – List and details of specification additions

| The following clauses are added to the Specification: | | |
|---|---|---|
| Section number | Clause number | Clause wording |
| | | |
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# APPENDIX 2

## Site Location Plan

APPENDIX 2

GEOTECHNICS
BUILD ON CONFIDENCE

# Site Location Plan




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# APPENDIX 3

## Exploratory Hole Location Plan




N

Legend

Locations By Type - HP

GEOTECHNICS

Unit 5 Orchard Court
Heron Road
Exeter
EX2 7NR

Phone: 01392 463110
Email: mail@geotechnics.co.uk
www.geotechnics.co.uk

Engineer:
**JBA Consulting**

Client:
**JBA Consulting**

Project:
**SHOREHAM SOLDIERS POINT DETAILED DESIGN GI**

Drawing Title:
**Exploratory Hole Location Plan**

| Scale: | Date: |
|---|---|
| **1:500 at A3** | **10/05/2024** |
| Project No.: **PE241896** | **Exploratory Hole Location Plan** |

# APPENDIX 4

## Trial Pit Records

# *DATA SHEET - Symbols and Abbreviations used on Records*

## Sample Types

| | |
|---|---|
| B | Bulk disturbed sample |
| BLK | Block sample |
| C | Core sample |
| D | Small disturbed sample (tub/jar) |
| E | Environmental test sample |
| ES | Environmental soil sample |
| EW | Environmental water sample |
| G | Gas sample |
| L | Liner sample |
| LB | Large bulk disturbed sample |
| P | Piston sample (PF - failed P sample) |
| TW | Thin walled push in sample |
| U | Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample) |
| UT | Thin wall open drive tube sampler - 102mm diameter with blows to take sample. (UTF - failed UT sample) |
| V | Vial sample |
| W | Water sample |
| # | Sample Not Recovered |

## Insitu Testing / Properties

| | |
|---|---|
| CBRP | CBR using TRL probe |
| CHP | Constant Head Permeability Test |
| COND | Electrical conductivity |
| TC | Thermal Conductivity |
| TR | Thermal Resistivity |
| HV | Strength from Hand Vane |
| ICBR | CBR Test |
| IDEN | Density Test |
| IRES | Resistivity Test |
| MEX | CBR using Mexecone Probe Test |
| PKR | Packer Permeability Test |
| PLT | Plate Load Test |
| PP | Strength from Pocket Penetrometer |
| Temp | Temperature |
| VHP | Variable Head Permeability Test |
| VN | Strength from Insitu Vane |
| w% | Water content |

(All other strengths from undrained triaxial testing)

| | |
|---|---|
| S | Standard Penetration Test (SPT) |
| C | SPT with cone |
| N | SPT Result |
| -/- | Blows/penetration (mm) after seating drive |
| -*/- (mm) | Total blows/penetration |
| ( ) | Extrapolated value |

## Groundwater

Water Strike

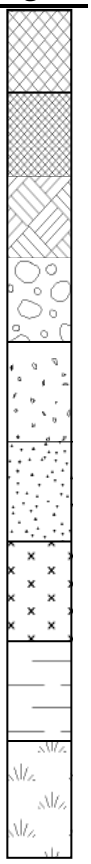
Depth Water Rose To

## Instrumentation

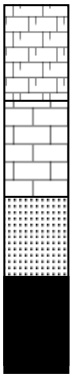



## Strata

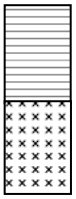
## Legend



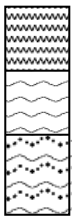

**Note: Composite soil types shown by combined symbols**



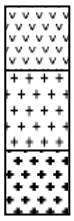

## Strata, Continued




**Metamorphic Rock**




**Igneous Rock**




## Backfill Materials




## Rotary Core

| | |
|---|---|
| RQD | Rock Quality Designation (% of intact core >100mm) |
| FRACTURE INDEX | Fractures/metre |
| NI | Non-intact core |
| NR | No core recovery |
| AZCL | Assumed zone of core loss |

(where core recovery is unknown it is assumed to be at the base of the run)



GEOTECHNICS

# TRIAL PIT RECORD - *Hand-Dug Inspection Pit*

| | | | | | |
|---|---|---|---|---|---|
| **Project** | SHOREHAM SOLDIERS POINT DETAILED DESIGN GI | **Engineer** | JBA Consulting | **Project No.** | PE241896 |
| | | | | **Location ID** | HP101 |
| **Client** | JBA Consulting | **National Grid Coordinates** | 523252.8 E<br>104842.6 N | **Ground Level** | -0.92 m OD |

Samples and Tests | Strata | Scale 1:10

| Depth | Sample Type | Stratum No. | Results | Description | Depth | Legend | Level (m OD) |
|---|---|---|---|---|---|---|---|
| 0.00 - 0.10 | ES | | w: 17 % | Orangish brown very gravelly fine to coarse SAND. Gravel is subangular to rounded fine to coarse of chert and quartz. | | | |
| | | | | | 0.10 | | -1.02 |
| | | | | Grey mottled black and dark brown slightly gravelly slightly silty slightly organic SAND. Sand is fine to coarse. Gravel is subrounded to rounded fine to coarse of chert and quartz. Occasional partially decomposed organic fragments with a slight organic odour. | | | |
| 0.30 - 0.50 | ES | | | | | | |
| | | | | From 0.50m, becoming gravelly and dark grey in colour. | | | |
| 0.60 - 0.70 | ES | | | | | | |
| | | | | End of Excavation | 0.70 | | -1.62 |

**Excavation**

| | | | |
|---|---|---|---|
| **Plant** | Hand tools. | **Width (B)** | 0.00 |
| **Date** | 24/04/2024 | **Length (C)** | 0.30 |
| **Shoring** | 0.00-0.50m bgl. | **Date Backfilled** | 24/04/2024 |
| **Stability** | Unstable from ground level. | | |

**Groundwater**

| Depth Observed | Depth of Pit | Rose to | in Mins | Remarks |
|---|---|---|---|---|
| 0.10 | 0.70 | | | Settled in pit at 0.10m bgl. |

**Remarks** Exploratory hole location checked for services using a Cable Avoidance Tool (CAT) & Genny prior to excavation. No services were detected. Hole was dug to depth using hand tools and terminated at 0.70m due to a cobble obstruction. Excess arisings were used to backfill the hole upon completion.

Logged by LP

Figure Sheet 1 of 1

11/06/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

# TRIAL PIT RECORD - *Hand-Dug Inspection Pit*

| | | | | | |
|---|---|---|---|---|---|
| **Project** | SHOREHAM SOLDIERS POINT DETAILED DESIGN GI | **Engineer** | JBA Consulting | **Project No.** | PE241896 |
| | | | | **Location ID** | HP102 |
| **Client** | JBA Consulting | **National Grid Coordinates** | 523256.0 E<br>104833.9 N | **Ground Level** | -0.99 m OD |

Samples and Tests | Strata | Scale 1:10

| Depth | Sample Type | Stratum No. | Results | Description | Depth | Legend | Level (m OD) |
|---|---|---|---|---|---|---|---|
| 0.00 - 0.10 | ES | | | Orangish brown very gravelly SAND with a low cobble content (up to 120x80mm in size) of chert and quartz. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of chert and quartz. | | | |
| | | | | | 0.10 | | -1.09 |
| | | | | Grey mottled black and dark brown slightly gravelly slightly silty slightly organic SAND. Sand is fine to coarse. Gravel is subrounded to rounded fine to coarse of chert and quartz. Occasional partially decomposed organic fragments with a slight organic odour. | | | |
| 0.30 - 0.50 | ES | | w: 17,15 % | | | | |
| 0.60 - 0.90 | ES | | | | | | |
| | | | | | 0.60 | | -1.59 |
| | | | | Blackish dark grey very sandy slightly silty slightly organic GRAVEL. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of chert and quartz. Occasional shell fragments. | | | |
| | | | | | 0.90 | | -1.89 |
| | | | | End of Excavation | | | |

**Excavation**

| | | | |
|---|---|---|---|
| **Plant** | Hand tools. | **Width (B)** | 0.30 |
| **Date** | 25/04/2024 | **Length (C)** | 0.30 |
| **Shoring** | 0.00-0.80m bgl. | **Date Backfilled** | 25/04/2024 |
| **Stability** | Unstable from ground level. | | |

**Groundwater**

| Depth Observed | Depth of Pit | Rose to | in Mins | Remarks |
|---|---|---|---|---|
| 0.40 | 0.90 | | | Settled in pit at 0.50m bgl. |

**Remarks** Exploratory hole location checked for services using a Cable Avoidance Tool (CAT) & Genny prior to excavation. No services were detected. Hole was dug to depth using hand tools and terminated at 0.90m bgl due to instability and collapse below the shoring. Excess arisings were used to backfill the hole upon completion.

Logged by LP

Figure Sheet 1 of 1

11/06/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

# TRIAL PIT RECORD - *Hand-Dug Inspection Pit*

| | | | | | |
|---|---|---|---|---|---|
| **Project** | SHOREHAM SOLDIERS POINT DETAILED DESIGN GI | **Engineer** | JBA Consulting | **Project No.** | PE241896 |
| | | | | **Location ID** | HP103 |
| **Client** | JBA Consulting | **National Grid Coordinates** | 523258.9 E<br>104826.0 N | **Ground Level** | -1.17 m OD |

Samples and Tests | Strata | Scale 1:10

| Depth | Sample Type | Stratum No. | Results | Description | Depth | Legend | Level (m OD) |
|---|---|---|---|---|---|---|---|
| 0.00 - 0.20 | ES | | | Orange and reddish brown very sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of chert and quartz. | | | |
| 0.30 - 0.50 | ES | | | Orange and grey SAND and GRAVEL. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of chert and quartz. | 0.30 | | -1.47 |
| 0.60 - 0.90 | ES | | w: 10,10 % | | | | |
| | | | | End of Excavation | 0.90 | | -2.07 |

**Excavation**

| | | | |
|---|---|---|---|
| **Plant** | Hand tools. | **Width (B)** | 0.30 |
| **Date** | 25/04/2024 | **Length (C)** | 0.30 |
| **Shoring** | 0.00-0.80m bgl. | **Date Backfilled** | 25/04/2024 |
| **Stability** | Unstable from ground level. | | |

**Groundwater**

| Depth Observed | Depth of Pit | Rose to | in Mins | Remarks |
|---|---|---|---|---|
| 0.30 | 0.90 | | | Settled in pit at 0.30m bgl. |

**Remarks** Exploratory hole location checked for services using a Cable Avoidance Tool (CAT) & Genny prior to excavation. No services were detected. Hole was dug to depth using hand tools and terminated at 0.90m bgl due to instability and collapse below the shoring. Excess arisings were used to backfill the hole upon completion.

