Ground Conditions Assessment Report

Gnoll Country Park, Neath

Jubb

PREPARED BY:	FOR:	DATE:	REFERENCE:
Jubb Consulting Engineers Ltd.	Andrew Scott Limited	September 2023	23252-JCE-XX-XX-RP-GE-001-P1

Table of Contents

EXECUTIVE SUMMARY 5
1 Introduction 10
1.1 Commission 10
1.2 Objectives 10
1.3 Scope, Sources & Limitations 10
2 Site Setting 12
2.1 Site Location 12
2.2 Site Description 12
2.3 Site Proposals 14
3 Desk Study Information 15
3.1 Published Geology 15
3.2 Coal Mining Risk 15
3.3 Hydrogeology 16
3.4 Hydrology 16
3.5 Radon Risk 17
3.6 Site History 17
3.7 Preliminary Risk Assessment (Contamination 17
4 Ground Investigation Works 18
4.1 General 18
4.2 Geotechnical Testing 19
4.3 Contamination Testing 19
5 Ground Conditions 21
5.1 Ground Conditions Encountered 21
5.2 Groundwater 22
6 Material Properties 23
6.1 Weathered Pennant Sandstone Formation 23
7 Generic Quantitative Risk Assessment (Contamination) 25
7.1 General 25
7.2 Risks to Human Health 25
7.3 Ground Gas 28
7.4 Asbestos 28
7.5 Risk to Controlled Waters 28
7.6 Risks to Flora and Fauna 28
7.7 Risks to Adjacent Land and Third Parties 29
7.8 Potential Geo-Environmental Liabilities 29
7.9 Off Site Disposal 29
7.10 Updated Conceptual Site Model 29

7.11 Contamination Risk Summary 32
7.12 Mitigation Measures 32
8 GEOTECHNICAL ASSESSMENT 34
8.1 Introduction 34
8.2 Excavations 34
8.3 Foundation Options 34
8.4 Floor Slabs 35
8.5 Protection of Buried Concrete 36
8.6 Earthworks 36
8.7 Pavement Design 37
8.8 Soakaway Design 37
8.9 Coal Mining Risk 38
8.10 Further Work 39
9 GEOTECHNICAL RISK REGISTER 40
10 References 41
Appendix A: Site Location Plan i
Appendix B: Proposed Site Development Plan ii
Appendix C: Exploratory Hole Location Plan iii
Appendix D: Contamination Risk Assessment Methodology and Definitions iv
Appendix E: Hazwaste Asessment ix
Appendix F: Geotechnical Risk Register x
Appendix G: Terra Firma – Factual Report xi
Appendix H: Limitations and Exceptions xii

List of Figures

Figure 1: Site Location 12
Figure 2: Superficial Geology (BGS) 15
Figure 3: Bedrock Geology and Linear Features 15
Figure 4: Extract from Coal Authority website, showing Zones of 'Development High Risk' and Mine Shaft Entries 16
Figure 5: Summary of Plasticity Tests for Pennant Sandstone Formation 23
Figure 6: Weathered Pennant Sandstone Formation PSD Curve 24

List of Tables

Table 1: Sampling Strategy 18
Table 2: Geotechnical Testing 19
Table 3: Contamination Suite 19
Table 4: Soil Contamination Testing 20
Table 5: Ground Conditions Summary for Areas 1 - 6 21
Table 6: Atterberg Limit Tests 23

Table 7: Particle size distribution testing 24
Table 8: Summary of Soil Contamination – Metals and Semi Metals 25
Table 9: Summary of Soil Contamination – PAHs – Made Ground 26
Table 10: Summary of Soil Contamination – PAHs – Natural Soils 27
Table 11 - Conceptual Site Model 30
Table 12: BRE Sulphate Test Results 36
Table 13 : Soakaway Test Results Summary 38

PROJECT INFORMATION

Project Information

Client	Andrew Scott Limited

Project Details

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Jubb Project Number	23157
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J Young	Geotechnical Engineer	J Young
Checked By		
I Squibbs	Principal Engineering Geologist	I Squibbs

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1	22/08/2023	First Issue on Areas 2 and 3.
2	19/09/2023	Final Issue on All Areas

