



STAGE 2 GEO-ENVIRONMENTAL REPORT

AT

**HOPE HIGH SCHOOL
SKELMERSDALE**

ON BEHALF OF

**TAWD VALLEY
DEVELOPMENTS LTD/
WEST LANCASHIRE
BOROUGH COUNCIL /
LANCASHIRE COUNTY
COUNCIL**



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1.0 EXECUTIVE SUMMARY

The pertinent conclusions of the report are tabulated below. However, the information below is not exhaustive, and it is recommended the report is read in its entirety.

Proposed Development	Residential dwellings with private gardens.
Existing Site Description	Occupied by a former school and tennis courts in the west. Remaining site undeveloped. Occasional trees around boundaries.
Site History	Holland Moor Colliery Present in the west from sometime between 1938 and 1951 until sometime between 1967 and 1975. The colliery included several small structures, a spoil heap in the south, and an adit. The site was later developed as part of a large high school.
Geology	Glacial diamicton ("Boulder Clay"), overlying Rough Rock Formation (sandstone). However, this is contradicted by Coal Authority Records and is more likely to comprise undifferentiated strata (mudstone, siltstone and minor sandstone), and two coal seam outcrops crossing the site. No faults on/near the site.
Coal Mining	Both recorded and potential unrecorded shallow mine workings are indicated. Mine adit and mine shaft indicated to be present on the site, both of which are recorded as being treated in 1973. Intrusive investigation imminent. Drilling and grouting may be required.
Radon	No protection measures required.
Hazardous Gases	Gas monitoring wells have been installed and monitoring is ongoing. The results will be issued separately on completion.
Ground Conditions	Topsoil in landscaped areas and up to 3.5m of made ground, overlying firm glacial clays and occasional sands.
Contamination	No elevated determinands identified. No remedial measures proposed. Asbestos survey required.
Foundations	Strip or trench fill foundations considered acceptable across the majority of the site, dependent on depth of made ground. In any areas where foundations are required on deeper made ground (up to 3.5m deep) piled foundations may be favoured, subject to the

	findings of the proposed mining investigation. A tree survey will be required due to the presence of shallow clays. Foundations above any grouted mine workings (if present) will need to be 300mm thick and reinforced with two layers of B503 mesh.
Excavations	Likely to be stable in natural strata in the short term. Liable to collapses within made ground and natural sands if found below groundwater level.
Concrete	GEN1 designation for unreinforced foundations. For reinforced concrete, other design-specific mixes will apply.
Soakaways	Infiltration via soakaways is not considered to be practical.
Road Pavement	Design CBR value of 4% applicable on the natural clay, below any soft spots and at equilibrium moisture content. Earthworks/other engineering measures required where made ground is too deep to reach a natural formation. .
Other	An unrecorded gas pipe was encountered on the site, identified in TP7, and the exact route is unknown.

2.0 TERMS OF REFERENCE

- 2.1 Tawd Valley Developments Limited is considering developing the site at the Former Hope High School, in Skelmersdale with residential dwellings. It was considered appropriate to provide information to aid viability assessment and design of any subsequent development. In February 2020, ARP (North West) Ltd issued a Stage 1 Desk Study Report (Reference NW134/01/2r1, dated 4th February 2020). This involved an assessment of the geological and coal mining aspects, Ordnance Survey archive maps, radon gas, indicative flood risk, hydrogeology, landfill, and other environmental issues, primarily by assessment of a Landmark Envirocheck Report. In addition to comments and conclusions on a wide range of environmental and geotechnical issues, the report also provided recommendations for intrusive investigation and assessment.
- 2.2 In October 2021, ARP (North West) Ltd was appointed by Tawd Valley Developments Ltd to undertake the recommended further works, with the intrusive investigation comprising trial pits and windowless sample boreholes to assess the ground conditions.
- 2.3 The investigation was implemented generally in accordance with BS 5930:2015 +A1:2020 "Code of practice for site investigations", NHBC Standard Chapter 4.1 "Land quality - managing ground conditions", Environment Agency LCRM "Land Contamination Risk Management" and BS10175 : 2011 + A2 : 2017 "Investigation of potentially contaminated sites - Code of practice". This report is limited to the data obtained as part of this investigation. It should be noted that there is a possibility of variation in ground conditions between test locations and interpretation of strata is given for guidance only. No liability is accepted for changes to site conditions, including groundwater levels, after the preparation of this report.
- 2.4 The findings or contents of the Stage 1 Desk Study Report are not reproduced here in full, and it is recommended that this report is read in conjunction with the Stage 1 Report.

- 2.5 The general observation and assessment of the ground surface, and the identification/classification of vegetation is made in general terms only. It would be prudent for a specialist to undertake a more detailed survey, including for any invasive/harmful weeds.
- 2.6 The assessment of any topsoil is carried out in terms of potential chemical effects on human health only, and no account is taken of aesthetic or horticultural properties. Such considerations should be referred to a horticulturist or landscape architect.
- 2.7 The report has been prepared for the use and reliance of Tawd Valley Developments Ltd, West Lancashire Borough Council, and Lancashire County Council only. The report shall not be relied upon or transferred to any other parties without the written agreement of ARP (North West) Ltd. For the avoidance of any doubt, where ARP (North West) Ltd enters into a letter of reliance for the benefit of a third party, that third party will be permitted to rely on the report. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party without ARP (North West) Ltd.'s consent.
- 2.8 Attention is drawn to the requirements of the Construction Design and Management Regulations 2015, and in particular the duties and obligation of the Client.
- 2.9 The report refers to, and includes, a copy of an indicative proposed layout. This is only for the purposes of generating a conceptual site model for the contamination risk assessment. Unless the proposed layout changes significantly, such that the conceptual model and risk assessment is affected, there is no requirement to re-issue this report when the layout is revised.

3.0 THE SITE

Site Location

- 3.1 The site, which is centred on Ordnance Survey Grid Reference 350290, 405620, is located at Hope High School, in Skelmersdale.
- 3.2 A site location plan, aerial photograph and proposed site layout, are presented in Appendix A.

Site Description

- 3.3 The site is currently occupied by the former Hope High School, with associated hardstanding and landscaped areas. The former school building is currently disused and unoccupied, and present in the western area of the site. The school is of brick construction, with a corrugated metal roof. A car park is present to the north of the school building, and bitmac hardstanding areas used for sports activities are present to the south and east of the building. A small electricity sub-station is also present at the southwestern corner of the school. The southeast of the site comprises relatively flat grassland which, when compared to the surrounding areas, appeared to have been levelled at some time in the past. The general wider area slopes down to the south southwest.
- 3.4 The site is bounded to the north, east, south and west by residential properties as part of a larger housing estate. Google earth historical photographs show the surrounding housing estate to have been developed post-2000. To the east and south, beyond the residential properties, are 'A' roads as part of the infrastructure network of Skelmersdale.

Site History

- 3.5 Ordnance Survey archive maps show the west of the site was a colliery from sometime between 1938 and 1951 until sometime between 1967 and 1975. The colliery included several small structures, a spoil heap in the south, and an adit. The site was later developed as part of a large high school, with buildings in the west, and a tennis court.

4.0 ENVIRONMENTAL SETTING

- 4.1 The environmental setting for the site was established by the Stage 1 Desk Study Report undertaken by ARP (North West) Ltd under reference NW134/01/2 and dated 4th February 2021. The findings of the Desk Study Report, updated and amended where deemed appropriate, are summarised below.

Geology

- 4.2 The geological maps show the site to be covered by superficial glacial deposits of diamicton (usually stony cohesive material). The bedrock geology across the western and central areas of the site is shown to comprise sandstone of the Rough Rock Formation, and the eastern margins of the site are underlain by Undifferentiated Strata (mudstone, siltstone and minor sandstone) of the Pennine Lower Coal Measures Formation. A marine band is also shown to be present at the geological boundary between the Rough Rock Formation and the Pennine Lower Coal Measures Formation. The Rossendale Formation, comprising mudstone siltstone and sandstone, may locally encroach onto the western boundary of the site. The maps do not indicate any potential for the site to be adversely affected by any faults.
- 4.3 The BGS maps show no coal outcrops to be present on site. However, Coal Authority electronic data indicates that two coal seams are conjectured to outcrop through the centre of the site, within the Rough Rock, trending approximately north to south. The dip is indicated to be seven degrees to the east. The generalised section on the BGS 1:50,000 Series paper map (Sheet 84, Wigan), shows the Sand Rock Coal to be present within the sequence underlying the site, comprising 1.8m thickness in two leaves. The Six Inch Coal is also indicated to be present. Both seams are not continuous, and although indicated to be present across the full length of the site, they may be absent from the Rough Rock elsewhere, in other districts.

Coal Mining

- 4.4 The Coal Mining Report indicates that there is the possibility of unrecorded shallow workings and this will need to be assessed by an intrusive investigation using a rotary drilling rig.
- 4.5 There are two mine entries present within the central-western part of the site. The northern mine entry is documented to be an adit and the associated adit tunnel is documented to extend into the northeast of the site. The southern mine entry is documented to be a shaft. Both mine entries are documented by the Coal Authority to have been treated by Lancashire County Council in 1973. However, the details/specification of the treatment works undertaken have not been confirmed within the record. There is also a slight risk of unrecorded mine entries and bell pits.

Hydrogeology

- 4.6 The Landmark Envirocheck Report indicates the Bedrock Aquifer Designation to be 'Secondary A' aquifer. The overlying superficial glacial diamicton deposits are designated a 'Secondary Undifferentiated' aquifer.
- 4.7 There are no sensitive groundwater abstractions within 1km of the site.
- 4.8 The site is not within a groundwater Source Protection Zone.

Hydrology

- 4.9 The general area slopes to the south. Two watercourses are present on the site, one each side of the playing field in the southeast of the site, both flowing south/southwest. The site is not in an area at risk from river flooding.
- 4.10 There are no surface water abstractions within 1km of the site.

Other Relevant Environmental Data

- 4.11 There are no closed or currently licensed landfills within 250m of the site.
- 4.12 No radon protective measures are stated to be necessary for new dwellings or extensions on the site, and the site is within a “lower probability radon area”.
- 4.13 The site is not within an area at risk from river flooding.
- 4.14 BGS data indicates the general area has the “potential for groundwater flooding to occur at surface”.

Potential Contamination Sources

- 4.15 The following potential sources of contamination were identified in the Stage 1 Desk Study Report
 - 4.15.1 Possible made ground – metals, inorganics, total petroleum hydrocarbons (TPH), polyaromatic hydrocarbons (PAH), phenol, asbestos.
 - 4.15.2 Possible asbestos within existing buildings.
 - 4.15.3 Possible harmful gases from coal/workings and mine shaft/adit: - methane, carbon dioxide.
 - 4.15.4 Possible localised PCBs associated with the small electricity sub-station on site.

5.0 SITE INVESTIGATION

- 5.1 A site investigation was undertaken by ARP Geotechnical Ltd on 4th October 2021 and 5th October 2021. The purpose of the investigation was to produce an assessment of the site in accordance with BS10175 : 2011 + A2 : 2017 "Investigation of potentially contaminated sites - Code of practice", and to provide geotechnical information to aid design of the development.
- 5.2 The site was gridded on a maximum 25m spacing and trial pits and windowless sample boreholes were sampled on the grid, to satisfy the requirements of the British Standard, along with any targeted locations. Fifteen machine excavated trial pits (TP1 to TP15) and eleven boreholes (WS1 to WS11) were implemented, to depths of between 2.43m and 5.45m and one hand dug trial pit to a depth of 0.3m. The trial pits and boreholes were organised, supervised and logged by an Engineer from ARP Geotechnical Ltd. Justifications for the trial pit locations are given below.

LOCATION	REASON
TP1 to TP15	Part of grid
WS1 to WS11	Part of grid
HP1	Part of grid and adjacent to electricity substation

- 5.3 An intrusive coal mining investigation will be undertaken following receipt of the Coal Authority Permit, and will be reported separately.
- 5.4 Five gas monitoring wells were installed, in WS2, WS3, WS7, WS8 and WS9, and subsequently monitored by ARP Geotechnical Ltd. The wells were installed to 3m depth, with the bottom 2m comprising slotted pipe with gravel surround, and the upper 1m comprising plain pipe with bentonite seal and lockable flush cover.
- 5.5 The trial pit and borehole location plan and logs are included in Appendix B.