Logged by LP

Figure Sheet 1 of 1

11/06/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

# *TRIAL PIT RECORD* - *Hand-Dug Inspection Pit*

| | | | | | |
|---|---|---|---|---|---|
| **Project** | SHOREHAM SOLDIERS POINT DETAILED DESIGN GI | **Engineer** | JBA Consulting | **Project No.** | PE241896 |
| | | | | **Location ID** | HP104 |
| **Client** | JBA Consulting | **National Grid Coordinates** | 523262.0 E<br>104815.9 N | **Ground Level** | -1.14 m OD |

Samples and Tests | Strata | Scale 1:10

| Depth | Sample Type | Stratum No. | Results | Description | Depth | Legend | Level (m OD) |
|---|---|---|---|---|---|---|---|
| 0.00 - 0.10 | ES | | | Grey and light brown gravelly SAND with a low cobble content (up to 140x60mm in size) of chert and quartz. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of chert and quartz. | | | |
| | | | | | 0.10 | | -1.24 |
| | | | | Orange and grey SAND and GRAVEL. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of chert and quartz. | | | |
| 0.30 - 0.50 | ES | | | | | | |
| | | | | End of Excavation | 0.85 | | -1.98 |

**Excavation**

| | | | |
|---|---|---|---|
| **Plant** | Hand tools. | **Width (B)** | 0.30 |
| **Date** | 25/04/2024 | **Length (C)** | 0.30 |
| **Shoring** | 0.00-0.70m bgl. | **Date Backfilled** | 25/04/2024 |
| **Stability** | Unstable from ground level. | | |

**Groundwater**

| Depth Observed | Depth of Pit | Rose to | in Mins | Remarks |
|---|---|---|---|---|
| 0.20 | 0.85 | | | Settled in pit at 0.40m bgl. |

**Remarks** Exploratory hole location checked for services using a Cable Avoidance Tool (CAT) & Genny prior to excavation. No services were detected. Hole was dug to depth using hand tools and terminated at 0.85m bgl due to instability and collapse below the shoring. Excess arisings were used to backfill the hole upon completion.

Logged by LP

Figure Sheet 1 of 1

11/06/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

# TRIAL PIT RECORD - *Hand-Dug Inspection Pit*

| | | | | | |
|---|---|---|---|---|---|
| **Project** | SHOREHAM SOLDIERS POINT DETAILED DESIGN GI | **Engineer** | JBA Consulting | **Project No.** | PE241896 |
| | | | | **Location ID** | HP105 |
| **Client** | JBA Consulting | **National Grid Coordinates** | 523264.1 E<br>104807.9 N | **Ground Level** | -0.98 m OD |

Scale 1:10

| Samples and Tests | | | | Strata | | | |
|---|---|---|---|---|---|---|---|
| Depth | Sample Type | Stratum No. | Results | Description | Depth | Legend | Level (m OD) |
| 0.00 - 0.10 | ES | | | Grey and light brown slightly gravelly SAND. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of chert and quartz. | | | |
| | | | | | 0.15 | | -1.13 |
| | | | | Orangish brown and grey very sandy GRAVEL with a low cobble content (up to 80x50mm in size) of chert and quartz, Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of chert and quartz. | | | |
| 0.30 - 0.50 | ES | | w: 7 % | | | | |
| | | | | End of Excavation | 0.85 | | -1.83 |

**Excavation**

| | | | |
|---|---|---|---|
| **Plant** | Hand tools. | **Width (B)** | 0.30 |
| **Date** | 25/04/2024 | **Length (C)** | 0.30 |
| **Shoring** | 0.00-0.70m bgl. | **Date Backfilled** | 25/04/2024 |
| **Stability** | Unstable from ground level. | | |

**Groundwater**

| Depth Observed | Depth of Pit | Rose to | in Mins | Remarks |
|---|---|---|---|---|
| 0.30 | 0.85 | | | Settled in pit at 0.25m bgl. |

**Remarks**

Exploratory hole location checked for services using a Cable Avoidance Tool (CAT) & Genny prior to excavation. No services were detected. Hole was dug to depth using hand tools and terminated at 0.85m bgl due to instability and collapse below the shoring. Excess arisings were used to backfill the hole upon completion.

Logged by LP

Figure Sheet 1 of 1

11/06/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

# TRIAL PIT RECORD - *Hand-Dug Inspection Pit*

| | | | | | |
|---|---|---|---|---|---|
| **Project** | SHOREHAM SOLDIERS POINT DETAILED DESIGN GI | **Engineer** | JBA Consulting | **Project No.** | PE241896 |
| | | | | **Location ID** | HP106 |
| **Client** | JBA Consulting | **National Grid Coordinates** | 523267.0 E<br>104797.9 N | **Ground Level** | -0.75 m OD |

Samples and Tests | Strata | Scale 1:10

| Depth | Sample Type | Stratum No. | Results | Description | Depth | Legend | Level (m OD) |
|---|---|---|---|---|---|---|---|
| 0.00 - 0.20 | ES | | w: 7,7 % | Orangish brown and grey very gravelly slightly silty SAND. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of chert and quartz. | | | |
| 0.30 - 0.50 | ES | | | Between 0.40-0.50m, occasional pockets of grey silty sand with partially decomposed organic fragments with a slight organic odour. | | | |
| 0.60 - 0.80 | ES | | | Orangish brown and grey very sandy GRAVEL with a low cobble content (up to 80x60mm in size) of chert and quartz. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of chert and quartz. | 0.60 | | -1.35 |
| | | | | End of Excavation | 0.80 | | -1.55 |

**Excavation**

| | | | |
|---|---|---|---|
| **Plant** | Hand tools. | **Width (B)** | 0.30 |
| **Date** | 25/04/2024 | **Length (C)** | 0.30 |
| **Shoring** | 0.00-0.70m bgl. | **Date Backfilled** | 25/04/2024 |
| **Stability** | Unstable from ground level. | | |

**Groundwater**

| Depth Observed | Depth of Pit | Rose to | in Mins | Remarks |
|---|---|---|---|---|
| 0.40 | 0.80 | | | Settled in pit at 0.45m bgl. |

**Remarks** Exploratory hole location checked for services using a Cable Avoidance Tool (CAT) & Genny prior to excavation. No services were detected. Hole was dug to depth using hand tools and terminated at 0.80m bgl due to instability and collapse below the shoring. Excess arisings were used to backfill the hole upon completion.

Logged by LP

Figure Sheet 1 of 1

11/06/2024

Symbols and abbrevations are explained on the accompanying key sheets.
All dimensions are in metres.

Logged in accordance with BS5930:2015 + A1:2020

GEOTECHNICS

# APPENDIX 5

## Trial Pit Photographs

HP101 - Arisings




HP101 - Pit



HP102 - Arisings




HP102 - Pit



HP103 - Arisings




HP103 - Pit



HP104 - Arisings




HP104 - Pit



HP105 - Arisings




HP105 - Pit



HP106 - Arisings




HP106 - Pit



# APPENDIX 6

## Chemical Testing Laboratory Testing Results

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

# Final Report

| | |
|---|---|
| **Report No.:** | 24-13411-1 |
| **Initial Date of Issue:** | 13-May-2024 |
| **Re-Issue Details:** | |
| **Client** | Geotechnics Ltd |
| **Client Address:** | Unit 5 Orchard Court, Heron Road<br>Sowton Industrial Estate<br>Exeter<br>Devon<br>EX2 7LL |
| **Contact(s):** | Anne Simpson<br>Scott Hunter |
| **Project** | PE241896 Shoreham Soldiers GI |

| | | | |
|---|---|---|---|
| **Quotation No.:** | Q23-33177 | **Date Received:** | 29-Apr-2024 |
| **Order No.:** | OE40349 | **Date Instructed:** | 30-Apr-2024 |
| **No. of Samples:** | 4 | | |
| **Turnaround (Wkdays):** | 5 | **Results Due:** | 07-May-2024 |

