



Coedffranc Primary School

Interpretive Ground Investigation Report

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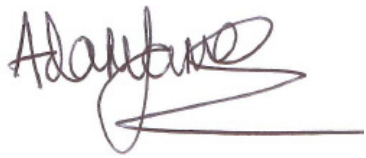
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EXECUTIVE SUMMARY

The Site	The site is located within the current Coedffranc Primary School, within the school grounds to the north of the junior school building and the west of the infant school building. The site measures approximately 0.08ha in area and is centred on NGR SS 72541 97347.
Summary of DTS	BGS mapping indicates that the site is underlain by superficial deposits of Glacial Till. Underlying bedrock is recorded as being Hughes Member sandstones and mudstone with thin coal seams. Made ground is not recorded by the BGS to be present on site. Both the superficial deposits and bedrock geology beneath the site are designated as Secondary A Aquifers. Earliest mapping (1884) shows the site as an undeveloped agricultural field. Similar land use is shown to surround the site interspersed with roads and residential properties. The current site use as a school is shown in 1900, immediately south to which is a small road and quarry. By 1921, the school is shown to have increased in size, surrounded by denser residential properties. From 1921 to the present day there do not appear to be any significant changes to the site or surrounding area on historical mapping.
Site Investigation	The site investigation comprised the following scope of works: • 4 no. Windowless sample boreholes with in-situ testing every metre to a maximum depth of up to 3.0m bgl; • 2 no. Follow on Super Heavy Dynamic Probes (SHDP) up to a maximum depth of 4.20m bgl; • 1 no. Machine excavated trial pit for soakaway testing purposes. One soakaway test carried out with 3 fills in accordance with BRE 365 guidance.
Ground Conditions	The encountered ground conditions comprised asphalt over a thin mantle of made ground overlying Glacial Till Deposits. Possible mudstone of the Hughes Member Sandstone were encountered at the base of one exploratory hole.
Geotechnical Assessment	Traditional shallow foundations placed at a minimum of 0.50m bgl and founded on the Glacial Till Deposits may be designed to a net allowable bearing pressure of 135Pa. Floor slabs may be ground bearing for light dead and live loads of up to 15kN/m². Based on soakaway testing at SA01, soakaways are unlikely to be a viable option. The Design Sulphate Class for the site can be taken as DS-1, and the Aggressive Chemical Environment for Concrete (ACEC) site classification be taken as AC-1.
Ground Contamination Assessment	Within the context of a human health risk assessment, no exceedances have been identified in the near surface soils within the context of the proposed development. Only limited exceedances have been identified within soil derived leachate samples in excess of the EQS screening criteria, however, given the conservative nature of the assessment and the presence of widespread hardstanding as part of the current and future development the risk to the wider environment is considered to be low. Asbestos containing materials have not been identified in the shallow soils during the site investigation.
Conclusions and	The extent of ground contamination is considered to be limited across the site

Recommendations	and as such no further risk management procedures are considered necessary, however it is recommended that a proactive approach is adopted during the development works. If localised areas of thicker made ground beneath the building footprint are encountered during construction works, these should be assessed for suitability as a founding medium. Although no land gas assessment was required by the contaminated land officer for this development if significant thicknesses of made ground are identified during construction it is recommended a land gas assessment is undertaken.
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1. INTRODUCTION

1.1 Instruction

WYG Environment Planning Transport Ltd (WYG) was commissioned by Neath Port Talbot Council to undertake a Ground Investigation and Interpretive Report at an area of the current Coedffranc Primary School, Skewen, Neath (known hereafter as “the site”).

The location of the site is shown on Figure 1.

1.2 Brief

The brief was to undertake a preliminary intrusive ground investigation to provide information on the ground conditions and to provide a geotechnical assessment and contaminated land risk assessment to support proposals for the construction of a single storey kitchen block extension at the site.

The investigation was designed to comprise the following elements:

- 5 No. windowless sample boreholes to bedrock or to a maximum depth of 5.0m bgl with SPTs at 1m intervals to full depth;
- Where the windowless sampler refuses, follow on dynamic probing continued to the base of the hole to provide DP300-N values for deeper strata.
- 1 No. soil infiltration test within a mechanically excavated trial pit to a depth of 1.50m bgl in accordance with BRE 365 guidance;
- On-site recovery. inspection and logging of samples;
- Laboratory geotechnical and chemical testing of soils.

1.3 Report Scope

This report summarises the work undertaken and includes the following elements:

- Review of Environmental Setting;
- Full factual records of the site works carried out;
- Summary of the ground conditions encountered;

- In-Situ testing results;
- Environmental laboratory testing results;
- Geotechnical laboratory testing results;
- Interpretation of Geotechnical and Environmental laboratory data, including a ground contamination risk assessment; and
- An executive summary of the report to allow a rapid, layman's overview.

1.4 Limitations

This report has been prepared in accordance with the requirements of Neath Port Talbot Council. It is subject to the report conditions presented in Appendix A.

The information contained in this report is intended for the use of Neath Port Talbot Council and WYG can take no responsibility for the use of this information by any third party or for uses other than that described in this report or detailed within the terms of our engagement.

2. SITE INFORMATION

2.1 Location

The site is positioned in the north-eastern portion of the Coedffranc Primary School site, which is located off Stanley Road in Skewen, Neath. The site is approximately 0.08 hectares (ha) in area and is centred on National Grid Reference (NGR) SS 72541 97347. The approximate postcode of the site is SA10 6LP.

The site address is: Coedffranc Primary School, 19 Stanley Rd, Skewen, Neath SA10 6LP.

A site location plan is presented in Figure 1.

2.2 Site Description

The site is located the within the grounds of the current Coedffranc Primary School, to the north of the junior school building and the west of the infant school building. The area of the site under investigation is located on hard standing areas. The site is bounded to the south by Hen Heol and to the west by Stanley Road which both have residential properties beyond. The site is bounded to the north by residential properties with commercial properties on New Road. The site is also bounded by residential properties to the east and High Street beyond.

The site is located on a slope that rises steeply from New Road cresting at Hen Heol. The site area is located on a hardstanding terrace approximately 2m below the main school building and is currently used as a playground.

2.3 Proposed Development

The proposed development consists of a wooden framed single storey kitchen block extension.

3. SITE SETTING

A summary of the key site information gathered from the Envirocheck Report as part of the short form DTS is presented in the following sections, however, the reader should refer to the full Envirocheck report in Appendix G for full details including supporting/referenced information.

3.1 Geology, hydrogeology and hydrology

3.1.1 Geology

The Envirocheck report reviewed the anticipated geology underlying the site, based on information collated from the British Geological Survey (BGS) sheet No.249 Solid and Drift (1:50,000) and the BGS website. The geological maps show no evidence that Made Ground is present at the site.

Geological mapping indicates that the site is predominantly underlain by Glacial Till Deposits.

The underlying bedrock geology is recorded as the Hughes Member - Sandstone, which comprises sandstones with thin mudstones and siltstones and mainly thin coals.