- 5.6 Chemical analysis of 25 soil samples, for metals, inorganics, speciated PAH, TPH, phenols, and asbestos, was undertaken by the UKAS accredited Eurofins Chemtest Laboratory in Cambridge. The test certificates are included in Appendix C.
- 5.7 Analysis for Atterberg Limits and moisture content was undertaken by the UKAS accredited Professional Soils Laboratory (PSL) in Doncaster. Geochemical testing comprising pH and water soluble sulphate was undertaken by Eurofins Chemtest. The test certificates are included in Appendix C.

6.0 SUMMARY OF GROUND CONDITIONS

Strata and Groundwater

- 6.1 Across the southeast of the site, and in the areas of landscaping surrounding the existing building, dark brown slightly sandy, slightly gravelly clayey topsoil was present, to a depth of 0.3m. In TP10 made ground topsoil was identified to be present, with occasional traces of fabric and plastic at the surface. Topsoil/Made ground topsoil was identified to be present in sixteen of the twenty-seven investigation positions.
- 6.2 In the north of the site, and surrounding the current building, made ground was identified to be present to a depths of between 0.4m (WS1) and 3.5m (WS7). The made ground in the north of the site ranged in depth from 0.6m to 1.1m and comprised both granular and cohesive material, typically either brown sandy, clayey, fine to coarse grained angular gravels of mixed lithology, brick and plastic or brown slightly sandy, gravelly clay with the gravels comprising mixed lithology brick, concrete and ceramic. Site levels in the north of the site appear to be raised in relation to the school development platform further south, and at similar levels to those of the adjacent residential development, although often sloping down into the site away from the boundaries.
- 6.3 In the central and western areas of the site, tarmac/bitmac hardstanding was present to a recorded depth of 0.1m, which was typically underlain by granular subbase of mixed lithology to a depth of up to 0.6m. Underlying the hardstanding and subbase in the central and western areas of the site (in three of the investigation positions only) was made ground to depths of between 1.4m and 3.5m. In WS7, this comprised mainly dark grey clayey angular gravel of mudstone and was interpreted to be possibly colliery spoil. WS7 is in the vicinity of a recorded mine shaft. In TP7 and TP9, the material generally comprised gravelly clay of mixed stone, brick, and concrete. The made ground in TP9 had a medium cobble and boulder content of mixed stone, brick and concrete. In TP7, the original trial pit was terminated at 0.4m and subsequently relocated further north, due to a suspected gas pipe which was not marked on the utility maps.

- 6.4 Natural strata were encountered in all of the investigation positions, typically comprising firm/medium strength reddish brown, slightly sandy gravelly clay, with the gravel content comprising sub angular to rounded mixed lithologies. In TP14 only, the upper clays were noted to be very soft, from 0.3m to 1.4m depth. In six of the investigation positions, underlying the cohesive deposits, light brown, clayey, gravelly sand was identified to be present. The sequences of cohesive and granular strata are interpreted to be superficial glacial diamicton deposits.
- 6.5 Solid mudstone strata were encountered in two of the investigation positions (TP5 and WS7 only), at respective depths of 3.6m and 4.8m. Solid strata were not encountered in any of the other investigation positions, which had penetration depths of up to 5.45m.
- 6.6 The excavations generally remained stable in the short term within the natural strata, although slight to severe instability was encountered within the made ground across the site. Severe instability was encountered within the shallow natural cohesive strata within TP14, which was noted to be very soft. Slight groundwater ingress was encountered in TP9 at 4.5m depth, which correlated with the change from cohesive to granular strata. No groundwater was encountered in any of the other investigation positions.

Gas Monitoring

- 6.7 Gas monitoring is currently being undertaken in accordance with BS 8576: 2013 "Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)". The findings will be reported separately on completion of the monitoring.

Coal Mining and Mine Shaft Exposure

- 6.8 An intrusive coal mining investigation will be undertaken at a later date and reported separately on completion.

6.9 During the site investigation, exposure of Coal Authority mine shaft 350405-003 (003) was undertaken by excavating the surrounding area to natural ground. Following stripping of the topsoil around the suspected location of shaft 003, made ground was encountered at the surface, of a similar composition (possible colliery spoil) to the nearby investigation position WS7. The made ground was excavated to a depth of 2.5m, where concrete was found to be present. It is known from the Coal Authority records that mine shaft 003 was treated by Lancashire County Council (specifications of treatment unknown). It is, therefore interpreted that mine shaft 003 was successfully located, with a concrete cap present at a depth of 2.5m below existing ground level. Full exposure of the mine shaft cap was not feasible at the time of the site investigation due to the significant depth and collapse of the made ground. It is recommended that during development, the mine shaft cap is full exposed to measure dimensions, and the concrete shaft cap cored to determine the thickness and level of treatment that was installed.

7.0 CONTAMINATION ANALYSIS

Screening Values - Soils

- 7.1 There is presently conflicting opinion with regard to the appropriate generic assessment criteria, or screening values, for soils which should be used in contamination assessment for proposed development. In March 2014, DEFRA published Category 4 Screening Levels (C4SLs) for six contaminants: arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead. The values are based on the toxicological benchmark of a "low level of toxicological concern" (LLTC) rather than the previous regulatory approach of "minimal or tolerable level of risk". As the C4SLs are less protective of health than the previous approach, the Chartered Institute of Environmental Health (CIEH) has advocated an alternative approach based on minimal risk, but with some adjustment of exposure parameters to more realistic scenarios than those previously used. To this end, the CIEH has collaborated with Land Quality Management to publish "Suitable 4 Use Levels" (S4ULs) "The LQM/CIEH S4ULs for Human Health Risk Assessment", November 2014 (LQM/CIEH). However, DEFRA has reiterated its intention that the C4SLs should be used in generic risk assessment for proposed development, and there is indication that other parties will collaborate, in the near future, to extend the range of C4SL determinands beyond the six published so far.
- 7.2 In the absence of a final resolution to the issue, soil contamination test results in this report have been compared first against the more conservative S4UL, and where a C4SL exists for the same determinand, consideration given to the use of the C4SL for any exceedances of the S4UL, within the site specific context (including the use of benzo(a)pyrene as a surrogate marker for genotoxic PAH compounds, where appropriate). Where no S4UL exists for a determinand, for example lead, the C4SL has been used. The LQM/CIEH screening values have been calculated for soil organic matter contents of 1% and 2.5%, as well as 6%, and the appropriate screening value is used for the organic matter content of the soil. All the C4SL values published are for a soil organic matter content of 6%.
- 7.3 A table showing the screening values utilised is included in Appendix C.

Soils Analysis

- 7.4 Twenty-five soil samples were issued to Eurofins Chemtest for the suite of testing (As, Cd, Cr (VI), Cr(III), Cu, Hg, Ni, Pb, Se, Zn, Total Sulphate, Water Soluble Sulphate, pH, Phenol-monohydric, Speciated PAH, Total TPH, Asbestos, and Organic Matter). One sample was also tested for PCBs adjacent to the electricity substation. The testing comprised:

Thirteen samples of **Topsoil** from TP6 to TP8, TP10 to TP15, WS2, WS8, WS11 and HP1

Twelve samples of **Made Ground** from TP1 to TP5, TP9, WS1, WS3 to WS7

The one sample from **HP1**, also for PCBs

- 7.5 For each material, any determinands with exceedances of screening values were subjected to statistical analysis to determine the 95% Upper Confidence Level (UCL).

Topsoil

- 7.6 No elevated determinands were identified within any of the samples of topsoil tested. The topsoil requires no further consideration in the risk assessment.

Made Ground

- 7.7 No elevated determinands were identified to be present within any of the samples of made ground tested. The made ground requires no further consideration in the risk assessment.

PCBs

- 7.8 No elevated determinands were identified to be present within the sample taken adjacent to the electricity substation. PCB contamination from the substation requires no further consideration in the risk assessment.

Updated Risk Assessment and Conceptual Model

7.9 The categorisations of risk adopted in this report are adapted from CIRIA Report C552 (Contaminated Land Risk Assessment: A Guide to Good Practice, 2001). This approach assesses the potential severity of any pollution event and the probability of the event occurring, to arrive at a risk category, for the various potential source - pathway - receptor linkages. The relevant tables used, with the definitions, are presented in Appendix D.

7.10 The updated source – pathway – receptor matrix is presented below, taking into account the findings of the investigation. Any pathways in italics are deemed not to be viable and the reason given.

Viable Source - Pathway - Receptor Matrix (Finished Development)

Contamination Sources	Pathways	Receptors	Severity of Consequence	Probability of Event	Risk
Possible shallow workings/coal and mine entries:- methane and carbon dioxide	• Asphyxiation • Explosive risk	• Construction/de-molition workers • Future occupants • Buildings	Severe	Low Likelihood	Moderate
Possible asbestos within existing buildings	• Inhalation	• Future occupants • Maintenance workers • Adjacent residents and general public	Severe	Low Likelihood	Moderate

7.11 It can be seen from the above matrix that, although pathways from contaminated made ground are not present, pathways to receptors from potential ground gas and asbestos within buildings are operative, and this may affect users of the finished development, with a moderate risk applicable. Some further action is, therefore, considered necessary to allow residential development without excess risk and this is assessed below.

Risk Based Assessment of Further Action Required

Asbestos Within Existing Buildings

- 7.12 Provided an asbestos survey is carried out prior to any demolition or work on the existing buildings on the site, and any identified asbestos is removed and disposed to a licenced facility, then the risk to receptors is low. The work should be carried out by appropriately qualified Contractors.

Mine Gases

- 7.13 To address the potential risk from mine gases, monitoring of borehole wells is in progress. This will determine whether or not gas protection measures are likely to be necessary. This will be confirmed by separate letter report on completion of the monitoring.

Imported soils

- 7.14 Any imported soils used within the cover blanket will need to be verified as suitable by inspection and testing, in accordance with guidance.

Risks During Construction Period

- 7.15 It is also necessary to consider the effects of the contamination present on the site in relation to the risks to adjacent residents, construction workers and the general public during construction. This is assessed in the following matrix.

Source	Pathway	Potential risk	Risk after employing suitable Health and Safety plan.
Asbestos in existing buildings	Inhalation	High	Provided an asbestos survey is carried out, and any identified asbestos is removed from site prior to any other works commencing, the pathway is blocked and the risk is negligible.
Ground Gases	Inhalation & explosion	High	The gas risks should be known by the time development works commence. Measure required, if necessary, may include no smoking and measures to ventilate confined spaces.

- 7.16 Provision of all the above measures will ensure that all the identified pathways for the contamination will be blocked.
- 7.17 A Method Statement for the Assessment of Imported Soils is included in Appendix E.

8.0 GEOTECHNICAL TESTING

- 8.1 Selected samples of the natural strata were delivered to PSL in Doncaster for testing with regard to plasticity indices and moisture content. Test certificates are presented in Appendix C and a summary of the results, including Modified Plasticity Indices, is given below.

Location	Depth (m)	MC	LL	PL	PI	<425µm	I'p
WS2 D2	2.0-2.5	15	33	16	17	96	16
WS4 D2	0.5-1.0	16	35	17	18	97	17
WS6 D2	1.0-1.5	13	31	16	15	96	14
WS8 D2	1.0-1.5	14	33	16	17	95	16
WS11 D2	0.5-1.0	18	31	16	15	96	14
	No. of results	5	5	5	5	5	5
	Min.	13	31	16	15	95	14
	Max.	18	35	17	18	97	17

I'p	VCP
>40%	High
20% - <40%	Medium
10% - <20%	Low

MC= Moisture Content (%) LL= Liquid Limit (%) PL= Plastic Limit (%)
 PI= Plasticity Index (%) I'p= Modified PI (%) VCP= NHBC Standard Chapter 4.2 Volume Change Potential

- 8.2 The plasticity test data shows clays of low to intermediate plasticity, in accordance with BS 5930:2015 +A1:2020 "Code of Practice for Site Investigations". When the percentage retained on the 425 micron BS sieve is considered, the Modified Plasticity Index, in accordance with NHBC Standard Chapter 4.2 "Building Near Trees" is a maximum of 17. In accordance with the Standard, this equates to Low Volume Change Potential.
- 8.3 Geochemical testing (water soluble sulphate and pH) was undertaken on selected samples by Eurofins Chemtest, comprising five samples of natural strata and twelve samples of made

ground. In accordance with the BRE Special Digest 1 "Concrete in aggressive ground", the characteristic values for the two materials are given below:

Characteristic Values

Material	pH	SO₄
Made Ground	8.0	40
Natural Strata	7.0	10

SO₄ = Sulphate content in mg/l on a 2:1 water : soil extract pH = Acidity

- 8.4 The geochemical analyses show both the natural strata and made ground to have low water soluble sulphate content and near neutral pH. The Aggressive Chemical Environment for Concrete (ACEC) class is AC-1. Therefore, the use of GEN1 designated concrete will be satisfactory for unreinforced buried concrete, in accordance with BS 8500-1:2015+A2:2019. For any reinforced buried concrete, other design-specific mixes will apply.