**Date Approved:** 13-May-2024

**Approved By:**



**Details:** David Smith, Technical Director

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

# Results - Soil

**Project: PE241896 Shoreham Soldiers GI**

| **Client: Geotechnics Ltd** | | | | **Chemtest Job No.:** | | 24-13411 | 24-13411 | 24-13411 | 24-13411 |
|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: Q23-33177 | | | | **Chemtest Sample ID.:** | | 1800260 | 1800264 | 1800268 | 1800269 |
| | | | | Client Sample ID.: | | ES(1) + ES(2) | ES(1) + ES(2) | ES(1) + ES(2) | ES(1) + ES(2) |
| | | | | Sample Location: | | HP102 | HP103 | HP105 | HP106 |
| | | | | Sample Type: | | SOIL | SOIL | SOIL | SOIL |
| | | | | Top Depth (m): | | 0.30 | 0.60 | 0.30 | 0.00 |
| | | | | Bottom Depth (m): | | 0.50 | 0.90 | 0.50 | 0.20 |
| | | | | Date Sampled: | | 24-Apr-2024 | 24-Apr-2024 | 24-Apr-2024 | 24-Apr-2024 |
| | | | | Asbestos Lab: | | NEW-ASB | NEW-ASB | NEW-ASB | NEW-ASB |
| **Determinand** | **HWOL Code** | **Accred.** | **SOP** | **Units** | **LOD** | | | | |
| ACM Type | | U | 2192 | | N/A | - | - | - | - |
| Asbestos Identification | | U | 2192 | | N/A | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected | No Asbestos Detected |
| Moisture | | N | 2030 | % | 0.020 | 15 | 10 | 6.9 | 6.9 |
| Soil Colour | | N | 2040 | | N/A | Brown | Brown | Brown | Brown |
| Other Material | | N | 2040 | | N/A | Stones | Stones | Stones | Stones |
| Soil Texture | | N | 2040 | | N/A | Sand | Sand | Sand | Sand |
| pH at 20C | | U | 2010 | | 4.0 | 8.0 | 7.6 | 8.1 | 8.2 |
| Boron (Hot Water Soluble) | | U | 2120 | mg/kg | 0.40 | 4.2 | 0.87 | 1.6 | 2.0 |
| Sulphate (2:1 Water Soluble) as SO4 | | U | 2120 | g/l | 0.010 | 0.28 | 0.13 | 0.12 | 0.14 |
| Total Sulphur | | U | 2175 | % | 0.010 | 0.43 | 0.059 | 0.073 | 0.053 |
| Cyanide (Total) | | U | 2300 | mg/kg | 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Arsenic | | U | 2455 | mg/kg | 0.5 | 3.8 | 5.9 | 7.0 | 9.4 |
| Cadmium | | U | 2455 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Chromium | | U | 2455 | mg/kg | 0.5 | 3.2 | 7.0 | 9.7 | 6.1 |
| Copper | | U | 2455 | mg/kg | 0.50 | 1.3 | 1.8 | 3.7 | 3.6 |
| Mercury | | U | 2455 | mg/kg | 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Nickel | | U | 2455 | mg/kg | 0.50 | 2.0 | 2.7 | 4.7 | 3.5 |
| Lead | | U | 2455 | mg/kg | 0.50 | 2.7 | 3.9 | 5.6 | 4.5 |
| Selenium | | U | 2455 | mg/kg | 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 |
| Zinc | | U | 2455 | mg/kg | 0.50 | 8.0 | 10 | 16 | 16 |
| Aliphatic VPH >C5-C6 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Aliphatic VPH >C6-C7 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Aliphatic VPH >C7-C8 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Aliphatic VPH >C6-C8 (Sum) | HS_2D_AL | N | 2780 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Aliphatic VPH >C8-C10 | HS_2D_AL | U | 2780 | mg/kg | 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Total Aliphatic VPH >C5-C10 | HS_2D_AL | U | 2780 | mg/kg | 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 |
| Aliphatic EPH >C10-C12 MC | EH_2D_AL_#1 | U | 2690 | mg/kg | 2.00 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| Aliphatic EPH >C12-C16 MC | EH_2D_AL_#1 | U | 2690 | mg/kg | 1.00 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Aliphatic EPH >C16-C21 MC | EH_2D_AL_#1 | U | 2690 | mg/kg | 2.00 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| Aliphatic EPH >C21-C35 MC | EH_2D_AL_#1 | U | 2690 | mg/kg | 3.00 | < 3.0 | < 3.0 | < 3.0 | < 3.0 |
| Aliphatic EPH >C35-C40 MC | EH_2D_AL_#1 | N | 2690 | mg/kg | 10.00 | < 10 | < 10 | < 10 | < 10 |
| Total Aliphatic EPH >C10-C35 MC | EH_2D_AL_#1 | U | 2690 | mg/kg | 5.00 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Total Aliphatic EPH >C10-C40 MC | EH_2D_AL_#1 | N | 2690 | mg/kg | 10.00 | < 10 | < 10 | < 10 | < 10 |
| Aromatic VPH >C5-C7 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Aromatic VPH >C7-C8 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Aromatic VPH >C8-C10 | HS_2D_AR | U | 2780 | mg/kg | 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |

# Results - Soil

**Project: PE241896 Shoreham Soldiers GI**

| **Client: Geotechnics Ltd** | | | | **Chemtest Job No.:** | | 24-13411 | 24-13411 | 24-13411 | 24-13411 |
|---|---|---|---|---|---|---|---|---|---|
| Quotation No.: Q23-33177 | | | | **Chemtest Sample ID.:** | | 1800260 | 1800264 | 1800268 | 1800269 |
| | | | | Client Sample ID.: | | ES(1) + ES(2) | ES(1) + ES(2) | ES(1) + ES(2) | ES(1) + ES(2) |
| | | | | Sample Location: | | HP102 | HP103 | HP105 | HP106 |
| | | | | Sample Type: | | SOIL | SOIL | SOIL | SOIL |
| | | | | Top Depth (m): | | 0.30 | 0.60 | 0.30 | 0.00 |
| | | | | Bottom Depth (m): | | 0.50 | 0.90 | 0.50 | 0.20 |
| | | | | Date Sampled: | | 24-Apr-2024 | 24-Apr-2024 | 24-Apr-2024 | 24-Apr-2024 |
| | | | | Asbestos Lab: | | NEW-ASB | NEW-ASB | NEW-ASB | NEW-ASB |
| **Determinand** | **HWOL Code** | **Accred.** | **SOP** | **Units** | **LOD** | | | | |
| Total Aromatic VPH >C5-C10 | HS_2D_AR | U | 2780 | mg/kg | 0.25 | < 0.25 | < 0.25 | < 0.25 | < 0.25 |
| Aromatic EPH >C10-C12 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 1.00 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Aromatic EPH >C12-C16 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 1.00 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Aromatic EPH >C16-C21 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 2.00 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| Aromatic EPH >C21-C35 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 2.00 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| Aromatic EPH >C35-C40 MC | EH_2D_AR_#1 | N | 2690 | mg/kg | 1.00 | 1.3 | < 1.0 | < 1.0 | < 1.0 |
| Total Aromatic EPH >C10-C35 MC | EH_2D_AR_#1 | U | 2690 | mg/kg | 5.00 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Total Aromatic EPH >C10-C40 MC | EH_2D_AR_#1 | N | 2690 | mg/kg | 10.00 | < 10 | < 10 | < 10 | < 10 |
| Total VPH >C5-C10 | HS_2D_Total | U | 2780 | mg/kg | 0.50 | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Total EPH >C10-C35 MC | EH_2D_Total_#1 | U | 2690 | mg/kg | 10.00 | < 10 | < 10 | < 10 | < 10 |
| Total EPH >C10-C40 MC | EH_2D_Total_#1 | N | 2690 | mg/kg | 10.00 | < 10 | < 10 | < 10 | < 10 |
| Organic Matter | | U | 2625 | % | 0.40 | 0.52 | < 0.40 | < 0.40 | < 0.40 |
| Naphthalene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Acenaphthylene | | N | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Acenaphthene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Fluorene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Phenanthrene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Anthracene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Fluoranthene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Pyrene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[a]anthracene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Chrysene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[b]fluoranthene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[k]fluoranthene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[a]pyrene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Indeno(1,2,3-c,d)Pyrene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Dibenz(a,h)Anthracene | | N | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Benzo[g,h,i]perylene | | U | 2800 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |
| Total Of 16 PAH's | | N | 2800 | mg/kg | 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| Total Phenols | | U | 2920 | mg/kg | 0.10 | < 0.10 | < 0.10 | < 0.10 | < 0.10 |

# Test Methods

| SOP | Title | Parameters included | Method summary | Water Accred. |
|---|---|---|---|---|
| 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. | |
| 2040 | Soil Description(Requirement of MCERTS) | Soil description | As received soil is described based upon BS5930 | |
| 2120 | Water Soluble Boron, Sulphate, Magnesium & Chromium | Boron; Sulphate; Magnesium; Chromium | Aqueous extraction / ICP-OES | |
| 2175 | Total Sulphur in Soils | Total Sulphur | Determined by high temperature combustion under oxygen, using an Eltra elemental analyser. | |
| 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. | |
| 2625 | Total Organic Carbon in Soils | Total organic Carbon (TOC) | Determined by high temperature combustion under oxygen, using an Eltra elemental analyser. | |
| 2690 | EPH A/A Split | Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 | Acetone/Heptane extraction / GCxGC FID detection | |
| 2780 | VPH A/A Split | Aliphatics: >C5–C6, >C6–C7,>C7–C8,>C8-C10 Aromatics: >C5–C7,>C7-C8,>C8–C10 | Water extraction / Headspace GCxGC FID detection | |
| 2800 | Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS | 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-MS | |
| 2920 | Phenols in Soils by HPLC | Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded. | 60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection. | |

## Report Information

**Key**

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

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.

**Sample Deviation Codes**

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

**Sample Retention and Disposal**

All soil samples will be retained for a period of 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.