3.1.2 Hydrogeology

The Glacial Till deposits are classified as a Secondary A Aquifer- Undifferentiated. Undifferentiated aquifers are those where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type. The bedrock Hughes Member is designated as a Secondary A Aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

3.1.3 Hydrology

The nearest surface water feature is the Tennant Canal approximately 500m to the south east.

3.2 Site History

The earliest available historical mapping (1884) shows the site as an undeveloped field. The surrounding area shows agricultural fields and a road to the south, agricultural fields to the west, residential properties followed by agricultural fields and a road to the north and residential properties to the east.

The current site use as a school was first seen on the 1900 historic map. Immediately to the south is a road and small quarry followed by residential properties and agricultural fields. To the west is a road followed by residential properties and undeveloped fields. To the north is residential properties and a railway line and to the east the residential area has spread.

By 1921, the current bigger school buildings appear to be in use. Further residential buildings have appeared to the east and west and the railway line has expanded slightly to the north.

No significant changes are seen between 1921 and present day on site or within the immediate surrounding area.

3.3 Historical Mining

According to the Coal Authority Interactive Viewer (The Coal Authority, 2019) the site is located within a Coal Mining Reporting Area. As such, a site-specific Coal Authority Report has been obtained for the site and is presented in Appendix H.

Table 1 – Summary of Coal Authority Report

Feature	Details
Past Underground Coal Mining	The property is in a surface area that could be affected by underground mining in 1 seam of coal at 130m depth, and last worked in 1911. Any movement in the ground due to coal mining activity associated with these workings should have stopped by now.
Present Underground Coal Mining	The property is not within a surface area that could be affected by present underground mining.
Future Underground Coal Mining	The property is not in an area where the Coal Authority has received an application for and is currently considering whether to grant a licence to remove or work coal by underground methods. The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods. The property is not in an area likely to be affected from any planned future underground coal mining. However, reserves of coal exist in the local area which could be worked at some time in the future. No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating the land is at risk of subsidence.
Mine Entries	There are no known coal mine entries on, or within 20 meters of, the boundary of the property.
Coal Mining Geology	The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.
Past Opencast Coal Mining	The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.
Present Opencast Coal Mining	The property does not lie within 200 meters of the boundary of an opencast site from which coal is being removed by opencast methods.
Future Opencast Coal Mining	There are no licence requests outstanding to remove coal by opencast methods within 800 meters of the boundary. The property is not within 800 meters of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.
Coal Mining Subsidence	The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994. There is no current Stop Notice delaying the start of remedial works or repairs to the property.

Feature	Details
	The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.
Mine Gas	The Coal Authority has no record of a mine gas emission requiring action.
Hazards related to coal mining	The property has not been subjected to remedial works, by or on behalf of the Coal Authority, under its Emergency Surface Hazard Call Out procedures.
Withdrawal of Support	The property is in an area where a notice to withdraw support was given in 1984. The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

3.3.1 Summary

The site is located within a Coal Mining Reporting Area. As such, a Coal Authority Report was obtained indicating the site is in an area that could be affected by underground mining in 1 seam of coal at 130m depth, and last worked in 1911. Any movement in the ground due to coal mining activity associated with these workings should have stopped by now. No current or future mining applications have been submitted or approved by the Coal Authority. There are no known coal mine entries within, or within 20 meters of, the boundary of site and no damage from faults or coal mining activities. Therefore, there is a low risk of any coal mining relating hazards to the site.

3.4 Radon

The BRE document 211 (Scivyer, 2015) mapping coverage for the site area was consulted and indicates that the site is located within an area where radon protection measures may be required for new developments.

3.5 Unexploded Ordnance

Based on freely available mapping data from Zetica UXO (Zetica UXO, 2008), the site is located within a Low Risk Area with regards to Unexploded Ordnance (UXO).

4. SITE INVESTIGATION

The site investigation was undertaken between the 19th to 24th of February 2020.

Details of the fieldwork methods are given in the notes section at the end of this report.

4.1 Scope

The scope of the completed site investigation included the following:

- 4no. Windowless sample boreholes (designated WS01, WS02, WS03 and WS05 to a maximum depth of 3.0m bgl with SPTs conducted at 1m intervals throughout;
- Dynamic probing follow-on in two window sample positions to a maximum depth of 4.3m bgl;
- 1no. machine excavated trial pit designated SA01 to a depth of 1.5m bgl with three repeat soil infiltration tests in accordance with BRE 365;
- On-site inspection and logging of recovered samples;
- Representative soil samples taken and submitted for geotechnical classification testing; and
- Representative soil samples submitted and tested for a suite of potential contaminants.

Figure 2 shows the layout of the exploratory holes advanced during the site investigation. Exploratory hole logs including photographic plates are presented in Appendix B.

The position of the investigation locations were determined by available access on the site and the presence of numerous services associated with the current site layout whilst still being positioned to provide good coverage in relation to the proposed development.

5. GROUND CONDITIONS ENCOUNTERED

5.1 Strata encountered

The sequence of strata encountered beneath the site generally comprised;

- Made Ground;
- Glacial Deposits; and
- Hughes Member Sandstone.

A summary of each stratum depth is provided in Table 2 below, with descriptions of each stratum detailed in the subsequent sections. Exploratory hole logs including photographic plates can also be seen in Appendix B.

Table 2 - Summary of strata depths (m bgl) for windowless sample boreholes and soakaways

Location	Depth to base of strata (m bgl)		
	Made Ground	Glacial Deposits	Hughes Member
WS01	GL – 0.1	0.1 – 2.7	2.7 – 2.8*
WS02	GL – 0.2	0.2 – 0.55*	ne
WS03	GL – 0.1	0.1 – 3.0*	ne
WS05	GL – 0.2	0.2 – 2.9*	ne
SA01	GL – 1.1	1.1 – 1.5*	ne

* Base of stratum not proven
ne denotes not encountered

5.1.1 Made Ground

Made Ground was encountered in all locations, to a maximum depth of 1.10m bgl in SA01, however the majority of locations revealed thicknesses of between 0.10m to 0.20m bgl.

All exploratory positions comprised hardstanding Tarmacadam between GL and 0.10m bgl (to 0.03m bgl in SA01). WS02 and WS05 comprised Made Ground deposits of dark brown to black sandy clayey gravel. SA01 comprised Made Ground deposits of quartzite gravel to 0.05m bgl followed by light brown gravelly clayey silt to 1.10m bgl.

A feint olfactory indication of possible contamination was recorded within SA01 which is thought to be attributed to the breaking out of a large area of asphalt for the soakaway test pit.

Please see exploratory hole logs in Appendix B for full descriptions of each position.

5.1.2 Glacial Deposits

Glacial deposits were in all exploratory holes and were proven to a depth of 3.00m bgl in WS03. The Glacial deposits were generally encountered as soft to firm orangish brown and light brown to brown gravelly slightly sandy clay with varying cobble content. Shallow coarse grained deposits were encountered in WS01 and WS03 to a maximum depth of 1.40m bgl in WS01 and 0.20m bgl in WS03. Coarse grained deposits generally comprised light brown clayey gravel with varying cobble content.

