

**YGG RHOSAFAN PRIMARY SCHOOL,
SANDFIELDS**

**FACTUAL AND INTERPRETATIVE REPORT ON
GROUND INVESTIGATION**

Report No H9098-19

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Carried out for:
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Report No H9098-19

REPORT STRUCTURE

DATE	TITLE	REPORT No
December 2019	DESK STUDY	H9091-19
March 2020	FACTUAL AND INTERPRETATIVE REPORT	H9098-19

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EXECUTIVE SUMMARY

In November 2019 SOCOTEC UK Limited (SOCOTEC) was commissioned by Neath Port Talbot County Borough Council (NPT) to carry out a Desk Study and Site Reconnaissance at Ysgol Gynradd Gymraeg (YGG) Rosafan Primary School, Sandfields, Port Talbot in South Wales, to obtain geotechnical and geoenvironmental information for a proposed extension to the primary school. A desk study report was issued in December 2019 (SOCOTEC Report No H9091-19) including historical information in relation to the site, a conceptual site model and a proposed scope of intrusive investigation.

Subsequently SOCOTEC was instructed in December 2019 to carry out the ground investigation. The agreed scope of investigation comprised boreholes, trial pits, monitoring, laboratory testing and reporting. This report presents the factual records of the fieldwork, monitoring and laboratory testing together with an interpretation of the results.

The strata profile generally comprised a thin layer of Made Ground overlying Blown Sand, to the base of the exploratory holes. Deeper Made Ground was identified adjacent to the existing school and likely relates to excavations as part of the original construction.

Groundwater depths of around 4m (7mOD) were recorded during the monitoring period.

Foundations are likely to entail a shallow foundation within the Blown Sand. Based on the observed groundwater level at approximately 4 m depth, an allowable bearing pressure of 100 kPa or more is estimated for shallow footings up to 1 m wide, limiting settlements to a customary 25 mm. However, the presence of wood fragments was noted within the sand to a maximum depth of 1.60 m (BH01) and inspection of the formation should be carried out to ensure that if potentially decomposable material is present the foundations are taken down to below this level.

Shallow excavations through the Made Ground and underlying Blown Sand should be within the scope of conventional backhoe excavators. Side stability of excavations may be relatively poor in granular materials requiring suitable support or being cut to an appropriate batter angle.

The chemical considerations for buried concrete are design sulphate class DS-1 and aggressive chemical environment AC-1.



The chemical analysis results of the soil, leachate and groundwater samples indicate that the majority of contaminants are not present at concentrations which could pose an unacceptable risk to construction workers or future end users of the site. As such no remediation measures are required.

The indicative Waste Classification is for disposal at a non hazardous waste landfill site.

Ground gas risk is anticipated to be very low to low risk, in accordance with Characteristic Situation 1.



1 INTRODUCTION

SOCOTEC UK Limited was commissioned in November 2019 by Neath Port Talbot County Borough Council (NPT) to carry out a Desk Study and Site Reconnaissance at Ysgol Gynradd Gymraeg (YGG) Rosafan Primary School, Sandfields, Port Talbot in South Wales, to obtain geotechnical and geoenvironmental information for a proposed extension to the primary school. A report was issued in December 2019 (SOCOTEC Report No H9091-19) including historical information in relation to the site, a conceptual site model and a proposed scope of intrusive investigation.

Subsequently SOCOTEC was instructed in December 2019 by Neath Port Talbot County Borough Council to carry out the ground investigation. The project specification was provided within an email from NPT dated 20 November 2019. The agreed scope of investigation comprised boreholes, trial pits, monitoring, laboratory testing and reporting. The investigation was performed in accordance with the contract specification, and the general requirements of BS 5930 (2015), BS EN 1997-2 (2007), BS EN ISO 22475-1 (2006) and other relevant related standards identified below. The fieldwork took place between 14 and 16 January 2020.

This report presents the factual records of the fieldwork, monitoring and laboratory testing together with an interpretation of the results.

2 SITE SETTING

The geographical and geological site settings are discussed in the Desk Study report; the main points are included below.

2.1 Location and Description

YGG Rhosfan Primary School is located in the Sandfields area of Port Talbot, some 2.5 km west of the town centre, at National Grid reference SS 739 904, see Site Location Plan in Appendix A. The school address is Marine Drive, Sandfields, Port Talbot, SA12 7NN. The Swansea Bay shoreline lies approximately 500 m to the west.

The area of proposed development is situated on the western end of one of the school building wings, adjacent to the playing field area, see Site Plan in Appendix A.



The development site is an approximately rectangular area, 20 m by 25 m in plan, comprising a level, grassed play area. The site is bisected by a palisade fence which enters the site from the north west and trends in a northwest southeast direction to the middle of the site. The fence then turns 90 ° and trends in a northeast-southwest direction. The fencing terminates at the north eastern site boundary and is attached to the current school building.

The site is bounded to the northeast by the current school buildings, and in all other directions by the grassed school playing fields.

2.2 Geological Information

The published geological map for the area, BGS Sheet 247 (2011), the Desk study and the BGS GeoIndex Onshore online viewer (2020), show the site located on Blown Sand (sand) of Quaternary age. This overlies Older Coastal Zone deposits (Marine Beach Deposits), of similar age, which are indicated to comprise sand. Areas of Tidal Flat Deposits are shown to the north east of the site, which may underlie the Blown Sand and Marine Beach Deposits.

Evidence gathered during the desk study suggests the presence of anthropogenic ground (commonly referred to as 'Made Ground'), comprising locally produced Margam Slag, placed as 'fill' during construction of the school buildings. It is not known whether this extends across the area of the playing fields, nor what degree of engineering control (if any) was involved in the selection and placement of the material. The GeoIndex viewer also indicates a large area, including the school site, to comprise of Landscaped Ground (Undivided). This is defined by the BGS as "landscaped ground is an area where the land surface (natural or artificial) has been extensively remodelled, but where it is impracticable or impossible to delineate separate zones of made ground, worked ground or disturbed ground. Variable composition."

The underlying bedrock is shown as the South Wales Middle Coal Measures of Carboniferous age. These are indicated to comprise mudstones with coal seams, seat earths and thin sandstone beds. A fault, trending northwest-southeast and downthrown to the east, is located approximately 475 m east of the site.



3 FIELDWORK

3.1 General

The exploratory hole locations were selected by SOCOTEC and set out from local features. The co-ordinates and ground levels of the positions were surveyed by SOCOTEC to National Grid and Ordnance Datum, and are shown on the Site Plan in Appendix A.

3.2 Exploratory Holes

The exploratory holes are listed in the following table.

TABLE 1 : SUMMARY OF EXPLORATORY HOLES

TYPE	QUANTITY	DEPTH RANGE (m)	REMARKS
Cable Percussion Boring	3	8.45 to 9.45	BH01 to BH03
Hand Excavated Trial Pits	2	1.20 and 1.30	HDP1 and HDP2 to locate existing foundations

The exploratory hole logs are presented in Appendix B. These include descriptions of the strata encountered together with details of the equipment and methods used, sampling and field testing carried out, water depths and other field observations. Explanation of the terms and abbreviations used on the logs is given in the Key to Exploratory Hole Records in Appendix B, along with other explanatory information. Soil and rock material descriptions are in accordance with BS EN ISO 14688-1 (2018), BS EN ISO 14689 (2018) and the guidance of BS 5930 (2015).

Standard penetration tests (SPT) in the boreholes were carried out in accordance with BS EN ISO 22476-3+A1 (2011) and the SPT hammer energy ratio certificate is included in Appendix B. The results are presented on the logs as uncorrected N values.

On completion of the fieldwork, geotechnical samples were transported to the Bridgend office of SOCOTEC for temporary retention, with those required for testing being transferred to the SOCOTEC laboratory at Carcroft, near Doncaster. Geoenvironmental samples were transported from site directly to the DETS laboratory at Consett.



Photographs of the trial pits are presented in Appendix G.

3.3 Groundwater and Gas Monitoring

Gas and groundwater monitoring instrumentation was installed in the boreholes, as shown on the logs, and summarised in Appendix C. Records of monitoring carried out by SOCOTEC after the fieldwork period are presented in Appendix C and summarised in Table 2.

TABLE 2 : SUMMARY OF MONITORING

TYPE	QUANTITY	REMARKS
Gas and Groundwater Monitoring Visits	4	28 January, 5, 13 and 27 February 2020
Water Sampling Visit	1	5 February 2020

4 LABORATORY TESTING

4.1 Geotechnical Testing

Geotechnical laboratory testing was scheduled by SOCOTEC and carried out in accordance with BS 1377 (1990) unless otherwise stated within the test reports. The test types are listed below and the results are presented in Appendix D.

TABLE 3 : SUMMARY OF GEOTECHNICAL LABORATORY TESTING

TYPE	QUANTITY	REMARKS
Particle Size Distribution Analysis	3	BS 1377
pH, Acid and Water Soluble Sulphate and Total Sulphur Content of Soils	5	Test methods are BS 1377 or others recognised in BRE Special Digest 1 (2005); they are indicated on the results report sheets in Appendix D.

4.2 Geoenvironmental Testing

Geoenvironmental laboratory testing was scheduled by SOCOTEC on selected soil samples recovered during the fieldwork, and water samples taken by SOCOTEC from the installations during a monitoring visit. The test types are summarised in the table below and the results are presented in Appendix E.

**TABLE 4 : SUMMARY OF GEOENVIRONMENTAL LABORATORY TESTING**

TYPE	QUANTITY	REMARKS
Core Classification Suite	3	Metals (As, B, Cd, Cr, Cr VI, Cu, Hg, Ni, Pb, Zn and Se), Cyanide (free), Asbestos screen, Phenol index, pH, 16 priority PAH, WM3 TPH C6-C40 (GRO (nC6 to nC8) and TPH by GCFID, (C8 to C40 carbon banded)), VOCs, PCBs, Moisture content and SOM
Leachate Suite	3	Metals, pH, Cyanide (free) and TOC
Full WAC Suite	2	Waste Acceptance Criteria testing covering requirements for various landfill types, ie inert, non hazardous .

5 GROUND CONDITIONS AND GROUNDWATER

5.1 Strata Encountered

Descriptions of the strata encountered are given on the exploratory hole records. The downward succession encountered was essentially consistent in the three boreholes as summarised below.

TABLE 5 : SUMMARY OF GROUND CONDITIONS

STRATUM	TOP (m)	RANGE OF THICKNESS (m)	REMARKS
Made Ground	0.00	0.20 to 1.30	Encountered within all exploratory holes. 0.20 to 0.30m within boreholes; 1.20 to 1.30m within trial pits adjacent to existing building
Blown Sand	0.20	Penetrated between 8.15 and 9.25m, to maximum depth of 9.45m	Encountered within BH01, BH02 and BH03. Base of stratum not proven. Possibly includes material of other origin, see text Section 5.3

5.2 Made Ground

The term Made Ground has been used in this report in the traditional sense of describing any anthropogenic (man-made) material, rather than specifically for non-engineered material.

Cohesive Made Ground was encountered at the surface within all exploratory hole locations to a maximum depth of 0.30 m, comprising soft, slightly gravelly sandy clay. The gravel consisting of subangular to subrounded fine to coarse mudstone, quartzite, brick and concrete.



Granular Made Ground was encountered within the hand excavated trial pits excavated adjacent to the current structure, extending to 1.30 m depth. The base of the stratum was not proven, but as this is similar to the underlying natural material (as encountered within the boreholes) a defined boundary may be difficult to confirm. This material comprised fine to coarse sand with occasional pockets of sandy clay and is considered to be reworked natural material which was excavated and replaced during the construction of the current school buildings.

5.3 Blown Sand

Blown Sand was encountered in the boreholes comprising light brown fine and medium sand, with occasional fragments of wood at shallow depths, and shell fragments to a maximum of 8 m depth. Although the area is recorded as including *Landscaped Ground*, see Section 2, and potentially imported anthropogenic material (possible Margam Slag), there is no real evidence of material type variation in the sand encountered in the top 8 m or so of the boreholes. The basal material in the boreholes (>8 m) included pockets of sandy clay which may indicate a boundary into underlying Tidal Flat Deposits or Marine Beach Deposits. For the purposes of this report all of the sand material has been regarded as Blown Sand.

Three particle size distribution tests, on samples from between 2.5 and 7 m, show the sand to be of particularly uniform size (uniformity coefficient, $U = 2$), with over 95 % falling within the range 150 to 400 μm , and over 80 % being within the *medium* sand size category. This is consistent with an aeolian deposit where the method of transport by wind action leads to a well sorted/poorly graded material.

Fourteen SPTs recorded N values of between 7 and 47 blows, with a further nine tests recording 50 blows without achieving the full test drive penetration, ie 'refusal'. The test results have been converted to standard energy ratio values, N_{60} , as shown in Figure 2. This includes extrapolated values for the tests terminating at 50 blows, where values of between 65 and 134 were derived. The results indicate a *loose to medium dense* relative density to around 2 m, with an increase to *very dense* between 3 and 7 m. Below 8 m blow counts reduce indicating a *medium dense* relative density. The profile of SPT results is somewhat unusual, in terms of the high N values at 3 to 5 m depth, and the marked reduction with depth below this. The reasons for this are not clear, seemingly not related to any material type variation, but may be due to the influence of the standing groundwater level apparently at around 4 m depth, see below.



5.4 Groundwater

Any groundwater entries in the boreholes were obscured by the need to add water during drilling to maintain borehole stability. Each borehole was completed within one shift precluding any standing water observations. To obtain further information, groundwater monitoring standpipes were installed in each borehole and four monitoring visits carried out during January and February 2020, as summarised in Table 6 below.

TABLE 6 : SUMMARY OF INSTALLATIONS AND MONITORING

HOLE ID	RESPONSE ZONE (m)	GROUNDWATER DEPTH (m)	STRATUM
BH01	2.00 to 5.00	3.84 to 4.00	Blown Sand
BH02	5.00 to 8.00	4.08 to 4.43	
BH03	6.00 to 9.00	4.31 to 4.46	

The results indicate a groundwater level at around 4 m depth (7 mOD) lying within the Blown Sand. It will be appreciated that seasonal fluctuations in groundwater level occur, and these readings were obtained during the wetter winter period. Other affects such as tidal influence, water abstraction/recharge, constructional dewatering and excavations, etc may also change groundwater levels.

6 PROPOSED WORKS

According to information provided by NPT the proposed development will comprise a single storey extension to the current primary school buildings, including four new classrooms, two toilet blocks and plant room, with a corridor connecting to the existing school building. The proposed development is shown on NPT drawing included within Appendix A. Approximate dimensions, based on the plan, are 18 x 20 m. The existing school buildings are of brick construction and a similar form is assumed for the proposed extension.

At this stage no details of structural loadings have been provided, nor any particular foundation performance requirements specified. However, foundations would be assumed to be relatively lightly loaded for this type of structure.



7 GEOTECHNICAL ENGINEERING ASSESSMENT

7.1 Foundations

Foundations for the existing school building were revealed in the two hand dug pits to comprise shallow concrete footings at about 0.7 m depth, founded within the sand stratum. Assuming that these have performed satisfactorily and there are no signs of movement or distress within the existing building, then similar foundations would be expected to be satisfactory for the extension building, given similar ground conditions.

Adjacent to the existing building the granular material has been identified as Made Ground as it was likely disturbed as part of the original construction. Any excavations near to the existing school should take into account the possibility of variations in the shallow material due to prior disturbance.

Between 1 and 2 m depth the natural Blown Sand deposits are described as having a *loose to medium dense* relative density with an SPT N_{60} value of 10, increasing rapidly with depth, see Figure 2. Based on the observed groundwater level at approximately 4 m depth, an allowable bearing pressure of 100 kPa or more is estimated for shallow footings up to 1 m wide, limiting settlements to a customary 25 mm. However, the presence of wood fragments was noted within the sand to a maximum depth of 1.60 m (BH01) and inspection of the formation should be carried out to ensure that if potentially decomposable material is present the foundations are taken down to below this level.

7.2 Excavations

Shallow excavations through the thin Made Ground and into the underlying natural deposits for the shallow foundations and service trenches, etc, would be within the scope of conventional backhoe excavators. The groundwater monitoring information indicates that such excavations unlikely to be subject to groundwater ingress.

It should be noted that the side stability of excavations may be relatively poor in the granular materials, requiring suitable support or being cut to an appropriate batter angle. An appropriate risk assessment should be undertaken for all excavations that may require man entry, with slopes and support designed accordingly.



7.3 Chemical Considerations for Buried Concrete

Five soil samples, recovered from between 0.50 and 8.00 m, were tested for pH, total sulphur, water soluble and acid soluble sulphate content. The test results are summarised in Table 7, together with the assessed Design Sulphate (DS) and Aggressive Chemical Environment for Concrete (ACEC) following the approach of BRE Special Digest 1 (2005). The site has been regarded as brownfield with mobile groundwater, as the most conservative situation, although actual conditions are considered to be less onerous. The assessment indicates a DS class of DS-1 and ACEC class of AC-1. The recommendations in the BRE digest should be followed for the design of subsurface concrete.

TABLE 7 : CONCRETE DURABILITY ASSESSMENT

RANGE OF TEST VALUES					CALCULATED VALUES			DESIGN SULPHATE CLASS	ACEC CLASS
No of results	Acid Soluble Sulphate (%)	Total Sulphur (%)	pH	Water Soluble Sulphate (mg/l)	Total Potential Sulphate (TPS % SO ₄)	Oxidisable Sulphides (OS % SO ₄)	Pyrite probably present?		
5 results	0.01 to 0.05	<0.01 to 0.1	8.0 to 8.9	14 to 34	0.3 highest value	0.25 highest value	No	DS-1	AC-1

8 GEOENVIRONMENTAL ASSESSMENT

8.1 Summary of Conceptual Site Model

In line with existing legislation and the current regime for the management of contaminated land, assessments are undertaken using a risk based approach. It is necessary to define a Conceptual Site Model (CSM) for the site which identifies the potential sources of contamination, the receptors and the pathways that can connect them. In order for there to be a risk from contamination, one or more relevant pollutant linkages must exist, connecting a contamination source, a receptor (an entity which might be affected by the contamination) and a pathway (or mechanism) by which the receptor can be exposed to the contaminant.