9.0 GEOTECHNICAL ASSESSMENT

Coal Mining and Coal Recovery

- 9.1 The Coal Mining Report indicates that there is the possibility of unrecorded shallow workings. An intrusive coal mining investigation is proposed to be undertaken shortly and will be reported separately on completion.
- 9.2 There are two mine entries present within the central-western part of the site. The northern mine entry (350405-002) is documented to be an adit and the associated adit tunnel is documented to extend into the northeast of the site. The southern mine entry (350405-003) is a shaft recorded as being treated in 1973. Construction of buildings on or close to the mine entries is to be avoided.
- 9.3 There is a slight theoretical risk of unrecorded mine entries. If any suspect features are identified during development works, then a geotechnical engineer should be contacted for advice.
- 9.4 Shaft “003” was located using an excavator during the wider site investigation, and was proven to have been fitted with a concrete shaft cap. It was not feasible at the time of the investigation to fully expose the cap to measure its size. It is recommended that, during development works, the shaft cap is exposed, its dimensions recorded, and the concrete cored to determine the thickness and the specification of treatment provided. An attempt will be made during the forthcoming rotary drilling to locate the line of the adit “002”, the opening of which is recorded as being below the existing school building.
- 9.5 There is unlikely to be any significant arisings of coal during proposed development works, and it will not be possible to win any coal from the site before development.

Foundations

- 9.6 The made ground on the site is not considered suitable for support of foundation loads and, as such, foundations should be taken to the underlying natural superficial glacial clays of at least firm consistency, using strip or trench fill foundations. An allowable bearing pressure of 100kN/m² is considered applicable. In TP14, the clays were noted to be very soft to a depth of 1.4m. Foundations should be taken below any such soft zones.
- 9.7 Made ground generally did not exceed 2.1m depth. An exception was WS7, in the vicinity of the mine shaft, where made ground was present to a depth of 3.5m. Developing on or near mine shafts requires specific attention.
- 9.8 If any development is to occur near a mine shaft, alternative founding solutions will be required. The specific solution will need to be designed by a Structural Engineer; however, we present the following considerations. Raft foundations would require complete excavation and re-engineering of the made ground, which is likely to be uneconomic given the depth, and the largely cohesive materials may be subject to softening if poor weather occurred during the works. Therefore, where deep made ground is encountered and associated with the mine shafts, piled foundations are likely to be the favoured solution. This is subject to the findings of the rotary coal mining investigation. A piling specialist should be contacted for advice and design. Boulders were identified to be present within the made ground, and should also be taken into account. It is noted that piles within the 45 degree founding wedge of a mine shaft cap or within 5m of a mine shaft should be founded at depths below the base of the shaft or located away from the shaft, with a bridging/spanning ground beam to account for this.
- 9.9 The clays were shown to be of Low Volume Change Potential. Therefore, in accordance with NHBC Standard Chapter 4.2 "Building Near Trees", in the absence of trees, a minimum foundation depth of 0.75m below existing or proposed ground level is applicable, whichever is the lower. However, in the presence of any proposed, existing or removed trees, the foundation may need to be deepened, depending on the type of tree and its distance from the face of the foundation. If not already available, a tree survey may be required to enable a

foundation schedule to be prepared. The tree survey will also need to consider trees on third party properties.

- 9.10 Although the material in WS7 appeared to comprise colliery spoil, the total potential sulphate content of this material was low (0.01%). Therefore, there is no indication of significant pyritic content or potential for pyritic heave (from expansion of pyrite from weathering). The colliery spoil was found to be localised to this area. However, in the unlikely event that any significant quantities are revealed in other areas of the site during development works, it would be prudent to contact the Engineer so that the material can be inspected, and samples taken for testing (if necessary) to confirm any heave potential.
- 9.11 The foundation should be taken below the depth of any existing foundations or obstructions, onto natural ground. The whole plan area of the foundation should be placed on similar natural material.
- 9.12 If bedrock is encountered on part of a foundation excavation (unlikely), the rest of the plot should be deepened to ensure founding on similar material. However, if rock is not encountered by 2.5m depth on the remainder of the plot, then the Engineer should be contacted for further advice.
- 9.13 If shallow coal mine workings are identified to be present following the intrusive coal mining investigation, which require drilling and grouting, the foundations will need to be 300mm thick and reinforced with two layers of B503 mesh – one near the bottom and one near the top.

Excavations

- 9.14 It is likely that excavations into the natural strata will remain stable in the short term, requiring minimal trench support, in accordance with the prevailing statutory guidance. However, instability may be anticipated within the made ground. Excavations within the

natural sands may be unstable at times of elevated water table, although this was not evident at the time of the investigation.

- 9.15 Slight groundwater seepages were recorded in TP9, at 4.5m depth. Groundwater was not encountered in any of the other investigation positions. Any encounters from the clays should be controllable by pumping from an artificial sump, but may be more problematic if ingressing from sands, in which case instability and “running sands” may occur. Excavation should be halted if this occurs, and well point dewatering employed before continuing.
- 9.16 Excavations should be readily achieved using conventional hydraulic plant. However, excavations into intact bedrock (unlikely) or any buried foundations and structures are likely to require a hydraulic breaker.

Chemical Precautions

- 9.17 The Aggressive Chemical Environment for Concrete (ACEC) class is AC-1 for both the natural strata and made ground. Therefore, the use of GEN1 designated concrete will be satisfactory for unreinforced buried concrete, in accordance with BS 8500-1:2015+A2:2019. For reinforced buried concrete, other design-specific mixes will apply.

Road Pavement Construction

- 9.18 For areas of road pavement, including parking areas, the formation will be the natural clays. Based on the observed characteristics of the material, and the results of the plasticity testing a design California Bearing Ratio (CBR) value of 4% is considered applicable, below any obvious soft spots, and at equilibrium moisture content. If considered necessary, this should be confirmed by testing at proposed subgrade level before construction. Formation of roads on the existing made ground will not be acceptable. If shallow mine workings are found to be present, then these will need to be treated below the road area by means of injecting grout via a grid of boreholes.

- 9.19 Due to the depth of existing made ground in the centre west of the site, a formation for road pavement on natural strata may be impractical. There are a number of potential solutions for this situation, but either complete excavation of the made ground to natural strata, and placement of engineered fill to controlled specification, or partial excavation and replacement, with or without layers of geogrid, are likely to be the favoured options. The proposed measures will need to be agreed with stakeholders/regulators at the earliest stage.

Flooding and Soakaways

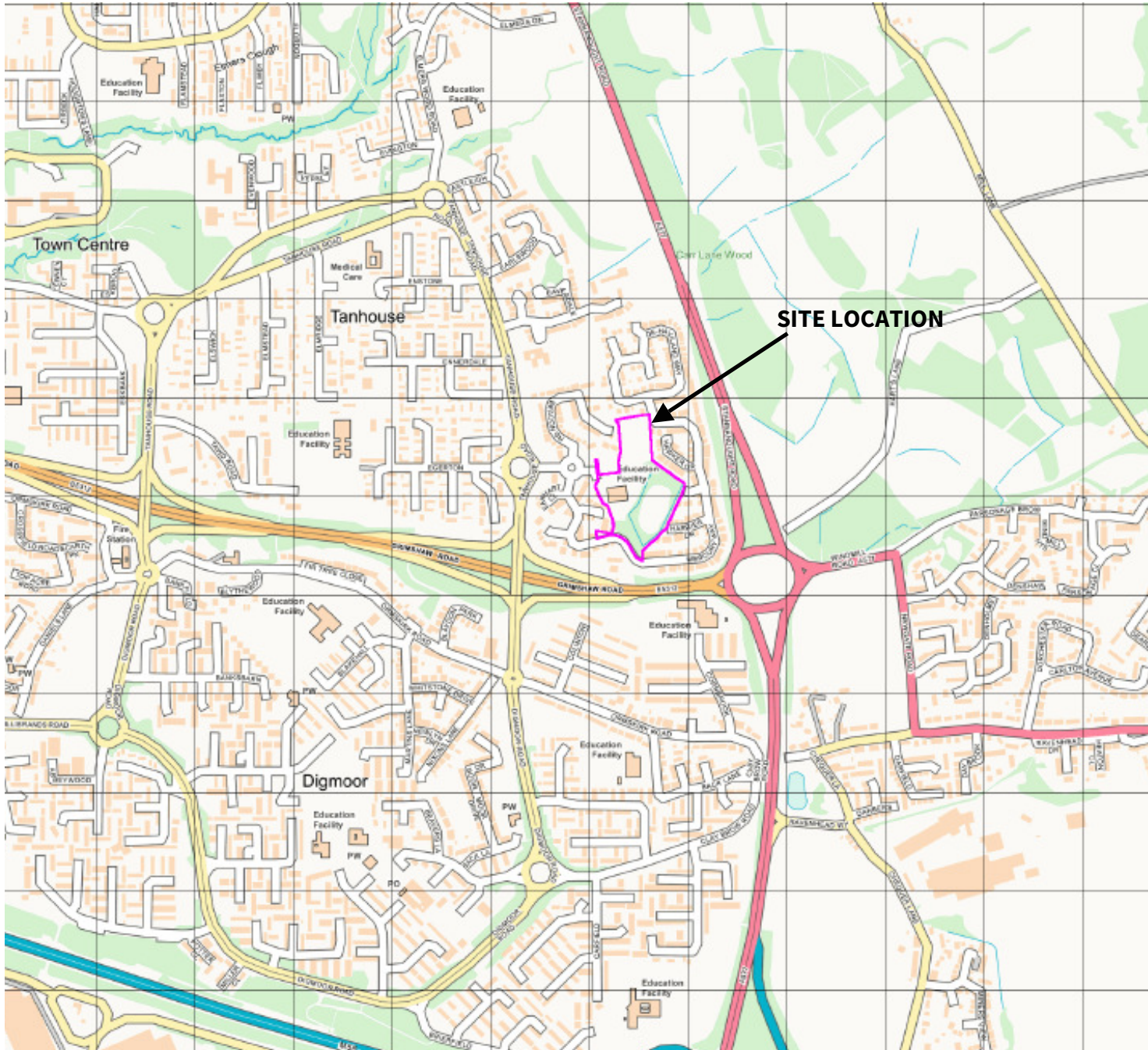
- 9.20 The site is not at risk from river flooding. The risks of flooding from other causes such as adverse topography or insufficient surface water drainage, are not considered here. If such risk needs to be quantified, a separate specialist Flood Risk and Drainage Report should be commissioned, if not already available.
- 9.21 BGS data indicates the general area has the “potential for groundwater flooding to occur at surface”.
- 9.22 The disposal of surface water using soakaways is not considered to be practical on the site.

Gas Protection

- 9.23 No radon protective measures are required for properties constructed on the site.
- 9.24 There are no landfills within 250m of the site. There is the possibility of shallow unrecorded mine workings and two mine entries present on the site. Gas monitoring is ongoing, and will be reported separately on completion.

APPENDIX A

SITE LOCATION PLAN, AERIAL PHOTOGRAPH AND PROPOSED LAYOUT



0m 400m

Approximate Scale

ARP
 ARP NORTH WEST LTD
 CHARTERED CONSULTING ENGINEERS
 2nd Floor · 3 Hardman Square · Manchester M3 3EB
 Telephone : 0113 245 8498 · E-Mail : manchester@arnorthwest.co.uk

Project HOPE HIGH SCHOOL SKELMERSDALE	
Client TAWD VALLEY DEVELOPMENTS LIMITED	
Title SITE LOCATION PLAN	
Date JANUARY 2020	
Drawn DMB	Scale AS SHOWN
Job No. NW134/01/02	



0m 100m

Approximate Scale



2nd Floor · 3 Hardman Square · Manchester M3 3EB
Telephone : 0113 245 8498 · E-Mail : manchester@arnorthwest.co.uk

Project HOPE HIGH SCHOOL SKELMERSDALE	
Client TAWD VALLEY DEVELOPMENTS LIMITED	
Title AERIAL PHOTOGRAPH	
Date JANUARY 2020	
Drawn DMB	Scale AS SHOWN
Job No. NW134/01/02	



SCHEDULE OF ACCOMMODATION

2B4P - 79 m2	10.No
3B5P - Standard - 93 m2	28.No
3B5P - Gable Fronted - 93 m2	4.No
4B6P - Detached - 106 m2	10.No
4B6P - Semi - 106 m2	2.No

TOTAL OF 54 UNITS

NOTE:

All house types are designed to 100% NDSS

Car parking allocations to suit WLBC Planing policy and LCC guidance. 200 % for 2 and 3 beds, 300% for 4 beds.