5.1.3 Hughes Member

The Hughes Member Sandstone was encountered in WS01 at a depth of 2.70m bgl. It was recovered as a brown laminated mudstone gravel.

5.2 Groundwater

During drilling, groundwater was only encountered within WS01 at 1.0m bgl. The groundwater level within WS01 is interpreted as perched and is therefore assumed to not be representative of the groundwater water table.

5.3 In Situ Testing

5.3.1 Standard Penetration Testing

Standard Penetration Tests (SPTs) were undertaken throughout all window sample positions at approximately 1.0m intervals, where possible and at the base of each window sample boreholes where shallow refusal was observed.

The results are presented in the exploratory hole logs included in Appendix B.

5.3.2 Continuous Dynamic Probing

Continuous dynamic probing was carried out in the base of WS02 and WS03. The results are presented on the exploratory hole logs included in Appendix B.

5.4 Visual or Olfactory Evidence of Contamination

During the site investigation a faint olfactory sign of contamination was encountered in SA01 comprising a slight hydrocarbon odour possibly attributed to the breaking out of a large area of



asphalt for the soakaway test.

6. LABORATORY TESTING

6.1 Geotechnical Testing

A programme of laboratory testing was carried out on samples taken from the various strata encountered during the site investigation. Geotechnical testing was scheduled by WYG and carried out by GSTL Ltd, an approved supplier in accordance with the requirements of WYG quality system and UKAS accredited for a range of geotechnical tests. The test procedures used were generally in accordance with the methods described in BS1377:1990. Details of the specific tests used in each case are given in Table 3. Laboratory geotechnical test results are given in Appendix D.

Table 3 - Summary of Geotechnical Testing

Test	No.	Test Method
Moisture Content	5	BS1377:1990 Part 2: 3.2
4 Point Liquid and Plastic Limit	5	BS1377:1990 Part 2: 4.3 & 5.3
PSD: Wet Sieve method	5	BS1377:1990 Part 2: 9.2
BRE Reduced Suite: pH, Acid Soluble Sulphate, Water Soluble Sulphate and Total Sulphur	3	BS1377:1990 Part 3 & BRE CP2/79 (non-accredited test)

6.2 Environmental Testing

Environmental chemistry was investigated by specialist chemical analysis of selected soil samples carried out by ALS Environmental Laboratories, an approved supplier in accordance with the requirements of WYG quality system and UKAS and MCERTS accredited for a range of chemical analyses. The testing was scheduled by WYG and is summarised in Table 4 for soil samples. The test results are included in Appendix E.

Table 4 - Summary of environmental testing

Test suite	No.
<u>Soil Samples:</u> WYG Suite C • Heavy metals including Chromium (Hexavalent), Boron (water soluble), Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Vanadium and Zinc; • Inorganics – including pH, Water soluble Sulphate as SO₄ (2:1 Extract), Cyanide (Easily liberatable- low level); • Speciated Petroleum Hydrocarbons (TPH CWG); • Speciated Polyaromatic Hydrocarbons (USEPA 16); • BTEX and MTBE; • Asbestos Screen; and, • Phenol.	3
<u>Soil Derived Leachate Samples</u> WYG Leachate Suite C • Heavy metals including Antimony, Boron, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium and Zinc; • Inorganics – including pH, Sulphate, Chloride, Nitrite, Nitrate, Total Cyanide, Ammoniacal Nitrogen and NH₃ and NH₄ and Total Alkalinity • Speciated Petroleum Hydrocarbons (TPH CWG); • Speciated Polyaromatic Hydrocarbons (USEPA 16); • BTEX and MTBE; • Phenol.	2

7. SOIL INFILTRATION TESTING

7.1 Background

On 7th January 2019, the Welsh Government introduced Schedule 3 of the Flood and Water Management Act 2010 which requires new developments to consider the feasibility of Sustainable Drainage Systems (SuDS) at the design stage. New developments over 100m² or including more than one property must obtain approval of the drainage system from the SuDS Approval Body (SAB) prior to the commencement of construction.

To support the assessment study, preliminary soil infiltration testing has been undertaken as part of the site investigation to provide information on the potential infiltration rates within the sub-strata on the site.

Soil infiltration tests have been undertaken in line with BRE 365 (2016) methodology and any deviations from this approach are documented within the following section. Where possible, locations and depths of test pits were determined based on the proposed drainage design.

7.2 Test Locations

The location of the exploratory pit was determined on site based on access limitations and the the current use as a playground. As such, the exploratory pit was situated in the north east corner of the site in an area less trafficked by children. Based on the findings of the wider ground investigation, the ground conditions in this area are believed to be representative of the wider site.

7.3 Soil Infiltration Tests

One soil infiltration test was undertaken within a machine excavated trial pit as summarised in the following table.

Table 5 Summary of Soil Infiltration Test Locations

Test Location	Depth to Base (m bgl)	Target strata
SA01	1.50	Glacial Till

Three repeat fills were undertaken within the test location over a period of four days. Test locations were securely fenced and covered until the testing period was completed and excavations

backfilled on completion.

The results of the soil infiltration tests are presented in the following table. Full test results are included in **Error! Reference source not found.** of this report.

Table 6 - Summary of Soil Infiltration Test Results

Test Location	Soil Infiltration Rate (m/s)		
	Test 1	Test 2	Test 3
SA01	8.89×10^{-7} (Extrapolated)	FAIL (water Level Rose)	8.01×10^{-7} (Extrapolated)

7.4 Ground Conditions

7.4.1 Depth to groundwater

A groundwater strike was not recorded in the soakaway pit while being advanced however a water strike as encountered following the start of the test at 1.00m bgl in WS01. This is thought to be perched water and unlikely to represent the groundwater table and was encountered during heavy rainfall. Other exploratory test locations advanced as part of the wider ground investigation did not record any groundwater strikes.

7.4.2 Strata Type

Based on soil descriptions included in the trial pit logs, the test strata consisted of made ground over Glacial Till consisting of sandy gravelly clay with a low cobble content. Full draft logs of the exploratory pits are included in **Error! Reference source not found.**

7.4.3 Ground Contamination

Ground contamination was identified during the ground investigation the ground investigation in the made ground deposits, a contamination assessment is presented in Sections **Error! Reference source not found.** and **Error! Reference source not found.**

7.5 Constraints and Limitations

The information presented above is intended to assess the feasibility of soakaway drainage in order to support the development of the drainage strategy. Further testing, groundwater monitoring and ground investigation may be required to support a full SAB application or to inform the development of the final design process.

Ground conditions can vary throughout the year, including the location of the groundwater table.



Consideration should be given to the potential effects of seasonal variation when reviewing the data above.

8. GEOTECHNICAL ASSESSMENT

8.1 Ground Conditions

The ground conditions across the site generally comprise a thin layer of Tarmacadam over a localised limited thickness of Made Ground and a mixture of fine and coarse grained Glacial Deposits.

8.2 Soil Properties

The ranges of the various soil properties measured are discussed below to aid in the selection of design values. However, the appropriate choice of characteristic and design values will depend on the particular analysis and design philosophy used and should be selected by the designer.