EXECUTIVE SUMMARY

Site Information	
Client	Andrew Scott Limited
Project	Gnoll Country Park, Neath
OS Co-ordinates	E276468, N197398.
Proposals	Jubb understands that sections of the park are to be re-developed with infrastructure enhancements and a new visitor centre. The site comprises six areas within the existing Gnoll Country Park with the following proposals: **Area 1 – Gnoll Hose Ruins**: A raised platform to be formed to create performance space/ outdoor cinema. Platform to be formed with a low blockwork wall on foundations.. **Area 2 – Visitor Centre**: The existing visitor centre is proposed to be demolished and replaced with a 2-storey building with a podium and a first-floor timber frame building, with two cascade seating areas on the first floor and an external terrace. **Area 3 – Pond Cottage**: The existing cottage is proposed to be refurbished into a café with public toilets and seating areas. The associated gardens will be outside seating areas with landscape areas. A one storey timber extension with a cantilever viewing platform is also proposed on the southern side of the existing cottage. **Area 4 – Kitchen Gardens and Service Yard**: The Kitchen Gardens to the west are proposed to be converted into a mixture of approximately 16 no. 1-2 bed holiday lodges/ cabins with the form of construction not known, along with the existing access road to be retained. The Service Yard to the east is proposed for improvements to create more appropriate storage facilities and car parking for the accommodation proposal in the Kitchen Gardens to the west. **Area 5 & 6 – Main Car Park/Footbridge/Adventure Play Area**: The main car park to the north of Gnoll Country Park is proposed for expansion with the creation of two new car parking areas with one to the north and the other northeast of the existing access road within the current grass areas, with associated plants and shrubs dividing the parking lanes. The proposal is mainly for overflow parking to cater for increase visitor numbers. In Area 6 a pedestrian footbridge is proposed over an existing water course to connect the Country Park to Woodland Trust land to the east. An adventure playground is proposed within the wooded areas between the two areas.
Site Description	**Area 1 – Gnoll Hose Ruins**: The Area 1 boundary is situated at the western side of the park around the Gnoll House Ruins. This area comprises a mixture of exposed walls and partly demolished structures associated with the historic Gnoll House. The areas around and in between the structures is a mix of gravel surfacing and soft

	landscaping. Area 1 is generally flat and level and is noted to be situated on the crest of Gnoll Hill. **Area 2 – Visitor Centre**: Area 2 currently comprises the existing Gnoll Park visitors centre, with the surrounding area consisting of concrete slab/gravel footpaths and soft landscaping areas. A small wooden area borders the visitors centre to the north with the pedestrian access to the main car park (Area 5). A children's play area boarders Area 2 to the west with tarmac surfacing. **Area 3 – Pond Cottage**: Area 3 currently comprises an existing 2-storey cottage known as 'Pond Cottage' with a rear and side garden. The cottage is understood to be vacant with access into the building from the north side, with semi-mature to mature trees bordering the site. **Area 4 – Kitchen Gardens and Service Yard:** Area 4 is located over the southern area of the estate and currently comprises an area known as 'Kitchen Gardens' to the west and 'Service Yard' to the east. The Kitchen Gardens area currently comprises a collection of vacant one-storey barns, stone sheds and storage containers with an overgrown gravel area surrounded with historic masonry walls to the north. The service yard to the east is occupied by a collection of vacant one-storey stone sheds and shipping containers with access into the area just off the main road to the south. **Area 5 & 6 – Main Car Park/Footbridge:** Area 5 is located around the main carpark for the country park over the northwestern end of the estate. The area is split into predominantly three parking areas located to the east, southeast and eastern sides of the access road with tarmac surfacing for the associated roads and parking spaces. Area 6 is currently located around Fishpond Wood, which is a wooded area situated over the eastern end of the country park. The area is accessed along the pedestrian footpath from pond cottage to the southwest.
Ground Conditions	
Geology	The online BGS Geology of Britain Viewer,) and the 1:10,560 Geological Sheet (Sheet SS79NE) show the Area 1 and 2 to the north to be underlain by the Brithdir Sandstone Member, which is overlain by superficial deposits of Glacial Till (Diamicton) in the eastern area only. Areas 3 to 6 to the south are underlain by the Swansea Sandstone Member both described as micaceous sandstones with thin interbeds of mudstone/siltstone and thin coals beds. These formations form part of the Pennant Sandstone parent group.
Ground Conditions Encountered	A thin veneer of topsoil extending to a maximum depth of 0.30m was encountered around the grassed areas within Areas 1, 2 and 5. Made Ground was encountered from ground level extending to depths of around 0.35m – 1.40m below existing ground levels within Areas 3 and 4. The material typically comprised a sandy silty gravel comprising of sandstone and anthropogenic components of brick, concrete, coal, slag, glass and timber.