**Water Sample Category Key for Accreditation**

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable

## Report Information

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

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

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

# Amended Report

| | | | |
|---|---|---|---|
| **Report No.:** | 24-13583-2 | | |
| **Initial Date of Issue:** | 08-May-2024 | **Date of Re-Issue:** | 09-May-2024 |
| **Re-Issue Details:** | This report has been revised and directly supersedes 24-13583-1 in its entirety | | |
| **Client** | Geotechnics Ltd | | |
| **Client Address:** | Unit 5 Orchard Court<br>Heron Road<br>Sowton Industrial Estate<br>Exeter<br>Devon<br>EX2 7LL | | |
| **Contact(s):** | Anne Simpson<br>Scott Hunter | | |
| **Project** | PE241896 Shoreham Soliders Point GI | | |
| **Quotation No.:** | Q23-33177 | **Date Received:** | 30-Apr-2024 |
| **Order No.:** | OE40349 | **Date Instructed:** | 30-Apr-2024 |
| **No. of Samples:** | 4 | | |
| **Turnaround (Wkdays):** | 7 | **Results Due:** | 09-May-2024 |
| **Date Approved:** | 08-May-2024 | | |

**Approved By:**



**Details:** David Smith, Technical Director

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

# Results - 2 Stage WAC

**Project: PE241896 Shoreham Soliders Point GI**

| | | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-13583 | | | | | | | | |
| **Chemtest Sample ID:** | 1800773 | | | | | | | | |
| **Sample Ref:** | | | | | | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| **Sample ID:** | | | | | | | | | |
| **Sample Location:** | HP101 | | | | | | | | |
| **Top Depth(m):** | 0.00 | | | | | | | | |
| **Bottom Depth(m):** | 0.10 | | | | | | | | |
| **Sampling Date:** | 24-Apr-2024 | | | | | | | | |
| **Determinand** | **SOP** | **Accred.** | **Units** | | | | | | |
| Total Organic Carbon | 2625 | M | % | | | 1.1 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | M | % | | | 0.69 | -- | -- | 10 |
| Total BTEX | 2760 | M | mg/kg | | | < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | M | mg/kg | | | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | M | mg/kg | | | < 10 | 500 | -- | -- |
| Total (Of 17) PAH's | 2700 | N | mg/kg | | | < 2.0 | 100 | -- | -- |
| pH at 20C | 2010 | M | | | | 8.0 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | N | mol/kg | | | 0.0070 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | **2:1 mg/l** | **8:1 mg/l** | **2:1 mg/kg** | **Cumulative mg/kg 10:1** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | U | 0.0022 | 0.0028 | 0.0043 | 0.027 | 0.5 | 2 | 25 |
| Barium | 1455 | U | 0.007 | < 0.005 | 0.013 | 0.010 | 20 | 100 | 300 |
| Cadmium | 1455 | U | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00011 | 0.04 | 1 | 5 |
| Chromium | 1455 | U | 0.0029 | 0.0022 | 0.0057 | 0.023 | 0.5 | 10 | 70 |
| Copper | 1455 | U | 0.0022 | 0.0016 | 0.0043 | 0.0033 | 2 | 50 | 100 |
| Mercury | 1455 | U | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | U | 0.022 | 0.0020 | 0.044 | 0.051 | 0.5 | 10 | 30 |
| Nickel | 1455 | U | 0.0036 | 0.0025 | 0.0070 | 0.027 | 0.4 | 10 | 40 |
| Lead | 1455 | U | < 0.0005 | < 0.0005 | < 0.0005 | < 0.0005 | 0.5 | 10 | 50 |
| Antimony | 1455 | U | 0.0025 | < 0.0005 | 0.0049 | 0.0037 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | U | 0.0012 | 0.0009 | 0.0024 | 0.0095 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | U | < 0.003 | 0.003 | < 0.003 | 0.029 | 4 | 50 | 200 |
| Chloride | 1220 | U | 2000 | 120 | 4000 | 4000 | 800 | 15000 | 25000 |
| Fluoride | 1220 | U | 0.45 | 0.11 | < 1.0 | 1.6 | 10 | 150 | 500 |
| Sulphate | 1220 | U | 280 | 18 | 560 | 580 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | N | 4300 | 270 | 8400 | 8600 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | U | < 0.030 | < 0.030 | < 0.30 | < 0.50 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | U | 5.9 | 3.8 | < 50 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.175 |
| Moisture (%) | 17 |

| **Leachate Test Information** | |
|---|---|
| Leachant volume 1st extract/l | 0.314 |
| Leachant volume 2nd extract/l | 1.400 |
| Eluant recovered from 1st extract/l | 0.261 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - 2 Stage WAC

**Project: PE241896 Shoreham Soliders Point GI**

| | | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-13583 | | | | | | | | |
| **Chemtest Sample ID:** | 1800774 | | | | | | | | |
| **Sample Ref:** | | | | | | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| **Sample ID:** | | | | | | | | | |
| **Sample Location:** | HP102 | | | | | | | | |
| **Top Depth(m):** | 0.30 | | | | | | | | |
| **Bottom Depth(m):** | 0.50 | | | | | | | | |
| **Sampling Date:** | 24-Apr-2024 | | | | | | | | |
| **Determinand** | **SOP** | **Accred.** | **Units** | | | | | | |
| Total Organic Carbon | 2625 | M | % | | | < 0.20 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | M | % | | | 1.2 | -- | -- | 10 |
| Total BTEX | 2760 | M | mg/kg | | | < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | M | mg/kg | | | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | M | mg/kg | | | < 10 | 500 | -- | -- |
| Total (Of 17) PAH's | 2700 | N | mg/kg | | | < 2.0 | 100 | -- | -- |
| pH at 20C | 2010 | M | | | | 7.8 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | N | mol/kg | | | 0.0090 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | **2:1 mg/l** | **8:1 mg/l** | **2:1 mg/kg** | **Cumulative mg/kg 10:1** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | U | 0.0031 | 0.0037 | 0.0060 | 0.036 | 0.5 | 2 | 25 |
| Barium | 1455 | U | 0.009 | < 0.005 | 0.017 | 0.013 | 20 | 100 | 300 |
| Cadmium | 1455 | U | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00011 | 0.04 | 1 | 5 |
| Chromium | 1455 | U | 0.0022 | 0.0030 | 0.0042 | 0.029 | 0.5 | 10 | 70 |
| Copper | 1455 | U | 0.0009 | 0.0013 | 0.0018 | 0.0014 | 2 | 50 | 100 |
| Mercury | 1455 | U | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | U | 0.45 | 0.041 | 0.88 | 1.0 | 0.5 | 10 | 30 |
| Nickel | 1455 | U | 0.0038 | 0.0030 | 0.0075 | 0.031 | 0.4 | 10 | 40 |
| Lead | 1455 | U | < 0.0005 | < 0.0005 | < 0.0005 | < 0.0005 | 0.5 | 10 | 50 |
| Antimony | 1455 | U | 0.0065 | 0.0009 | 0.013 | 0.018 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | U | 0.0019 | 0.0008 | 0.0037 | 0.0095 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | U | 0.003 | 0.012 | 0.005 | 0.11 | 4 | 50 | 200 |
| Chloride | 1220 | U | 1500 | 99 | 3000 | 3200 | 800 | 15000 | 25000 |
| Fluoride | 1220 | U | 0.46 | 0.12 | < 1.0 | 1.7 | 10 | 150 | 500 |
| Sulphate | 1220 | U | 250 | 19 | 490 | 540 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | N | 3200 | 250 | 6300 | 7000 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | U | < 0.030 | < 0.030 | < 0.30 | < 0.50 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | U | 9.7 | 4.8 | < 50 | 55 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.175 |
| Moisture (%) | 17 |

| **Leachate Test Information** | |
|---|---|
| Leachant volume 1st extract/l | 0.314 |
| Leachant volume 2nd extract/l | 1.400 |
| Eluant recovered from 1st extract/l | 0.269 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - 2 Stage WAC

**Project: PE241896 Shoreham Soliders Point GI**

| | | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-13583 | | | | | | | | |
| **Chemtest Sample ID:** | 1800775 | | | | | | | | |
| **Sample Ref:** | | | | | | | | | |
| **Sample ID:** | | | | | | | | | |
| **Sample Location:** | HP103 | | | | | | | | |
| **Top Depth(m):** | 0.60 | | | | | | | | |
| **Bottom Depth(m):** | 0.90 | | | | | | | | |
| **Sampling Date:** | 24-Apr-2024 | | | | | | | | |
| **Determinand** | **SOP** | **Accred.** | **Units** | | | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| Total Organic Carbon | 2625 | M | % | | | < 0.20 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | M | % | | | 0.92 | -- | -- | 10 |
| Total BTEX | 2760 | M | mg/kg | | | < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | M | mg/kg | | | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | M | mg/kg | | | < 10 | 500 | -- | -- |
| Total (Of 17) PAH's | 2700 | N | mg/kg | | | < 2.0 | 100 | -- | -- |
| pH at 20C | 2010 | M | | | | 8.0 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | N | mol/kg | | | 0.011 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | **2:1 mg/l** | **8:1 mg/l** | **2:1 mg/kg** | **Cumulative mg/kg 10:1** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | U | 0.025 | 0.0077 | 0.050 | 0.11 | 0.5 | 2 | 25 |
| Barium | 1455 | U | 0.048 | 0.008 | 0.095 | 0.15 | 20 | 100 | 300 |
| Cadmium | 1455 | U | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00011 | 0.04 | 1 | 5 |
| Chromium | 1455 | U | 0.0026 | 0.0027 | 0.0051 | 0.027 | 0.5 | 10 | 70 |
| Copper | 1455 | U | 0.0017 | 0.0019 | 0.0033 | 0.0029 | 2 | 50 | 100 |
| Mercury | 1455 | U | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | U | 0.0031 | 0.0006 | 0.0062 | 0.010 | 0.5 | 10 | 30 |
| Nickel | 1455 | U | 0.0028 | 0.0029 | 0.0055 | 0.029 | 0.4 | 10 | 40 |
| Lead | 1455 | U | < 0.0005 | < 0.0005 | < 0.0005 | < 0.0005 | 0.5 | 10 | 50 |
| Antimony | 1455 | U | 0.0007 | < 0.0005 | 0.0013 | 0.0011 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | U | 0.0010 | 0.0009 | 0.0020 | 0.0088 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | U | 0.004 | 0.013 | 0.008 | 0.12 | 4 | 50 | 200 |
| Chloride | 1220 | U | 550 | 23 | 1100 | 1100 | 800 | 15000 | 25000 |
| Fluoride | 1220 | U | 0.21 | 0.10 | < 1.0 | 1.2 | 10 | 150 | 500 |
| Sulphate | 1220 | U | 77 | 3.5 | 150 | 160 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | N | 1300 | 73 | 2600 | 2800 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | U | < 0.030 | < 0.030 | < 0.30 | < 0.50 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | U | 2.7 | 3.3 | < 50 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.175 |
| Moisture (%) | 10 |

| **Leachate Test Information** | |
|---|---|
| Leachant volume 1st extract/l | 0.330 |
| Leachant volume 2nd extract/l | 1.400 |
| Eluant recovered from 1st extract/l | 0.299 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Results - 2 Stage WAC