APPENDIX B

BOREHOLE AND TRIAL PIT LOCATION PLAN AND LOGS



0m Approximate Scale 90m

Key

- Trial Pit
- Windowless Sample Borehole
- Windowless Sample Borehole and Gas Well Installation



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 Telephone : 0113 245 8498 · E-Mail : manchester@arnorthwest.co.uk

Project
HOPE HIGH SCHOOL
SKELMERSDALE

Client
TAWD VALLEY
DEVELOPMENTS LIMITED

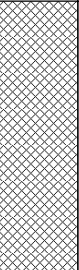
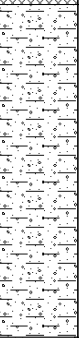
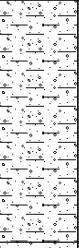
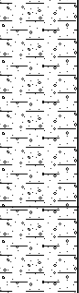
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SITE INVESTIGATION PLAN

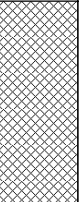
Date
OCTOBER 2021

Drawn DMB	Scale AS SHOWN
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Job No.
NW134/01/02

 ARP Geotechnical Limited				Trial Pit Log				TrialPit No HP1 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 05/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 0.30 m		Machine Type: Shovel.	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.30	ES		0.30			Dark brown clayey gravelly sandy TOPSOIL.			
						End of Pit at 0.300m			
						1 2 3 4 5			
Groundwater: No groundwater encountered. Backfill: Backfilled with arisings on completion. Stability: Sides stable throughout. Remarks:									
RrTP_v1.053									

 ARP Geotechnical Limited				Trial Pit Log				TrialPit No TP1 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 04/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 3.80 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.30	ES		0.90			MADE GROUND: Brown slightly clayey sandy fine to coarse angular gravel with a low rounded cobble and boulder content of mixed lithology. Gravel is of mixed lithology, brick, plastic and fabric.			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Firm grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Firm grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			2.00						
			2.80						
			3.50						
			3.80						
						End of Pit at 3.800m Target depth achieved.			
Groundwater: No groundwater encountered. Backfill: Backfilled with arisings on completion. Stability: Slight instability within made ground. Remarks:									

 ARP Geotechnical Limited				Trial Pit Log				TrialPit No TP2 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 04/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 3.80 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.20 - 0.40	ES		0.70			MADE GROUND: Brown sandy very clayey fine to coarse angular gravel of mixed lithology, brick and plastic.			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Firm grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						End of Pit at 3.800m Target depth achieved.			
			3.80						

Groundwater: No groundwater encountered.

Backfill: Backfilled with arisings on completion.

Stability: Slight instability within made ground.

Remarks:

1

2

3

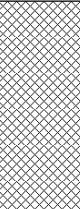
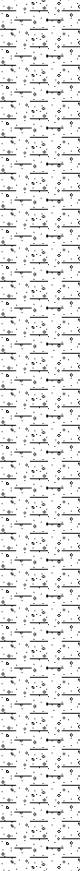
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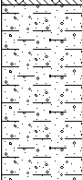
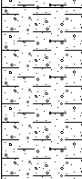
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Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 04/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 3.90 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.40	ES					MADE GROUND: Brown slightly sandy gravelly clay. Gravel is fine to coarse angular of mixed lithology, brick, concrete and ceramic.			
			0.60			Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			1.70			Firm brown slightly gravelly sandy CLAY. [GLACIAL TILL/BOULDER CLAY]			
			2.60			Soft grey slightly silty slightly gravelly sandy CLAY. gravel is fine to medium subangular of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			3.80 3.90			Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						End of Pit at 3.900m Target depth achieved.			
Groundwater: No groundwater encountered.									
Backfill: Backfilled with arisings on completion.									
Stability: Slight instability within made ground.									
Remarks:									

 ARP Geotechnical Limited				Trial Pit Log				TrialPit No TP4 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 04/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 3.80 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.30	ES					MADE GROUND: Dark grey slightly sandy gravelly clay. Gravel is fine to coarse angular of mixed lithology, brick and plastic.			
			1.10			Firm grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			1.70			Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			3.80			End of Pit at 3.800m Target depth achieved.			
Groundwater: No groundwater encountered. Backfill: Backfilled with arisings on completion. Stability: Slight instability within made ground. Remarks:									

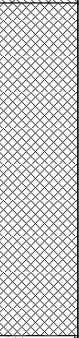
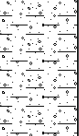
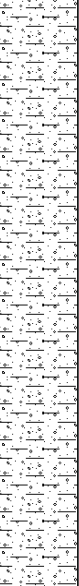
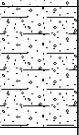
 ARP Geotechnical Limited				Trial Pit Log				TrialPit No TP5 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 04/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 3.80 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.40	ES		0.70			MADE GROUND: Dark grey slightly sandy gravelly clay. Gravel is fine to coarse angular of mixed lithology, brick and plastic.			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Dark grey MUDSTONE recovered as angular to tabular gravel and cobbles			
			3.60						
			3.80			End of Pit at 3.800m Target depth achieved.			
Groundwater: No groundwater encountered. 1 Backfill: Backfilled with arisings on completion. 2 Stability: Slight instability within made ground. 3 Remarks: 4 RrTP_v1.053 5									

Date
04/10/2021

Logged:
DMB

Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
Depth	Type	Results				
0.00 - 0.30	ES		0.30			Dark brown clayey gravelly sandy TOPSOIL.
						Grey slightly sandy gravelly CLAY. Gravel is fine to medium subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]
						Firm reddish brown slightly sandy gravelly CLAY with occasional rounded cobbles and boulders of mixed lithology. Gravel is fine to coarse subangular to subrounded of mixed lithology. Boulders up to 0.4m x 0.3m. [GLACIAL TILL/BOULDER CLAY]
			3.00			End of Pit at 3.000m Target depth achieved.

RrTP_v1.053

				Trial Pit Log				TrialPit No TP7 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 04/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 4.50 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.30	ES		0.30			Dark brown clayey gravelly sandy TOPSOIL.			
						MADE GROUND: Dark grey slightly sandy gravelly clay. Gravel is fine to coarse angular of mixed lithology, brick and plastic.			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Firm grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			4.10			Brown clayey gravelly SAND. Gravel is fine to medium rounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			4.50			End of Pit at 4.500m Target depth achieved.			
Groundwater: No groundwater encountered. Backfill: Backfilled with arisings on completion. Stability: Slight instability within made ground. Remarks:									

 ARP Geotechnical Limited				Trial Pit Log				TrialPit No TP8 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 04/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 3.60 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.30	ES		0.30			Dark brown clayey gravelly sandy TOPSOIL.			
						Brown slightly sandy gravelly CLAY. Gravel is fine to coarse subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						End of Pit at 3.600m Target depth achieved.			
			3.60						

Groundwater: No groundwater encountered.

Backfill: Backfilled with arisings on completion.

Stability: Sides remained stable throughout.

Remarks:

1

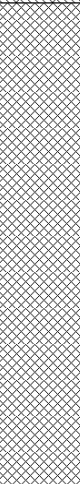
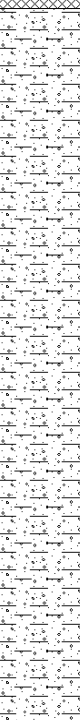
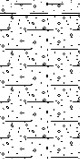
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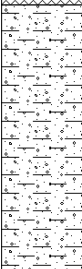
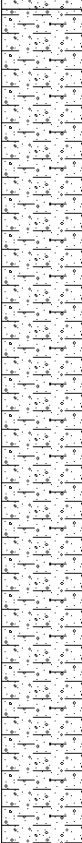
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RrTP_v1.053

 ARP Geotechnical Limited				Trial Pit Log				TrialPit No TP9 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 04/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 5.00 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.40 - 0.60	ES		0.30			Dark brown clayey gravelly sandy TOPSOIL.			
			1.90			MADE GROUND: Dark grey gravelly clay with a low to medium cobble and boulder content. Gravel, cobbles and boulders are fine to coarse angular of mixed lithology, brick and concrete. Boulders up to 0.5m x 0.3m.			
			2.10			MADE GROUND: Grey clayey sandy fine to coarse angular gravel of mudstone, mixed lithology and brick.			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			4.50			Dull brown slightly gravelly silty clayey SAND. [GLACIAL TILL/BOULDER CLAY]			
			5.00			End of Pit at 5.000m Target depth achieved.			
Groundwater: Slight groundwater ingress from 4.5m. Backfill: Backfilled with arisings on completion. Stability: Slight instability within made ground. Remarks:									

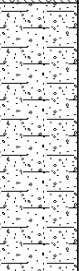
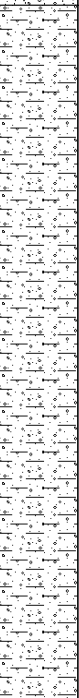
Date
05/10/2021

Logged:
DMB

Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
Depth	Type	Results					
0.00 - 0.30	ES		0.30			MADE GROUND: Dark brown slightly sandy slightly gravelly clayey topsoil.	1
						Firm light brown/grey slightly gravelly sandy CLAY. [GLACIAL TILL/BOULDER CLAY]	
			1.20			Firm reddish brown slightly sandy gravelly CLAY with a low rounded cobble content of mixed lithology. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	2
			4.00			End of Pit at 4.000m Target depth achieved.	4
							5

Remarks:

				Trial Pit Log				TrialPit No TP11 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 05/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 3.50 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.30	ES		0.30			Dark brown slightly sandy slightly gravelly clayey TOPSOIL			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Brown clayey gravelly SAND. Gravel is fine to coarse subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Brown clayey very gravelly SAND. Gravel is fine to coarse subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			3.50			End of Pit at 3.500m Target depth achieved.			
Groundwater: No groundwater encountered. Backfill: Backfilled with arisings on completion. Stability: Sides remained stable throughout. Remarks:									

				Trial Pit Log				TrialPit No TP12 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 05/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 3.50 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.30	ES		0.30			Dark brown slightly sandy slightly gravelly clayey TOPSOIL			
			1.20			Light brown clayey gravelly SAND. Gravel is fine to medium subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			3.50			Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						End of Pit at 3.500m Target depth achieved.			
Groundwater: No groundwater encountered. Backfill: Backfilled with arisings on completion. Stability: Sides remained stable throughout. Remarks:									

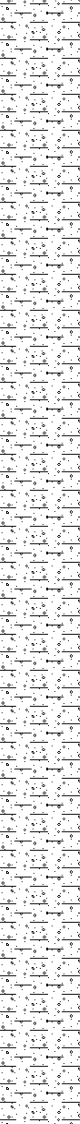
 ARP Geotechnical Limited				Trial Pit Log				TrialPit No TP13 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 05/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 4.00 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.30	ES		0.30			Dark brown slightly sandy slightly gravelly clayey TOPSOIL			
						Firm light brown slightly sandy gravelly CLAY. [GLACIAL TILL/BOULDER CLAY]			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
4.00					End of Pit at 4.000m Target depth achieved.				

Groundwater: No groundwater encountered.
Backfill: Backfilled with arisings on completion.
Stability: Sides remained stable throughout.

Remarks:

RrTP_v1.053

				Trial Pit Log				TrialPit No TP14 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 05/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 4.10 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.30	ES		0.30			Dark brown slightly sandy slightly gravelly clayey TOPSOIL			
						Very soft reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Firm grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
						Light brown clayey gravelly SAND. gravel is fine to medium subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			4.10			End of Pit at 4.100m Target depth achieved.			
Groundwater: No groundwater encountered. Backfill: Backfilled with arisings on completion. Stability: Severe collapse in upper 1m. Remaining sides stable. Remarks:									

				Trial Pit Log				TrialPit No TP15 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: - Level:		Date 05/10/2021	
Location: Former Hope High School, Skelmersdale						Pit Dimensions (m) Length: m Width: m Depth: 4.10 m		Machine Type: 8ton Tracked Excavator	
Client: Tawd Valley Developments Ltd								Scale 1:25 Logged: DMB	
Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
Depth	Type	Results							
0.00 - 0.30	ES		0.30			Dark brown slightly sandy slightly gravelly clayey TOPSOIL			
						Firm to stiff reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]			
			4.10			End of Pit at 4.100m Target depth achieved.			
Groundwater: No groundwater encountered. Backfill: Backfilled with arisings on completion. Stability: Sides remained stable throughout. Remarks:									



ARP Geotechnical
Limited

Windowless Sample Log

Borehole No.