	Made Ground in form of gravel surfacing extending to depths of 0.20 and brown sandy gravelly clay fill with gravels of sandstone, mudstone, slate, mortar and shale extending to depths >1.20m, were also encountered in Area 1 (Gnoll Ruins). Residual deposits of the Pennant Sandstone Formation bedrock was encountered typically underlying the topsoil and/or Made Ground, encountered around 0.30 – 1.40m extending to the base of exploratory hole depths. The material typically comprised a firm brown, slightly sandy, slightly gravelly, silt/clay at shallow depths before sandy, silty, gravel was encountered likely to be weathered sandstone bedrock. Groundwater was not encountered during the investigation.
Mining	The Earth Science Partnership Ltd (ESP), were initially instructed by Andrew Scott to prepare a Phase One (desk study based) Coal Mining Risk Assessment (CMRA). To summarise, the main area of the site where there appears to be risk from coal mining is to the southwest around Area 3 and Area 4. The outcrop of the Swansea Five Feet coal seam is shown to loop around to the west in the area of Gnoll House (Area 1) and is shown east-west across Area 3 and 4. The report also shows the wooded area to the southeast of existing reservoir has two recorded mine shaft entry according to historical records, therefore the Coal Authority have also deemed this area also a 'high development risk zone'. The other area to the north of the reservoir around Areas 2 and 5 appears to be at less of a risk from mining. The probable Brithdir Rider coal seam is shown to crop out in a south-west to north-east orientation some 300m to the north-west, in the area of the former mine entries identified on historical maps. The area of the ruins (Area 1) was outside the CMRA but there are no shafts recorded in that area and the house was built in the 1700s so could be argued that it predates any historical mining.
Geo-environmental Assessment	
Contamination Assessment	In summary, the following contamination risks are noted for the soils tested across all areas: One sample tested from natural soils were found to contain exceedances of the Generic Assessment Criteria (GCA) for 'Public Open Space (Park) end-use' from the contaminant Dibenz[ah]anthracene. It is thought to be attributed to coal fragment within the weathered rock, therefore is not a risk. One sample tested from Made Ground within Area 4 was found to contain exceedances of the Generic Assessment Criteria (GCA) for 'Public Open Space (Park) end-use' for two PAH contaminants. The location of TP06 to the west of Area 4 and the inclusion of slag, suggests the contaminated Made Ground could be attributed to possible historic industrial activities. All of the samples tested were classified as non-hazardous for off site disposal purposes. No groundwater was encountered during the investigation. Given no significant visual/olfactory indications of contamination were noted during the investigation and

	the very limited amounts of Made Ground encountered across the site, the leaching risk to groundwater is considered very low. Based on topographic levels and River Neath to the west, no significant visual/olfactory indications of contamination within soils and TP07 and TP06 are likely down gradient from the southwest surface water with TP07 underlain by a cohesive layer, therefore, the risk to surface waters is considered low.
Radon	The radon risk is reported on the UK Radon Atlas (ukradon.org). The guidance indicates that the site is in a moderate probability radon area (5 – 10% of homes are estimated to be at or above the Action Level) and therefore basic radon protection methods are required for construction of new buildings/dwellings. A site-specific radon report is recommended to confirm this guidance is correct.
Ground Gas	No significant source of ground gas was identified. Potential for unrecorded shallow workings under Area 4, therefore gas monitoring recommended in this area as part of any additional CMRA works.
Geotechnical Assessment	
Foundations	Traditional strip foundations will likely be suitable across the site with foundations extending through any Made Ground and into the granular weathered Pennant Sandstone Formation, where an allowable bearing pressure of 125kPa is available. Pad foundations will also be suitable for the proposed footbridge in Area 6. In areas underlain by cohesive residual soils, foundations should extend into the cohesive deposits that are at least firm in strength. A traditional 0.6m wide foundation, founding in the firm clay with an undrained shear strength of 50kPa, would give an allowable bearing pressure in the order 100kPa. In Area 4, given the risk posed by coal mining, a raft foundation solution may be considered for the pods to mitigate any potential ground movement risk.
Floor Slabs	**Area 2 – Visitor Centre:** Subject to confirmation of removal of Made Ground and the presence of granular soils, a ground bearing slab should be suitable. **Area 3 – Pond Cottage:** Given the cohesive nature of the natural soils around Area 3 and that a greater thickness of Made Ground was encountered in HP04, a suspended floor slab is recommended for the extension. **Area 4 – Kitchen Gardens**: Given that a greater thickness of Made Ground was encountered in TP06 and TP08, a suspended floor slab is recommended for the extension, as recommended in the National House-Building Council (NHBC) standards. Ground bearing slabs may be suitable for the lodges provided made ground removed and replaced with suitable engineered fill and compacted to a specification.
Excavations	Standard mechanical plant should be suitable for site excavations, although the use of a breaker may be required if excavations extend into the more competent bedrock. Temporary excavations within the cohesive residual soils should be stable in the short term at angles of no greater than 1V:1.5H (33°) but where the excavations extend into the Made Ground or more granular material then these should be