Where characteristic values are given, these are reasonably conservative estimates of a measured or assessed property that may be used to represent the overall behaviour of the material. Design values are similar but also take into account the ground-structure interaction for a given structure so need to be selected by the designer. It is recommended, however, that design values used do not exceed the characteristic values given in this report.

8.2.1 Made Ground

Given the limited thickness of Made Ground soils encountered across the majority of the site no standard penetration tests (SPT's) were undertaken in the material, and no samples were recovered for laboratory testing. Exploratory positions located within the footprint of the proposed structure (WS01-WS05) encountered a maximum depth of made ground to 0.20m bgl. It is considered likely that this material will be removed as part of the construction process, and therefore will not be assessed further. If the proposed footprint of the building is to change, due to the identification of locally thicker deposits of made ground to the north (SA01), further assessment and delineation of made ground material may be necessary to aid design.

8.2.2 Glacial Deposits

Given the variable nature of the Glacial Till deposits, characteristics have been derived for their potential behaviour as either fine grained or coarse-grained soil, the most conservative of which should be used as the design value. The results of the particle size distribution testing are presented below:

Particle size distribution on five representative sample of the Glacial Till recorded the following size percentage ranges:

- Gravel 18-54%
- Sand 22-34%
- Silt and Clay 24-49%

8.2.3 Fine Grained Soil Assessment

Table 7 - Summary of in-situ test results within Glacial Deposits – Fine Grained Assessment

	No. of results	Range (min-max)	Average	Lower quartile	Upper quartile	Characteristic value ⁺
Natural moisture content (m - %)	5	6 – 16	13	11	15	11
Liquid limit (LL)	4	41 – 49	45	42	47	42
Plastic limit (PL)	4	16 – 19	18	17	19	17
Plasticity index (PI)	4	22 – 30	27	26	28	26
Modified Plasticity Index ¹	4	8 – 22	15	14	17	17
SPT N Values	6	13 – 26	22	20	25	20
SPT N Values (SHDP Derived)	16	7 – 50	28	17	39	19
SPT N Values (Combined)	22	7-50	27	18	37	18
Undrained shear strength (kPa):						
- from Hand Vane	6	27 – 120	67	42.5	90.5	42.5

Notes:

+ suggested characteristic values are appropriate for most normal applications but designers should satisfy themselves that they are suitable for the specific application and design method they are using;

1 Modified Plasticity Index (I_P) is defined as: $I_P = (PI \times \% \text{passing } 425\mu\text{m}) / 100\%$.

A total of 22 SPT N values have been derived from glacial till deposits (as a combination of SPT results, and SHDP derived results), with recorded N values ranging from 7 – 50 (lower quartile of 18). Based on the correlation proposed by Stroud and Butler (1975), using a conservative plasticity index (PI) of 26, such values would indicate undrained shear strengths of 31 – 220 kPa (soft to very stiff), and 79kPa based on the lower quartile SPT N value.

Based on the above, it is recommended that the following values are taken as design/characteristic values for this material following a fine-grained soil assessment:

- SPT N Value 18
- Undrained Shear Strength 79kPa

8.2.4 Coarse Grained Soil Assessment

Table 8 - Summary of in-situ test results within Glacial Deposits – Coarse Grained Assessment

	No of Results	Range (min-max)	Average	Lower quartile	Upper quartile	Characteristic value ⁺
SPT N Values	6	13 – 26	22	20	25	20
SPT N Values (SHDP Derived)	16	7 – 50	28	17	39	19
SPT N Values (Combined)	22	7-50	27	18	37	18
ϕ (°)*	22	30 – 35	33.7	32.5	37.9	33.7

Notes:

+ suggested characteristic values are appropriate for most normal applications but designers should satisfy themselves that they are suitable for the specific application and design method they are using;

* Estimated from a correlation from Peck, Hansen and Thornburn, Foundation Engineering, Wiley, 2nd ed., (1974)(6)

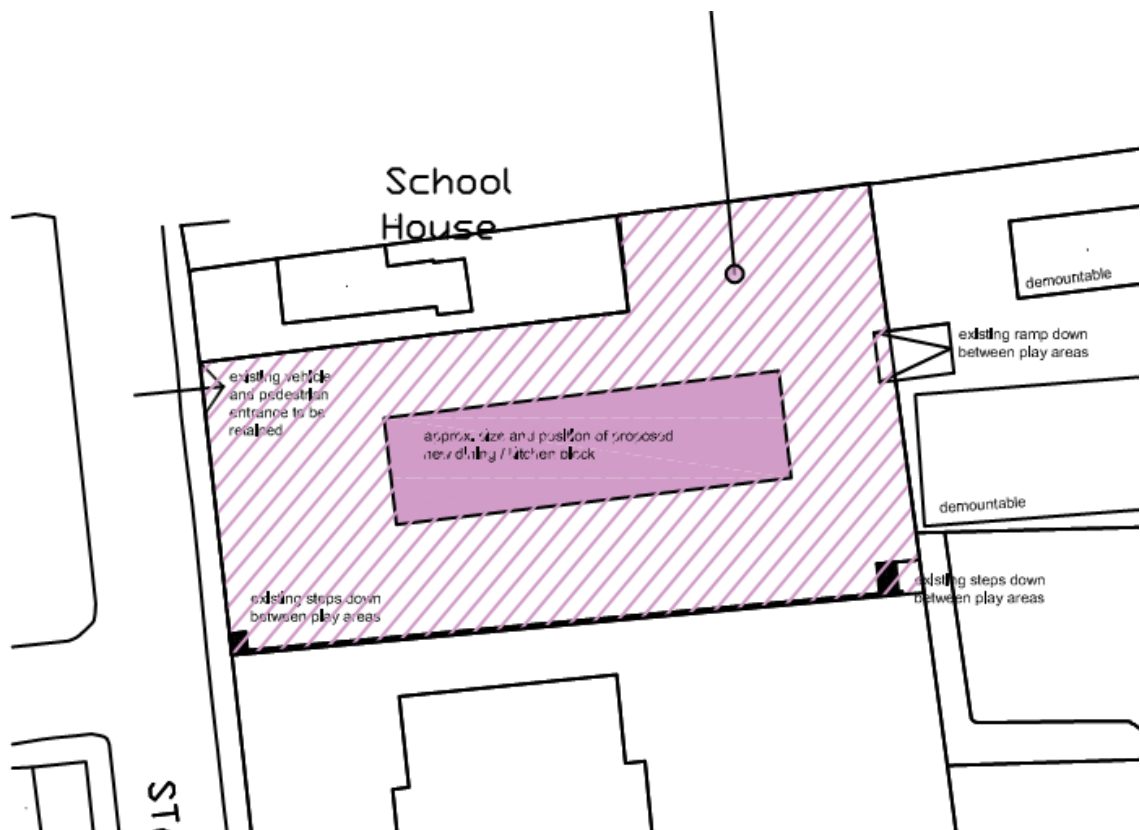
Based on the above, it is recommended that the following values are taken as design/characteristic values for this material following a coarse-grained soil assessment:

- SPT N Value 18
- Angle of shearing resistance, ϕ 32.5°

9. GEOTECHNICAL DESIGN CONSIDERATIONS

9.1 Proposed Development

The proposed development (see Figure 3 and below extract) is anticipated to consist of a single storey building, to the north of the existing school buildings within the existing asphalt hardstanding play area. It should be noted that the below plan is understood to be approximate only, and therefore any variations of design other than this will require additional assessment. Exploratory positions are located within or immediately adjacent to the proposed building footprint.