A Desk Study was previously published for this site (SOCOTEC Report number H9091 Volume 1, 2019) which has been used to identify the likely contaminants, their sources and their spatial distribution across the site with respect to the current assessment.

It is understood that the proposed development will comprise a single storey extension to the current primary school building, see Section 6.

8.1.1 Summary of Potential Sources

The Preliminary Risk Assessment and CSM from the Desk Study indicates there is a moderate risk from Made Ground and historical site uses. A summary of the potential sources is presented in Table 8.

TABLE 8 : POTENTIAL SOURCES OF CONTAMINATION

SITE USE / ACTIVITY AND AREA	SOURCES	CONTAMINANTS
Historical onsite fill	Imported slag used as fill material from nearby steel works	Heavy metals, cyanide, sulphide, extremes of pH, asbestos, phenol, oil / fuel hydrocarbons, aromatic hydrocarbons, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) Ground gases including methane and carbon dioxide.
Current and historic features (within 250 m of the site)	Boiler house within school grounds Electrical Substations Tanks (unspecified) Infilled land Printing works Car parks	Range of organic and inorganic contaminants, including heavy metals and metalloids, cyanide, fuels oils, hydrocarbons, phenol, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), asbestos

8.1.2 Potential Pathways and Receptors

To develop a further understanding of the potential risks posed by contaminants to human receptors, the pathways through which contaminants may impact sensitive receptors need to be identified. The following were identified in the Desk Study as potential migration pathways:

- Direct soil, soil dust and/or water ingestion.
- Inhalation of soil dust, soil vapour and/or water vapour.
- Dermal contact with contaminated soil, soil dust and/or water.
- Gas generation followed by lateral and vertical migration of gases and/or vapours through permeable strata.
- Permeable ground conditions/rainfall infiltration.
- Leaching of contaminants from soils into soil pore water and shallow groundwater.
- Downward migration of soil pore water and shallow groundwater.
- Lateral groundwater flow.
- Preferential pathways including existing and proposed new services trenches and foundations.
- Surface water runoff into drains.



- Permeation of organic contaminants through water supply pipes and into the water supply for the site.

Potential receptors have been identified and categorised as follows:

- Construction workers
- Current and future site users (school children and staff)
- Neighbouring site occupants
- Maintenance workers
- New school buildings and associated services

Controlled waters receptors include the following:

- Bedrock and superficial aquifers are Secondary A aquifers
- Swansea Bay, located 250 m southwest

No known environmental receptors are located within 500 m of the site.

8.2 Human Health Risk Assessment

8.2.1 Technical Approach

In accordance with Environment Agency guidance CLR 11, Model Procedures for the Management of Land Contamination, (EA, 2004), human health risk assessment follows a tiered approach. The first tier ordinarily comprises a Preliminary Risk Assessment, completed as part of the aforementioned Desk Study. Following the ground investigation, the Preliminary Risk Assessment has been further developed below into an updated Conceptual Site Model.

Further tiers of risk assessment include Generic Quantitative Risk Assessment (GQRA) and Detailed Quantitative Risk Assessment (DQRA), which use data derived from the ground investigation and known details about the proposed use of the site to assess risks to identified receptors. The assessment included in this report comprises a GQRA, which is undertaken by comparing soil contaminant concentrations with conservative Generic Assessment Criteria (GAC).



Generic Assessment Criteria (GAC) for various land use and exposure scenarios have been selected from the following sources:

- CL:AIRE Category 4 Screening Levels (C4SL);
- LQM Suitable for Use Levels (S4UL); and
- CL:AIRE/EIC/AGS GAC

The GAC have been derived using the Environment Agency Contaminated Land Exposure Assessment (CLEA) model, for a range of land uses and exposure scenarios, including:

- Residential with the consumption of homegrown produce;
- Residential without the consumption of homegrown produce;
- Commercial;
- Allotments;
- Public Open Space near residential housing (POSresi); and
- Public Open Space public park scenario (POSpark)¹

Provisional C4SL values for a total of six priority substances (arsenic, benzene, benzo(a)pyrene, cadmium, hexavalent chromium and lead) were produced by CL:AIRE, and published in December 2013. A policy companion document was published by DEFRA in March 2014, which confirmed the final C4SL for these determinants.

The final C4SL values are considered to represent 'relevant technical tools', as per paragraph 4.21(c) of the Contaminated Land Part IIA Statutory Guidance. Their purpose is to identify land that falls within Category 4 (Human Health) as defined by the Statutory Guidance, i.e. land that is definitely not Contaminated Land as defined by the Part IIA legislation.

It should be noted that the C4SLs have been derived using toxicological criteria that are presented as posing a 'low level of toxicological concern'. This is in comparison with previous Soil Guidelines Values (SGVs) and LQM GAC, which were derived using toxicological criteria that represent a 'minimal risk' to human health.

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The LQM Suitable for Use Levels (S4ULs) have been derived in accordance with the changes in exposure modelling presented within the C4SL framework, whilst still using a set of toxicological criteria that are set within the 'minimal risk' range. The S4ULs were published to offer a set of collated information on the toxicity and transport properties for a number of common contaminants, and should be seen as suitable for use in planning and change of use assessments, as well as Part IIA assessments.

The CL:AIRE/EIC/AGS Generic Assessment Criteria were published in December 2009. Assessment criteria were produced using the CLEA model for a total of 35 No. less common contaminants, in accordance with the CLEA guidance. The GAC were intended to compliment the SGVs produced by the Environment Agency, and the LQM GAC that were current at the time. These have been used in the assessment for contaminants where S4ULs and C4SLs are not available.

The SOCOTEC approach to human health risk assessment in reuse assessments is to use the various assessment criteria in the following order of preference: S4UL > EIC GAC > C4SLs. Note that for some contaminants this will not be possible, for example lead has a C4SL but not an S4UL or a EIC GAC.

Where contaminants fail the initial screen against S4UL or EIC GAC, a further assessment may be possible by screening against C4SLs. Where this is undertaken it should be clearly understood that the C4SLs represent 'low risk' rather than 'minimal risk' GAC.

SOCOTEC understands the proposed development will comprise the development of an extension to an existing primary school. Therefore, it is considered that Residential with the consumption of homegrown produce, while conservative, is the most appropriate assessment criteria.

8.3 Human Health Generic Quantitative Risk Assessment

8.3.1 In-situ Soils

A total of three soil samples, one from each borehole location, were analysed for a range of brownfield contaminants. The maximum recorded concentrations of contaminants in the in-situ soil samples obtained have been primarily compared with Residential with home grown produce GAC (adjusted for 1.0% SOM).



TABLE 9 : COMPARISON OF MAXIMUM MEASURED CONCENTRATIONS WITH RESIDENTIAL WITH HOMEGROWN PRODUCE GACS

DETERMINAND	MAXIMUM MEASURED CONCENTRATION (mg/Kg)	GENERIC ASSESSMENT CRITERION (GAC) (mg/Kg)	NO. OF RESULTS EXCEEDING GAC (NO. OF TESTS IN BRACKETS)
Metals & semi- metals			
Arsenic	15	37	0 (3)
Boron	0.6	290	0 (3)
Cadmium	0.1	11	0 (3)
Chromium III	6	910	0 (3)
Chromium VI	<1.0	6	0 (3)
Copper	11	2400	0 (3)
Lead ¹	7.6	200	0 (3)
Mercury ²	<0.05	1.2	0 (3)
Nickel	6.1	180	0 (3)
Selenium	<0.5	250	0 (3)
Zinc	47	3700	0 (3)
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	<0.03	210	0 (3)
Acenaphthylene	<0.03	170	0 (3)
Anthracene	<0.03	2400	0 (3)
Benzo(a)anthracene	<0.03	7.2	0 (3)
Benzo(a)pyrene	<0.03	2.2	0 (3)
Benzo(b)fluoranthene	<0.03	2.6	0 (3)
Benzo(g,h,i)perylene	<0.03	320	0 (3)
Benzo(k)fluoranthene	<0.03	77	0 (3)
Chrysene	<0.03	15	0 (3)
Dibenzo(a,h)anthracene	<0.03	0.24	0 (3)
Fluoranthene	<0.03	280	0 (3)
Fluorene	<0.03	170	0 (3)
Indeno(1,2,3,c,d)pyrene	<0.03	27	0 (3)
Napthalene	<0.03	2.3	0 (3)
Phenanthrene	<0.03	95	0 (3)
Pyrene	<0.03	620	0 (3)
Total Petroleum Hydrocarbons and BTEX			
TPH (C10-C40)	<10	N/A	N/A



GRO C5-C10 ³	17	27	0 (3)
Benzene	<0.01	0.087	0 (3)
Toluene	<0.01	130	0 (3)
Ethylbenzene	0.29	47	0 (3)
Xylene	0.51	56	0 (3)
Other Compounds			
Asbestos	NAD	No asbestos detected	0 (3)
Phenol (total)	<0.3	280	0 (3)
Cyanide (free)	<0.1	22	0 (3)
pH (range of results, pH units)	8.6 to 9.5	N/A	N/A

¹C4SL²GAC for Inorganic Mercury used³Most conservative aliphatic/aromatic GAC used

A variety of Made Ground and natural strata samples were tested as part of the contamination assessment. As highlighted in Table 9 none of the chemical contaminants exceeded the GAC for residential with plant uptake land use. Asbestos was not identified in any of the three samples analysed.

8.4 Risk to Site Users

As highlighted in Table 9, concentrations of the chemical contaminants have not been recorded in excess of their GAC for a residential with plant uptake land use scenario, indicating that the site soils will not pose an unacceptable risk to future site users from these contaminants.

8.5 Risks to Other Human Receptors

The CLEA model cannot be used to assess the acute risks to construction and/or maintenance workers from soil contamination. CLEA only deals with chronic long term risks.

Based on the chemical analysis results in Table 9, the levels of contaminants in the soil at the site are such that they are unlikely to pose a hazard to construction and/or maintenance workers.

Contact with soil should be avoided where possible and standard site hygiene procedures should be implemented, such as wearing gloves and overalls and providing adequate washing facilities.



Eating, drinking and smoking should be banned in the working areas to prevent inadvertent ingestion of the soil.

8.6 Technical Approach to Controlled Water Risk Assessment

The assessment of risks to controlled waters follows guidance provided by the EA (Remedial Targets Methodology, Hydrogeological Risk Assessment for Land Contamination (2006)) and DEFRA in the Contaminated Land (England) Regulations 2006 (SI 2006/1380) and consolidated regulations. Groundwater samples were requested from selected installations and scheduled by Aecom.

The nearest surface water receptor is 250 m. The site is located on granular Blown Sand. For the purpose of this assessment, the concentrations of potential contaminants in the groundwater samples collected from the installations have been compared to relevant estuaries and coastal water Environmental Quality Standards (EQS) and United Kingdom Drinking Water Standards (UKDWS) where available.

8.7 Groundwater Screening

Groundwater samples were taken from each of the three borehole installations. The chemical analysis results are summarised in Table 10 together with relevant EQS and UKDWS values for estuaries and coastal waters.

TABLE 10 : COMPARISON OF MAXIMUM MEASURED CONCENTRATIONS

DETERMINAND	MAXIMUM MEASURED CONCENTRATION (ug/l)	EQS (ug/l)	NO. OF RESULTS EXCEEDING EQS (NO. OF TESTS IN BRACKETS)	UKDWS (ug/l)	NO. OF RESULTS EXCEEDING UKDWS (NO. OF TESTS IN BRACKETS)
Metals & semi- metals					
Arsenic	1.1	25	0 (3)	10	0 (3)
Boron	43	7000	0 (3)	2400	0 (3)
Cadmium	0.05	0.2	0 (3)	5	0 (3)
Chromium	1.4	-	n/a	50	0 (3)
Chromium VI	<7.0	32	0 (3)	50	0 (3)
Copper	0.8	3.76	0 (3)	2	0 (3)



Lead	0.64	1.3	0 (3)	10	0 (3)
Mercury	0.01	0.07	0 (3)	1	0 (3)
Nickel	0.9	8.6	0 (3)	20	0 (3)
Selenium	3.3	-	n/a	10	0 (3)
Zinc	5.2	6.8	0 (3)	-	n/a
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	<0.01	-	n/a	-	n/a
Acenaphthylene	<0.01	-	n/a	-	n/a
Anthracene	<0.01	0.1	0 (3)	-	n/a
Benzo(a)anthracene	<0.01	-	n/a	-	n/a
Benzo(a)pyrene	<0.01	0.00017	3 (3) All <LOD	0.01	0 (3)
Benzo(b)fluoranthene	<0.01	0.00017	3 (3) All <LOD	10	0 (3)
Benzo(g,h,i)perylene	<0.01	0.00017	3 (3) All <LOD	10	0 (3)
Benzo(k)fluoranthene	<0.01	0.00017	3 (3) All <LOD	10	0 (3)
Chrysene	<0.01	-	n/a	-	n/a
Dibenzo(a,h)anthracene	<0.01	-	n/a	-	n/a
Fluoranthene	<0.01	0.0063	3 (3) All <LOD	-	n/a
Fluorene	<0.01	-	n/a	-	n/a
Indeno(1,2,3,c,d)pyrene	<0.01	0.00017	3 (3) All <LOD	10	0 (3)
Napthalene	<0.05	2	0 (3)	-	n/a
Phenanthrene	<0.01	-	n/a	-	n/a
Pyrene	<0.01	-	n/a	-	n/a
Other Compounds					
Cyanide (free)	<20	5	3 (3) All <LOD	50	0 (3)
Phenol	<0.50	7.7	0 (3)	50	0 (3)
LOD = laboratory limit of detection					

8.8 Leachate Screening

Leachate samples were taken from each of the three boreholes. The chemical analysis results are summarised in Table 11 together with relevant EQS and UKDWS values for estuaries and coastal waters.



TABLE 11 : COMPARISON OF MAXIMUM MEASURED CONCENTRATIONS

DETERMINAND	MAXIMUM MEASURED CONCENTRATION (ug/l)	EQS (ug/l)	NO. OF RESULTS EXCEEDING EQS (NO. OF TESTS IN BRACKETS)	UKDWS (ug/l)	NO. OF RESULTS EXCEEDING UKDWS (NO. OF TESTS IN BRACKETS)
Metals & semi- metals					
Arsenic	1.4	25	0 (3)	10	0 (3)
Boron	<12	7000	0 (3)	2400	0 (3)
Cadmium	<0.03	0.2	0 (3)	5	0 (3)
Chromium	<0.25	-	n/a	50	0 (3)
Copper	1.1	3.76	0 (3)	2	0 (3)
Lead	0.27	1.3	0 (3)	10	0 (3)
Mercury	<0.01	0.07	0 (3)	1	0 (3)
Nickel	<0.5	8.6	0 (3)	20	0 (3)
Selenium	0.3	-	n/a	10	0 (3)
Zinc	<1.3	6.8	0 (3)	-	n/a
Other Compounds					
Cyanide (free)	<20	5	3 (3) All <LOD	50	0 (3)
Phenol	<0.50	7.7	0 (3)	50	0 (3)
LOD = laboratory limit of detection					

8.9 Risks to Controlled Waters

Comparison of the analysis results in Table 10 and 11 indicate that concentrations of a number of determinants in groundwater and leachate samples analysed have been detected above controlled water values. These are summarised in Table 12 below.

TABLE 12 : SUMMARY OF GROUNDWATER EXCEEDING EQS/UKDWS

CONTAMINANT	EQS / UKDWS	REMARKS	RISK LEVEL
Cyanide (free)	EQS	All groundwater and leachate concentrations recorded below LOD. Soil concentrations are also recorded below LOD, as such it is considered unlikely that a source is present on site.	Low

PAH (various)	EQS	All groundwater and leachate concentrations recorded below LOD. Soil concentrations are also recorded below LOD, as such it is considered unlikely that a source is present on site.	Low
---------------	-----	---	-----

As can be seen, the risk to controlled waters from the contaminants encountered within groundwater beneath the site is considered to be low based on the test results.

Potential risks to controlled water receptors will be dependent upon the end development. It is understood that the development area will be covered in a surface of hardstanding, which will limit the infiltration of rainwater and the subsequent leaching of low levels of potential contaminants within the soil to controlled waters via groundwater migration. On this basis, and given the distance to nearest surface water receptor, the risk of site derived substances impacting it is considered to be low.

8.10 Site Conceptual Model

In Section 8.2 potential sources of contamination, pathways and receptors were identified for the site based on the available information. These potential pollutant linkages constituted the preliminary conceptual model for the site.

The results of the ground investigation have been used to refine the conceptual model and to define the specific source-pathway-receptor pollutant linkages for the site based on the proposed development.

TABLE 13 : SUMMARY OF SOURCE-PATHWAY-RECEPTOR POLLUTANT LINKAGES

SOURCE	PATHWAY	RECEPTOR
Groundwater contamination (cyanide and individual PAH compounds)	Surface Water Runoff	- Surface water drainage and drains - Swansea Bay
	Leaching and downward migration	
	Lateral Groundwater Migration	



The chemical analysis results indicate there is currently a very low risk to future site users from soil contamination at the site.

No asbestos was detected in the three samples analysed.

8.11 Remediation Recommendations

The chemical analysis results of the soil, leachate and groundwater samples indicate that the majority of contaminants are not present at concentrations which could pose an unacceptable risk to construction workers or future end users of the site. As such no remediation measures are required.

Due to the limited nature of all site investigations, there always remains the possibility that pockets of previously undiscovered contamination may be encountered during the development. If any unusual or fibrous materials or signs of contamination spillages are found during the works the area should be fenced off and advice sought on the nature of the possible contamination.