WS1

Sheet 1 of 1

Project Name: Former Hope High School, Skelmersdale

Project No.
NW134/01/02

Co-ords: -

Date
04/10/2021

Location: Former Hope High School, Skelmersdale

Level:

Scale
1:40

Client: Tawd Valley Developments Ltd

Rig Crew: RP Drilling Ltd

Logged:
DMB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.30	ES		0.40			MADE GROUND: Brown slightly sandy slightly gravelly clay. Gravel is fine to medium angular of mixed lithology and brick.	
		1.00	SPT	N=6 (0,0/0,1,2,3)	1.00			Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	1
					1.20		NO RECOVERY	No recovery	
					1.50			Soft (low strength) grey silty sandy CLAY. [GLACIAL TILL/BOULDER CLAY]	
		2.00	SPT	N=15 (3,3/4,3,4,4)				Firm (medium strength) to stiff (high strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	2
		3.00	SPT	N=15 (3,3/3,3,4,5)					3
		4.00	SPT	N=21 (3,3/4,5,5,7)					4
		5.00	SPT	N=46 (11,10/11,11,12,12)					5
					5.45			End of Borehole at 5.450m Maximum depth achieved.	
									6
									7
									8

Groundwater: Cores dry throughout.

Backfill: Backfilled with arisings on completion.

Remarks:



ARP Geotechnical
Limited

Windowless Sample Log

Borehole No.

WS2

Sheet 1 of 1

Project Name: Former Hope High School, Skelmersdale

Project No.
NW134/01/02

Co-ords: -

Date
04/10/2021

Location: Former Hope High School, Skelmersdale

Level:

Scale
1:40

Client: Tawd Valley Developments Ltd

Rig Crew: RP Drilling Ltd

Logged:
DMB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.30	ES		0.30			Dark brown slightly sandy slightly gravelly clayey TOPSOIL	
		1.00	SPT	N=8 (2,2/1,2,2,3)	1.50			Firm (medium strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	1
		2.00	SPT	N=13 (2,2/3,3,3,4)	1.80			Firm grey sandy CLAY.	
		3.00	SPT	N=15 (3,3/3,4,4,4)				Firm (medium strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	2
		4.00	SPT	N=50 (4,6/50 for 265mm)	4.42				3
									4
									5
									6
									7
									8
								End of Borehole at 4.415m SPT refusal	

Groundwater: Cores dry throughout.

Backfill: Gas well installation to 3m depth. Upper 1m comprising plain pipe with bentonite seal and from 1m to 3m comprising slotted pipe and gravel surround. Valve and flush cover provided.

Remarks:



ARP Geotechnical
Limited

Windowless Sample Log

Borehole No.

WS3

Sheet 1 of 1

Project Name: Former Hope High School, Skelmersdale

Project No.
NW134/01/02

Co-ords: -

Date
04/10/2021

Location: Former Hope High School, Skelmersdale

Level:

Scale
1:40

Client: Tawd Valley Developments Ltd

Rig Crew: RP Drilling Ltd

Logged:
DMB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			MADE GROUND: Tarmac	
		0.30 - 0.50	ES		0.40			MADE GROUND: Grey clayey sandy fine to coarse angular gravel of mixed lithology.	
								Firm grey sandy CLAY. [GLACIAL TILL/BOULDER CLAY]	
		1.00	SPT	N=12 (3,2/2,3,3,4)	1.00			Firm (medium strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	1
		2.00	SPT	N=15 (2,3/3,3,4,5)					2
		3.00	SPT	N=29 (7,9/7,7,8,7)	3.00				3
					3.30			Medium dense brown clayey gravelly SAND. Gravel is fine to medium subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	
		4.00	SPT	50 (7,9/50 for 135mm)				Stiff (high strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	4
					4.29			End of Borehole at 4.285m SPT refusal	
									5
									6
									7
									8

Groundwater: Cores dry throughout.

Backfill: Gas well installation to 3m depth. Upper 1m comprising plain pipe with bentonite seal and from 1m to 3m comprising slotted pipe and gravel surround. Valve and flush cover provided.

Remarks:



ARP Geotechnical
Limited

Windowless Sample Log

Borehole No.

WS4

Sheet 1 of 1

Project Name: Former Hope High School, Skelmersdale

Project No.
NW134/01/02

Co-ords: -

Date
04/10/2021

Location: Former Hope High School, Skelmersdale

Level:

Scale
1:40

Client: Tawd Valley Developments Ltd

Rig Crew: RP Drilling Ltd

Logged:
DMB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.40	ES		0.10			MADE GROUND: Tarmac	
		0.50 - 1.00	D		0.40			MADE GROUND: Brown clayey sandy fine to coarse angular gravel of mixed lithology and tarmac fragments.	
		1.00	SPT	N=11 (2,2/2,2,3,4)	1.00			Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology.	1
					1.30		NO RECOVERY NO	[GLACIAL TILL/BOULDER CLAY]	
								No recovery.	
		2.00	SPT	N=14 (3,3/3,3,4,4)				Firm (medium strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology.	2
								[GLACIAL TILL/BOULDER CLAY]	
		3.00	SPT	N=17 (2,3/4,4,4,5)					3
		4.00	SPT	50 (8,9/50 for 220mm)	3.90			Dense brown clayey gravelly SAND. Gravel is fine to medium subrounded of mixed lithology.	4
					4.37			[GLACIAL TILL/BOULDER CLAY]	
								End of Borehole at 4.370m SPT refusal	5
									6
									7
									8

Groundwater: Cores dry throughout.

Backfill: Backfilled with arisings on completion.

Remarks:



ARP Geotechnical
Limited

Windowless Sample Log

Borehole No.

WS5

Sheet 1 of 1

Project Name: Former Hope High School, Skelmersdale

Project No.
NW134/01/02

Co-ords: -

Date
04/10/2021

Location: Former Hope High School, Skelmersdale

Level:

Scale
1:40

Client: Tawd Valley Developments Ltd

Rig Crew: RP Drilling Ltd

Logged:
DMB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10			MADE GROUND: Tarmac	
		0.30 - 0.50	ES		0.60			MADE GROUND: Brown slightly sandy gravelly clay. Gravel is fine to coarse angular of mixed lithology.	
		1.00	SPT	N=8 (2,1/1,2,2,3)	1.00			Firm grey sandy CLAY. [GLACIAL TILL/BOULDER CLAY]	1
					1.40		NO RECOVERY	No recovery	
					1.60		NO RECOVERY	Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	
		2.00	SPT	N=16 (3,3/3,4,4,5)	2.00		NO RECOVERY	No recovery.	2
								Stiff (high strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	
		3.00	SPT	N=50 (7,8/50 for 275mm)	3.43				3
								End of Borehole at 3.425m SPT refusal	4
									5
									6
									7
									8

Groundwater: Cores dry throughout.

Backfill: Backfilled with arisings on completion.

Remarks:

 ARP Geotechnical Limited					Windowless Sample Log			Borehole No. WS6 Sheet 1 of 1		
Project Name: Former Hope High School, Skelmersdale					Project No. NW134/01/02		Co-ords: -		Date 04/10/2021	
Location: Former Hope High School, Skelmersdale					Level:			Scale 1:40		
Client: Tawd Valley Developments Ltd					Rig Crew: RP Drilling Ltd			Logged: DMB		

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 - 0.50	ES		0.10		MADE GROUND: Tarmac		
		1.00 - 1.50 1.00	D SPT	N=8 (2,1/2,2,2,2)	0.60		MADE GROUND: Grey clayey sandy fine to coarse gravel of mixed lithology.	1	
		2.00	SPT	N=18 (3,2/3,4,5,6)			Firm (medium strength) to stiff (high strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	2	
		3.00	SPT	N=34 (6,7/7,10,8,9)				3	
		4.00	SPT	50 (7,9/50 for 220mm)	4.37			4	
End of Borehole at 4.370m SPT refusal								5	
								6	
								7	
								8	

Groundwater: Cores dry throughout.
 Backfill: Backfilled with arisings on completion.
 Remarks:

RrWS_v1.054



ARP Geotechnical Limited

Windowless Sample Log

Borehole No.

WS7

Sheet 1 of 1

Project Name:

Former Hope High School, Skelmersdale

Project No.

NW134/01/02

Co-ords:

-

Date

05/10/2021

Location:

Former Hope High School, Skelmersdale

Level:

Scale

1:40

Client:

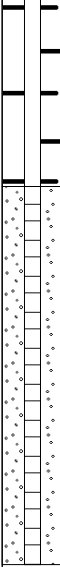
Tawd Valley Developments Ltd

Rig Crew:

RP Drilling Ltd

Logged:

DMB

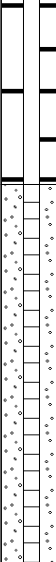
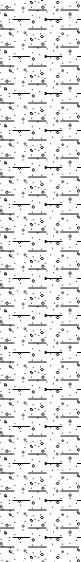
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.15		MADE GROUND: Tarmac.		
		0.50 - 0.60	ES		0.50		MADE GROUND: Light brown clayey sandy fine to coarse angular gravel of limestone and mixed lithology.		
		1.00	SPT	N=9 (3,1/2,2,2,3)			MADE GROUND: Dark grey clayey sandy fine to coarse angular gravel of mudstone. (Possibly Colliery Spoil)	1	
		2.00	SPT	N=3 (1,1/1,0,1,1)	2.00		No recovery.	2	
					2.50				
		3.00	SPT	N=9 (2,1/2,2,2,3)			MADE GROUND: Dark grey clayey sandy fine to coarse angular gravel of mudstone. (Possibly Colliery Spoil)	3	
					3.50				
		4.00	SPT	N=16 (4,3/3,4,4,5)			Stiff (high strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	4	
		4.80	SPT	50 (25 for 60mm/50 for 105mm)	4.80				
					4.97		Dark grey MUDSTONE.	5	
						End of Borehole at 4.965m SPT refusal			
								6	
								7	
								8	

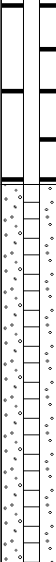
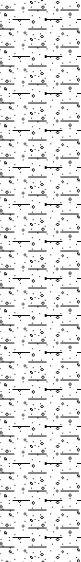
Groundwater: Cores dry throughout.

Backfill: Gas well installation to 3m depth. Upper 1m comprising plain pipe with bentonite seal and from 1m to 3m comprising slotted pipe and gravel surround. Valve and flush cover provided.

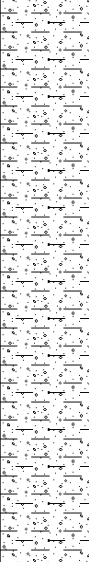
Remarks:

RrWS_v1.054

 ARP Geotechnical Limited				Windowless Sample Log				Borehole No. WS8 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: -		Date 05/10/2021	
Location: Former Hope High School, Skelmersdale						Level:		Scale 1:40	
Client: Tawd Valley Developments Ltd						Rig Crew: RP Drilling Ltd		Logged: DMB	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.30	ES		0.30		 Dark brown slightly sandy slightly gravelly clayey TOPSOIL		
		1.00 - 1.50	D				 Stiff (high strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	1	
	1.00	SPT	N=21 (4,4/5,5,5,6)			2			
	2.00	SPT	N=15 (4,4/4,4,3,4)			3			
		3.00	SPT	50 (8,11/50 for 210mm)	3.36		End of Borehole at 3.360m SPT refusal	4	
								5	
								6	
								7	
								8	
Groundwater: Cores dry throughout. Backfill: Gas well installation to 3m depth. Upper 1m comprising plain pipe with bentonite seal and from 1m to 3m comprising slotted pipe and gravel surround. Valve and flush cover provided. Remarks:									

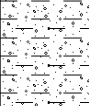
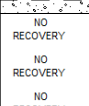
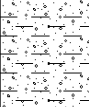
 ARP Geotechnical Limited				Windowless Sample Log				Borehole No. WS9 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: -		Date 05/10/2021	
Location: Former Hope High School, Skelmersdale						Level:		Scale 1:40	
Client: Tawd Valley Developments Ltd						Rig Crew: RP Drilling Ltd		Logged: DMB	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30			Dark brown slightly sandy slightly gravelly clayey TOPSOIL	
		1.00	SPT	N=14 (3,3/3,3,4,4)				Firm (medium strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	1
		2.00	SPT	N=16 (4,4/4,3,4,5)					2
		3.00	SPT	50 (11,12/50 for 225mm)					3
					3.38			End of Borehole at 3.375m SPT refusal	4
									5
									6
									7
									8
Groundwater: Cores dry throughout. Backfill: Gas well installation to 3m depth. Upper 1m comprising plain pipe with bentonite seal and from 1m to 3m comprising slotted pipe and gravel surround. Valve and flush cover provided. Remarks:									