9.2 Earthworks

The ground level drops towards the north-east across the proposed development footprint, from 54.93m to AOD in the south west corner to 53.83 m AOD in the north east corner. If the building is constructed approximately at the levels that exist currently on site, then a wedge of fill will be

required of up to 1.0m to provide a consistent formation level across the site. Compaction tests will be required on excavated material in order to determine the suitability for re-use as engineered fill.

9.3 Foundations

Natural soils comprising Glacial Till deposits were encountered below asphalt and a thin mantle of Made Ground across the site, at depths typically ranging between 0.10m and 0.20mbgl, although locally as deep as 1.10m bgl (SA01) and are considered a suitable founding medium for traditional spread foundations.

As mentioned in section 7.2.2, given the particle size distribution of Glacial Till deposits and the variable nature of such material, it may behave as either a fine- or coarse-grained soil. A foundation assessment for each scenario was undertaken and the most conservative assessment is presented below.

Traditional shallow foundations taken down to a minimum of 0.50m bgl and founded on the Glacial Till Deposits, may be designed to an allowable net bearing pressure of 135kPa. This will give a factor of safety greater than 3 against ultimate bearing capacity failure and should result in settlement of less than 25mm for strip footings of no more than 0.50m wide or pad footings of up to 1.00m square. Foundation excavations should be deepened where Made Ground soils are encountered.

Foundation excavations should be inspected by a suitably experienced engineer or inspector to ensure the founding material is suitable. Any soft, loose or otherwise unsuitable material should be excavated and replaced by compacted granular backfill or lean concrete.

Plasticity index results suggest the fine grained Glacial Till present on the site are of low volume change potential. On this basis, no further action is considered to be required for the foundation design.

9.4 Floor Slabs

Given the low volume change potential of the Glacial Till deposits, the nature of the proposed development and the nature of the existing development ground bearing floor slabs may be ground bearing for light dead and live loads of up to 15kN/m².

9.5 Chemical Attack on Buried Concrete

Chemical tests undertaken on representative samples show low levels of water-soluble sulphates and generally neutral conditions. Based on these conditions, it is recommended that for foundations the Design Sulphate Class for the site, as defined in BRE Special Digest 1, be taken as DS-1, and the Aggressive Chemical Environment for Concrete (ACEC) site classification be taken as AC-1.

9.6 Temporary Works

Excavated pits generally remained open and stable during the investigation and it is considered that most shallow excavation for foundations and service runs should remain stable in the short term. However, where soft or variable materials are encountered some collapse may occur requiring localised support or battering of the excavation. All excavations requiring man entry should be fully supported to prevent unexpected collapse.

Extensive shallow groundwater was not encountered during the investigation, although excavations below 1.0m may encounter groundwater. It should be noted that groundwater levels can vary seasonally.

10. GROUND CONTAMINATION ASSESSMENT – HUMAN HEALTH

10.1 Introduction

The UK Contaminated Land Regime (CLR) allows for a tiered approach to the assessment of ground contamination which is designed to allow increasingly site-specific assessment. In order to assess the potential risk posed by contaminants contained within the soils at the study area a generic quantitative risk assessment (gQRA) has been undertaken by comparing recorded concentrations of chemical constituents in soil with Generic Assessment Criteria (GAC) to identify whether, at the concentrations recorded, the presence of the constituent has the potential to adversely affect the health of site users (a Tier 1 assessment). GAC are set at levels where potential exposure is deemed to be within acceptable limits.

If the recorded concentrations of a particular constituent are below the GAC then the risk is generally considered to be acceptable and further assessment / or mitigation measures are not required. Where a substance is recorded at concentrations higher than GAC this does not necessarily indicate that a particular risk is present, however, it does typically signify the requirement to undertake further assessment in line with the UK tiered risk assessment framework.

10.2 Assessment Criteria

10.2.1 Generic Assessment Criteria

The following GAC for soils have been utilised for the screening process, in order of preference:

- CL:AIRE published C4SL (DEFRA, 2014);
- CIEH/LQM published S4UL (LQM/CIEH, 2015);
- WYG internal Tier 1 Screening Criteria (issue 15) derived using the derivation tool CLEA version 1.06, in line with the current UK Contaminated Land Regime.

C4SL are currently available for arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead¹. The C4SL were originally developed to support the categorisation of sites in accordance with Part 2A are also, based on DEFRA guidance, considered suitable for use during the assessment of sites as part of the planning process.

¹ Arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI, lead assuming 6% SOM (1% SOM C4SL also published for benzene).

Where C4SLs are not available, 'Suitable for Use Levels' (S4UL) developed by CIEH/LQM have been used. The S4UL provide GAC based on minimal or tolerable risk intended to be protective of human health for individual or mixtures of substances. It is considered conservative and appropriate to use these values for contaminants for which C4SL are unavailable. GAC for volatile and semi-volatile organic compounds (VOC and SVOC) not presented in the S4UL document are sourced from CL:AIRE (CL:AIRE, January 2010).

Where no published screening values are available WYG have derived their own values (easily liberatable cyanide).

The CLEA model states that "For most exposure pathways, the contamination is assumed to be at or within one metre of the surface" (Environment Agency, 2009). It is considered that at depths greater than 1.0m, the probability of human exposure via the direct contact pathways are significantly reduced, leaving inhalation of volatile compounds as the dominant pathway with regard to human health risks. Typically, volatile compounds only significantly affect the indoor inhalation pathway. The same screening concentrations have been used for all depths at this stage, though it is noted that these are highly conservative for depths below 1.00m bgl.

10.2.2 Proposed End Use

Screening criteria have been developed for the following land use scenarios:

- Residential with plant uptake;
- Residential without plant uptake;
- Allotments;
- Public open space (park and residential);
- Commercial / Industrial.

The proposed development on site will consist of the construction of a single storey school building within the grounds of the existing primary school. As the proposed land use does not fall into one of the categories listed above, the screening assessment has been undertaken against the residential without plant uptake scenario to provide a conservative assessment.

10.2.3 Soil Organic Matter

For organic contaminants, the generic soil screening values have been derived for a range of

concentrations of soil organic matter (1%, 2.5%, 6%). In order to provide a conservative assessment the GAC derived for a 1% SOM have been adopted.

10.3 Tier 1 – Soil Screening

A total of three soil samples collected from across the site were submitted for chemical laboratory analysis. Full copies of laboratory certificates for all soil analysis are included in Appendix E.

Comparison of the chemical analysis results with the generic assessment criteria for a residential with plant uptake end use has identified no exceedance with respect to the relevant screening criteria.

A summary table of all the data is also presented in Appendix E for reference.