8.12 Indicative Waste Classification

In accordance with Environment Agency (EA) technical guidance document WM3, *Waste Classification: Guidance on the classification and assessment of waste (Version 1.1: May 2018)* (EA, 2018) and associated references, the number of samples required to adequately characterise waste soil is dependent upon the volume of waste to be disposed. At this stage it is unknown how much material will be required to be removed from the site, and as such only an indicative waste classification can be provided by SOCOTEC at this time. Once accurate volumes of any material destined to leave the site as waste are known, further sampling, analysis, and assessment may be necessary.

The HazWasteOnline toolkit was used to undertake a Hazard Assessment Screen, to establish whether the sampled soils should be considered as representative of either hazardous or non-hazardous waste. This classification process is in accordance with technical guidance document WM3, *Guidance on the classification and assessment of waste (Version 1.1: May 2018)*, published jointly by Natural Resources Wales / Cyfoeth Naturiol Cymru, the Scottish Environment Protection Agency, the Environment Agency and the Northern Ireland Environment Agency (WM3, 2018).



The concentrations for the each of the samples were input into HazWasteOnline to classify the sampled material. The HazWasteOnline output sheets (see Appendix F), give an initial classification for the material represented by all samples as Non-Hazardous waste based on the chemical properties of the material.

Each sample was tested for asbestos. Asbestos was not detected in any of the samples.

Based on the results of the analysis, and the assessment described above, the indicative List of Waste (LoW) code for all samples is considered to be **'17 05 04 Soil and stones other than those mentioned in 17 05 03' i.e non-hazardous waste**. The samples are a mix of Made Ground and Natural, as summarised below.

- BH1 1.00m – Blown Sand
- BH2 0.20m – Made Ground
- BH3 1.20m – Blown Sand

Materials classified as non-hazardous may be disposed of at an inert landfill subject to meeting inert waste acceptance criteria (WAC) thresholds. Full WAC testing (single-stage leachate) has been carried out on samples 'BH1' and 'BH2' and no exceedances of the inert WAC criteria were recorded.

Materials represented by the three samples indicated above may be accepted at a non-hazardous waste landfill site.

It is recommended that the waste receiver is consulted as to whether they would be willing to accept this material, as it is ultimately the decision of the waste receiver.

All wastes removed from site should be consigned, transported and disposed of in full accordance with all relevant UK legislation.

9 GAS

For the assessment of sites in terms of the potential for ground gas to be present as a hazard, the risk based methodology detailed in CIRIA Report C665 (2007) is used. This is primarily based on



the method of characterising a site as proposed by Wilson and Card (1999). The method is predominantly centred on a conceptual model which relates possible sources of gas to likely receptors via potential pathways.

The Desk Study indicated a potential for gas generation from Made Ground on the site, no other sources, on or near the site, were identified. However, the extent and composition of Made Ground encountered during the investigation was minimal and the likelihood of this as a source of hazardous ground gas generation is considered to be negligible. Nonetheless the predominantly coarse granular soils present would allow transmission of gas through the ground if this were present.

Four monitoring visits were carried out during January and February 2020, following the main investigation fieldworks, for measurement of ground gas and groundwater levels within the borehole standpipe installations. The results are summarised in Table 14 below. The data for BH02 and BH03 may be less reliable as the groundwater level was above the top of the response zone. However, similar data were obtained for BH01, where the groundwater level was within the response zone.

Gas concentrations were generally close to atmospheric conditions, with the levels of potentially hazardous gases very low. The measured gas emission flow rates and differential pressures were close to zero with the exception of one observation in BH01 on 13 February. This appears to be an anomaly, although slightly higher gas flow rates were also observed in the other two holes, albeit at significantly lower rates. These are possibly related to the low atmospheric pressure recorded at this time.

The gas risk is assessed by considering both the concentration of gas and the emission rate, in terms of a Gas Screening Value (GSV). This is defined as the gas concentration multiplied by the gas flow, the worst case scenario from the monitoring data being established using the maximum of each. Based on the information available, although gas concentrations for carbon dioxide were slightly elevated, the measured flow rates were essentially zero for most visits. Using the highest gas flow rate and carbon dioxide concentration readings gives a GSV of 0.07 l/hr, which is on the boundary of Characteristic Situations 1 and 2. As the rest of the readings have very low or effectively zero flows, these certainly fall below the 0.07 l/hr value defining Characteristic Situation 1 (very low risk) in the CIRIA guidance, normally associated with natural soils and 'typical made ground'. Overall no special precautions are therefore indicated.

**TABLE 14 : SUMMARY OF GAS MONITORING**

PARAMETER	UNITS	VALUE		REMARKS
		MIN	MAX	
Methane, CH ₄	% vol	ND	0.2	
Carbon Dioxide, CO ₂	% vol	ND	1.4	
Oxygen, O ₂	% vol	18.3	20.9	
Gas Flow Rate	l/hr	0.0	5.3	Gas flow rate <0.3 l/hr except in BH01 during 13 Feb visit
Atmospheric Pressure	mbar	978	1037	
Gas concentration peak and steady readings were measured on site. Values used above are the highest recorded per determinand. ND = None detected. Reading shown as 0.0, which is below the limit of detection for the gas analyser				



10 REFERENCES

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- BS EN ISO 14688-1:2018 : Geotechnical investigation and testing - Identification and classification of soil - Part 1 Identification and description
- BS EN ISO 14688-2:2018 : Geotechnical investigation and testing - Identification and classification of soil - Part 2 Principles for a classification
- BS EN ISO 14689:2018 : Geotechnical investigation and testing - Identification and classification of rock - Part 1 Identification and description
- BS EN ISO 22475-1 : 2006 : Geotechnical investigation and testing – Sampling methods and groundwater measurements - Part 1 Technical principles for execution. British Standards Institution.
- BS EN ISO 22476-3:2005+A1 : 2011 : Geotechnical investigation and testing - Field testing - Part 3 Standard penetration test. British Standards Institution.



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APPENDIX A

FIGURES AND DRAWINGS

Site Location Plan	A1
Site Plan	A2
Site Layout / Location Plan	NPTCBC Drwg No A1184-06
PSD Envelope	Figure 1
SPT N Depth Profile	Figure 2

Site Location Plan



THE
SITE

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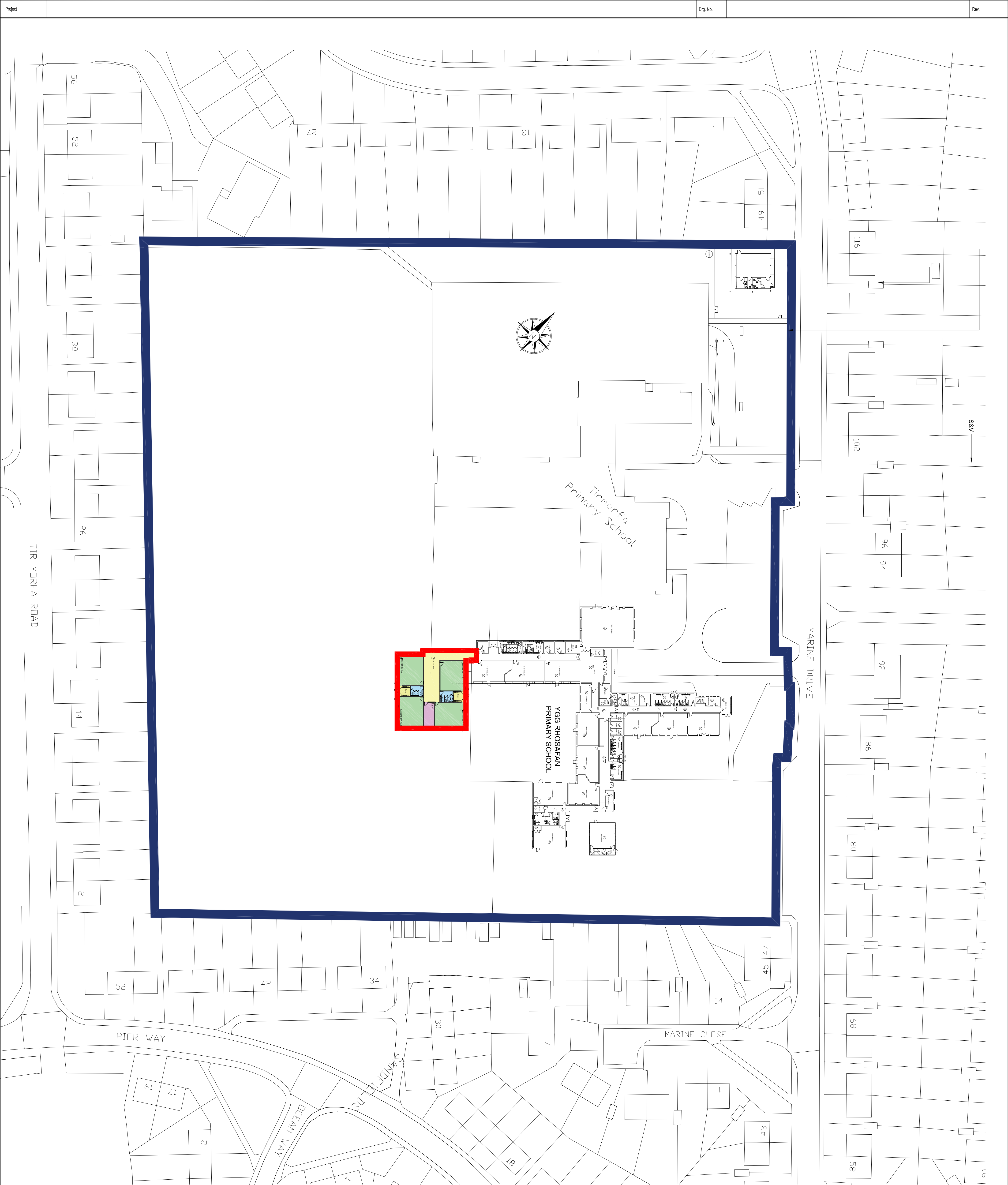
Notes: Scale 1:50 000	Project YGG Rhosafan Primary School Project No. H9098-19 Carried out for Neath Port Talbot County Borough Council	Figure A1
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Site Plan



NOTES

1. All dimensions in millimetres unless otherwise stated.



Rev	Details	Dr	Cd	Apr	Date

**Neath Port Talbot**
Castell-nedd Port Talbot
County Borough Council Cynhordd Swyddfa'r Bwrdeist

Making a difference Gwahanlaeth er gwell

PROPERTY & REGENERATION
Gareth Nutt B.Sc(Hons), M.Sc., DMS, FRICS
CORPORATE DIRECTOR OF ENVIRONMENT
THE QUAYS, BRUNEL WAY
BAGLAN ENERGY PARK SA11 2GG
www.npt.gov.uk

Project

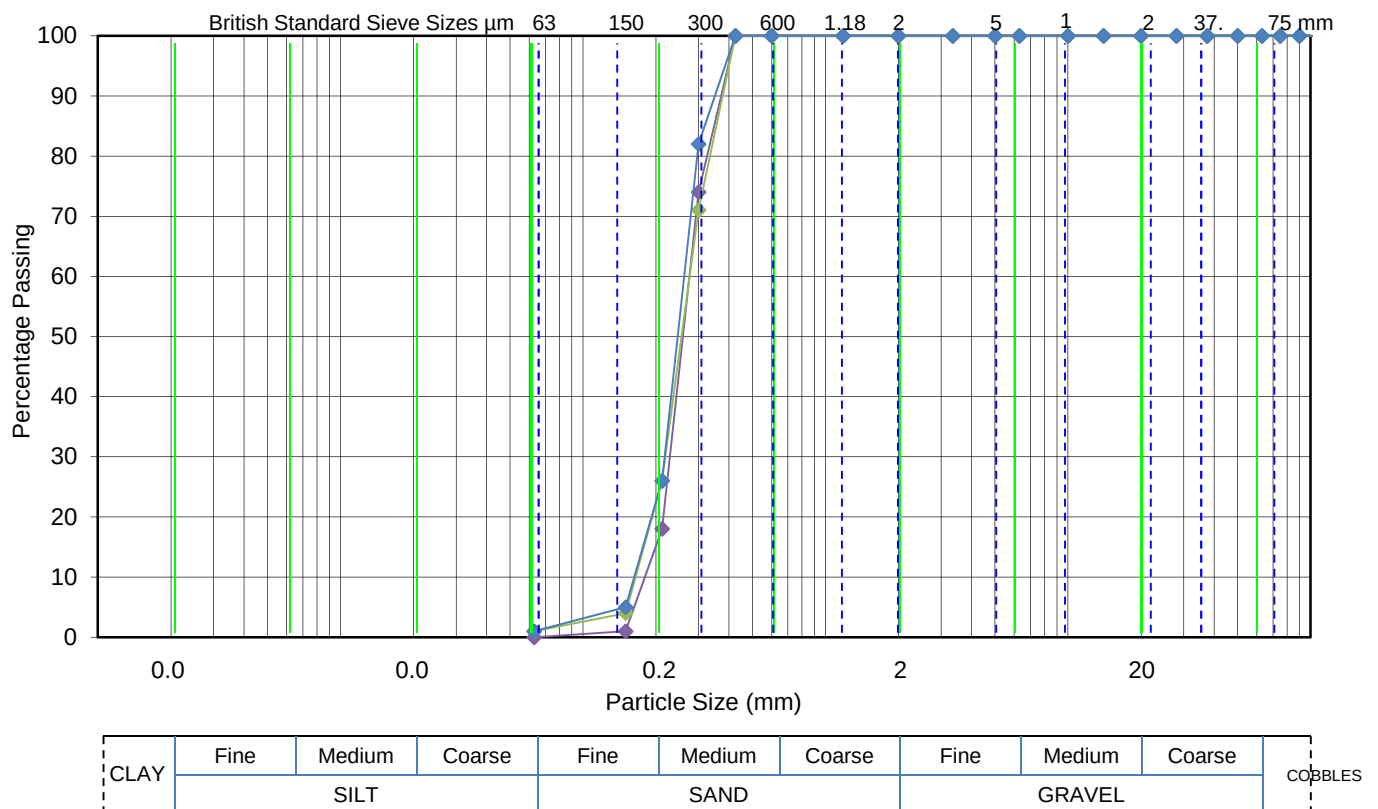
YGG Rhosafan Primary School

Drawing Title

SITE LAYOUT / LOCATION PLAN

File No.	Property Ref. No.	Drawn	Checked	Approved
WGH				
Date	Date	Date	Date	Date
NOV 2019				
Scales 1:500				
Drawing No.	Rev.			
A1184 - 06				

Particle Size Distribution - Blown Sand



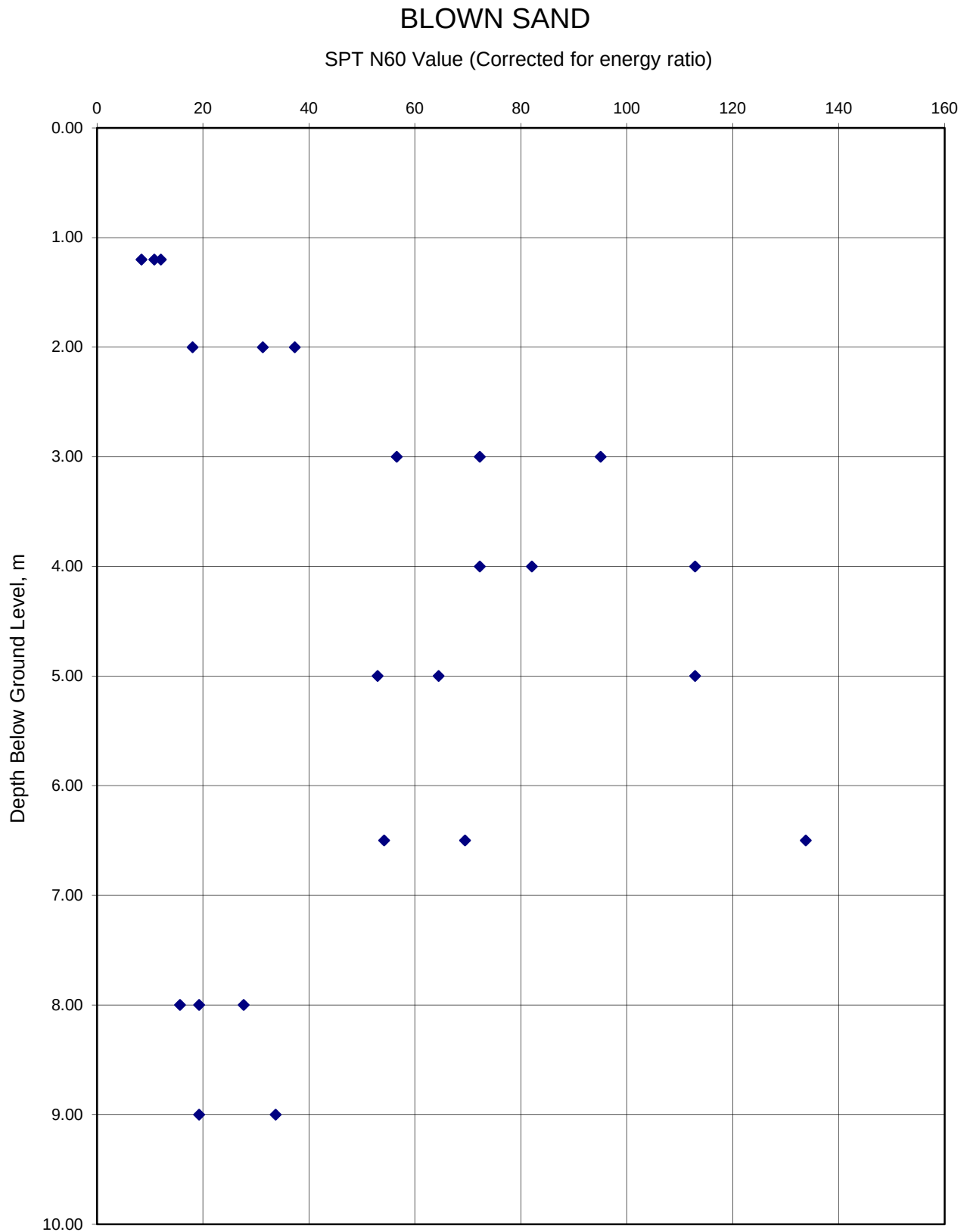
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Project YGG Rhosafan Primary School, Sandfields
 Project No. H9098-19
 Carried out for Neath Port Talbot County Borough Council

Figure

1

SPT N Value - Depth Profile



Notes:

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Figure

2
 Sheet 1 of 1



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APPENDIX B

EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records
SPT Hammer Energy Ratio Report
Borehole Logs
Trial Pit Logs
Trial Pit Drawing

Key
JD04
BH01 to BH03
HDP1 and HDP2
HDP1 and HDP2

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Key to Exploratory Hole Records

SAMPLES

Undisturbed

U	Driven tube sample	} nominally 100 mm diameter and full recovery unless otherwise stated
UT	Driven thin wall tube sample	
TW	Pushed thin wall tube sample	
P	Pushed piston sample	
L	Liner sample from dynamic (windowless) sampling. Full recovery unless otherwise stated	
CBR	CBR mould sample	
BLK	Block sample	
C / CS	Core sample (from rotary core) taken for laboratory testing.	
AMAL	Amalgamated sample	

Disturbed

D	Small sample
B	Bulk sample

Other

W	Water sample
G	Gas sample

	Environmental chemistry samples (in more than one container where appropriate)
ES	Soil sample
EW	Water sample

Comments

Sample reference numbers are assigned to every sample taken. A sample reference of 'NR' indicates that, while an attempt was made to take a tube sample, there was no recovery.