**Project: PE241896 Shoreham Soliders Point GI**

| | | | | | | | Landfill Waste Acceptance Criteria Limits | | |
|---|---|---|---|---|---|---|---|---|---|
| **Chemtest Job No:** | 24-13583 | | | | | | | | |
| **Chemtest Sample ID:** | 1800776 | | | | | | | | |
| **Sample Ref:** | | | | | | | **Inert Waste Landfill** | **Stable, Non-reactive hazardous waste in non-hazardous Landfill** | **Hazardous Waste Landfill** |
| **Sample ID:** | | | | | | | | | |
| **Sample Location:** | HP106 | | | | | | | | |
| **Top Depth(m):** | 0.00 | | | | | | | | |
| **Bottom Depth(m):** | 0.20 | | | | | | | | |
| **Sampling Date:** | 24-Apr-2024 | | | | | | | | |
| **Determinand** | **SOP** | **Accred.** | **Units** | | | | | | |
| Total Organic Carbon | 2625 | M | % | | | < 0.20 | 3 | 5 | 6 |
| Loss On Ignition | 2610 | M | % | | | 0.67 | -- | -- | 10 |
| Total BTEX | 2760 | M | mg/kg | | | < 0.010 | 6 | -- | -- |
| Total PCBs (7 Congeners) | 2815 | M | mg/kg | | | < 0.10 | 1 | -- | -- |
| TPH Total WAC | 2670 | M | mg/kg | | | < 10 | 500 | -- | -- |
| Total (Of 17) PAH's | 2700 | N | mg/kg | | | < 2.0 | 100 | -- | -- |
| pH at 20C | 2010 | M | | | | 8.2 | -- | >6 | -- |
| Acid Neutralisation Capacity | 2015 | N | mol/kg | | | 0.0060 | -- | To evaluate | To evaluate |
| **Eluate Analysis** | | | **2:1 mg/l** | **8:1 mg/l** | **2:1 mg/kg** | **Cumulative mg/kg 10:1** | **Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg** | | |
| Arsenic | 1455 | U | 0.013 | 0.0052 | 0.026 | 0.065 | 0.5 | 2 | 25 |
| Barium | 1455 | U | 0.027 | 0.006 | 0.054 | 0.096 | 20 | 100 | 300 |
| Cadmium | 1455 | U | < 0.00011 | < 0.00011 | < 0.00011 | < 0.00011 | 0.04 | 1 | 5 |
| Chromium | 1455 | U | 0.0025 | 0.0026 | 0.0049 | 0.026 | 0.5 | 10 | 70 |
| Copper | 1455 | U | 0.0085 | 0.0020 | 0.017 | 0.015 | 2 | 50 | 100 |
| Mercury | 1455 | U | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | 0.01 | 0.2 | 2 |
| Molybdenum | 1455 | U | 0.0037 | 0.0007 | 0.0075 | 0.012 | 0.5 | 10 | 30 |
| Nickel | 1455 | U | 0.011 | 0.0028 | 0.021 | 0.041 | 0.4 | 10 | 40 |
| Lead | 1455 | U | < 0.0005 | < 0.0005 | < 0.0005 | < 0.0005 | 0.5 | 10 | 50 |
| Antimony | 1455 | U | < 0.0005 | < 0.0005 | < 0.0005 | < 0.0005 | 0.06 | 0.7 | 5 |
| Selenium | 1455 | U | 0.0013 | 0.0006 | 0.0026 | 0.0073 | 0.1 | 0.5 | 7 |
| Zinc | 1455 | U | 0.005 | 0.011 | 0.011 | 0.10 | 4 | 50 | 200 |
| Chloride | 1220 | U | 520 | 21 | 1000 | 1100 | 800 | 15000 | 25000 |
| Fluoride | 1220 | U | 0.26 | 0.098 | < 1.0 | 1.3 | 10 | 150 | 500 |
| Sulphate | 1220 | U | 74 | 3.7 | 150 | 160 | 1000 | 20000 | 50000 |
| Total Dissolved Solids | 1020 | N | 1300 | 75 | 2500 | 2800 | 4000 | 60000 | 100000 |
| Phenol Index | 1920 | U | < 0.030 | < 0.030 | < 0.30 | < 0.50 | 1 | - | - |
| Dissolved Organic Carbon | 1610 | U | 2.8 | 3.4 | < 50 | < 50 | 500 | 800 | 1000 |

| **Solid Information** | |
|---|---|
| Dry mass of test portion/kg | 0.175 |
| Moisture (%) | 6.9 |

| **Leachate Test Information** | |
|---|---|
| Leachant volume 1st extract/l | 0.337 |
| Leachant volume 2nd extract/l | 1.400 |
| Eluant recovered from 1st extract/l | 0.301 |

**Waste Acceptance Criteria**

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

# Test Methods

| SOP | Title | Parameters included | Method summary | Water Accred. |
|---|---|---|---|---|
| 1020 | Electrical Conductivity and Total Dissolved Solids (TDS) in Waters | Electrical Conductivity at 25°C and Total Dissolved Solids (TDS) in Waters | Conductivity Meter | |
| 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. | |
| 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). | |
| 1610 | Total/Dissolved Organic Carbon in Waters | Organic Carbon | TOC Analyser using Catalytic Oxidation | |
| 1920 | Phenols in Waters by HPLC | Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded. | Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection. | |
| 2010 | pH Value of Soils | pH at 20°C | pH Meter | |
| 2015 | Acid Neutralisation Capacity | Acid Reserve | Titration | |
| 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. | |
| 2040 | Soil Description(Requirement of MCERTS) | Soil description | As received soil is described based upon BS5930 | |
| 2610 | Loss on Ignition | loss on ignition (LOI) | Determination of the proportion by mass that is lost from a soil by ignition at 550°C. | |
| 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. | |
| 2815 | Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS | ICES7 PCB congeners | Acetone/Hexane extraction / GC-MS. Reported PCB 101 results may contain contributions from PCB 90 due to inseparable chromatography. | |
| 640 | Characterisation of Waste (Leaching C10) | Waste material including soil, sludges and granular waste | ComplianceTest for Leaching of Granular Waste Material and Sludge | |
| 650 | Characterisation of Waste (Leaching WAC) | 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 |

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.

**Sample Deviation Codes**

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

**Sample Retention and Disposal**

All soil samples will be retained for a period of 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.

**Water Sample Category Key for Accreditation**

DW - Drinking Water
GW - Ground Water
LE - Land Leachate
NA - Not Applicable

## Report Information

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

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

# Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

**Test Report ID** MAR02285

Issue Version: 1

Customer: Geotechnics Ltd, 5 Orchard Court, Heron Road, Sowton Industrial Estate, Exeter, EX2 7NR

Customer Reference: PE241896 Shoreham - MMO Analysis

Date Sampled: 25-Apr-24

Date Samples Received: 01-May-24

Test Report Date: 31-May-24

Condition of samples: Cold Satisfactory

Opinions and Interpretations expressed herein are outside the scope of our UKAS accreditation
The results reported relate only to the sample tested
The results apply to the sample as received



Authorised by: Katherine Smith

Position: Customer Services Co-ordinator

UKAS TESTING
1252




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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO | MMO |
| | | | 45mm | 31.5mm | 22.4mm | 16mm | 11.2mm | 8mm |
| Client Reference: | SOCOTEC Ref: | Matrix | -5.5 | -5.0 | -4.5 | -4.0 | -3.5 | -3.0 |
| HP101 ES(3) 0.60-0.70m | MAR02285.002 | Sediment | 0.00 | 0.00 | 4.68 | 2.56 | 3.14 | 2.34 |
| HP102 ES(3) 0.60-0.90m | MAR02285.004 | Sediment | 0.00 | 9.97 | 18.85 | 7.34 | 18.36 | 9.87 |

* See Report Notes


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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO | MMO | MMO |
| | | | 5.6mm | 4mm | 2.8mm | 2mm | 1.4mm | 1mm | 707µm |
| Client Reference: | SOCOTEC Ref: | Matrix | -2.5 | -2.0 | -1.5 | -1.0 | -0.5 | 0.0 | 0.5 |
| HP101 ES(3) 0.60-0.70m | MAR02285.002 | Sediment | 3.77 | 1.80 | 1.94 | 1.48 | 1.43 | 1.51 | 0.00 |
| HP102 ES(3) 0.60-0.90m | MAR02285.004 | Sediment | 6.76 | 3.51 | 2.94 | 1.84 | 1.65 | 1.52 | 0.43 |

* See Report Notes


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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO | MMO | MMO |
| | | | 500µm | 353.6µm | 250µm | 176.8µm | 125µm | 88.39µm | 63µm |
| Client Reference: | SOCOTEC Ref: | Matrix | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
| HP101 ES(3) 0.60-0.70m | MAR02285.002 | Sediment | 0.91 | 2.56 | 7.85 | 27.26 | 22.03 | 6.77 | 1.99 |
| HP102 ES(3) 0.60-0.90m | MAR02285.004 | Sediment | 0.05 | 0.34 | 2.06 | 4.08 | 2.99 | 1.02 | 0.28 |

* See Report Notes


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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO | MMO | MMO |
| | | | 44.2µm | 31.3µm | 22.1µm | 15.6µm | 11µm | 7.8µm | 5.5µm |
| Client Reference: | SOCOTEC Ref: | Matrix | 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 7.0 | 7.5 |
| HP101 ES(3) 0.60-0.70m | MAR02285.002 | Sediment | 0.98 | 0.66 | 0.53 | 0.42 | 0.54 | 0.51 | 0.44 |
| HP102 ES(3) 0.60-0.90m | MAR02285.004 | Sediment | 0.38 | 0.52 | 0.51 | 0.48 | 0.51 | 0.60 | 0.65 |