10.4 Asbestos

Since 2009 there have been laboratory improvements in the detection of asbestos and as such all samples of made ground and natural were subject to an asbestos screen. There is no published screening value for asbestos.

A total of three samples were collected and analysed for the presence of asbestos containing materials. The laboratory results indicated that there were no positive identifications of asbestos within soil samples.

11. GROUND CONTAMINATION ASSESSMENT – WIDER ENVIRONMENT

11.1 Introduction

The potential for contaminated groundwater on site to adversely affect controlled water receptors (groundwater and surface water bodies) has been assessed at this stage by direct comparison of analytical data from the WYG ground investigation with relevant Water Quality Standards (WQS).

Similarly, the potential for soil contamination to impact controlled waters has been assessed by comparing analytical data from soil derived leachate tests directly against WQS.

11.2 Assessment Criteria

In light of the environmental setting of the site under consideration. The following water quality standards have been adopted, in order of preference.

- Water Framework Directive (WFD),
- Environmental Quality Standards (EQS);²
- WHO 2008 - Petroleum Products in Drinking Water (WHO 2008)
- UK Drinking Water Standards³.

11.3 Tier 1 Screening Assessment – Soil Derived Leachate

Soil derived leachate samples can be used to identify potentially mobile contamination within soil samples collected from the site. It should be noted that the laboratory test methodology indicates a potential mobility of contaminants and is usually considered to reflect a worst-case situation and unlikely to represent on-site conditions.

The laboratory preparation of leachate samples is likely to produce higher concentrations of leachable components than conditions encountered on site and as such the following assessment

² Where WFD 2015 are not presented revoked WFD 2010 standards are used

³ WHO 2005; WHO 2008; UK Water Supply Regulations 2010 and 1989 Regulations. Priority given to UK drinking water standards

is considered to be inherently conservative in nature. Furthermore, the resulting data are screened against criteria intended to be protective of water bodies and drinking water supplies and are not intended to assess the potential significance of contaminant mobility.

11.4 Tier 1 Screening Assessment – Soil Derived Leachate

Two soil derived leachate samples were screened against a suite of determinants outlined in Section 11.2.

The following table summarises the determinants which have been identified at concentrations in excess of the relevant WQS screening criteria.

Table 9 – Summary of Exceedances within Soil Derived Leachate Samples

Determinant	Units	Maximum	Minimum	Screening Value	Exceedances	
					No.	Location
TPH Aromatics EC12 - EC16	µg/l	122	10	90 [^]	1	WS03 1.0-1.2
TPH Aromatics EC21 – EC35	µg/l	66	10	0.0082	1	WS03 1.0-1.2
Fluoranthene	µg/l	0.024	0.0058	0.0063 [#]	1	WS01 0.7-1.0
Phenanthrene	µg/l	0.034	0.0054	<0.005 ^{\$}	2	WS03 1.0-1.2, WS01 0.7-1.0
Fluorene	µg/l	0.0054	<0.005	<0.005 ^{\$}	1	WS01 0.7-1.0
Pyrene	µg/l	0.0132	<0.005	<0.005 ^{\$}	1	WS01 0.7-1.0

* Freshwater waters EQS 2015

Inland water EQS 2015

[^] WHO Drinking Water Guidelines

^{\$} LOD in lieu of EQS value

Six determinants (heavy TPH fractions and PAH compounds) were identified within soil derived leachate samples at concentrations in excess of the relevant screening value or LOD.

The majority of the exceedances are considered to be marginal in nature, especially if the conservative nature of the assessment is taken into account. The use of leachate testing and the comparison of the results against water quality standards is an inherently conservative assessment approach. Leachate tests assess the level of contamination that will potentially leach out of material, but as the test uses an acid digestion procedure it is likely to represent a worst-case scenario in comparison with real site conditions. Environmental Quality Standards are limits on the concentration of priority substances and other pollutants in surface water which are set because of the risk that these substances present to the aquatic environment, i.e. they are thresholds which should not be exceeded if good quality status of receiving water is to be maintained. Comparison of leachate test results against these and other water quality standards gives an indication of risk

to the water environment but takes no account of flow pathways or dilution at receptors.

Given that the current site is currently covered with hard standing, which limits water infiltration to the underlying soils, and the proposed development is unlikely to create further pathways with no soft landscaping proposed and retention of area of hardstanding, these marginal exceedances are not considered to be a significant risk to the wider environment. Furthermore the clayey nature of the Glacial Till deposits would afford protection to the groundwater present within the Hughes Member Sandstone. Contamination concentrations would be reduced via the retardation processes as they migrate through the unsaturated zone.

However, to present a conservative assessment, the recorded exceedances in soil derived leachate samples have been carried forward to the risk assessment presented in Section 13.

12. SITE CONCEPTUAL MODEL AND GROUND CONTAMINATION RISK ASSESSMENT

12.1 Introduction

In general, ground contamination can occur through several causes, particularly from historical operations and activities. Contamination can result from either on-site sources or from on-site migration from off-site sources, leading to long term liabilities under recent legislation for any site owner.

The Environmental Protection Act 1990 (Part IIA) makes provisions for a risk-based framework for the identification, assessment, management and redevelopment of contaminated land within the UK. The provisions of the Act came into effect in England and Wales in July 2001 and are aimed at ensuring that actions taken with respect to contaminated land are directed by a technically well-founded assessment of risk.

The process of risk assessment is an evaluation of the probability of harm, and comprises the identification of sources of contamination, receptors that may be affected by the contamination and pathways by which the receptors may be harmed forming a pollution linkage. The site conceptual model (presented below) forms the basis for the qualitative assessment of ground contamination risks associated with the site.

12.2 Site Conceptual Model

The conceptual model for the site reflects the findings and observations during the site investigation. The key source, pathway, receptor model is outlined below within the context of the anticipated future residential development on the site.

12.2.1 Sources

The following sources of potential contamination have been identified from the site investigation and subsequent monitoring rounds:

- General contamination associated with Made Ground on site;
- Potentially Mobile Contamination within shallow soils (TPH and PAH from soil derived leachate samples);

- Potential asbestos within Made Ground;

Although no ground gas monitoring was undertaken at the site, given the absence of widespread thicknesses of made ground or organic soils, ground gas generation potential is considered likely to be low. If greater thicknesses of made ground are identified across the site during the construction phase it may be necessary for further assessment from a ground gas specialist in order to determine the requirement for ground gas protection measures for the new development. However, it would be prudent to further investigate the potential for ground gas generation from the Made Ground if significant thicknesses are identified during the construction.

12.2.2 Pathways

The primary pathways by which sensitive receptors may come into contact with ground contamination are considered to be the following:

- Direct dermal contact or ingestion of soils, or inhalation of dust (i.e. human interaction with surface and sub-surface materials);
- Disturbance of potential asbestos impacted soils and subsequent inhalation of asbestos fibres;
- Leaching and horizontal or vertical migration through the unsaturated ground, whether through permeable sub-surface materials and/or preferential pathways;
- Lateral and vertical migration of groundwater through permeable sub-surface materials and/or preferential pathways;
- The migration and accumulation of ground gases or vapours through permeable sub-surface materials and/or preferential pathways.