Samples taken from borehole installations (ie water or gas) after hole construction are not shown on the exploratory hole logs.

Specimens for point load testing undertaken on site (or other non-lab location) are not shown on the log.

IN SITU TESTS

SPT S or SPT C	Standard Penetration Test, open shoe (S) or solid cone (C)
----------------	--

The Standard Penetration Test is defined in BS EN ISO 22476-3:2005+A1:2011. The incremental blow counts are given in the Field Records column; each increment is 75 mm unless stated otherwise and any penetration under self-weight in mm (SW) is noted. Where the full 300 mm test drive is achieved the total number of blows for the test drive is presented as N = ** in the Test column. Where the test drive blows reach 50 the total blow count beyond the seating drive is given (without the N = prefix).

IV	<i>in situ</i> vane shear strength, peak (p) and remoulded (r)
HV	Hand vane shear strength, peak (p) and remoulded (r)
PP	Pocket penetrometer test, converted to shear strength
KFH, KRH, KPI	Permeability tests (KFH = falling head, KRH = rising head; KPI = packer inflow); results provided in Field Records column (one value per stage for packer tests)

DRILLING RECORDS

The mechanical indices (TCR/SCR/RQD & If) are defined in BS 5930:2015

TCR	Total Core Recovery, %
SCR	Solid Core Recovery, %
RQD	Rock Quality Designation, %
If	Fracture spacing, mm. Minimum, typical and maximum spacing measurements are presented.
NI	The term non-intact (NI) is used where the core is fragmented.
NA	Used where a measurement is not applicable (eg. If, SCR and RQD in non-rock materials).

Flush returns, estimated percentage with colour where relevant, are given in the Records column

CRF	Core recovered (length in m) in the following run
AZCL	Assessed zone of core loss

GROUNDWATER



Groundwater entry



Depth to groundwater after standing period

Notes:

See report text for full references of standards.

Updated October 2017

Project	YGG Rhosafan Primary School, Sandfields
Project No.	H9098-19
Carried out for	Neath Port Talbot County Borough Council

Key

Sheet 1 of 3

Key to Exploratory Hole Records

INSTALLATION

Details of standpipe/piezometer installations are given on the Record. Legend column shows installed instrument depths including slotted pipe section or tip depth, response zone filter material type and layers of backfill.

Standpipe/ piezometer

The type of instrument installed is indicated by a code in the Legend column at the depth of the response zone:

SP	Standpipe				
SPIE	Standpipe piezometer	Plain		Slotted	Piezometer
PPIE	Pneumatic piezometer	Pipe		Pipe	Tip
EPIE	Electronic piezometer				

Inclinometer or Slip Indicator

The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend column.

ICE	The type of instrument installed is indicated by a code in the Legend column at the base of the tubing:
ICM	Biaxial inclinometer
SLIP	Inclinometer tubing for use with probe Slip indicator

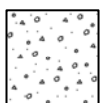
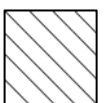
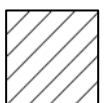
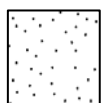
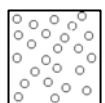
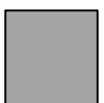
Settlement Points or Pressure Cells

The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the Legend column.

	The type of instrument installed is indicated by a code in the Legend column:
ESET	Electronic settlement cell/gauge
ETM	Magnetic extensometer settlement point
EPCE	Electronic embedment pressure cell
PPCE	Electronic push in pressure cell

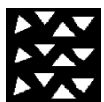
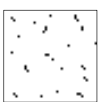
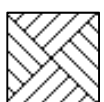
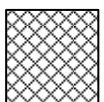
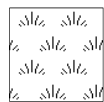
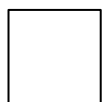
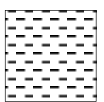
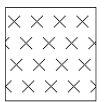
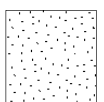
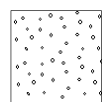
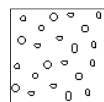
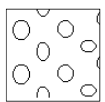
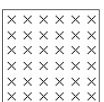
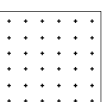
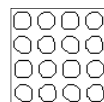
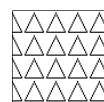
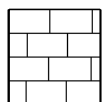
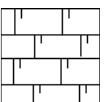
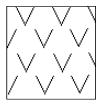
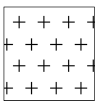
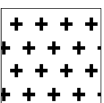
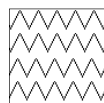
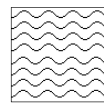
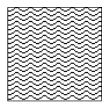
INSTALLATION / BACKFILL LEGENDS

A legend describing the installation is shown in the rightmost column. Legend symbols used to describe the backfill materials are indicated below.

Macadam	Concrete	Grout	Bentonite	Sand	Gravel	Arising
						

STRATUM LEGENDS

The legend symbols used for graphical representation of soils, rocks and other materials on the borehole logs are shown below. For soils with significant proportions of secondary soil types, a combination of two or more symbols may be used.

Macadam	Concrete	Topsoil	Made Ground / Fill	Peat	Void or No Information	
						
Clay	Silt	Sand	Gravel	Cobbles	Boulders	Coal
						
Mudstone	Siltstone	Sandstone	Conglomerate	Breccia	Limestone	Chalk
						
Igneous (Fine)	Igneous (Med)	Igneous (Coarse)	Metamorphic (Fine)	Metamorphic (Med)	Metamorphic (Coarse)	Tuff
						

Notes:

See report text for full references of standards.

Updated October 2017

Project YGG Rhosafan Primary School, Sandfields

Project No. H9098-19

Carried out for Neath Port Talbot County Borough Council

Key

Sheet 2 of 3



Key to Exploratory Hole Records

NOTES

- 1 Soils and rocks are described in accordance with BS EN ISO 14688-1:2002+A1:2013 and 14689-1:2003 respectively as amplified by BS 5930:2015.
- 2 For fine soils, consistency determined during description is reported for those strata where undisturbed samples are available. Where the logger considers that the sample may not be representative of the condition in situ, for whatever reason, the reported consistency is given in brackets. The reliability of the sample is indicated by Probably or Possibly as appropriate. Hence (Probably firm) indicates the logger is reasonably confident of the assessment, but (Possibly firm) means less certainty. Where the samples available are too disturbed to allow a reasonable assessment of the in situ condition, no consistency is given.
- 3 Evidence of the occurrence of very coarse particles (cobbles and boulders) is presented on the logs. However, because of their size in relation to the exploratory hole these records may not be fully representative of their size and frequency in the ground mass.
- 4 The declination of bedding and joints is given with respect to the normal to the core axis. Thus in a vertical borehole this will be the dip.
- 5 The assessment of SCR, RQD and Fracture Spacing excludes artificial fractures.
- 6 Observations of discernible groundwater entries during the advancement of the exploratory hole are given at the foot of the log and in the Legend column. The absence of a recorded groundwater entry should not, however, be interpreted as a groundwater level below the base of the borehole. Under certain conditions groundwater entry may not be observed, for instance, drilling with water flush or overwater, or boring at a rate faster than water can accumulate in the borehole. Similarly, where water entry observations do exist, groundwater may also be present at higher elevations in the ground than where recorded in the borehole. In addition, where appropriate, water levels in the hole at the time of recovering individual samples or carrying out in situ tests and at shift changes are given in the Records column.
- 7 The borehole logs present the results of Standard Penetration Tests recorded in the field without correction or interpretation. However, in certain ground conditions (eg high hydraulic head or where very coarse particles are present) some judgement may be necessary in considering whether the results are representative of in situ mass conditions.

REFERENCES

- 1 BS EN ISO 14688-1:2002+A1 : 2013 : Geotechnical investigation and testing - Identification and classification of soil. Part 1 Identification and description. British Standards Institution
- 2 BS EN ISO 14689-1 : 2003 : Geotechnical investigation and testing - Identification and classification of rock. Part 1 Identification and description. British Standards Institution
- 3 BS EN ISO 22476-3:2005+A1 : 2011 : Geotechnical investigation and testing - Field testing. Part 3 Standard penetration test. British Standards Institution
- 4 BS 5930 : 2015 : Code of practice for ground investigations. British Standards Institution

Notes:

See report text for full references of standards.

Updated October 2017

Project YGG Rhosafan Primary School, Sandfields

Project No. H9098-19

Carried out for Neath Port Talbot County Borough Council

Key

Sheet 3 of 3



SPT Calibration Report

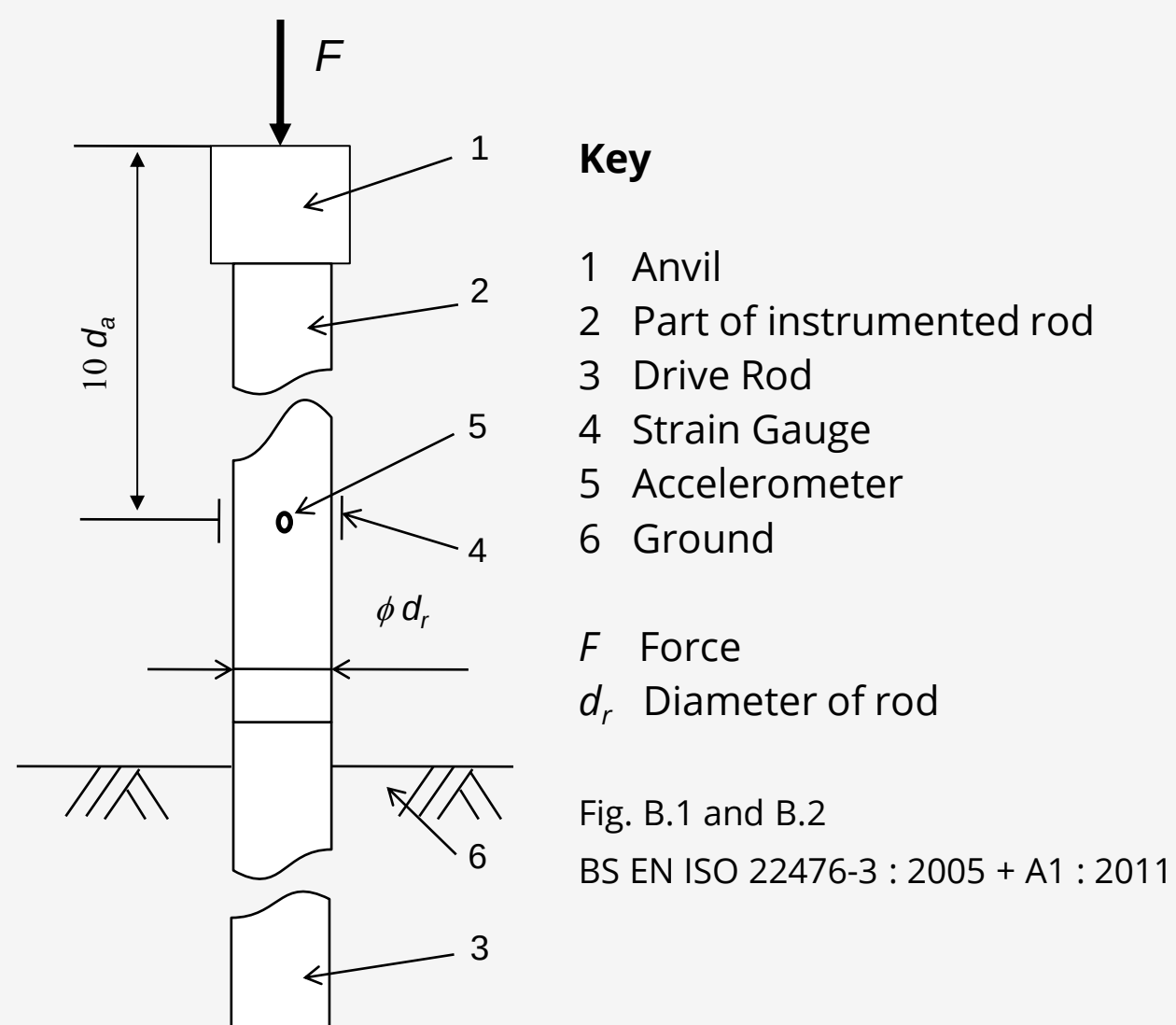
Hammer Energy Measurement Report

Type of Hammer SPT HAMMER
Test No EQU2429
Client JACKSON DRILLING

Test Depth (m) 8.00
Mass of hammer $m = 63.5\text{kg}$
Falling height $h = 0.76\text{m}$
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

Characteristics of the instrumented rod

Diameter $d_r = 0.052\text{ m}$
Length of instrumented rod 0.558 m
Area $A = 11.61\text{ cm}^2$
Modulus $E_a = 206843\text{ MPa}$