* See Report Notes


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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO | MMO | MMO |
| | | | 3.9µm | 2.75µm | 1.95µm | 1.38µm | 0.98µm | 0.69µm | 0.49µm |
| Client Reference: | SOCOTEC Ref: | Matrix | 8.0 | 8.5 | 9.0 | 9.5 | 10.0 | 10.5 | 11.0 |
| HP101 ES(3) 0.60-0.70m | MAR02285.002 | Sediment | 0.37 | 0.28 | 0.22 | 0.21 | 0.21 | 0.18 | 0.14 |
| HP102 ES(3) 0.60-0.90m | MAR02285.004 | Sediment | 0.58 | 0.44 | 0.31 | 0.25 | 0.21 | 0.18 | 0.15 |

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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) | % (at 0.5phi intervals) |
|---|---|---|---|---|---|---|---|---|---|
| | | Method No | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 | *SUB_01 |
| | | Accreditation | MMO | MMO | MMO | MMO | MMO | MMO | MMO |
| | | | 0.34µm | 0.24µm | 0.17µm | 0.12µm | 0.09µm | 0.06µm | 0.04µm |
| Client Reference: | SOCOTEC Ref: | Matrix | 11.5 | 12.0 | 12.5 | 13.0 | 13.5 | 14.0 | 14.5 |
| HP101 ES(3) 0.60-0.70m | MAR02285.002 | Sediment | 0.10 | 0.07 | 0.05 | 0.03 | 0.02 | 0.01 | 0.00 |
| HP102 ES(3) 0.60-0.90m | MAR02285.004 | Sediment | 0.12 | 0.09 | 0.07 | 0.05 | 0.03 | 0.01 | 0.00 |

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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | % (at 0.5phi intervals) |
|---|---|---|---|
| | | Method No | *SUB_01 |
| | | Accreditation | MMO |
| | | | <0.04µm |
| Client Reference: | SOCOTEC Ref: | Matrix | >14.5 |
| HP101 ES(3) 0.60-0.70m | MAR02285.002 | Sediment | 0.00 |
| HP102 ES(3) 0.60-0.90m | MAR02285.004 | Sediment | 0.00 |

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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | mg/Kg (Dry Weight) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ICPMSS* | | | | | | | |
| | | Limit of Detection | 0.5 | 0.04 | 0.5 | 0.5 | 0.01 | 0.5 | 0.5 | 2 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **Arsenic (As)** | **Cadmium (Cd)** | **Chromium (Cr)** | **Copper (Cu)** | **Mercury (Hg)** | **Nickel (Ni)** | **Lead (Pb)** | **Zinc (Zn)** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | 3.10 | 0.14 | 3.90 | 8.00 | 0.04 | 4.40 | 8.10 | 25.5 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | 4.60 | 0.05 | 4.00 | 7.00 | 0.04 | 3.30 | 5.20 | 18.6 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | 3.50 | <0.04 | 3.30 | 6.30 | 0.04 | 1.70 | 1.90 | 13.2 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | 5.00 | <0.04 | 7.60 | 8.10 | 0.04 | 6.80 | 6.50 | 25.7 |
| Certified Reference Material SETOC 768 (% Recovery) | | | 96 | 94 | 100 | 91 | 102 | 107 | 97 | 103 |
| QC Blank | | | <0.5 | <0.04 | <0.5 | <0.5 | <0.01 | <0.5 | <0.5 | <2 |

* See Report Notes


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# Certificate of Analysis

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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | mg/Kg (Dry Weight) | |
|---|---|---|---|---|
| | | Method No | ASC/SOP/301 | |
| | | Limit of Detection | 0.001 | 0.001 |
| | | Accreditation | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **Dibutyltin (DBT)** | **Tributyltin (TBT)** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | <0.001 | <0.001 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | <0.001 | <0.001 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | <0.001 | <0.001 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | <0.005 | <0.005 |
| Certified Reference Material BCR-646 (% Recovery) | | | 56 | 68 |
| QC Blank | | | <0.001 | <0.001 |

* See Report Notes


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# Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR02285
Issue Version 1
Customer Reference PE241896 Shoreham - MMO Analysis

| | | Units | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 |
| | | Limit of Detection | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **ACENAPTH** | **ACENAPHY** | **ANTHRACN** | **BAA** | **BAP** | **BBF** | **BENZGHIP** | **BEP** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | <1 | 2.10 | 3.88 | 5.72 | 4.75 | 3.53 | 1.76 | 2.76 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | 1.94 | 1.85 | 3.29 | 18.1 | 20.8 | 14.9 | 10.1 | 12.7 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | <1 | <1 | <1 | 1.96 | 1.90 | <1 | <1 | <1 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | <1 | 3.49 | 3.92 | 23.8 | 26.0 | 20.0 | 12.7 | 14.8 |
| Certified Reference Material Nist 1941b (% Recovery) | | | 71 | 120 | 68 | 71 | 68 | 86 | 63 | 81 |
| QC Blank | | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

For full analyte name see method summaries.

*See report notes


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# Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 |
| | | Limit of Detection | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Accreditation | UKAS/MMO | MMO | MMO | MMO | MMO | MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **BKF*** | **C1N** | **C1PHEN** | **C2N** | **C3N** | **CHRYSENE*** | **DBENZAH** | **FLUORANT** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | 5.01 | 2.39 | 7.42 | 5.79 | 5.45 | 5.22 | <1 | 10.8 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | 18.9 | 40.7 | 34.7 | 77.7 | 51.0 | 18.5 | 2.47 | 18.7 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | 1.96 | <1 | 2.16 | <1 | 1.74 | 1.83 | <1 | 2.93 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | 25.9 | 9.11 | 21.7 | 29.7 | 15.6 | 24.1 | 3.29 | 42.7 |
| Certified Reference Material Nist 1941b (% Recovery) | | | 83 | 76 | 82 | 112 | 119 | 91 | 100 | 81 |
| QC Blank | | | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |

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*See report notes


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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | µg/Kg (Dry Weight) | mg/Kg |
|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/303/304 | ASC/SOP/305 |
| | | Limit of Detection | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Accreditation | MMO* | UKAS/MMO | UKAS/MMO | MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **FLUORENE** | **INDPYR** | **NAPTH** | **PERYLENE** | **PHENANT** | **PYRENE** | **THC** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | 2.55 | 1.90 | <1 | 1.33 | 11.3 | 15.0 | <1 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | 2.92 | 10.1 | 6.19 | 3.86 | 29.3 | 21.0 | 14.4 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | <1 | <1 | <1 | <1 | <1 | 2.76 | 1.42 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | 2.81 | 13.5 | 3.85 | 5.44 | 21.0 | 44.1 | 20.2 |
| Certified Reference Material Nist 1941b (% Recovery) | | | 53 | 79 | 60 | 57 | 75 | 71 | 84~ |
| QC Blank | | | <1 | <1 | <1 | <1 | <1 | <1 | <1 |

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are available.

For full analyte name see method summaries.

*See report notes


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# Certificate of Analysis

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Test Report ID MAR02285
Issue Version 1
Customer Reference PE241896 Shoreham - MMO Analysis

| | | Units | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 |
| | | Limit of Detection | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **PCB 101** | **PCB 105** | **PCB 110** | **PCB 118** | **PCB 128** | **PCB 138** | **PCB 141** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| Certified Reference Material Nist 1941b (% Recovery) | | | 95 | 98 | 107 | 97 | 90 | 94 | 104~ |
| QC Blank | | | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |

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# Certificate of Analysis

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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 |
| | | Limit of Detection | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **PCB 149** | **PCB 151** | **PCB 153** | **PCB 156** | **PCB 158** | **PCB 170** | **PCB 18** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| Certified Reference Material Nist 1941b (% Recovery) | | | 92 | 110~ | 96 | 89 | 108 | 106 | 87 |
| QC Blank | | | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |

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Test Report ID MAR02285
Issue Version 1
Customer Reference PE241896 Shoreham - MMO Analysis

| | | Units | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 |
| | | Limit of Detection | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 | 0.00008 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **PCB 180** | **PCB 183** | **PCB 187** | **PCB 194** | **PCB 28** | **PCB 31** | **PCB 44** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| Certified Reference Material Nist 1941b (% Recovery) | | | 106 | 85 | 98 | 101 | 77 | 98 | 89 |
| QC Blank | | | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 | <0.00008 |

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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 | ASC/SOP/302 |
| | | Limit of Detection | 0.00008 | 0.00008 | 0.00008 | 0.00008 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **PCB 47** | **PCB 49** | **PCB 52** | **PCB 66** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | <0.00008 | <0.00008 | <0.00008 | <0.00008 |
| Certified Reference Material Nist 1941b (% Recovery) | | | 100~ | 94 | 92 | 88 |
| QC Blank | | | <0.00008 | <0.00008 | <0.00008 | <0.00008 |

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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | mg/Kg (Dry Weight) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/302 | | | | | | | |
| | | Limit of Detection | 0.0001 | | | | | | | |
| | | Accreditation | UKAS/MMO | MMO* | MMO* | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **AHCH** | **BHCH** | **GHCH** | **DIELDRIN** | **HCB** | **PPTDE** | **PPDDE** | **PPDDT** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Certified Reference Material Nist 1941b (% Recovery) | | | 92~ | 43~ | 46~ | 97~ | 139 | 77 | 95 | 116 |
| QC Blank | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |

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# Certificate of Analysis

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Test Report ID MAR02285
Issue Version 1
Customer Reference PE241896 Shoreham - MMO Analysis

| | | Units | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/308 | ASC/SOP/308 | ASC/SOP/308 | ASC/SOP/308 | ASC/SOP/308 | ASC/SOP/308 | ASC/SOP/308 | ASC/SOP/308 |
| | | Limit of Detection | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **BDE17** | **BDE28** | **BDE47** | **BDE66** | **BDE85** | **BDE99** | **BDE100** | **BDE138** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 |
| Certified Reference Material QBC069MS (% Recovery) | | | 132~ | 100 | 107 | 98~ | 117~ | 103 | 137 | 101~ |
| QC Blank | | | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 |