12.2.3 Receptors

The following are considered to be sensitive receptors:

- Current Site Users
- Site construction workers;
- Future Site users (within the context of the proposed early years education facility);

- Groundwater within underlying Aquifer;
- Nearby surface water features.

12.3 Ground Contamination Risk Assessment Table

The pollution linkages and a qualitative risk assessment are presented in the table below. The risk assessment considers the site within an area context and assesses potential risks to identified receptors in relation to the existing site setting and the proposed development. CIRIA C552 has been used to define the risk rating presented in the Qualitative Risk Assessment matrix, methodology for which is presented in Appendix F.

Table 10 - Ground Contamination Assessment Risk Table

Source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Risk Classification	Potential risk management requirements
General contamination associated with Made Ground on site / Potentially Mobile Contamination within shallow soils (TPH and PAH from soil derived leachate samples);	Direct dermal contact or ingestion	Current site users	Medium	Unlikely	Low Risk	The soil laboratory results have not indicated the presence of contaminants of concern in excess of their GAC. The site is also covered in a layer of hardstanding that cuts any potential pathway for current and future site users. Construction workers wearing appropriate PPE and practising good hygiene should also be low risk. The overall risk human health is considered to be low.
		Future site users		Unlikely	Low Risk	
		Construction workers		Unlikely	Low Risk	
	Leaching and horizontal or vertical	Groundwater (Secondary A Aquifer)	Medium	Unlikely	Low Risk	The laboratory results of the soil derived leachate testing indicated elevated concentrations of TPH and PAH compounds against the screening criteria.

Source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Risk Classification	Potential risk management requirements
	migration	Surface waters		Unlikely	Low Risk	Given the conservative nature of the leachate testing methodology, the relatively minor exceedances identified in the soil derived leachate samples and the distance to the closest surface water body, the recorded concentrations are not considered to pose a significant risk to controlled waters. Furthermore the clayey nature of the Glacial Till deposits would afford protection to the groundwater present within the Hughes Member Sandstone. Contamination concentrations would be reduced via the retardation processes as they migrate through the unsaturated zone. Furthering this, the current and proposed development at the site, comprising hard standing and buildings should restrict soil infiltration rates across the site, thus reducing the leachability of any shallow soil contamination.
Asbestos within Made Ground	Inhalation	Current and future site users	Medium	Unlikely	Low Risk	No ACM was identified during the site investigation. However, the presence of ACM within the Made Ground cannot be discounted. In the event that ACM is encountered during the development process, further assessment will be required to provide an updated risk assessment process.
		Construction Workers	Medium	Low likelihood	Moderate to Low Risk	

13. CONCLUSIONS AND RECOMMENDATIONS

13.1 Ground Contamination

13.1.1 Summary

Made Ground has been identified across the site to be usually no more than 0.20m in thickness but has been locally observed up to 1.10m bgl in depth in SA01. It is important to note that SA01 was not located beneath the proposed building footprint. No soil phase contamination exceedances have been identified in the context of the proposed development.

With respect to the presence of potentially mobile contamination, a limited number of TPH fractions and PAH compounds have been identified in exceedance of the relevant EQS screening criteria within soil derived leachate samples. When the recorded concentrations are considered within the context of the conservative nature of the testing methodology and the presence of infiltration limiting hardstanding/buildings as part of the current and future site development the risks to the wider environment are considered to be low.

Asbestos containing materials have not been identified within the shallow soils on the site, however, the potential presence of asbestos containing materials within the Made Ground cannot be discounted. In the event that previously unidentified asbestos contamination is encountered during the development phase, works should stop to allow additional investigation and risk assessment to be undertaken and additional risk management procedures put in place, if required.

13.2 Geotechnical

Traditional shallow foundations taken down to a minimum of 0.50m bgl and founded on the coarse-grained or fine grained Glaciofluvial Deposits, may be designed to an allowable net bearing pressure of 135kPa. Floor slabs may be ground bearing for light dead and live loads of up to 15kN/m²

The soakaway testing undertaken in SA01 to BRE 365 resulted in three failed tests. Two of the tests were extrapolated providing a permeability value for the Glacial Till of 8.01×10^{-7} and 8.89×10^{-7} . Further testing, groundwater monitoring and ground investigation may be required to support a full SAB application or to inform the development of the final design process.

The Design Sulphate Class for the site can be taken as DS-1, and the Aggressive Chemical Environment for Concrete (ACEC) site classification be taken as AC-1.

13.3 Recommendations

Within the context of ground contamination, no further risk management procedures are recommended with respect to the proposed development of the site. However, it is recommended that a proactive approach is adopted during the future development of the site to identify and assess any previously unidentified contamination which may be encountered during development works.

Locally, Made Ground has been observed to at increased thickness (1.10m bgl) to the north of the proposed development. In the event that greater thicknesses of made ground are encountered below the proposed development during construction, it is recommended that this material is assessed and tested for suitability as a founding material.

Although no land gas assessment is required by the contaminated land officer for this development should significant thicknesses of Made Ground be identified not currently encountered as part of the ground investigation then a land gas assessment should be undertaken.

14. NOTES

1. Standards

All boring operations, sampling of soils, *in situ* testing and geotechnical laboratory testing have been carried out in accordance with the recommendations of the British Standards BS 5930(2015)⁽¹⁾, BS 1377 (1990)⁽²⁾ and BS10175 (2001)⁽³⁾.

Soil and rock descriptions follow the recommendations of BS 593. Where descriptions or classifications are based on other documents (e.g. BS 8004 (1986) or CIRIA Project Report 11 (1993)), this is stated in the report text.

2. Site methods

Unless specifically stated otherwise, the following methods are used for exploratory holes.

- Holes described as cable percussive are bored using a light cable percussive rig. Standard penetration tests are carried out where appropriate, as shown in the logs. Disturbed and undisturbed samples are taken from the exploratory holes at the depths on the records.
- Window sampling generally uses the windowless sampling method, using a tracked Geotool.
- Dynamic probes are usually heavy dynamic probes, using the same tracked Geotool used for window sampling.

3. Definitions and abbreviations

The following terms are used in the exploratory hole logs

Samples

U	Undisturbed 102mm dia. sample
TW	Thin Walled undisturbed 102mm dia. sample
B	Bulk sample
D	Small disturbed sample
W	Water sample
CBR	California Bearing Ratio test or CBR value obtained from Mexiprobe test

In situ tests

S	Standard penetration test (SPT)
N	SPT N value (blows/300mm)
HP	Hand penetrometer – shear strength
SV	Hand shear vane – shear strength
VOC	Volatile organic compounds (ppm)
PID	Photo-ionisation detector – used to detect the presence of VOCs.

Core recovery and rock quality

TCR	Total core recovery (%)
SCR	Solid core recovery (%)
RQD	Rock quality designation (%)
FI	Fracture index
NR	No recovery
NI	Not intact

Rotary drilling sizes

Index letter	Nominal diameter (mm)	
	Borehole	Core
N	75	54
H	99	76
P	120	92
S	146	113

Water strikes

▽	Level of water strike
▼	Water level rose to this level (see Remarks at foot of log for details)

Depth means depth below existing ground level unless otherwise specified. Values specified in soil descriptions given in the exploratory hole logs are depths unless otherwise specified.