DATE OF TEST VALID UNTIL HAMMER ID

20/12/2019

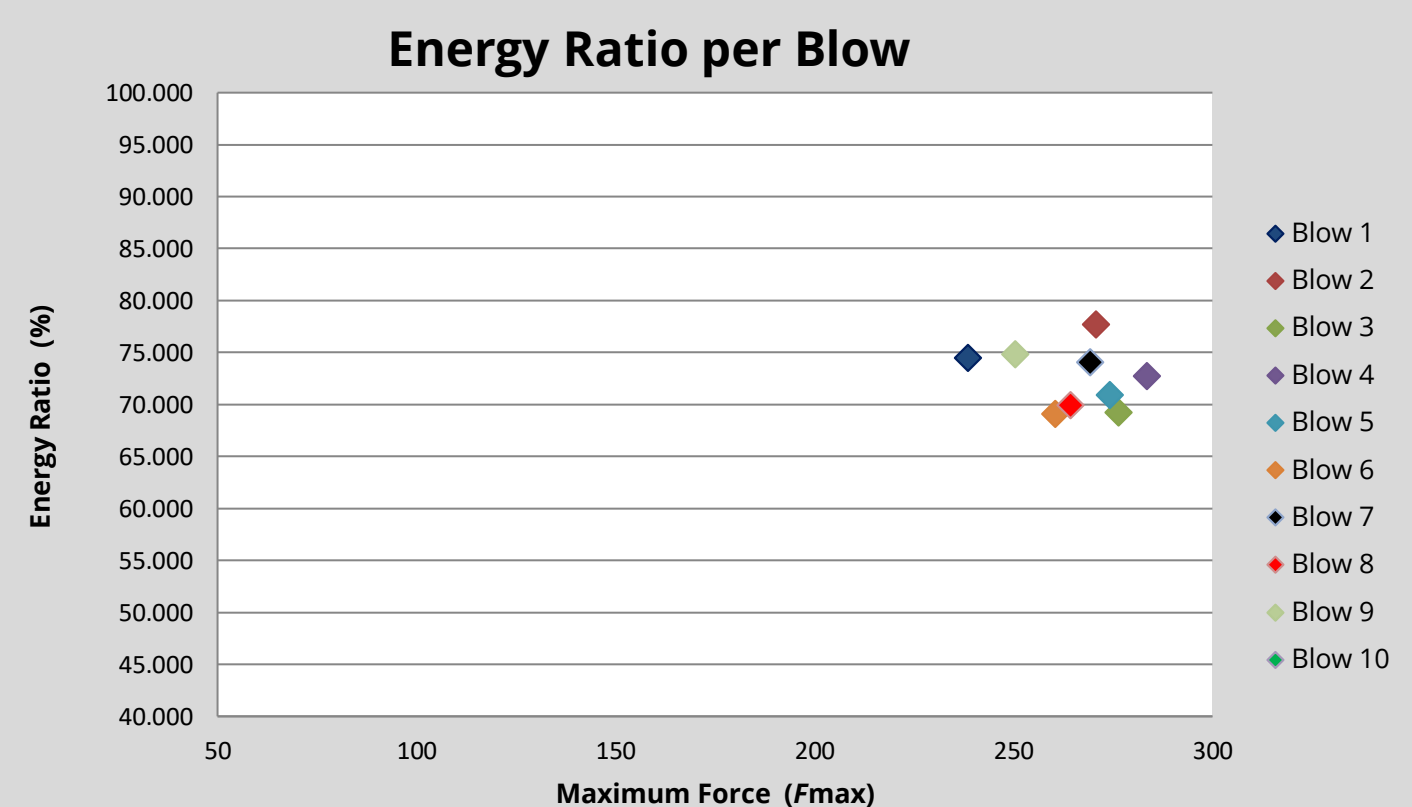
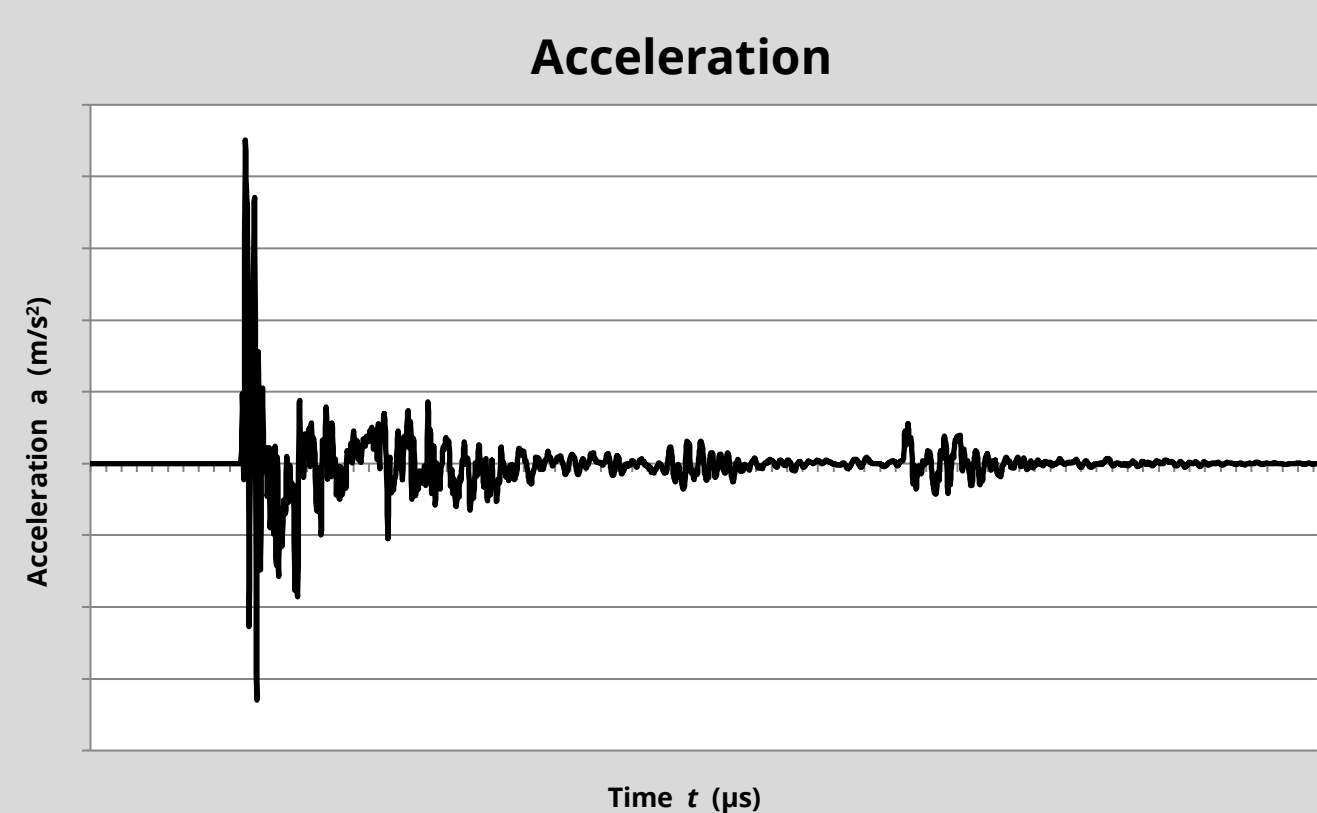
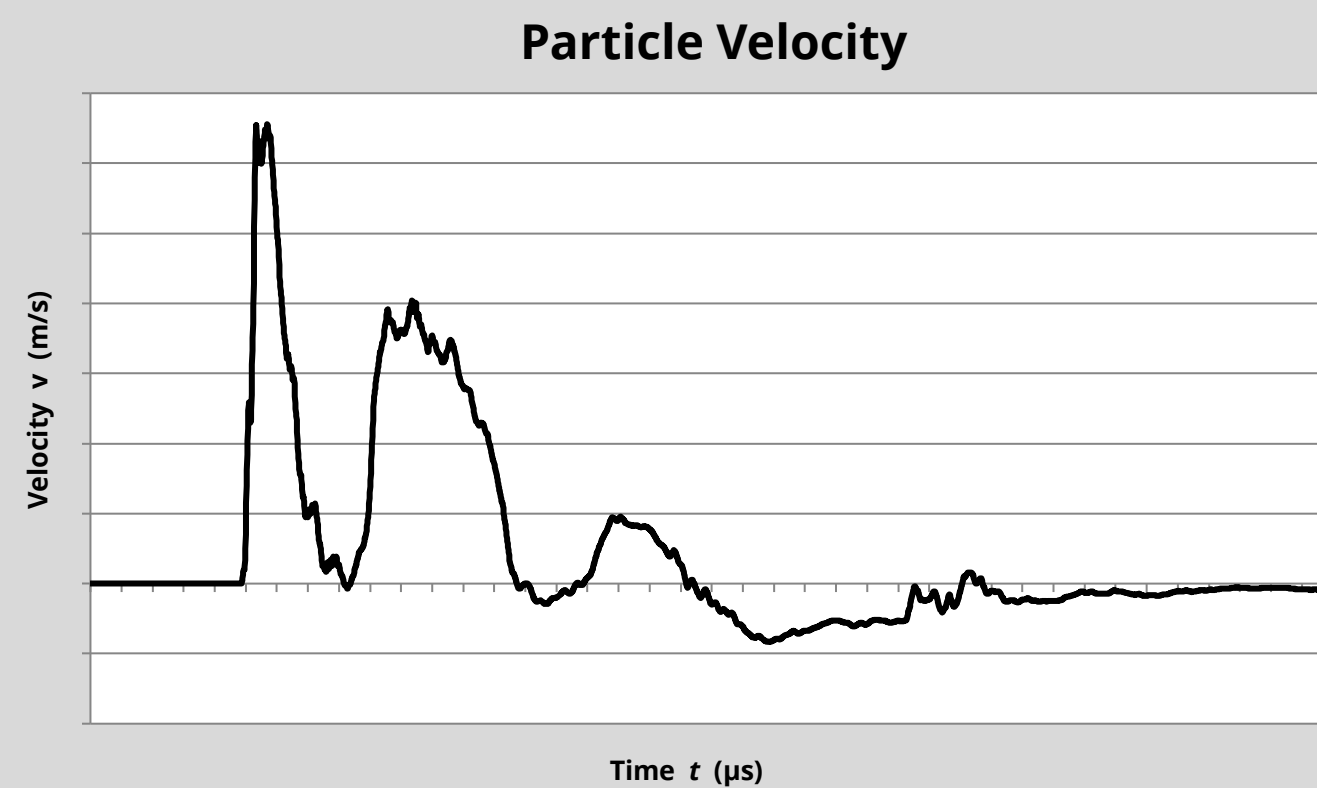
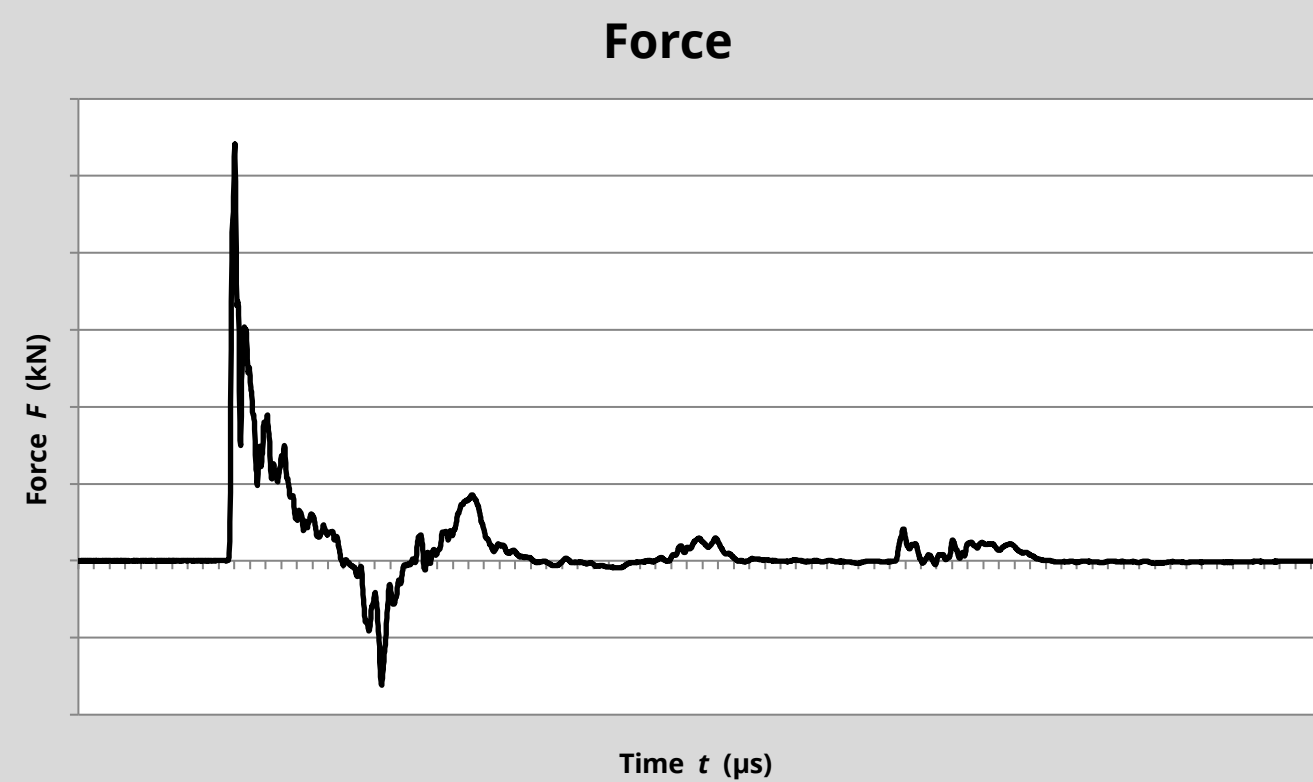
19/12/2020

JD04

$E_{\text{meas}} = 0.342\text{ kN-m}$

$E_{\text{theor}} = 0.473\text{ kN-m}$

Comments



$$\text{Energy Ratio (Er)} = \frac{E_{\text{meas}}}{E_{\text{theor}}}$$

72.25%
© COPYRIGHT 2020

Equipe SPT Analyzer Operator

AF

Certificate prepared by

Equipe

Certificate checked by

Equipe

Certificate date

02/01/2020

Borehole Log



Drilled DS Logged GRP Checked AP Approved MW	Start 16/01/2020 End 16/01/2020	Equipment, Methods and Remarks Dando 2500 Cable percussive drilling rig Hand excavated inspection pit from GL to 1.20m. Cable percussion drilling from 1.20m to 9.00m.	Depth from (m) 0.00 to (m) 9.45 Diameter (mm) 150 Casing Depth (m) 9.00	Ground Level 10.96 mOD Coordinates (m) E 273939.90 National Grid N 190457.08				
Samples and Tests		Strata Description						
Depth 0.00 - 0.30 0.10 0.50 0.50 - 1.00 1.00 1.20 - 1.65 1.65 - 2.00 2.00 - 2.45 2.50 - 3.00 3.00 - 3.34 3.50 - 4.00 4.00 - 4.31 4.50 - 5.00 5.00 - 5.43 5.50 - 6.00 6.50 - 6.95 6.50 - 7.00 7.50 - 8.00 8.00 - 8.45 8.50 - 9.00 9.00 - 9.45	Type & No. B 1 ES 1 ES 2 B 2 ES 3 SPTC B 3 SPTC B 4 SPTC B 5 SPTC B 6 SPTC B 7 SPTC B 8 B 9 SPTC B 10 SPTC	Records N=7 (3,2/1,2,2,2) N=26 (4,5/5,6,6,9) 50 (8,12/13,20,17 for 40mm) 50 (5,11/21,20,9 for 10mm) 50 (4,13/10,17,10,13 for 55mm) N=45 (7,9/10,10,13,12) N=23 (2,6/4,7,6,6) N=28 (1,5/12,6,6,4)	Date 16/01/20 Time 0800 0.00 1800 0.00 0.00	Main Soft brown slightly gravelly sandy CLAY with occasional fine rootlets. Gravel is subangular to subrounded fine to coarse of mudstone and quartzite (MADE GROUND) Loose becoming medium dense light brown fine to coarse SAND with fragments of wood (up to 50mm). (BLOWN SAND) Very dense becoming dense light brown fine and medium SAND with shell fragments (up to 50mm). (BLOWN SAND) Medium dense light brown fine and medium SAND. (BLOWN SAND) END OF EXPLORATORY HOLE	Detail	Depth, Level (Thickness) (0.20) +10.76 (2.55) 2.75 +8.21 (4.75) 7.50 +3.46 (1.50) 9.00 +1.96	Legend	Backfill
Groundwater Entries No. Depth Strike (m) Remarks		Depth Sealed (m)	Depth Related Remarks Depths (m) Remarks 1.20 - 9.00 SPT hammer; JD04. ER = 72.25% 1.20 - 9.00 Water added.		Hard Boring Depths (m) Duration (mins) Tools used			
Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 © Copyright SOCOTEC UK Limited 01/04/2020 11:34:30		Project YGG Rhosafan Primary School, Sandfields Project No. H9098-19 Carried out for Neath Port Talbot County Borough Council	Borehole BH01 Sheet 1 of 1					

Borehole Log

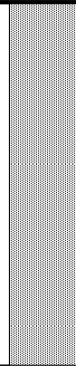


Drilled DS Logged GRP Checked AP Approved MW	Start 14/01/2020 End 14/01/2020	Equipment, Methods and Remarks Dando 2500 Cable percussive drilling rig Hand excavated inspection pit from GL to 1.20m. Cable percussion drilling from 1.20m to 8.00m.	Depth from (m) 0.00 to (m) 8.45 Diameter (mm) 150 Casing Depth (m) 9.00	Ground Level 11.21 mOD Coordinates (m) E 273924.40 National Grid N 190438.94				
Samples and Tests			Strata Description					
Depth 0.00 - 0.30 0.20 0.30 - 0.80 0.60 1.10 1.20 - 1.65 1.20 - 1.65 2.00 - 2.45 2.50 - 3.00 3.00 - 3.40 3.50 - 4.00 4.00 - 4.37 4.50 - 5.00 5.00 - 5.45 5.50 - 6.00 6.50 - 6.91 6.50 - 7.00 7.50 - 8.00 8.00 - 8.45	Type & No. B 1 ES 1 B 2 ES 2 ES 3 SPTC B 3 SPTC B 4 SPTC B 5 SPTC B 6 SPTC B 7 SPTC B 8 B 9 SPTC	Records N=9 (2,2/2,2,3,2) N=15 (1,2/3,2,4,6) 50 (4,7/13,15,14,8 for 25mm) 50 (5,10/15,16,19 for 70mm) N=44 (3,7/10,9,12,13) 50 (2,11/14,13,13,10 for 35mm) N=13 (1,2/1,2,4,6)	Date 14/01/20 Casing 0.00 Time 0800 0.00 14/01/20 8.00 1800 0.00	Main Soft brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine and medium of limestone, mudstone, quartzite and rare brick. Occasional rootlets. (MADE GROUND) Light brown fine to coarse SAND with fragments of wood (up to 50mm). (BLOWN SAND) Loose becoming medium dense light brown fine to coarse SAND with shell fragments (up to 50mm). (BLOWN SAND) Very dense light brown fine and medium SAND with shell fragments (up to 50mm) and rare clay. (BLOWN SAND) Light brownish grey becoming grey slightly clayey fine to coarse SAND recovered with inclusions (10-20mm) of sandy clay (BLOWN SAND) END OF EXPLORATORY HOLE	Detail 5.00-5.45 Dense	Depth, Level (Thickness) (0.30) 0.30 +10.91 (0.90) 1.20 +10.01 (1.55) 2.75 +8.46 (4.75) 7.50 +3.71 (0.50) 8.00 +3.21	Legend 	Backfill
Groundwater Entries No. Depth Strike (m) Remarks Depth Sealed (m)			Depth Related Remarks Depths (m) Remarks 1.20 - 8.00 Water added 1.20 - 8.00 SPT hammer, JD04. ER = 72.25%		Hard Boring Depths (m) Duration (mins) Tools used			
Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 © Copyright SOCOTEC UK Limited 01/04/2020 11:34:30			Project YGG Rhosafan Primary School, Sandfields Project No. H9098-19 Carried out for Neath Port Talbot County Borough Council		Borehole BH02 Sheet 1 of 1			