* See Report Notes


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| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| | | Units | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) | mg/Kg (Dry Weight) |
|---|---|---|---|---|---|---|
| | | Method No | ASC/SOP/308 | ASC/SOP/308 | ASC/SOP/308 | ASC/SOP/308 |
| | | Limit of Detection | 0.00005 | 0.00005 | 0.00005 | 0.0001 |
| | | Accreditation | UKAS/MMO | UKAS/MMO | UKAS/MMO | UKAS/MMO |
| **Client Reference:** | **SOCOTEC Ref:** | **Matrix** | **BDE153** | **BDE154** | **BDE183** | **BDE209** |
| HP101 ES(3) 0.30-0.50m | MAR02285.001 | Sediment | <0.00005 | <0.00005 | <0.00005 | <0.0005 |
| HP102 ES(3) 0.30-0.50m | MAR02285.003 | Sediment | <0.00005 | <0.00005 | <0.00005 | <0.0005 |
| HP103 ES(3) 0.60-0.90m | MAR02285.005 | Sediment | <0.00005 | <0.00005 | <0.00005 | <0.0005 |
| HP106 ES(3) 0.30-0.50m | MAR02285.006 | Sediment | <0.00005 | <0.00005 | <0.00005 | <0.0005 |
| Certified Reference Material QBC069MS (% Recovery) | | | 130 | 91~ | 106 | 81 |
| QC Blank | | | <0.00005 | <0.00005 | <0.00005 | <0.0005* |

* See Report Notes


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# Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

Test Report ID MAR02285
Issue Version 1
Customer Reference PE241896 Shoreham - MMO Analysis

## REPORT NOTES

| Method Code | Sample ID | The following information should be taken into consideration when using the data contained within this report |
|---|---|---|
| *SUB_01 | MAR02285.002, .004 | Analysis was conducted by an approved subcontracted laboratory. |
| ICPMSS* | MAR02285.001, .003, .005-006 | Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252. |
| ASC/SOP/301 | MAR02285.006 | The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated. |
| ASC/SOP/302 | MAR02285.001, .003, .005-006 | The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected.However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (BHCH, GHCH) . These circumstances should be taken into consideration when utilising the data. |
| ASC/SOP/303/304 | MAR02285.001, .003, .005-006 | The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected.However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (FLUORENE) . These circumstances should be taken into consideration when utilising the data. |
| ASC/SOP/303/304 | MAR02285.001, .003, .005-006 | Benzo[k]fluoranthene is known to coelute with Benzo[j]fluoranthene and these peaks can not be resolved. It is believed Benzo[j]fluoranthene is present in these samples therefore it is suggested that the Benzo[k]fluoranthene results should be taken as a Benzo[k]fluoranthene (inc. Benzo[j]fluoranthene). Benzo[j]fluoranthene is not UKAS accredited. This should be taken into consideration when utilising the data. |
| ASC/SOP/303/304 | MAR02285.001, .003, .005-006 | Chrysene is known to coelute with Triphenylene and these peaks can not be resolved in the PAHSED UKAS accredited method. Chrysene and Triphenylene are resolved for MMO but this is currently not UKAS accredited therefore Chrysene is reported without this acccreditation. |
| ASC/SOP/308 | MAR02285.001, .003, .005-006 | The Primary process control blank data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with BDE209 falling above acceptable reporting limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected.However in line with our QMS policy the report limit for this compound has been raised and samples have been blank subtracted. |

## DEVIATING SAMPLE STATEMENT

| Deviation Code | Deviation Definition | Sample ID | Deviation Details. The following information should be taken into consideration when using the data contained within this report |
|---|---|---|---|
| D1 | Holding Time Exceeded | N/A | N/A |
| D2 | Sample Contaminated through Damaged Packaging | N/A | N/A |
| D3 | Sample Contaminated through Sampling | N/A | N/A |
| D4 | Inappropriate Container/Packaging | N/A | N/A |
| D5 | Damaged in Transit | N/A | N/A |
| D6 | Insufficient Quantity of Sample | N/A | N/A |
| D7 | Inappropriate Headspace | N/A | N/A |
| D8 | Retained at Incorrect Temperature | N/A | N/A |
| D9 | Lack of Date & Time of Sampling | N/A | N/A |
| D10 | Insufficient Sample Details | N/A | N/A |
| D11 | Sample integrity compromised or not suitable for analysis | N/A | N/A |


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# Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Advanced Chemistry and Research, Etwall House, Bretby Business Park, Ashby Road, Burton-upon-Trent DE15 0YZ

| | |
|---|---|
| Test Report ID | MAR02285 |
| Issue Version | 1 |
| Customer Reference | PE241896 Shoreham - MMO Analysis |

| Method | Sample and Fraction Size | Method Summary |
|---|---|---|
| Particle Size Analysis | Wet Sediment | Wet and dry sieving followed by laser diffraction analysis. |
| Metals | Air dried | Aqua-regia extraction followed by ICP analysis. |
| Organotins | Wet Sediment | Solvent extraction and derivatisation followed by GC-MS analysis. |
| Polyaromatic Hydrocarbons (PAH) | Wet Sediment | Solvent extraction and clean up followed by GC-MS analysis. |
| Total Hydrocarbon Content (THC) | Wet Sediment | Ultra-violet fluorescence spectroscopy |
| Polychlorinated Biphenyls (PCBs) | Air dried and seived to <2mm | Solvent extraction and clean up followed by GC-MS-MS analysis. |
| Organochlorine Pesticides (OCPs) | Air dried and seived to <2mm | Solvent extraction and clean up followed by GC-MS-MS analysis. |
| Brominated Flame Retardants (PBDEs) | Air dried and seived to <2mm | Solvent extraction and clean up followed by GC-MS-MS analysis. |

**Analyte Definitions**

| Analyte Abbreviation | Full Analyte name | Analyte Abbreviation | Full Analyte name | Analyte Abbreviation | Full Analyte name |
|---|---|---|---|---|---|
| ACENAPTH | Acenaphthene | C2N | C2-naphthalenes | THC | Total Hydrocarbon Content |
| ACENAPHY | Acenaphthylene | C3N | C3-naphthalenes | AHCH | alpha-Hexachlorocyclohexane |
| ANTHRACN | Anthracene | CHRYSENE | Chrysene | BHCH | beta-Hexachlorocyclohexane |
| BAA | Benzo[a]anthracene | DBENZAH | Dibenzo[ah]anthracene | GHCH | gamma-Hexachlorocyclohexane |
| BAP | Benzo[a]pyrene | FLUORANT | Fluoranthene | DIELDRIN | Dieldrin |
| BBF | Benzo[b]fluoranthene | FLUORENE | Fluorene | HCB | Hexachlorobenzene |
| BEP | Benzo[e]pyrene | INDPYR | Indeno[1,2,3-cd]pyrene | PPDDE | p,p'-Dichlorodiphenyldichloroethylene |
| BENZGHIP | Benzo[ghi]perylene | NAPTH | Naphthalene | PPDDT | p,p'-Dichlorodiphenyltrichloroethane |
| BKF | Benzo[k]fluoranthene | PERYLENE | Perylene | PPTDE | p,p'-Dichlorodiphenyldichloroethane |
| C1N | C1-naphthalenes | PHENANT | Phenanthrene | | |
| C1PHEN | C1-phenanthrene | PYRENE | Pyrene | | |


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# APPENDIX 7

## Investigation Techniques and General Notes

# *INVESTIGATION TECHNIQUES*

*INTRODUCTION*

*The following brief review of Ground Investigation techniques, generally used as part of most Site Investigations in the UK, summarises their methodology, advantages and limitations. Detailed descriptions of the techniques are available and can be provided on request. This review should be read in conjunction with the accompanying General Notes.*

*TRIAL PITS*

*The trial pit is amongst the simplest yet most effective means of identifying shallow ground conditions on a site. Its advantages include simplicity, speed, potential accuracy and cost-effectiveness. The trial pit is most commonly formed using a back-acting excavator which can typically determine ground conditions to some 4 metres below ground level. Hand excavation is often used to locate, expose and detail existing foundations, features or services. In general, it is difficult to extend pits significantly below the water table in predominantly granular soils, where flows can cause instability. Unless otherwise stated, the trial pits will not have been provided with temporary side support during their construction. Under such circumstances, entrance into the pit is not permitted and hence observations will have been made from the ground surface and samples taken from the excavator bucket.*

*Where access for personnel is required to allow close observation of the exposed strata, the taking of samples and the carrying out of in situ tests, the sides of the trial pits (Observation Pits in BS 5930:2015) will be made safe using temporary supports or the sides battered back to a stable angle. Some limited access to such Trial Pits (Observation Pits) at depths less than 1m may be allowed in stable conditions or where the sides are benched or battered back to a safe angle.*

*Trends in strata type, level and thickness can be determined, shear surfaces identified and the behaviour of plant, excavation sides and excavated materials can be related to the construction process. They are particularly valuable in land slip investigations. Some types of in situ test can be undertaken in such pits and large disturbed or block samples obtained.*

*CABLE PERCUSSION BORING*

*The light Cable Percussion technique of soft ground boring, typically at a diameter of 150mm, is a well-established simple and flexible method of boring vertical holes and generally allows data to be obtained in respect of strata conditions other than rock. A tubular cutter (for cohesive soils) or shell with a flap valve (for granular soils) is repeatedly lifted and dropped using a winch and rope operating from an "A" frame. Soil which enters these tools is regularly removed and either sampled for subsequent examination or test, or laid to one side for later removal off site and licensed disposal or, if permitted by the Client, use as backfill. Steel casing will have been used to prevent collapse of the borehole sides where necessary. A degree of disturbance of soil and mixing of layers is inevitable and the presence of very thin layers of different soils within a particular stratum may not be identified. Changes in strata type can only be detected on recognition of a change in soil samples at the surface, after the interface has been passed. For the foregoing reasons, depth measurements should not be considered to be more accurate than 0.10 metre. The technique can determine ground conditions to depths in excess of 30 metres under suitable circumstances and usually causes less surface disturbance than trial pitting.*