 ARP Geotechnical Limited				Windowless Sample Log			Borehole No. WS10 Sheet 1 of 1		
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: -		Date 05/10/2021	
Location: Former Hope High School, Skelmersdale						Level:		Scale 1:40	
Client: Tawd Valley Developments Ltd						Rig Crew: RP Drilling Ltd		Logged: DMB	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30		 Dark brown slightly sandy slightly gravelly clayey TOPSOIL		
		1.00	SPT	N=14 (3,3/3,3,4,4)			 Firm (medium strength) to stiff (high strength) reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	1	
		2.00	SPT	N=17 (2,3/4,4,4,5)				2	
		3.00	SPT	50 (11,13/50 for 210mm)	3.36			3	
							End of Borehole at 3.360m SPT refusal	4	
								5	
								6	
								7	
								8	

Groundwater: Cores dry throughout.
 Backfill: Backfilled with arisings on completion.
 Remarks:

RrWS_v1.054

 ARP Geotechnical Limited				Windowless Sample Log				Borehole No. WS11 Sheet 1 of 1	
Project Name: Former Hope High School, Skelmersdale				Project No. NW134/01/02		Co-ords: -		Date 05/10/2021	
Location: Former Hope High School, Skelmersdale						Level:		Scale 1:40	
Client: Tawd Valley Developments Ltd						Rig Crew: RP Drilling Ltd		Logged: DMB	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.20	ES					Dark brown slightly sandy slightly gravelly clayey TOPSOIL	
		0.50 - 1.00	D		0.30			Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	
		1.00	SPT	N=12 (2,2/2,3,3,4)	1.00			No recovery	1
		2.00	SPT	N=50 (4,4/50 for 275mm)	1.50			Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of mixed lithology. [GLACIAL TILL/BOULDER CLAY]	2
					2.43			End of Borehole at 2.425m SPT refusal	
									3
									4
									5
									6
									7
									8
Groundwater: Cores dry throughout. Backfill: Backfilled with arisings on completion. Remarks:									

APPENDIX C

LABORATORY TEST CERTIFICATES AND SCREENING VALUES



ARP GEOTECHNICAL LIMITED
SOIL CONTAMINANT SCREENING VALUES
RESIDENTIAL WITH HOME-GROWN PRODUCE

Determinand	S4UL (mg/kg)			C4SL (mg/kg)		
Arsenic	37			37		
Cadmium	11			22		
Chromium (trivalent)	910					
Chromium (hexavalent)	6			21		
Copper	2400					
Lead				200		
Inorganic Mercury	40					
Nickel	180					
Selenium	250					
Zinc	3700					
Acidity (pH)	*Should be Greater Than 5			*Should be Greater Than 5		
	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM
Naphthalene	2.3	5.6	13			
Acenaphthylene	170	420	920			
Acenaphthene	210	510	1,100			
Fluorene	170	400	860			
Phenanthrene	95	220	440			
Anthracene	2,400	5,400	11,000			
Fluoranthene	280	560	890			
Pyrene	620	1,200	2,000			
Benzo(a)anthracene	7.2	11	13			
Chrysene	15	22	27			
Benzo(b)fluoranthene	2.6	3.3	3.7			
Benzo(k)fluoranthene	77	93	100			
Benzo(a)pyrene	2.2	2.7	3			5
Indeno(1,2,3-cd)pyrene	27	36	41			
Dibenzo(a,h)anthracene	0.24	0.28	0.30			
Benzo(g,h,i)perylene	320	340	350			
Phenols	120	200	380			
Total TPH	*Above 500, speciate and compare with values below:					
C5 to C6 Aliphatic	42	78	160			
C6 to C8 Aliphatic	100	230	530			
C8 to C10 Aliphatic	27	65	150			
C10 to C12 Aliphatic	130	330	760			
C12 to C16 Aliphatic	1100	2,400	4,300			
C16 to C35 Aliphatic	65,000	92,000	110,000			
C35 TO C44 Aliphatic	65,000	92,000	110,000			
C5 to C7 Aromatic (Benzene)	70	140	300			
C7 to C8 Aromatic (Toluene)	130	290	660			
C8 to C10 Aromatic	34	83	190			
C10 to C12 Aromatic	74	180	380			
C12 to C16 Aromatic	140	330	660			
C16 to C21 Aromatic	260	540	930			
C21 TO C35 Aromatic	1100	1,500	1,700			
C35 TO C44 Aromatic	1100	1,500	1,700			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suitable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits.

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Final Report

Report No.: 21-34880-1
Initial Date of Issue: 13-Oct-2021
Client ARP Geotechnical Ltd
Client Address: 5/6 Northwest Business Park
Servia Hill
Leeds
Yorkshire
LS6 2QH
Contact(s): Dan Bennett
Project NW134/01/02 Former Hope High
School, Skelmersdale
Quotation No.: Q20-21438
Order No.: NW/134/01/02
No. of Samples: 30
Turnaround (Wkdays): 5
Date Approved: 13-Oct-2021

Date Received: 07-Oct-2021

Date Instructed: 07-Oct-2021

Results Due: 13-Oct-2021

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: NW134/01/02 Former Hope High School, Skelmersdale

Client: ARP Geotechnical Ltd	Chemtest Job No.:				21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880
Quotation No.: Q20-21438	Chemtest Sample ID.:				1293821	1293822	1293823	1293824	1293825	1293826	1293827	1293828	1293829
	Client Sample ID.:				TP1 D1	TP2 D1	TP3 D1	TP4 D1	TP5 D1	TP6 D1	TP7 D1	TP8 D1	TP9 D1
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.00	0.20	0.00	0.00	0.00	0.00	0.0	0.00	0.40
	Bottom Depth (m):				0.30	0.40	0.40	0.30	0.40	0.30	0.30	0.30	0.60
	Date Sampled:				04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	14	5.1	12	12	9.6	10	28	16	9.7
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones and Roots	Stones and Roots	Stones and Roots	Stones and Roots	Stones and Roots	Stones
Soil Texture	N	2040		N/A	Clay	Sand	Clay	Clay	Clay	Sand	Sand	Sand	Sand
pH	M	2010		4.0	8.2	8.1	8.6	8.5	9.1	9.1	8.8	8.7	8.8
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	0.054	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.027
Sulphate (Total)	M	2430	mg/kg	100	1600	< 100	220	270	190	400	900	600	1100
Arsenic	M	2450	mg/kg	1.0	8.7	4.9	9.9	12	7.1	6.3	11	12	9.5
Cadmium	M	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.11	0.14	< 0.10	0.26
Chromium	M	2450	mg/kg	1.0	22	12	27	31	23	9.1	22	22	15
Copper	M	2450	mg/kg	0.50	24	18	55	33	19	23	33	73	29
Mercury	M	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.15	0.12
Nickel	M	2450	mg/kg	0.50	22	13	25	27	24	11	22	22	17
Lead	M	2450	mg/kg	0.50	22	15	20	21	11	29	40	33	24
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	0.24
Zinc	M	2450	mg/kg	0.50	43	24	41	41	33	47	67	61	91
Chromium (Trivalent)	N	2490	mg/kg	1.0	22	12	27	31	23	9.1	22	22	15
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	1.3	2.6	1.7	1.7	2.4	4.6	6.0	3.9	4.7
Total TPH >C6-C40	M	2670	mg/kg	10	29	< 10	11	< 10	< 10	< 10	< 10	< 10	43
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.58	< 0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.13	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	0.72	0.19	< 0.10	1.2	< 0.10	< 0.10	0.32
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	0.89	0.25	< 0.10	1.2	< 0.10	< 0.10	0.43
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.0	< 0.10	< 0.10	0.54
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.4	< 0.10	< 0.10	0.76
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.40	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.21	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.67	< 0.10	< 0.10	< 0.10

Results - Soil

Project: NW134/01/02 Former Hope High School, Skelmersdale

Client: ARP Geotechnical Ltd	Chemtest Job No.:				21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880
Quotation No.: Q20-21438	Chemtest Sample ID.:				1293821	1293822	1293823	1293824	1293825	1293826	1293827	1293828	1293829
	Client Sample ID.:				TP1 D1	TP2 D1	TP3 D1	TP4 D1	TP5 D1	TP6 D1	TP7 D1	TP8 D1	TP9 D1
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.00	0.20	0.00	0.00	0.00	0.00	0.0	0.00	0.40
	Bottom Depth (m):				0.30	0.40	0.40	0.30	0.40	0.30	0.30	0.30	0.60
	Date Sampled:				04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	6.8	< 2.0	< 2.0	2.1
PCB 28	U	2815	mg/kg	0.010									
PCB 52	U	2815	mg/kg	0.010									
PCB 90+101	U	2815	mg/kg	0.010									
PCB 118	U	2815	mg/kg	0.010									
PCB 153	U	2815	mg/kg	0.010									
PCB 138	U	2815	mg/kg	0.010									
PCB 180	U	2815	mg/kg	0.010									
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10									
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: NW134/01/02 Former Hope High School, Skelmersdale

Client: ARP Geotechnical Ltd	Chemtest Job No.:				21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880
Quotation No.: Q20-21438	Chemtest Sample ID.:				1293830	1293831	1293832	1293833	1293834	1293835	1293836	1293837	1293838
	Client Sample ID.:				TP10 D1	TP11 D1	TP12 D1	TP13 D1	TP14 D1	TP15 D1	WS1 D1	WS2 D1	WS3 D1
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30
	Bottom Depth (m):				0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.50
	Date Sampled:				05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	14	13	39	31	17	25	14	14	4.0
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones and Roots	Stones and Roots	Stones and Roots	Stones and Roots	Stones and Roots	Stones and Roots	Stones and Roots	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand	Sand	Clay	Sand	Sand
pH	M	2010		4.0	8.2	8.6	8.7	7.9	7.8	8.6	7.9	8.6	8.7
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Sulphate (Total)	M	2430	mg/kg	100	460	340	880	740	680	480	610	450	280
Arsenic	M	2450	mg/kg	1.0	19	16	12	9.3	14	13	14	12	4.9
Cadmium	M	2450	mg/kg	0.10	0.14	0.12	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chromium	M	2450	mg/kg	1.0	27	24	20	18	30	26	34	30	7.3
Copper	M	2450	mg/kg	0.50	35	34	35	44	39	55	47	30	39
Mercury	M	2450	mg/kg	0.10	0.14	0.13	0.13	0.13	0.14	0.14	0.12	0.13	< 0.10
Nickel	M	2450	mg/kg	0.50	26	23	17	15	24	19	34	26	6.8
Lead	M	2450	mg/kg	0.50	36	38	30	24	34	27	33	27	10
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Zinc	M	2450	mg/kg	0.50	66	57	47	38	58	44	61	49	12
Chromium (Trivalent)	N	2490	mg/kg	1.0	27	24	20	18	30	26	34	30	7.3
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.40	2.6	2.4	5.3	5.4	3.4	2.6	3.0	2.6	1.4
Total TPH >C6-C40	M	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	0.18	0.68	< 0.10	< 0.10	0.51	< 0.10	0.47	< 0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	0.33	0.62	< 0.10	< 0.10	0.68	< 0.10	0.15	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.20	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.2	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: NW134/01/02 Former Hope High School, Skelmersdale

Client: ARP Geotechnical Ltd	Chemtest Job No.:				21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880
Quotation No.: Q20-21438	Chemtest Sample ID.:				1293830	1293831	1293832	1293833	1293834	1293835	1293836	1293837	1293838
	Client Sample ID.:				TP10 D1	TP11 D1	TP12 D1	TP13 D1	TP14 D1	TP15 D1	WS1 D1	WS2 D1	WS3 D1
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30
	Bottom Depth (m):				0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.50
	Date Sampled:				05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	04-Oct-2021	04-Oct-2021	04-Oct-2021
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD									
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	3.0	< 2.0	< 2.0
PCB 28	U	2815	mg/kg	0.010									
PCB 52	U	2815	mg/kg	0.010									
PCB 90+101	U	2815	mg/kg	0.010									
PCB 118	U	2815	mg/kg	0.010									
PCB 153	U	2815	mg/kg	0.010									
PCB 138	U	2815	mg/kg	0.010									
PCB 180	U	2815	mg/kg	0.010									
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10									
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: NW134/01/02 Former Hope High School, Skelmersdale