Drilled	DS	Start	Equipment, Methods and Remarks			Depth from	to	Diameter	Casing Depth	Ground Level	11.20 mOD
Logged	GRP	15/01/2020	Dando 2500 Cable percussive drilling rig Hand excavated inspection pit from GL to 1.20m. Cable percussion drilling from 1.20m to 9.45m.			(m)	(m)	(mm)	(m)	Coordinates (m)	E 273940.01
Checked	AP	End				0.00	9.45	150	9.00	National Grid	N 190431.58
Approved	MW	15/01/2020									
Samples and Tests						Strata Description					
Depth		Type & No.	Records	Date	Time	Main		Detail	Depth, Level (Thickness)	Legend	Backfill
0.00 - 0.30		B 1		15/01/20	0800	Soft brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to coarse of limestone, mudstone, quartzite and rare brick. Occasional rootlets (MADE GROUND) Medium dense light brown fine to coarse SAND with fragments of wood (50mm). (BLOWN SAND)			(0.25)		
0.30		ES 1						0.25	+10.95		
0.50 - 1.00		B 2									
0.70		ES 2									
1.20 - 1.65		SPTC	N=10 (2,1/3,2,2,3)		0.00				(2.50)		
1.20		ES 3									
1.65 - 2.00		B 3									
2.00 - 2.45		SPTC	N=31 (2,4/4,9,9,9)	2.00	0.00						
2.50 - 3.00		B 4				Very dense light brown fine and medium SAND with occasional shell fragments (up to 50mm). (BLOWN SAND)			2.75	+8.45	
3.00 - 3.45		SPTC	N=47 (3,9/12,9,10,16)	3.00	0.00						
3.50 - 4.00		B 5									
4.00 - 4.40		SPTC	50 (10,13/1,15,20,14 for 25mm)	4.00	0.00						
4.50 - 5.00		B 6									
5.00 - 5.31		SPTC	50 (4,9/20,25,5 for 10mm)	5.00	0.00						
5.50 - 6.00		B 7									
6.50 - 6.78		SPTC	50 (9,14/22,28 for 60mm)	6.50	0.00						
6.50 - 7.00		B 8							(5.25)		
7.50 - 8.00		B 9									
8.00 - 8.45		SPTC	N=16 (2,4/3,4,5,4)	8.00	0.00						
8.00 - 8.50		B 10									
8.50 - 9.00		B 11				Medium dense light brownish grey silty fine to coarse SAND (BLOWN SAND)			8.00	+3.20	
9.00 - 9.45		SPTS	N=16 (2,1/3,4,4,5)	9.00	0.00						
9.00 - 9.45		D 12		15/01/20	1800						
				9.00	0.00						
						END OF EXPLORATORY HOLE			9.45	+1.75	
Groundwater Entries						Depth Related Remarks			Hard Boring		
No.	Depth	Strike (m)	Remarks	Depth Sealed (m)		Depths (m)	Remarks		Depths (m)	Duration (mins)	Tools used
						1.20 - 9.00	Water Added				
						1.20 - 9.45	SPT hammer; JD04. ER = 72.25%				
Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.						Project YGG Rhosafan Primary School, Sandfields			Borehole		
Scale 1:50						Project No. H9098-19			BH03		
© Copyright SOCOTEC UK Limited						Carried out for Neath Port Talbot County Borough Council			Sheet 1 of 1		

Trial Pit Log

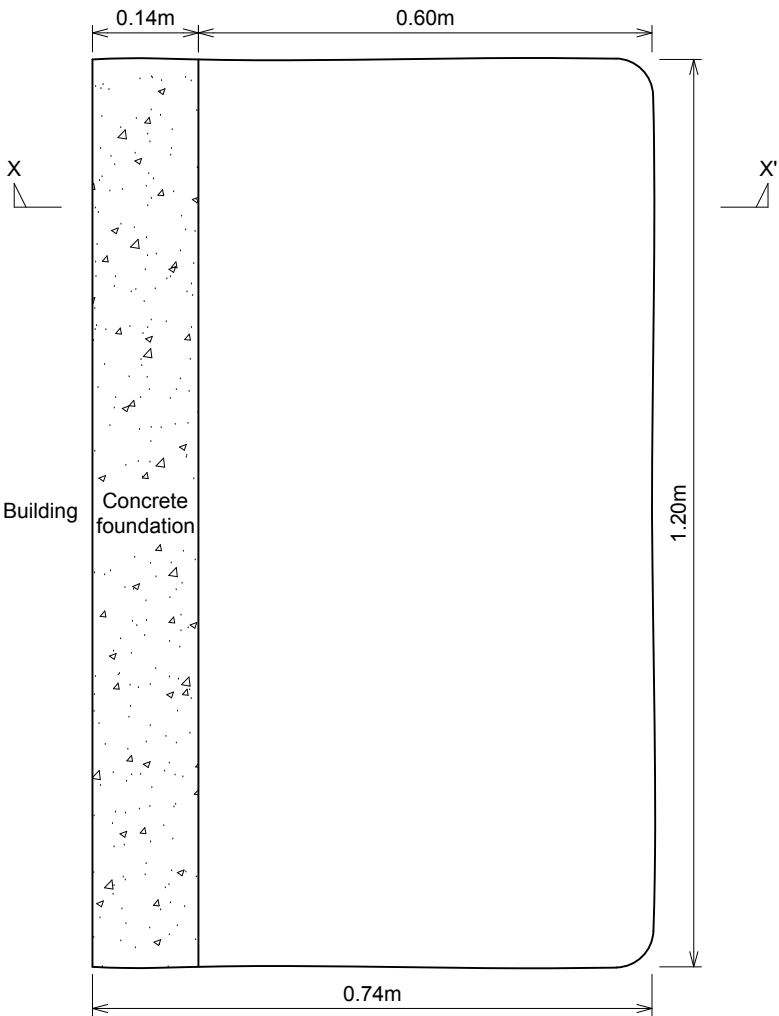


Logged GRP Checked MW Approved MW		Start 15/01/2020 End 15/01/2020	Equipment, Methods and Remarks Hand excavated trial pit from GL to 1.20m for foundation investigation, see HDP1 Trial Pit Drawing. No groundwater encountered Approximate coordinates only	Dimension and Orientation Width 0.74 m Length 1.20 m A D B C ➔ 45 (Deg)		Ground Level Coordinates (m) E 273950.00 National Grid N 190452.00			
Samples and Tests			Strata Description						
Depth	Type & No.	Records	Main	Detail	Depth, Level (Thickness)	Legend	Backfill		
			Soft brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick, concrete and mudstone. (MADE GROUND) Light brown slightly silty fine to coarse SAND with occasional pockets (<100mm) of dark grey sandy clay. (MADE GROUND)	0.00-0.64 Brick wall (school building). 0.64-0.94 Concrete foundation, projection 140mm wide.	0.10 (0.10) (1.10)				
			END OF EXPLORATORY HOLE		1.20				
Groundwater Entries No. Depth Strike (m) Remarks			Remarks Depth (m) Remarks			Stability Good Shoring None Weather Dry			
Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 © Copyright SOCOTEC UK Limited 01/04/2020 11:34:31			Project YGG Rhosafan Primary School, Sandfields Project No. H9098-19 Carried out for Neath Port Talbot County Borough Council			Trial Pit HDP1 Sheet 1 of 1			

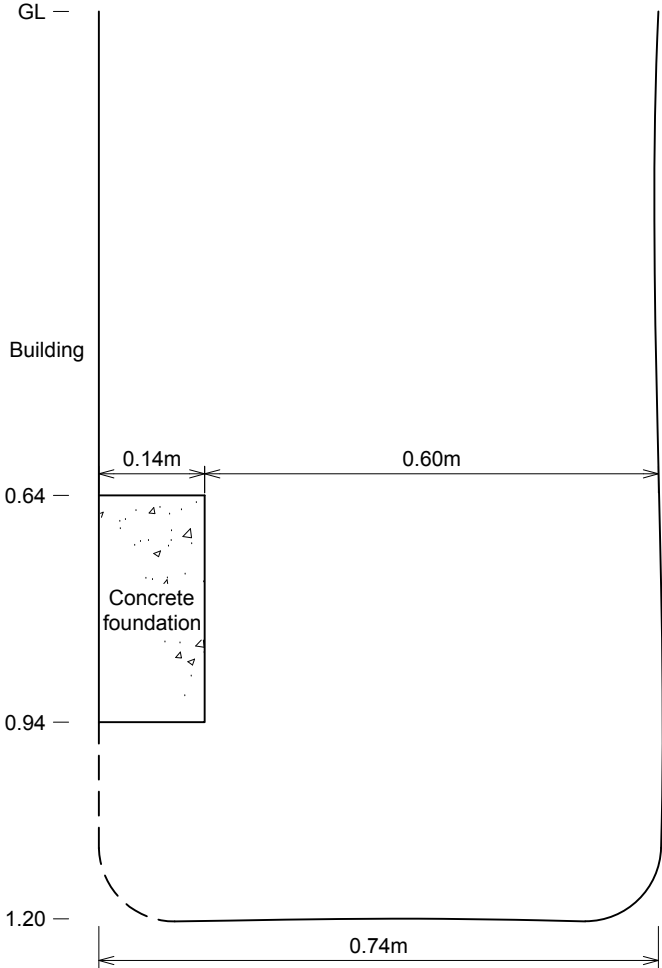
SOCOTEC

[illegible]

Trial Pit Drawing



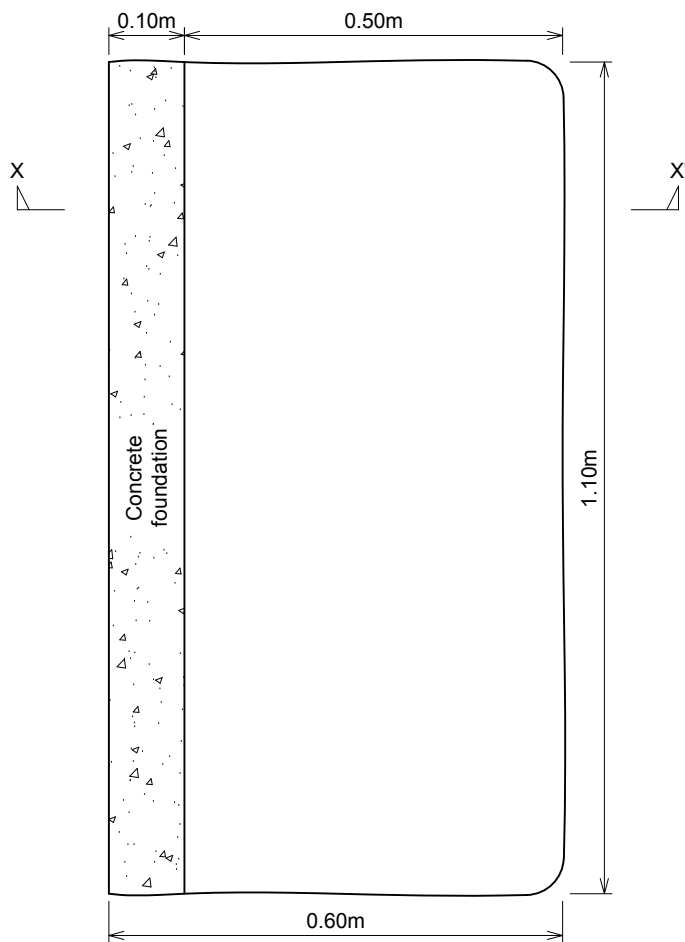
PLAN VIEW



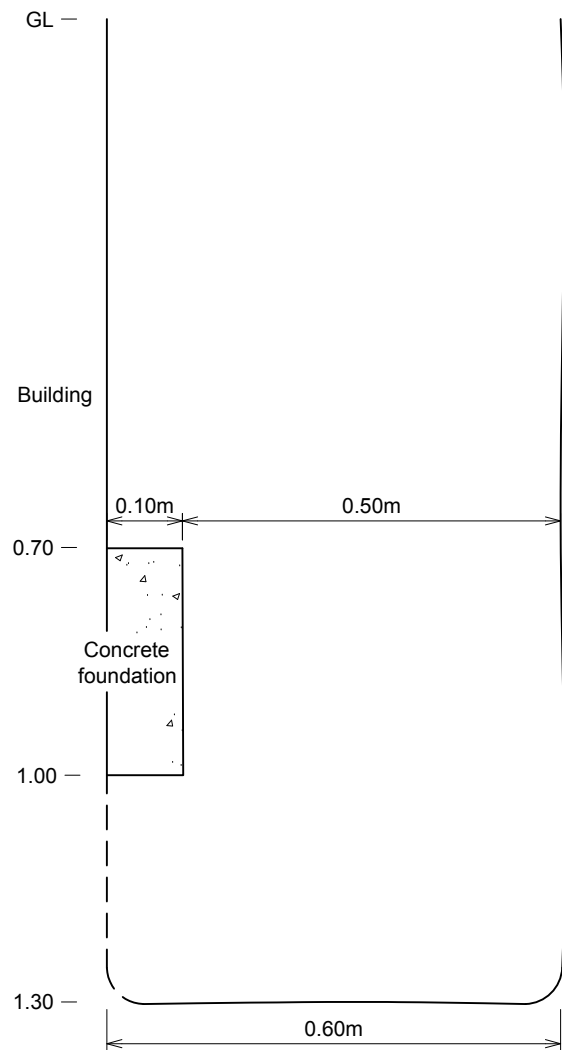
SECTION X-X'

All dimensions in metres. Scale: 1:10 A4	Project YGG Rhosafan Primary School Project no. H9098-19 Client Neath Port Talbot County Borough Council	TP No. HDP1
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Trial Pit Drawing



PLAN VIEW



SECTION X-X'

All dimensions in metres.

Scale: 1:10

A4

Project YGG Rhosafan Primary School

Project no. H9098-19

Client Neath Port Talbot County Borough Council

TP No.

HDP2



SOCOTEC

APPENDIX C

INSTRUMENTATION AND MONITORING

Groundwater Monitoring Installations Summary

Table C1

Groundwater Monitoring

Table C2

Gas Monitoring

Table C3

Groundwater Monitoring Installations Summary

Instrument Reference	Instrument Type (See Notes)	Installation Date, dd/mm/yyyy	Pipe Diameter, mm	Instrument Base, mbgl	Response Zone Range, mbgl	Pipe Top Details	Headworks	Remarks
BH01 (1)	SP	16/01/2020	50	5.00	2.00 to 5.00	Gas tap	Flush cover	
BH02 (1)	SP	14/01/2020	50	8.00	5.00 to 8.00	Gas tap	Flush cover	
BH03 (1)	SP	15/01/2020	50	9.00	6.00 to 9.00	Gas tap	Flush cover	

Notes: Type: SP - Standpipe



Project YGG Rhosafan Primary School, Sandfields
 Project No. H9098-19
 Carried out for Neath Port Talbot County Borough Council

Table

C1

Groundwater Monitoring

Instrument Reference	Instrument Type	Instrument Base, mbgl	Date Time dd/mm/yyyy hh:mm:ss	Groundwater depth, mbgl	Comments
BH01 (1)	SP	5.00	28/01/2020 11:00:00	3.90	
BH01 (1)	SP	5.00	05/02/2020 12:00:00	4.00	
BH01 (1)	SP	5.00	13/02/2020 09:45:00	4.00	
BH01 (1)	SP	5.00	27/02/2020 09:40:00	3.84	
BH02 (1)	SP	8.00	28/01/2020 11:40:00	4.25	
BH02 (1)	SP	8.00	05/02/2020 12:30:00	4.43	
BH02 (1)	SP	8.00	13/02/2020 10:00:00	4.32	
BH02 (1)	SP	8.00	27/02/2020 09:00:00	4.08	
BH03 (1)	SP	9.00	28/01/2020 11:05:00	4.37	
BH03 (1)	SP	9.00	05/02/2020 12:50:00	4.31	
BH03 (1)	SP	9.00	13/02/2020 09:30:00	4.46	
BH03 (1)	SP	9.00	27/02/2020 09:20:00	4.36	
Notes: Type: SP - Standpipe  Project Project No. Carried out for YGG Rhosafan Primary School, Sandfields H9098-19 Neath Port Talbot County Borough Council Table C2					

Gas Monitoring

Instrument Reference	Instrument Base, mbar	Date Time dd/mm/yyyy hh:mm:ss		Air Temperature, °C	Barometric Pressure, mbar	Gas Differential Pressure, Pa	Gas Concentrations						
							Gas Flow Rate, l/hr	Carbon Dioxide, %vol	Hydrogen Sulphide, ppm	Methane, %LEL	Nitrogen, %vol	Oxygen, %vol	Methane, %vol
BH01 (1)	5.00	28/01/2020 11:00:00	Peak	7.0	997	0.0	0.0	ND	4.0	ND	78.0	18.5	ND
BH01 (1)	5.00	28/01/2020 11:05:00	Steady	7.0	997	0.0	0.0	1.3	3.4	0.1	78.0	18.5	ND
BH01 (1)	5.00	05/02/2020 12:00:00	Peak	5.0	1037	0.0	0.0	ND	4.1	ND		18.7	ND
BH01 (1)	5.00	05/02/2020 12:05:00	Steady	5.0	1037	0.0	0.0	1.1	3.7	ND		19.5	ND
BH01 (1)	5.00	13/02/2020 09:45:00	Peak	9.0	978		5.3	0.1		0.4		20.9	0.2
BH01 (1)	5.00	13/02/2020 09:50:00	Steady	9.0	978		5.3	1.4		ND		19.2	0.2
BH01 (1)	5.00	27/02/2020 09:40:00	Peak	6.0	1002	-0.3	0.1	ND	2.7	ND		18.9	ND
BH01 (1)	5.00	27/02/2020 09:48:00	Steady	6.0	1002	-0.1	0.2	1.4	2.5	ND		19.1	ND
BH02 (1)	8.00	28/01/2020 11:40:00	Peak	7.0	996	0.0	0.0	ND	ND	ND	78.0	20.2	ND
BH02 (1)	8.00	28/01/2020 11:48:00	Steady	7.0	996	0.0	0.0	ND	ND	ND	78.0	20.4	ND
BH02 (1)	8.00	05/02/2020 12:30:00	Peak	6.0	1037	0.0	0.0	ND	4.1	ND		18.4	ND
BH02 (1)	8.00	05/02/2020 12:35:00	Steady	6.0	1037	0.0	0.0	ND	3.5	ND		20.7	ND
BH02 (1)	8.00	13/02/2020 10:00:00	Peak	9.0	978		0.2	0.3		ND		19.8	0.2
BH02 (1)	8.00	13/02/2020 10:08:00	Steady	9.0	978		0.2	0.1				20.1	0.2
BH02 (1)	8.00	27/02/2020 09:00:00	Peak	6.0	1002	0.0	0.0	ND	2.6	ND		20.5	ND
BH02 (1)	8.00	27/02/2020 09:08:00	Steady	6.0	1002	0.0	0.0	ND	2.6	ND		20.8	ND
BH03 (1)	9.00	28/01/2020 11:05:00	Peak	7.0	996	0.0	0.0	ND	2.8	ND	78.0	20.4	ND
BH03 (1)	9.00	28/01/2020 11:10:00	Steady	7.0	996	0.0	0.0	1.3	3.0	ND	78.0	18.3	ND
BH03 (1)	9.00	05/02/2020 12:50:00	Peak	6.0	1037	0.0	0.0	ND	2.6	ND		20.1	ND
BH03 (1)	9.00	05/02/2020 12:55:00	Steady	6.0	1037	0.0	0.0	ND	2.9	ND		20.6	ND
BH03 (1)	9.00	13/02/2020 09:30:00	Peak	9.0	978		0.3	0.4				19.8	0.2
BH03 (1)	9.00	13/02/2020 09:38:00	Steady	9.0	978		0.3	0.4				19.8	0.2
BH03 (1)	9.00	27/02/2020 09:20:00	Peak	6.0	1001	0.0	-0.1	1.3	2.2	ND		18.7	ND
BH03 (1)	9.00	27/02/2020 09:28:00	Steady	6.0	1001	-0.2	0.0	ND	2.0	ND		20.8	ND