*In cohesive soils cylindrical samples are retrieved by driving or pushing in 100mm nominal diameter tubes. In soft soils, piston sampling or vane testing may be undertaken. In granular soils and often in cohesive materials, in situ Standard Penetration Tests (SPT's) are performed. The SPT records the number of standard blows required to drive a 50mm diameter open or cone ended probe for 300mm after an initial 150mm penetration. A modified method of recording is used in denser strata. Small disturbed samples are obtained throughout.*

*ROTARY DRILLING*

*Rotary Drilling to produce cores by rotating an annular diamond-impregnated tube or barrel into the ground is the technique most appropriate to the forming of site investigation boreholes through rock or other hard strata. It has the advantage of being able to be used vertically or at an angle. Core diameters of less than 100mm are most common for site investigation purposes. Core is normally retrieved in plastic lining tubes. A flushing fluid such as air, water or foam is used to cool the bit and carry cuttings to the surface. Depths in excess of 60 metres can be achieved under suitable circumstances using rotary techniques, with minimal surface disturbance.*

*Examination of cores allows detailed rock description and generally enables angled discontinuity surfaces to be observed. However, vertical holes do not necessarily reveal the presence of vertical or near-vertical fissures or joint discontinuities. The core type and/or techniques used will depend on the ground conditions. Where open hole rotary drilling is employed, descriptions of strata result from examination at the surface of small particles ejected from the borehole in the flushing medium. In consequence, no indication of fissuring, bedding, consistency or degree of weathering can be obtained.*

*DYNAMIC SAMPLING*

*This technique involves the driving of an open-ended tube into the ground and retrieval of the soil which enters the tube. It was previously called window or windowless sampling. The term "window sample" arose from the original device which had a "window" or slot cut into the side of the tube through which samples were taken. This was superseded by the use of a thin-walled plastic liner to retrieve the soil sample from within a sampler (windowless sampling) which has a solid wall. Line diameters range from 36 to 86mm. Such samples can be used for qualitative logging, selection of samples for classification and chemical analysis and for obtaining a rudimentary assessment of strength.*

*Driving devices can be hand-held or machine mounted and the drive tubes are typically in 1m lengths. Depending on the type of rig used, the hole formed can be cased to prevent collapse of the borehole sides. Where the type of rig does not allow the insertion of casing, the success of this technique can be limited when soils and groundwater conditions are such that the sides of the hole collapse on withdrawal of the sampler. Obstructions within the ground, the density of the material or its strength can also limit the depth and rate of penetration of this light-weight investigation technique. Nevertheless, it is a valuable tool where access is constrained such as within buildings or on embankments. Depths of up to 10m can be achieved in suitable circumstances depending on the rig type but depths of 5m to 6m are more common.*

*EXPLORATORY HOLE RECORDS*

*The data obtained by these techniques are generally presented on Trial Pit, Borehole, Drillhole or Dynamic Sample Records. The descriptions of strata result from information gathered from a number of sources which may include published geological data, preliminary field observations and descriptions, in situ test results, laboratory test results and specimen descriptions. A key to the symbols and abbreviations used accompanies the records. The descriptions on the exploratory hole records accommodate but may not necessarily be identical to those on any preliminary records or the laboratory summaries.*

*The records show ground conditions at the exploratory hole locations. The degree to which they can be used to represent conditions between or beyond such holes, however, is a matter for geological interpretation rather than factual reporting and the associated uncertainties must be recognised.*

*DYNAMIC PROBING*

*This technique typically measures the number of blows of a standard weight falling over a standard height to advance a cone-ended rod over sequential standard distances (typically 100mm). Some devices measure the penetration of the probe per standard blow. It is essentially a profiling tool and is best used in conjunction with other investigation techniques where site-specific correlation can be used to delineate the distribution of soft or loose soils or the upper horizon of a dense or strong layer such as rock.*

*Both machine-driven and hand-driven equipment is available, the selection depending upon access restrictions and the depth of penetration required. It is particularly useful where access for larger equipment is not available, disturbance is to be minimised or where there are cost constraints. No samples are recovered and some techniques leave a sacrificial cone head in the ground. As with other lightweight techniques, progress is limited in strong or dense soils. The results are presented both numerically and graphically. Depths of up to 10m are commonly achieved in suitable circumstances.*

*The hand-driven DCP probing device has been calibrated by the Highways Agency to provide a profile of CBR values over a range of depths.*

*INSTRUMENTATION*

*The most common form of instrument used in site investigation is either the standpipe or else the standpipe piezometer which can be installed in investigation holes. They are used to facilitate monitoring of groundwater levels and water sampling over a period of time following site work. Normally a standpipe would be formed using rigid plastic tubing which has been perforated or slotted over much of its length whilst a standpipe piezometer would have a filter tip which would be placed at a selected level and the hole sealed above and sometimes below to isolate the zone of interest. Groundwater levels are determined using an electronic "dip meter" to measure the depth to the water surface from ground level. Piezometers can also be used to measure permeability. They are simple and inexpensive instruments for long term monitoring but response times can limit their use in tidal areas and access to the ground surface at each instrument is necessary. Remote reading requires more sophisticated hydraulic, electronic or pneumatic equipment.*

*Settlement can be monitored using surface or buried target plates whilst lateral movement over a range of depths is monitored using slip indicator or inclinometer equipment.*

# GENERAL NOTES

1. *The report is prepared for the exclusive use of the Client named in the document and copyright subsists with Geotechnics Limited. Prior written permission must be obtained to reproduce all or part of the report. It is prepared on the understanding that its contents are only disclosed to parties directly involved in the current investigation, preparation and development of the site.*

2. *Further copies may be obtained with the Client's written permission, from Geotechnics Limited with whom the master copy of the document will be retained.*

3. *The report and/or opinion is prepared for the specific purpose stated in the document and in relation to the nature and extent of proposals made available to Geotechnics Limited at that time. Re-consideration will be necessary should those details change. The recommendations should not be used for other schemes on or adjacent to the site without further reference to Geotechnics Limited.*

4. *The assessment of the significance of the factual data, where called for, is provided to assist the Client and their Engineer and/or Advisers in the preparation of their designs.*

5. *The report is based on the ground conditions encountered in the exploratory holes together with the results of field and laboratory testing in the context of the proposed development. The data from any commissioned desk study and site reconnaissance are also drawn upon. There may be special conditions appertaining to the site, however, which are not revealed by the investigation and which may not be taken into account in the report.*

6. *Methods of construction and/or design other than those proposed by the designers or referred to in the report may require consideration during the evolution of the proposals and further assessment of the geotechnical and any geoenvironmental data would be required to provide discussion and evaluations appropriate to these methods.*

7. *The accuracy of results reported depends upon the technique of measurement, investigation and test used and these values should not be regarded necessarily as characteristics of the strata as a whole (see accompanying notes on Investigation Techniques). Where such measurements are critical, the technique of investigation will need to be reviewed and supplementary investigation undertaken in accordance with the advice of the Company where necessary.*

8. *The samples selected for laboratory test are prepared and tested in accordance with the relevant Clauses and Parts of BS EN ISO 17892 and BS 1377 Parts 1 to 8, where appropriate, in Geotechnics Limited's UKAS accredited Laboratory, where possible. A list of tests is given.*

9. *Tests requiring the use of another laboratory having UKAS accreditation where possible are identified.*

10. *Any unavoidable variations from specified procedures are identified in the report.*

11. *Specimens are cut vertically, where this is relevant and can be identified, unless otherwise stated*

12. *All the data required by the test procedures are recorded on individual test sheets but the results in the report are presented in summary form to aid understanding and assimilation for design purposes. Where all details are required, these can be made available.*

13. *Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes, or on the possible presence of features based on either visual, verbal, written, cartographical, photographic or published evidence, this is for guidance only and no liability can be accepted for its accuracy.*

14. *The Code of Practice for Ground Investigations – BS 5930:2015 calls for man-made soils to be described as Anthropogenic Ground with soils placed in an un-controlled manner classified as Made Ground and soils placed in a controlled manner as Fill. In view of the difficulty in always accurately determining the origin of man-made soils in exploratory holes, Geotechnics Limited classify such materials as Made Ground. Where soils can be clearly identified as being placed in a controlled manner then further classification of the soils as Fill has been added to the Exploratory Hole Records.*

15. *Classification of man-made soils is based on the inspection of retrieved samples or exposed excavations. Where it is obvious that foreign matter such as paper, plastic or metal is present, classification is clear. Frequently, however, for man-made soils that arise from the adjacent ground or from the backfilling of excavations, their visual characteristics can closely resemble those of undisturbed ground. Other evidence such as site history, exploratory hole location or other tests may need to be drawn upon to provide clarification. For these reasons, classification of soils on the exploratory hole records as either Made Ground or naturally occurring strata, the boundary between them and any interpretation that this gives rise to should be regarded as provisional and subject to re-evaluation in the light of further data.*

16. *The classification of materials as Topsoil is generally based on visual description and should not be interpreted to mean that the material so described complies with the criteria for Topsoil used in BS 3882:2015. Specific testing would be necessary where such a definition is a requirement.*

17. *Ground conditions should be monitored during the construction of the works and the report should be re-evaluated in the light of these data by the supervising geotechnical engineers.*

18. *Any comments on groundwater conditions are based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of boring, drilling or excavation and that groundwater levels will vary due to seasonal or other effects.*

19. *Any bearing capacities for conventional spread foundations which are given in the report and interpreted from the investigation are for bases at a minimum depth of 1m below finished ground level in naturally occurring strata and at broadly similar levels throughout individual structures, unless otherwise stated. Typically they are based on serviceability criteria taking account of an assessment of the shear strength and/or density data obtained by the investigation. The foundations should be designed in accordance with the good practice embodied in BS 8004:2015 - Foundations, supplemented for housing by NHBC Standards. Foundation design is an iterative process and bearing pressures may need adjustment or other measures may need to be taken in the context of final layouts and levels prior to finalisation of proposals.*

20. *Unless specifically stated, the investigation does not take account of the possible effects of mineral extraction or of gases from fill or natural sources within, below or outside the site.*

21. *The costs or economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical or geoenvironmental considerations and hence their evaluation is outside the scope of the report.*