Client: ARP Geotechnical Ltd	Chemtest Job No.:				21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880
Quotation No.: Q20-21438	Chemtest Sample ID.:				1293839	1293840	1293841	1293842	1293843	1293844	1293845	1293846	1293847
	Client Sample ID.:				WS4 D1	WS5 D1	WS6 D1	WS7 D1	WS8 D1	WS11 D1	Substation 1	WS2 D2	WS4 D1
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.20	0.30	0.30	0.50	0.00	0.00	0.00	2.00	0.50
	Bottom Depth (m):				0.40	0.50	0.50	0.60	0.30	0.20	0.30	2.50	1.00
	Date Sampled:				04-Oct-2021	04-Oct-2021	04-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	04-Oct-2021	04-Oct-2021
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM		
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192		N/A	-	-	-	-	-	-	-		
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		
Moisture	N	2030	%	0.020	4.5	7.4	2.1	8.6	20	14	13	8.1	9.4
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones and Roots	Stones	None	None
Soil Texture	N	2040		N/A	Sand	Clay	Sand	Sand	Sand	Clay	Sand	Clay	Clay
pH	M	2010		4.0	8.4	8.4	8.5	8.4	8.3	8.3	8.3	8.3	8.4
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Sulphate (Total)	M	2430	mg/kg	100	430	690	< 100	1200	700	430	580		
Arsenic	M	2450	mg/kg	1.0	7.3	11	3.3	22	13	13	16		
Cadmium	M	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	1.1	0.14	< 0.10	0.22		
Chromium	M	2450	mg/kg	1.0	7.9	34	9.0	27	24	24	22		
Copper	M	2450	mg/kg	0.50	190	54	150	89	30	26	39		
Mercury	M	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.12	0.15	0.15	0.17		
Nickel	M	2450	mg/kg	0.50	11	36	12	40	20	20	20		
Lead	M	2450	mg/kg	0.50	33	15	13	100	33	27	53		
Selenium	M	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	0.37	< 0.20	< 0.20	< 0.20		
Zinc	M	2450	mg/kg	0.50	40	51	21	160	57	45	88		
Chromium (Trivalent)	N	2490	mg/kg	1.0	7.9	34	9.0	27	24	24	22		
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		
Organic Matter	M	2625	%	0.40	1.6	1.3	0.47	16	4.4	2.7	5.2		
Total TPH >C6-C40	M	2670	mg/kg	10	< 10	< 10	140	< 10	240	19	< 10		
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1.7		
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	2.2		
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		

Results - Soil

Project: NW134/01/02 Former Hope High School, Skelmersdale

Client: ARP Geotechnical Ltd	Chemtest Job No.:				21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880	21-34880
Quotation No.: Q20-21438	Chemtest Sample ID.:				1293839	1293840	1293841	1293842	1293843	1293844	1293845	1293846	1293847
	Client Sample ID.:				WS4 D1	WS5 D1	WS6 D1	WS7 D1	WS8 D1	WS11 D1	Substation 1	WS2 D2	WS4 D1
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.20	0.30	0.30	0.50	0.00	0.00	0.00	2.00	0.50
	Bottom Depth (m):				0.40	0.50	0.50	0.60	0.30	0.20	0.30	2.50	1.00
	Date Sampled:				04-Oct-2021	04-Oct-2021	04-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	05-Oct-2021	04-Oct-2021	04-Oct-2021
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM		
Determinand	Accred.	SOP	Units	LOD									
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	3.9		
PCB 28	U	2815	mg/kg	0.010							< 0.010		
PCB 52	U	2815	mg/kg	0.010							< 0.010		
PCB 90+101	U	2815	mg/kg	0.010							< 0.010		
PCB 118	U	2815	mg/kg	0.010							< 0.010		
PCB 153	U	2815	mg/kg	0.010							< 0.010		
PCB 138	U	2815	mg/kg	0.010							< 0.010		
PCB 180	U	2815	mg/kg	0.010							< 0.010		
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10							< 0.10		
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		

Results - Soil

Project: NW134/01/02 Former Hope High School, Skelmersdale

Client: ARP Geotechnical Ltd	Chemtest Job No.:				21-34880	21-34880	21-34880
Quotation No.: Q20-21438	Chemtest Sample ID.:				1293848	1293849	1293850
	Client Sample ID.:				WS6 D2	WS8 D2	WS11 D2
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1.00	1.00	0.50
	Bottom Depth (m):				1.50	1.50	1.00
	Date Sampled:				04-Oct-2021	05-Oct-2021	05-Oct-2021
	Asbestos Lab:						
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A			
Asbestos Identification	U	2192		N/A			
Moisture	N	2030	%	0.020	9.4	8.7	9.0
Soil Colour	N	2040		N/A	Brown	Brown	Brown
Other Material	N	2040		N/A	None	None	None
Soil Texture	N	2040		N/A	Clay	Clay	Clay
pH	M	2010		4.0	7.1	7.0	7.6
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010	< 0.010	< 0.010	< 0.010
Sulphate (Total)	M	2430	mg/kg	100			
Arsenic	M	2450	mg/kg	1.0			
Cadmium	M	2450	mg/kg	0.10			
Chromium	M	2450	mg/kg	1.0			
Copper	M	2450	mg/kg	0.50			
Mercury	M	2450	mg/kg	0.10			
Nickel	M	2450	mg/kg	0.50			
Lead	M	2450	mg/kg	0.50			
Selenium	M	2450	mg/kg	0.20			
Zinc	M	2450	mg/kg	0.50			
Chromium (Trivalent)	N	2490	mg/kg	1.0			
Chromium (Hexavalent)	N	2490	mg/kg	0.50			
Organic Matter	M	2625	%	0.40			
Total TPH >C6-C40	M	2670	mg/kg	10			
Naphthalene	M	2700	mg/kg	0.10			
Acenaphthylene	M	2700	mg/kg	0.10			
Acenaphthene	M	2700	mg/kg	0.10			
Fluorene	M	2700	mg/kg	0.10			
Phenanthrene	M	2700	mg/kg	0.10			
Anthracene	M	2700	mg/kg	0.10			
Fluoranthene	M	2700	mg/kg	0.10			
Pyrene	M	2700	mg/kg	0.10			
Benzo[a]anthracene	M	2700	mg/kg	0.10			
Chrysene	M	2700	mg/kg	0.10			
Benzo[b]fluoranthene	M	2700	mg/kg	0.10			
Benzo[k]fluoranthene	M	2700	mg/kg	0.10			
Benzo[a]pyrene	M	2700	mg/kg	0.10			

Results - Soil

Project: NW134/01/02 Former Hope High School, Skelmersdale

Client: ARP Geotechnical Ltd	Chemtest Job No.:				21-34880	21-34880	21-34880
Quotation No.: Q20-21438	Chemtest Sample ID.:				1293848	1293849	1293850
	Client Sample ID.:				WS6 D2	WS8 D2	WS11 D2
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				1.00	1.00	0.50
	Bottom Depth (m):				1.50	1.50	1.00
	Date Sampled:				04-Oct-2021	05-Oct-2021	05-Oct-2021
	Asbestos Lab:						
Determinand	Accred.	SOP	Units	LOD			
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10			
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10			
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10			
Total Of 16 PAH's	M	2700	mg/kg	2.0			
PCB 28	U	2815	mg/kg	0.010			
PCB 52	U	2815	mg/kg	0.010			
PCB 90+101	U	2815	mg/kg	0.010			
PCB 118	U	2815	mg/kg	0.010			
PCB 153	U	2815	mg/kg	0.010			
PCB 138	U	2815	mg/kg	0.010			
PCB 180	U	2815	mg/kg	0.010			
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10			
Total Phenols	M	2920	mg/kg	0.10			

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

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

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

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com



LABORATORY REPORT



4043

Contract Number: PSL21/8096

Report Date: 09 November 2021

Client's Reference: NW134

Client Name: ARP Associates
Northwest House
5/6 Northwest Business Park
Servia Hill
Leeds
LS6 2QH

For the attention of: Dan Bennett

Contract Title: Former Hope High School, Skelmersdale

Date Received: 13/10/2021

Date Commenced: 13/10/2021

Date Completed: 9/11/2021

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)


S Eyre
(Senior Technician)

T Watkins
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
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tel: +44 (0)844 815 6641
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Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

Former Hope High School, Skelmersdale

Contract No:

PSL21/8096

Client Ref:

NW134/01/02

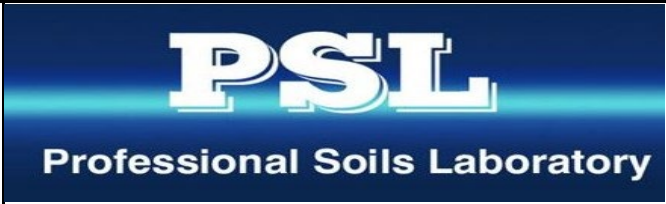
SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

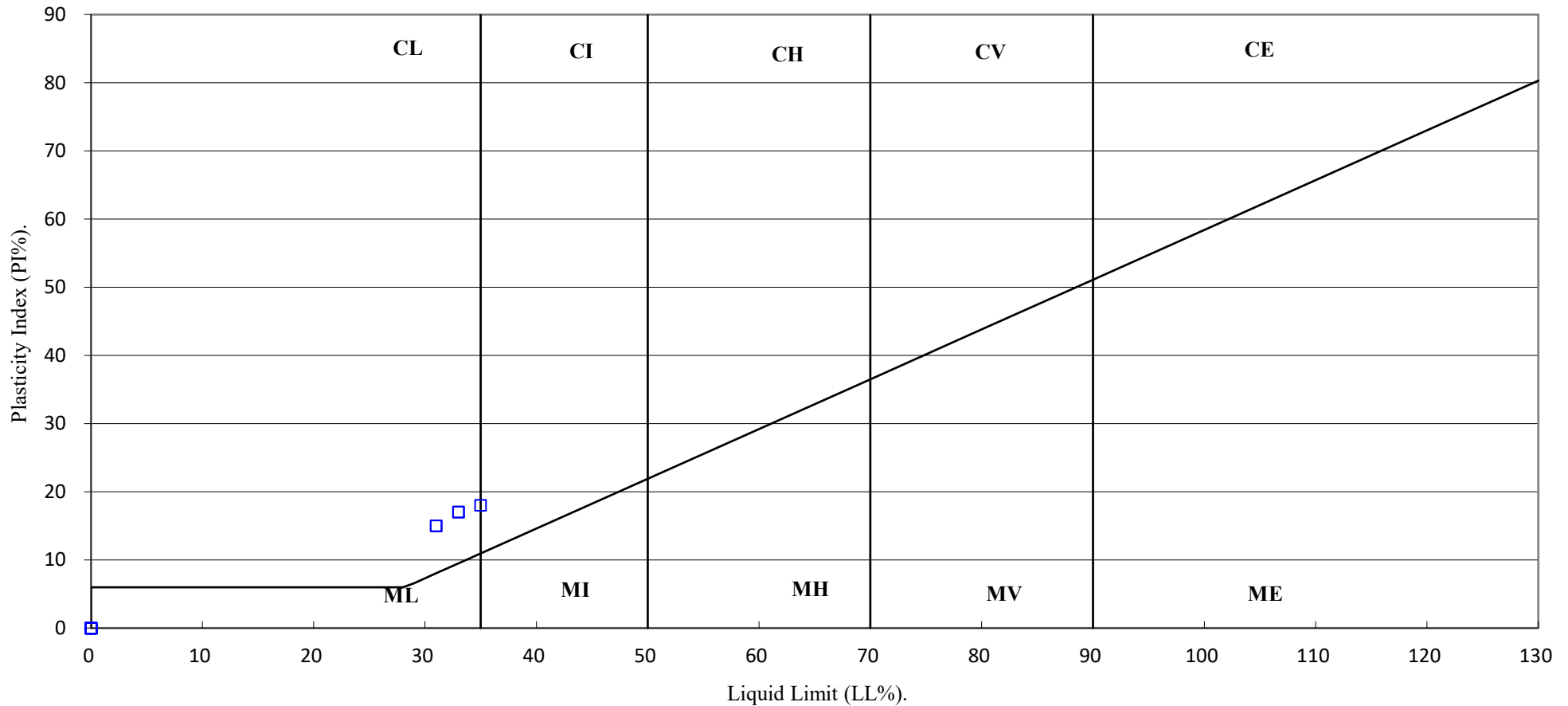
Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
WS2 D2			2.00	2.50	15			33	16	17	96	Low Plasticity CL
WS4 D2			0.50	1.00	16			35	17	18	97	Intermediate Plasticity CI
WS6 D2			1.00	1.50	13			31	16	15	96	Low Plasticity CL
WS8 D2			1.00	1.50	14			33	16	17	95	Low Plasticity CL
WS11 D2			0.50	1.00	18			31	16	15	96	Low Plasticity CL

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.