Notes: ND - not detected

Project YGG Rhosafan Primary School, Sandfields
 Project No. H9098-19
 Carried out for Neath Port Talbot County Borough Council

Table

C3

APPENDIX D

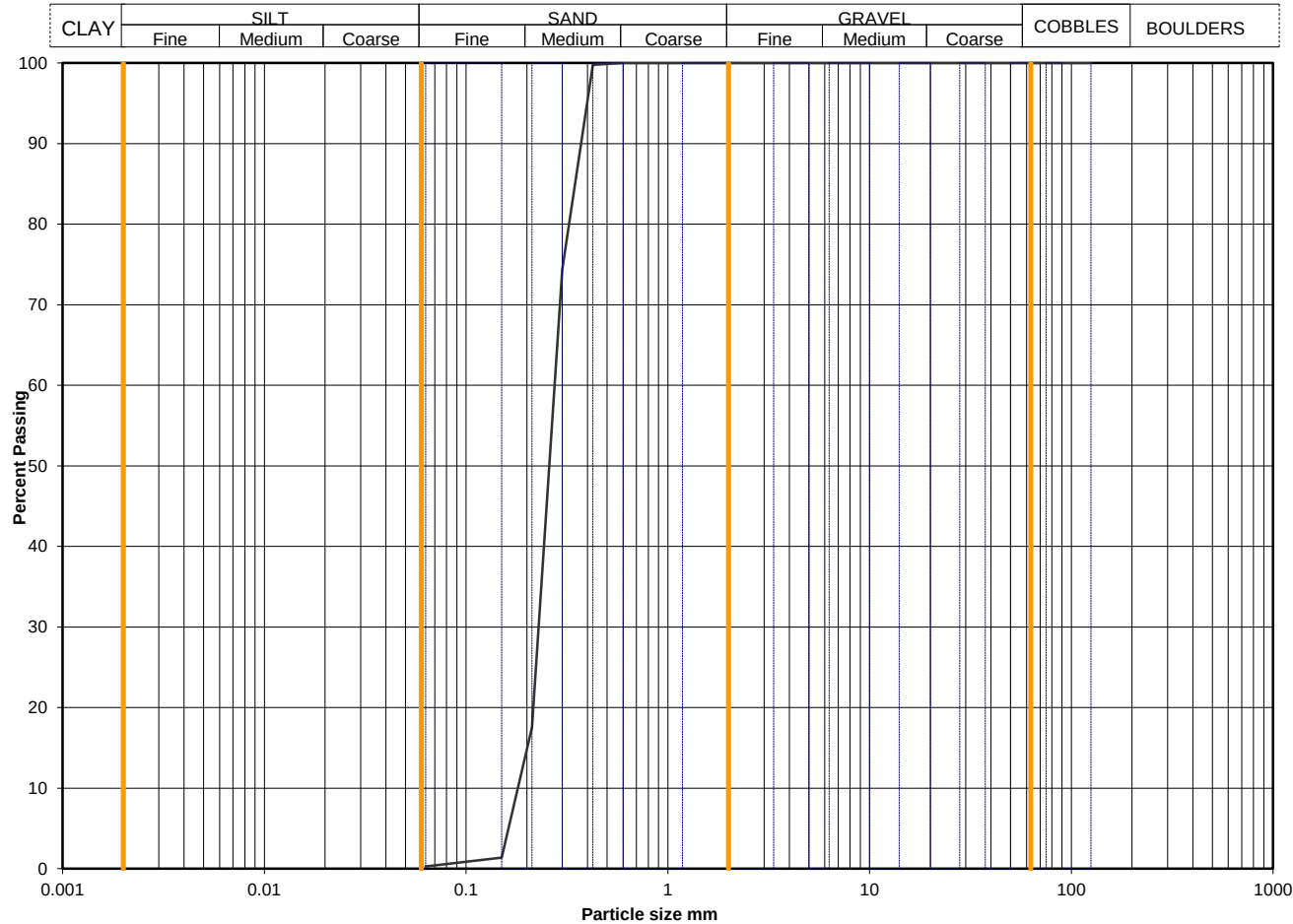
GEOTECHNICAL LABORATORY TEST RESULTS

Particle Size Distribution Analyses
Certificate of Analysis

PSD
20-01486

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH01
		Sample Depth (m BGL)	2.50 - 3.00
	H9098-1920200121102102	Sample Type and No	B4
		Specimen Ref	



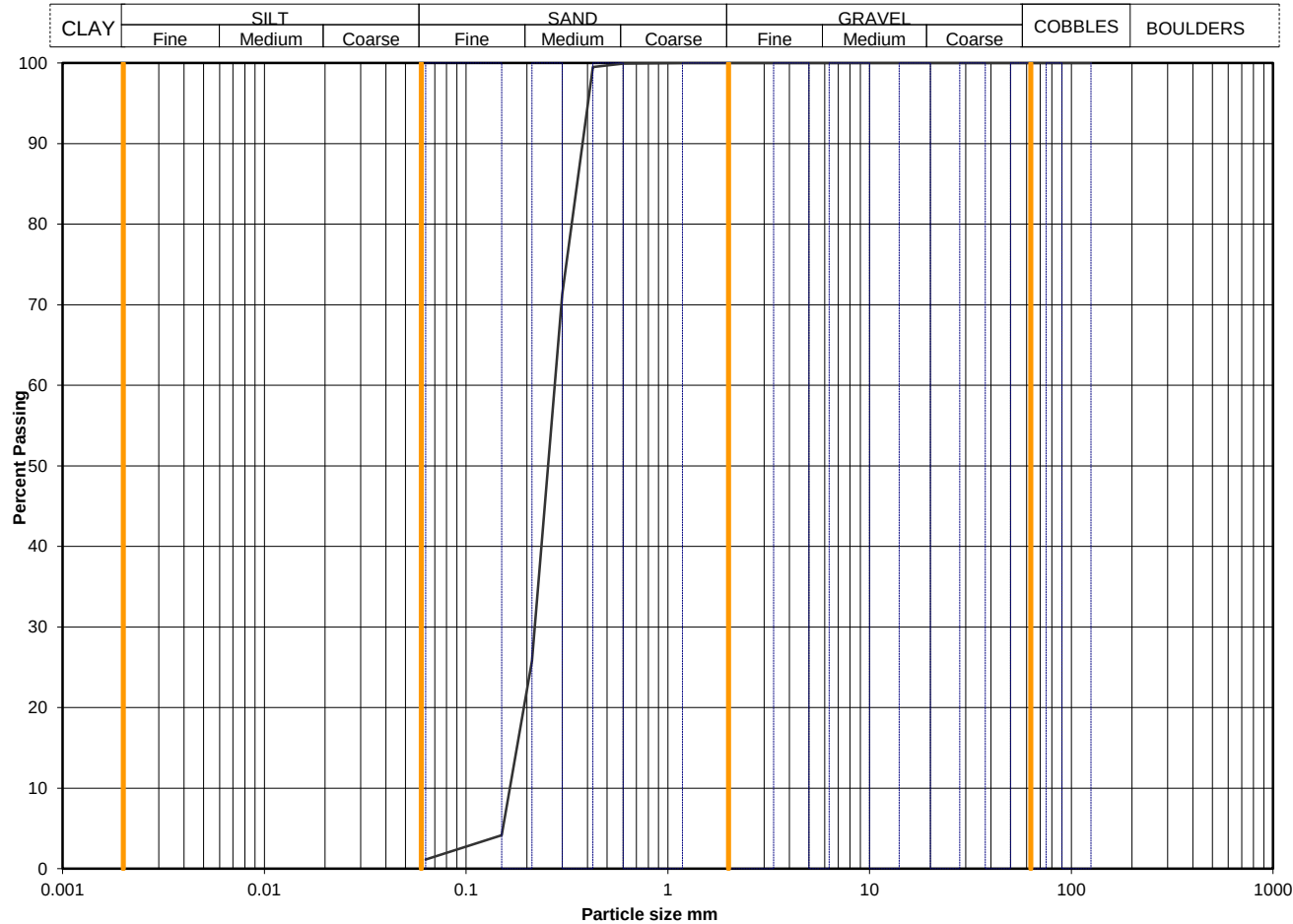
Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100		
0.300	74		
0.212	18		
0.150	1		
0.063	0		

Dry mass of sample, kg	
2.5	

Soil description	Brown SAND.		
Preparation / Pretreatment	Sieve: pre dried,		
Remarks			
Sample Proportions	Cobbles / boulders	Whole	*<60mm
	Gravel	0.0	0.0
	Sand	0.0	0.0
	Silt	99.7	99.7
	Clay	silt+clay =	
*<60mm values to aid description only		0.3	0.3
Uniformity Coefficient		D60 / D10	2
Test Method	BS 1377 : Part 2 : 1990		
	Sieving	9.2	wet sieve
	Sedimentation		none

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH02
	H9098-1920200121114712	Sample Depth (m BGL)	3.50 - 4.00
		Sample Type and No	B5
		Specimen Ref	



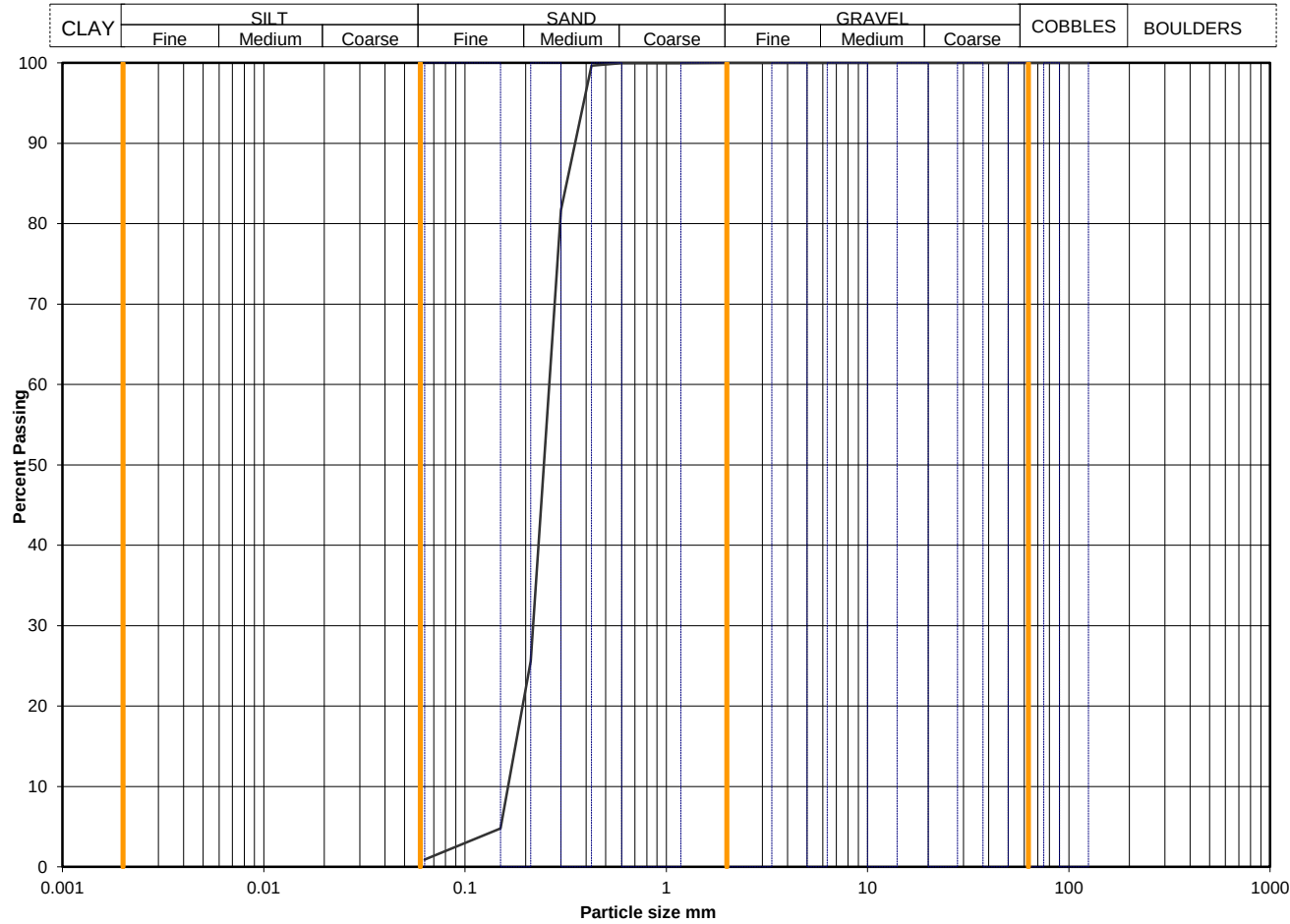
Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100		
0.300	71		
0.212	26		
0.150	4		
0.063	1		

Dry mass of sample, kg	
3.5	

Soil description	Brown SAND.		
Preparation / Pretreatment	Sieve: pre dried,		
Remarks			
Sample Proportions	Cobbles / boulders	Whole	*<60mm
	Gravel	0.0	0.0
	Sand	0.0	0.0
	Silt	98.9	98.9
	Clay	silt+clay =	
*<60mm values to aid description only		1.1	1.1
Uniformity Coefficient		D60 / D10	2
Test Method	BS 1377 : Part 2 : 1990		
	Sieving	9.2	wet sieve
	Sedimentation		none

Particle Size Distribution Analysis

Sample Details:	SAMPLE ID:	Hole No	BH03
	H9098-1920200121034014	Sample Depth (m BGL)	6.50 - 7.00
		Sample Type and No	B8
		Specimen Ref	



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5.0	100		
3.35	100		
2.00	100		
1.18	100		
0.600	100		
0.425	100		
0.300	82	Dry mass of sample, kg 4.3	
0.212	26		
0.150	5		
0.063	1		

Soil description	Brown SAND.		
Preparation / Pretreatment	Sieve: pre dried,		
Remarks			
Sample Proportions	Cobbles / boulders	Whole	*<60mm
	Gravel	0.0	0.0
	Sand	0.0	0.0
	Silt	99.1	99.1
	Clay	silt+clay =	
*<60mm values to aid description only		0.9	0.9
Uniformity Coefficient		D60 / D10	2
Test Method	BS 1377 : Part 2 : 1990		
	Sieving	9.2	wet sieve
	Sedimentation		none



Certificate of Analysis

Certificate Number 20-01486

29-Jan-20

Client Socotec
INFRASTRUCTURE SERVICES
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Our Reference 20-01486

Client Reference H9098-19

Order No H2507

Contract Title Rhosafan School Sandfields

Description 5 Soil samples.

Date Received 24-Jan-20

Date Started 24-Jan-20

Date Completed 29-Jan-20

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

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

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis Soil Samples

Our Ref 20-01486

Client Ref H9098-19

Contract Title Rhosafan School Sandfields

Lab No	1628397	1628398	1628399	1628400	1628401
Sample ID	BH01	BH01	BH02	BH02	BH03
Depth	0.50	4.50	2.50	6.50	8.00
Other ID	2	6	4	8	10
Sample Type	B	B	B	B	B
Sampling Date	n/s	n/s	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Inorganics								
pH	DETSC 2008#		pH	8.0	8.7	8.5	8.9	8.7
Sulphate Aqueous Extract as SO ₄	DETSC 2076#	10	mg/l	14	34	20	14	17
Sulphur as S, Total	DETSC 2320	0.01	%	0.10	0.01	0.02	< 0.01	< 0.01
Sulphate as SO ₄ , Total	DETSC 2321#	0.01	%	0.05	0.02	0.03	0.02	0.01

Information in Support of the Analytical Results

Our Ref 20-01486
 Client Ref H9098-19
 Contract Rhosafan School Sandfields

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1628397	BH01 0.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1628398	BH01 4.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1628399	BH02 2.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1628400	BH02 6.50 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	
1628401	BH03 8.00 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), Total Sulphur ICP (365 days), Total Sulphate ICP (730 days), Metals ICP Prep (365 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

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

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

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

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

Disposal

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

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

APPENDIX E

GEOENVIRONMENTAL LABORATORY TEST RESULTS

Certificate of Analysis – soil and leachate
Certificate of Analysis – water

20-01240
20-03104



DETS

Certificate of Analysis

Certificate Number 20-01240

28-Jan-20

Client Socotec
INFRASTRUCTURE SERVICES
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Our Reference 20-01240

Client Reference H9098-19

Order No (not supplied)

Contract Title Rhoesfan School

Description 3 Soil samples, 3 Leachate samples.