15. GLOSSARY

AOD	above Ordnance Datum
bgl	below ground level
BGS	British Geological Survey
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
C4SL	Category 4 Screening Levels
CIEH	Chartered Institute of Environmental Health
CLEA	Contaminated Land Exposure Assessment
CoC	Constituent of Concern
CSM	Conceptual Site Model
DEFRA	Department of Environment, food and Rural Affairs
DQRA	Detailed Quantitative Risk Assessment
DTS	Desktop Study
DRO	Diesel Range Organics
DWS	Drinking Water Standard
EA	Environment Agency (England)
EPH	Extractable Petroleum Hydrocarbons
EQS	Environmental Quality Standards
FOC	Fraction Organic Carbon
GPR	Ground Penetrating Radar
LOD	Limit of detection
LQM	Land Quality Management
NRW	Natural Resources Wales
OS	Ordnance Survey
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PPE	Personal Protection Equipment
ppm	parts per million
PRO	Petroleum Range Organics
SGV	Soil Guideline Values
SOM	Soil Organic Matter
SVOC	Semi-volatile organic compounds
TPH	Total Petroleum Hydrocarbon
TSV	Tier 1 Screening Values
VOC	Volatile Organic Carbon
VPH	Volatile Petroleum Hydrocarbons

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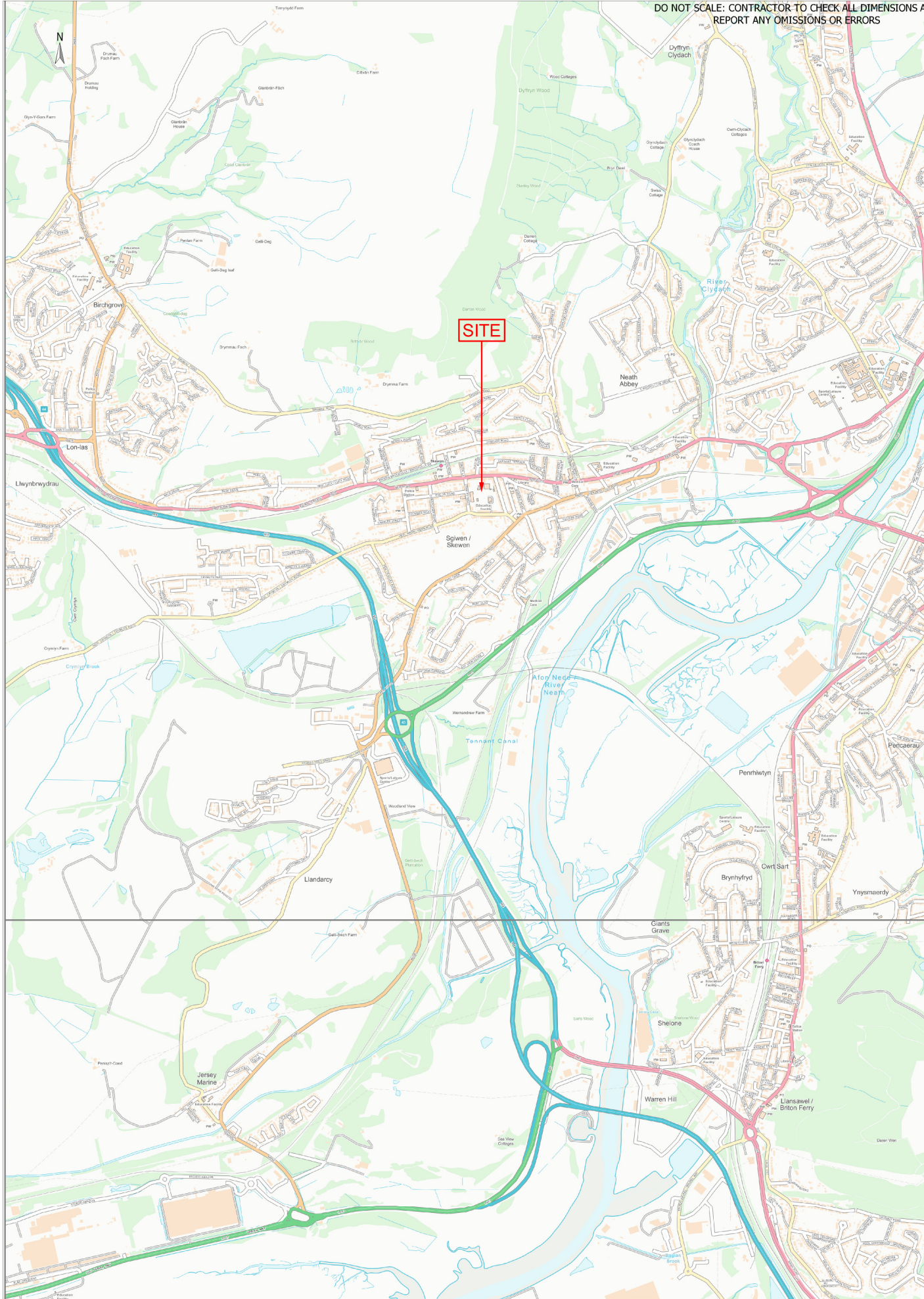


FIGURES



Figure 1 – Site Location Plan

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS



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5th FLOOR
LONGCROSS COURT
47 NEWPORT ROAD
CARDIFF
CF24 0AD
TEL: +44 (0)29 2082 9200
FAX: +44 (0)29 2045 5321
e-mail: cardiff@wyg.com



Client:
**NEATH PORT TALBOT
COUNTY BOROUGH COUNCIL**

Project:
COEDFFRANC INFANT SCHOOL

Drawing Title:
SITE LOCATION PLAN

REV	DESCRIPTION	BY	CHK	APP	DATE
	Scale @ A4	Drawn	Date	Checked	Date
	PP	18.03.20	JD	18.03.20	Approved
	Project No.	Office	Type	Drawing No.	Revision
	A111150-16	CDF	N	1	00



Figure 2 – Proposed Site Development Plan



Figure 3 – Site Investigation Layout Plan



DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND
REPORT ANY OMISSIONS OR ERRORS

KEY



WINDOW SAMPLE



SOAKAWAY



REV	DESCRIPTION	BY	CHK	APP	DATE
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Client:

NEATH PORT TALBOT C B C

5th FLOOR
LONGCROSS COURT
47 NEWPORT ROAD
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Project: A111150-16

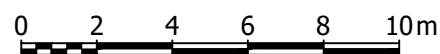
COED FFRANC INFANTS SCHOOL

Drawing Title:

EXPLORATORY HOLE LOCATION PLAN

Scale @ A3 1:200	Drawn CM	Date 05.03.20	Checked Date	Approved Date
Project No. A111150-16	Office CDF	Type N	Drawing No. 02	Revision

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SCALE 1:200