		Former Hope High School, Skelmersdale		Contract No:
				PSL21/8096
				Client Ref:
				NW134/01/02

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL
Professional Soils Laboratory

Former Hope High School, Skelmersdale

Contract No:

PSL21/8096

Client Ref:

NW134/01/02

APPENDIX D

RISK CATEGORISATION TABLES

Severity of Consequence

Severe	Short term (acute) risks to human health, likely to result in significant harm. Major pollution of (watercourses or groundwater)
Medium	Long-term (Chronic) damage (significant harm) to human health. Pollution of sensitive water resources.
Mild	Pollution of non-sensitive water resources.
Minor	Non-permanent health effects easily prevented by use of personal protective equipment during site works.

Probability of Risk Event Occurring

High Likelihood	There is a pollutant linkage and an event that either appears very likely in the short term, almost inevitable in the long term, or there is evidence of harm or pollution at the receptor.
Likely	There is a pollution linkage and all the elements are present and in the right place, so that a risk event is possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which a risk event could occur. However, it is not certain that such an event would take place even over a longer period, and even less likely in the short term.
unlikely	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur even in the very long term.

Comparison of Probability Against Severity of Consequence

		Severity of Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/ Low Risk
	Likely	High Risk	Moderate Risk	Moderate/ Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/ Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/ Low Risk	Low Risk	Very Low Risk	Very Low Risk

Risk Categories - Definitions

Very High Risk	High probability that severe harm could arise to a receptor, or there is evidence that severe harm is already occurring. Urgent investigation is required and urgent remediation is likely to be required.
High Risk	Harm is likely to arise to a receptor. Urgent investigation is required and remediation may be necessary in the short term and likely over the longer term.
Moderate Risk	Possible that harm could arise to a receptor, but low likelihood that such harm would be severe. Harm is likely to be mild. Investigation normally required to clarify risk. Some remedial works may be required in the long-term.
Moderate/ Low Risk	Possible that harm could arise to a receptor, but where a combination of likelihood and consequence results in a risk that is above low, but is not of sufficient concern to be classified as mild. Limited further investigation may be required to clarify the risk. If necessary, remediation works are likely to be limited in extent.
Low Risk	Possible that harm could arise to a receptor. Such harm, at worst, would normally be mild.
Very Low Risk	Low possibility that harm could arise to a receptor. Such harm is unlikely to be any worse than mild.

APPENDIX E

METHOD STATEMENT FOR ASSESSMENT OF IMPORTED SOILS



METHOD STATEMENT FOR ASSESSMENT OF IMPORTED SOILS

AT

**HOPE HIGH SCHOOL
SKELMERSDALE**

ON BEHALF OF

**TAWD VALLEY
DEVELOPMENTS LTD/
WEST LANCASHIRE
BOROUGH COUNCIL/
LANCASHIRE COUNTY
COUNCIL**



ARP (NORTH WEST) LTD

CHARTERED CONSULTING ENGINEERS

2nd Floor 3 Hardman Square Manchester M3 3EB

☎ 0113 245 8498 ✉ manchester@arpnorthwest.co.uk 🌐 www.arpconsultingengineers.co.uk

CLIENT: TAWD VALLEY DEVELOPMENTS LIMITED

JOB NUMBER: NW134/01/02

PROJECT: HOPE HIGH SCHOOL, SKELMERSDALE

REPORT TYPE: METHOD STATEMENT FOR ASSESSMENT OF IMPORTED SOILS

REPORT REFERENCE: NW134/01/02impV2

	Name	Signature
Prepared By:	D Bennett MSc BSc FGS	
Reviewed & Authorised By:	J Race BSc CGeol FGS EurGeol	

ISSUE	DATE	STATUS
1	1 st DECEMBER 2021	V1 FINAL
2	14 th MARCH 2022	V2 FINAL

1.0 Introduction

- 1.1 This document has been prepared to provide information for the Client and other interested parties, such as the Regulatory Authorities, outlining how soils imported to the site will be managed to ensure that they are suitable, in terms of human health, for the intended residential use. The document should be agreed, prior to implementation, with the relevant Regulatory Authorities, usually the local Planning Authority and NHBC or other building control provider.

2.0 The Site

- 2.1 The ARP (North West) Ltd Stage 2 Geo-environmental Report, dated 1st December 2021 under reference NW134/01/02r2, makes an assessment of contamination, along with other aspects.
- 2.2 The conceptual site model is for a residential development, including private gardens.
- 2.3 The site is occupied by the former Hope High School, with associated hardstanding and landscaped areas. The former school building is currently disused and unoccupied, and present in the western area of the site. A car park is present to the north of the school building, and bitmac hardstanding areas used for sports activities are present to the south and east of the building. A small electricity sub-station is also present at the southwestern corner of the school. The southeast of the site comprises relatively flat grassland which, when compared to the surrounding areas, appeared to have been levelled at some time in the past. The general wider area slopes down to the south southwest.
- 2.4 The site is bounded to the north, east, south and west by residential properties as part of a larger housing estate. Google earth historical photographs show the surrounding housing estate to have been developed post-2000. To the east and south, beyond the residential properties, are 'A' roads as part of the infrastructure network of Skelmersdale.
- 2.5 Ordnance Survey archive maps show the west of the site was a colliery from sometime between 1938 and 1951 until sometime between 1967 and 1975. The colliery included several small structures, a spoil heap in the south, and an adit. The site was later developed as part of a large high school, with buildings in the west, and a tennis court.
- 2.6 The British Geological Survey (BGS) maps show the site to be covered by glacial clays, overlying Rough Rock Formation sandstone. However, this is contradicted by Coal Authority (CA) records, which show undifferentiated strata (mudstone, siltstone and minor sandstone) of the Pennine Lower Coal Measures Formation. Two coal seams are conjectured to outcrop across the centre of the site, trending north to south, according to CA records, but these are absent from the BGS maps. No faults are indicated to adversely affect the site.
- 2.7 There are two mine entries present within the central-western part of the site. The Coal Mining Report indicates that there is the possibility of unrecorded shallow workings and this will need to be assessed by an intrusive investigation using a rotary drilling rig.

- 2.8 The strata beneath the site are classed as a Secondary A Aquifer. There are no sensitive groundwater abstractions within 1km of the site. Two watercourses are present on the site, one each side of the playing field in the southeast of the site, both flowing south/southwest. There are no sensitive surface water abstractions within 1km of the site.
- 2.9 No Radon Protection Measures are required for the proposed properties on the site. Gas monitoring is ongoing and will be reported separately on completion.
- 2.10 Across the southeast of the site, and in the areas of landscaping surrounding the existing building, topsoil was present, to a depth of 0.3m. In the north of the site, and surrounding the current building, made ground was identified to depths of between 0.4m and 3.5m. The made ground in the north of the site ranged in depth from 0.6m to 1.1m and comprised both granular and cohesive material, typically either brown sandy clayey angular gravels of mixed lithology, brick and plastic or brown slightly sandy, gravelly clay with the gravels comprising mixed lithology, brick, concrete, and ceramic. In the central and western areas of the site, tarmac/bitmac hardstanding was present to a recorded depth of 0.1m, which was typically underlain by granular subbase of mixed lithology to a depth of up to 0.6m.
- 2.11 Underlying the hardstanding and subbase in the central and western areas of the site (in three of the investigation positions only) was made ground to depths of between 1.4m and 3.5m. In WS7, this comprised mainly dark grey clayey angular gravel of mudstone and was interpreted to be possibly colliery spoil. Natural strata were encountered in all of the investigation positions, typically comprising firm/medium strength reddish brown, slightly sandy gravelly clay, with the gravel content comprising sub angular to rounded mixed lithologies. In six of the investigation positions, underlying the cohesive deposits, light brown clayey gravelly sand was present.
- 2.12 The contamination testing carried out on thirteen samples of topsoil and twelve samples of made ground, did not identify any concentrations of contaminants requiring any remedial measures. However, it is still necessary to have in place a method statement for the assessment of any soils to be imported, in order to satisfy the Regulatory Authorities that the soils are suitable for use on the site, in terms of human health. This needs to be independently confirmed, in accordance with guidance.

3.0 Imported Soils

- 3.1 If any imported soils are required, the source will need to be confirmed, and the material tested for the attached suite of contaminants, to comply with the maximum screening values listed. The frequency of testing is given on the table below.

Material Type	Number of Samples
Topsoil or subsoil from greenfield site	Minimum 3No. or 1 per 250m ³ (whichever is greater)
Topsoil or subsoil from brownfield site	Minimum 6No. or 1 per 100m ³ (whichever is greater)

- 3.2 The material should be placed in quarantined stockpiles and once a stockpile has been approved by the Engineer, no further material should be added to the stockpile, and any further import should be stockpiled separately. Further testing shall be carried out where any mixing is suspected to have occurred.
- 3.3 As and when required, the soils will be used around the plots as the development progresses, and it will be necessary to verify that the appropriate soils have been placed on the plots, and not soils from any other source. This will be achieved by excavating trial pits on the basis of between one in four plots. The trial pits will be photographed, to include a reference scale, and the photographs included within any report to enable the location on site to be identified.
- 3.4 If space is insufficient on the site to store quarantined stockpiles, the soils can be placed directly into the appropriate gardens/landscape areas, but samples of each material would need to be taken and tested directly from the trial pits within the gardens, described in 3.3 above.
- 3.5 The results of all the laboratory analysis, sample descriptions, plans, and import documents, will form part of the Soils Validation Report.
- 3.6 In order to enable the scheme to progress and sales of properties to continue throughout the construction of the development, interim Soils Validation Reports may be prepared for specific areas. This will enable enquiries during the sales of the properties to be satisfied and a final Soils Validation Report will be prepared at the end of the development, incorporating all the interim reports to satisfy the planning conditions.

4.0 Unexpected Contamination

- 4.1 Any unexpected contamination uncovered during the works shall be inspected, sampled and analysed in laboratory for the suite of determinands appended to this Method Statement, and compared to the maximum concentration levels listed on the enclosure. Works on the affected materials shall cease until the appraisal is complete and, if necessary, a Remediation Statement is to be prepared and approved by the Planning Authority before work is recommenced.



ARP GEOTECHNICAL LIMITED
SOIL CONTAMINANT SCREENING VALUES
RESIDENTIAL WITH HOME-GROWN PRODUCE

Determinand	S4UL (mg/kg)			C4SL (mg/kg)		
Arsenic	37			37		
Cadmium	11			22		
Chromium (trivalent)	910					
Chromium (hexavalent)	6			21		
Copper	2400					
Lead				200		
Inorganic Mercury	40					
Nickel	180					
Selenium	250					
Zinc	3700					
Acidity (pH)	*Should be Greater Than 5			*Should be Greater Than 5		
	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM
Naphthalene	2.3	5.6	13			
Acenaphthylene	170	420	920			
Acenaphthene	210	510	1,100			
Fluorene	170	400	860			
Phenanthrene	95	220	440			
Anthracene	2,400	5,400	11,000			
Fluoranthene	280	560	890			
Pyrene	620	1,200	2,000			
Benzo(a)anthracene	7.2	11	13			
Chrysene	15	22	27			
Benzo(b)fluoranthene	2.6	3.3	3.7			
Benzo(k)fluoranthene	77	93	100			
Benzo(a)pyrene	2.2	2.7	3			5
Indeno(1,2,3-cd)pyrene	27	36	41			
Dibenzo(a,h)anthracene	0.24	0.28	0.30			
Benzo(g,h,i)perylene	320	340	350			
Phenols	120	200	380			
Total TPH	*Above 500, speciate and compare with values below:					
C5 to C6 Aliphatic	42	78	160			
C6 to C8 Aliphatic	100	230	530			
C8 to C10 Aliphatic	27	65	150			
C10 to C12 Aliphatic	130	330	760			
C12 to C16 Aliphatic	1100	2,400	4,300			
C16 to C35 Aliphatic	65,000	92,000	110,000			
C35 TO C44 Aliphatic	65,000	92,000	110,000			
C5 to C7 Aromatic (Benzene)	70	140	300			
C7 to C8 Aromatic (Toluene)	130	290	660			
C8 to C10 Aromatic	34	83	190			
C10 to C12 Aromatic	74	180	380			
C12 to C16 Aromatic	140	330	660			
C16 to C21 Aromatic	260	540	930			
C21 TO C35 Aromatic	1100	1,500	1,700			
C35 TO C44 Aromatic	1100	1,500	1,700			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suitable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits.

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