Date Received 22-Jan-20

Date Started 22-Jan-20

Date Completed 28-Jan-20

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

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

Approved By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 20-01240

Client Ref H9098-19

Contract Title Rhoesfan School

Lab No	1626799	1626800	1626801
Sample ID	BH1	BH2	BH3
Depth	1.00	0.20	1.20
Other ID	3	1	3
Sample Type	ES	ES	ES
Sampling Date	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	11	15	12
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.6	0.3	< 0.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	< 0.1	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	6.0	6.0	4.6
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	11	9.3	7.3
Lead	DETSC 2301#	0.3	mg/kg	7.6	7.5	6.3
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	5.2	6.1	4.4
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	47	22	21
Inorganics						
pH	DETSC 2008#		pH	9.5	8.6	8.7
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Petroleum Hydrocarbons						
C5-C10 Gasoline Range Organics (GRO)	DETSC 3321*	0.1	mg/kg	17	< 0.1	< 0.1
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	0.29	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	0.51	< 0.01	< 0.01
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10

Summary of Chemical Analysis

Soil Samples

Our Ref 20-01240
 Client Ref H9098-19
 Contract Title Rhoesfan School

Lab No	1626799	1626800	1626801
Sample ID	BH1	BH2	BH3
Depth	1.00	0.20	1.20
Other ID	3	1	3
Sample Type	ES	ES	ES
Sampling Date	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis

Leachate Samples

Our Ref 20-01240

Client Ref H9098-19

Contract Title Rhoesfan School

Lab No	1626802	1626803	1626804
Sample ID	BH1	BH2	BH3
Depth	1.00	0.20	1.20
Other ID	3	1	3
Sample Type	ES	ES	ES
Sampling Date	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Preparation						
NRA Leachate Preparation	DETSC 1009*			Y	Y	Y
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.2	1.2	1.4
Boron, Dissolved	DETSC 2306*	12	ug/l	< 12	< 12	< 12
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.1	0.7	1.0
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.27	< 0.09	0.18
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.30	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	< 1.3	< 1.3
Inorganics						
pH	DETSC 2008		pH	8.4	8.9	7.7
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Total Organic Carbon	DETSC 2085	1	mg/l	2.5	2.3	2.4

Summary of Asbestos Analysis

Soil Samples

Our Ref 20-01240

Client Ref H9098-19

Contract Title Rhoesfan School

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1626799	BH1 3 1.00	SOIL	NAD	none	Colin Patrick
1626800	BH2 1 0.20	SOIL	NAD	none	Colin Patrick
1626801	BH3 3 1.20	SOIL	NAD	none	Colin Patrick

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

Information in Support of the Analytical Results

Our Ref 20-01240
Client Ref H9098-19
Contract Rhoesfan School

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1626799	BH1 1.00 SOIL		GJ 250ml, GJ 60ml, PT 1L x2	Sample date not supplied, Boron (365 days), BTEX (14 days), Chromium, Hexavalent (365 days), Mercury (365 days), ICP WS Boron (365 days), Metals ICP (365 days), Metals ICP Prep (365 days), Kone Cr6 (1095 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days)	
1626800	BH2 0.20 SOIL		GJ 250ml, GJ 60ml, PT 1L x2	Sample date not supplied, Boron (365 days), BTEX (14 days), Chromium, Hexavalent (365 days), Mercury (365 days), ICP WS Boron (365 days), Metals ICP (365 days), Metals ICP Prep (365 days), Kone Cr6 (1095 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days)	
1626801	BH3 1.20 SOIL		GJ 250ml, GJ 60ml, PT 1L x2	Sample date not supplied, Boron (365 days), BTEX (14 days), Chromium, Hexavalent (365 days), Mercury (365 days), ICP WS Boron (365 days), Metals ICP (365 days), Metals ICP Prep (365 days), Kone Cr6 (1095 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), EPH/TPH (14 days)	
1626802	BH1 1.00 LEACHATE		GJ 250ml, GJ 60ml, PT 1L x2	Sample date not supplied	
1626803	BH2 0.20 LEACHATE		GJ 250ml, GJ 60ml, PT 1L x2	Sample date not supplied	
1626804	BH3 1.20 LEACHATE		GJ 250ml, GJ 60ml, PT 1L x2	Sample date not supplied	

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

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Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

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

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

Disposal

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

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



Certificate of Analysis

Certificate Number 20-03104

25-Feb-20

Client Socotec
INFRASTRUCTURE SERVICES
Unit 15
Crosby Yard
Wildmill
Bridgend
CF31 1JZ

Our Reference 20-03104

Client Reference H9098-19

Order No (not supplied)

Contract Title Rhosafan School

Description 3 Water samples.

Date Received 13-Feb-20

Date Started 13-Feb-20

Date Completed 25-Feb-20

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

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

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Water Samples

Our Ref 20-03104

Client Ref H9098-19

Contract Title Rhosafan School

Lab No	1638704	1638705	1638706
Sample ID	BH01	BH02	BH03
Depth			
Other ID			
Sample Type	WATER	WATER	WATER
Sampling Date	05/02/2020	05/02/2020	05/02/2020
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.99	0.49	1.1
Boron, Dissolved	DETSC 2306*	12	ug/l	43	40	27
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.05	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	1.4	0.49	0.64
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0	< 7.0	< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.8	< 0.4	0.6
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.64	0.24	0.46
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.8	0.9	0.8
Selenium, Dissolved	DETSC 2306	0.25	ug/l	3.3	2.5	2.2
Zinc, Dissolved	DETSC 2306	1.3	ug/l	5.2	15	14
Inorganics						
pH	DETSC 2008		pH	6.8	7.1	7.2
Biochemical Oxygen Demand, Total	DETSC 2031	1	mg/l	24	20	21
Chemical Oxygen Demand, Total	DETSC 2032	10	mg/l	77	29	36
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Sulphate as SO4	DETSC 2055	0.1	mg/l	49	25	20
Total Organic Carbon	DETSC 2085	1	mg/l	2.8	< 1.0	1.4
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	2.9	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	21	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	17	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	41	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10
TPH Ali/Aro Total	DETSC 3072*	10	ug/l	< 10	41	< 10
PAHs						
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis

Water Samples

Our Ref 20-03104

Client Ref H9098-19

Contract Title Rhosafan School

Lab No	1638704	1638705	1638706
Sample ID	BH01	BH02	BH03
Depth			
Other ID			
Sample Type	WATER	WATER	WATER
Sampling Date	05/02/2020	05/02/2020	05/02/2020
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	< 0.20
Phenols						
Phenol	DETSC 3451*	0.5	ug/l	< 0.50	< 0.50	< 0.50

Information in Support of the Analytical Results

Our Ref 20-03104
 Client Ref H9098-19
 Contract Rhosafan School

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1638704	BH01 WATER	05/02/20	GB 1L, GV x2, PB 1L	BOD (2 days), COD (7 days), Chromium, Hexavalent (4 days), Kone (5 days), pH/Cond/TDS (1 days), PAH MS (4 days)	
1638705	BH02 WATER	05/02/20	GB 1L x2, GV, PB 1L	BOD (2 days), COD (7 days), Chromium, Hexavalent (4 days), Kone (5 days), pH/Cond/TDS (1 days), PAH MS (4 days)	
1638706	BH03 WATER	05/02/20	GB 1L x2, GV, PB 1L	BOD (2 days), COD (7 days), Chromium, Hexavalent (4 days), Kone (5 days), pH/Cond/TDS (1 days), PAH MS (4 days)	

Key: G-Glass P-Plastic B-Bottle V-Vial

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

Disposal

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

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

APPENDIX F
HAZWASTE ONLINE

Waste Classification Report

89N6M-8HKQQ-MNQJ4

Waste Classification Report



89N6M-8HKQQ-MNQJ4

Job name

H9098-19 Rhosafan School GI

Description/Comments

Project

H9098-19

Site

Rhosafan School

Related Documents

#	Name	Description
None		

Waste Stream Template

SOCOTEC Full generic list 28-10-2019

Classified by

Name: Tom Holdsworth	Company: SOCOTEC UK Limited	HazWasteOnline™ Training Record:	
Date: 28 Feb 2020 13:39 GMT	Unit 5	Course	Date
Telephone: 01926 819400	Gainsborough Trading Estate	Hazardous Waste Classification	-
	Southam	Advanced Hazardous Waste Classification	-
	CV47 1RB		

Report

Created by: Tom Holdsworth
Created date: 28 Feb 2020 13:39 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	BH1	1	Non Hazardous		2
2	BH2	0.2	Non Hazardous		5
3	BH3	1.2	Non Hazardous		7

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	9
Appendix B: Rationale for selection of metal species	10
Appendix C: Version	11

Classification of sample: BH1

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

Sample details

Sample Name:	LoW Code:
BH1	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	boron { diboron trioxide; boric oxide }				0.6 mg/kg	3.22	1.932 mg/kg	0.000193 %			
	005-008-00-8	215-125-8	1303-86-2								
2	arsenic { arsenic trioxide }				11 mg/kg	1.32	14.524 mg/kg	0.00145 %			
	033-003-00-0	215-481-4	1327-53-3								
3	cadmium { cadmium oxide }				0.1 mg/kg	1.142	0.114 mg/kg	0.0000114 %			
	048-002-00-0	215-146-2	1306-19-0								
4	chromium in chromium(III) compounds { chromium(III) oxide }				6 mg/kg	1.462	8.769 mg/kg	0.000877 %			
		215-160-9	1308-38-9								
5	copper { dicopper oxide; copper (I) oxide }				11 mg/kg	1.126	12.385 mg/kg	0.00124 %			
	029-002-00-X	215-270-7	1317-39-1								
6	lead { lead chromate }			1	7.6 mg/kg	1.56	11.855 mg/kg	0.00076 %			
	082-004-00-2	231-846-0	7758-97-6								
7	mercury { mercury dichloride }				<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
8	nickel { nickel chromate }				5.2 mg/kg	2.976	15.477 mg/kg	0.00155 %			
	028-035-00-7	238-766-5	14721-18-7								
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %			<LOD
	034-002-00-8										
10	zinc { zinc chromate }				47 mg/kg	2.774	130.385 mg/kg	0.013 %			
	024-007-00-3										
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %			<LOD
	006-007-00-5										
13	pH				9.5 pH		9.5 pH	9.5 pH			
			pH								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
14	phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
15	benzene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
16	ethylbenzene				0.29 mg/kg		0.29 mg/kg	0.000029 %			
	601-023-00-4	202-849-4	100-41-4								
17	toluene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
18	xylene				0.51 mg/kg		0.51 mg/kg	0.000051 %			
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
19	acenaphthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		201-469-6	83-32-9								
20	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-917-1	208-96-8								
21	anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		204-371-1	120-12-7								
22	benzo[a]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-033-00-9	200-280-6	56-55-3								
23	benzo[a]pyrene; benzo[def]chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
24	benzo[b]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
25	benzo[ghi]perylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-883-8	191-24-2								
26	benzo[k]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
27	chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
28	dibenz[a,h]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
29	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-912-4	206-44-0								
30	fluorene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		201-695-5	86-73-7								
31	indeno[123-cd]pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-893-2	193-39-5								
32	naphthalene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
33	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		201-581-5	85-01-8								
34	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		204-927-3	129-00-0								
Total:									0.0196 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because The hazard phase HP 3(i) refers to flammable liquids however as the material is solid this is not applicable and has been discounted from further consideration.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

ethylbenzene: (conc.: 0.00002%)

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

Because of determinand:

xylene: (conc.: 0.00005%)

Classification of sample: BH2

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

Sample details

Sample Name:	LoW Code:	
BH2	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.2 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	boron { diboron trioxide; boric oxide }				0.3 mg/kg	3.22	0.966 mg/kg	0.0000966 %		
	005-008-00-8	215-125-8	1303-86-2							
2	arsenic { arsenic trioxide }				15 mg/kg	1.32	19.805 mg/kg	0.00198 %		
	033-003-00-0	215-481-4	1327-53-3							
3	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
4	chromium in chromium(III) compounds { chromium(III) oxide }				6 mg/kg	1.462	8.769 mg/kg	0.000877 %		
		215-160-9	1308-38-9							
5	copper { dicopper oxide; copper (I) oxide }				9.3 mg/kg	1.126	10.471 mg/kg	0.00105 %		
	029-002-00-X	215-270-7	1317-39-1							
6	lead { lead chromate }			1	7.5 mg/kg	1.56	11.699 mg/kg	0.00075 %		
	082-004-00-2	231-846-0	7758-97-6							
7	mercury { mercury dichloride }				<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
8	nickel { nickel chromate }				6.1 mg/kg	2.976	18.155 mg/kg	0.00182 %		
	028-035-00-7	238-766-5	14721-18-7							
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
10	zinc { zinc chromate }				22 mg/kg	2.774	61.031 mg/kg	0.0061 %		
	024-007-00-3									
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
13	pH				8.6 pH		8.6 pH	8.6 pH		
			PH							

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
14	phenol				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<LOD
	604-001-00-2	203-632-7	108-95-2									
15	benzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
16	ethylbenzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
17	toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
18	xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									
20	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
21	anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7									
22	benzo[a]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
23	benzo[a]pyrene; benzo[def]chrysene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-032-00-3	200-028-5	50-32-8									
24	benzo[b]fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-034-00-4	205-911-9	205-99-2									
25	benzo[ghi]perylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-883-8	191-24-2									
26	benzo[k]fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-036-00-5	205-916-6	207-08-9									
27	chrysene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-048-00-0	205-923-4	218-01-9									
28	dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
29	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0									
30	fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7									
31	indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-893-2	193-39-5									
32	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
33	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8									
34	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0									
Total:										0.0131 %		

Key

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

Classification of sample: BH3

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

Sample details

Sample Name:	LoW Code:	
BH3	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.2 m		

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	boron { diboron trioxide; boric oxide }				<0.2 mg/kg	3.22	<0.644 mg/kg	<0.0000644 %		<LOD
	005-008-00-8	215-125-8	1303-86-2							
2	arsenic { arsenic trioxide }				12 mg/kg	1.32	15.844 mg/kg	0.00158 %		
	033-003-00-0	215-481-4	1327-53-3							
3	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
4	chromium in chromium(III) compounds { chromium(III) oxide }				4.6 mg/kg	1.462	6.723 mg/kg	0.000672 %		
		215-160-9	1308-38-9							
5	copper { dicopper oxide; copper (I) oxide }				7.3 mg/kg	1.126	8.219 mg/kg	0.000822 %		
	029-002-00-X	215-270-7	1317-39-1							
6	lead { lead chromate }			1	6.3 mg/kg	1.56	9.827 mg/kg	0.00063 %		
	082-004-00-2	231-846-0	7758-97-6							
7	mercury { mercury dichloride }				<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
8	nickel { nickel chromate }				4.4 mg/kg	2.976	13.096 mg/kg	0.00131 %		
	028-035-00-7	238-766-5	14721-18-7							
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<LOD
	034-002-00-8									
10	zinc { zinc chromate }				21 mg/kg	2.774	58.257 mg/kg	0.00583 %		
	024-007-00-3									
11	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1 mg/kg	1.923	<1.923 mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
12	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %		<LOD
	006-007-00-5									
13	pH				8.7 pH		8.7 pH	8.7 pH		
			PH							

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
14	phenol				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<LOD
	604-001-00-2	203-632-7	108-95-2									
15	benzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
16	ethylbenzene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
17	toluene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
18	xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									
20	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
21	anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7									
22	benzo[a]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
23	benzo[a]pyrene; benzo[def]chrysene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-032-00-3	200-028-5	50-32-8									
24	benzo[b]fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-034-00-4	205-911-9	205-99-2									
25	benzo[ghi]perylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-883-8	191-24-2									
26	benzo[k]fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-036-00-5	205-916-6	207-08-9									
27	chrysene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-048-00-0	205-923-4	218-01-9									
28	dibenz[a,h]anthracene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
29	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0									
30	fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7									
31	indeno[123-cd]pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-893-2	193-39-5									
32	naphthalene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
33	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8									
34	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0									
Total:										0.0113 %		

Key

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

Appendix A: Classifier defined and non CLP determinands

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

Conversion factor: 1.462

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

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

CLP index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

■ **pH** (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

■ **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4

Description/Comments:

Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)

Additional Hazard Statement(s): Carc. 2 H351

Reason for additional Hazards Statement(s):

03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

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

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

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

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

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

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

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

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

Appendix B: Rationale for selection of metal species

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required)

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide}

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

copper {dicopper oxide; copper (I) oxide}

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

lead {lead chromate}

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

mercury {mercury dichloride}

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

nickel {nickel chromate}

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

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

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

zinc {zinc chromate}

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

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

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

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

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

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.1, May 2018**

HazWasteOnline Classification Engine Version: 2020.52.4178.8324 (21 Feb 2020)

HazWasteOnline Database: 2020.52.4178.8324 (21 Feb 2020)

This classification utilises the following guidance and legislation:

WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010



SOCOTEC

APPENDIX G PHOTOGRAPHS

Trial Pit

HDP1 and HDP2



Notes:	Project	YGG Rhosafan Primary School, Sandfields	Plate	HDP1
	Project No. Carried out for	H9098-19 Neath Port Talbot County Borough Council		



Notes:

Project	YGG Rhosafan Primary School, Sandfields
Project No.	H9098-19
Carried out for	Neath Port Talbot County Borough Council

Plate	HDP1
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Notes:	Project	YGG Rhosafan Primary School, Sandfields	Plate
	Project No.	H9098-19	HDP1
	Carried out for	Neath Port Talbot County Borough Council	



Notes:

Project YGG Rhosafan Primary School, Sandfields
Project No. H9098-19
Carried out for Neath Port Talbot County Borough Council

Plate
HDP1



Notes:	Project	YGG Rhosafan Primary School, Sandfields	Plate
	Project No. Carried out for	H9098-19 Neath Port Talbot County Borough Council	
			HDP2



Notes:	Project	YGG Rhosafan Primary School, Sandfields	Plate HDP2
	Project No.	H9098-19	
	Carried out for	Neath Port Talbot County Borough Council	



Notes:

Project YGG Rhosafan Primary School, Sandfields
Project No. H9098-19
Carried out for Neath Port Talbot County Borough Council

Plate
HDP2