	reduced to 1V:2H (26°). Where space does not permit battering of excavation sides then suitable temporary shoring will be required. It is recommended a suitable easement zone for any excavations and enabling works is considered for the existing retaining wall for the existing southern access road on the southern area boundary for Areas 3 and 4 to avoid undermining the structure.
Earthworks	The proposed site levels have not been determined at this stage but given the relatively flat nature of Area 1, 2, 3, 5 and 6 these are expected to be similar to existing site levels. The proposed site levels have not been determined at this stage for Area 4, but giving the sloping nature of the site, some minor earthworks are expected to create levelled platforms for the proposed holiday lodges. The main materials likely subject to any earthworks include made ground encountered across Area 4 and the underlying cohesive residual soils of the Pennant Sandstone. Based on the classification testing of the residual soils of the Pennant Sandstone Member, the cohesive soils would either fall into Class 2A (Wet cohesive material) or 2C (Stoney Cohesive Material) when used as general fill, and the granular soils would either fall into Class 1A (Well graded granular material) or 2B (Uniformly graded granular material)in accordance with the SHW Series 600 – Manual of Contract Documents for Highway Works.
Buried Concrete Classification	Based on the soil results a design sulphate class of DS-1 and aggressive environment for concrete (ACEC) class of AC-1, should be adopted for the concrete specification for shallow foundations.
Pavement Design	In areas where subgrade material is cohesive then a design equilibrium CBR of 3% is recommended and a Restricted Design Approach. In areas where the subgrade comprises granular material then a CBR value of 8% can be used and a Performance Design Approach used.
Drainage	Infiltration drainage will likely be suitable in areas where the base of the soakaways is within the weathered bedrock where infiltration rates of between 1.74 $x10^{-4}$ m/s and 7.69 $x10^{-5}$ m/s were recorded. Soakaways were carried out with the base within the residual and failed to infiltrate therefore soakaways within the clays will not be suitable, although they could potentially be extended down to the weathered granular bedrock subject to further testing.
Geotechnical Risk Category	Geotechnical Category 1
Further Work	• Coal Mining ground investigation comprising of rotary boreholes to investigate any potential shallow coal seam workings beneath Area 4 (Kitchen Gardens). • Subsequent Remediation Strategy and Verification Plan will be required to be submitted to the local authority for the recommended clean cover system within Area 4.

1 Introduction

1.1 Commission

Andrew Scott Limited working on behalf of the local council is proposing infrastructure enhancements at specific sections of the Gnoll Estate Country Park in Neath, including the construction of a new visitor centre. To assist with the development of the site proposals, Jubb Consulting Engineers (Jubb) have been appointed to undertake a geotechnical and geo-environmental assessment of the ground conditions for the proposed site use.

The development is understood to include a new visitor centre, an extension to the existing car park, with the creation of new footpaths and future enhancement throughout the park. The proposed development, based on the Project Overview plan prepared by The Environment Partnership (Dwg No. D9457.100.001), is presented in **Appendix B**.

This report constitutes a Ground Conditions Assessment (GCA) to support the planning application for the proposed development, with this issue relating to the different proposal areas of the site and provides advice for the geotechnical and geo-environmental design of the development and associated ground contamination or geotechnical hazards.

This report is for the private and confidential use of Andrew Scott Limited (to whom alone is owed a duty of care) and their professional advisors and consultees; it may not be relied upon or reproduced by any third party for any use without the written agreement of Jubb.

1.2 Objectives

The objectives of this assessment are:

- to assess the geo-environmental ground conditions at the site with due regard to any previous investigation, remediation and validation works undertaken as part of the site enabling works. If necessary, to provide outline recommendations for risk mitigation based on the findings;

- to analyse the intrusive ground investigation results to determine ground conditions, obtain representative values for geotechnical analysis, and identify any geotechnical issues which may affect the proposed development;

- to make an evaluation of any potential environmental or geotechnical hazards, risks and liabilities to the planned development of the site on the basis of the foregoing studies, and to provide engineering and environmental recommendations for the site, in view of the potential development of the site.

1.3 Scope, Sources & Limitations

Jubb have been provided with the following report carried out by Earth Science Partnership for Andrew Scott Ltd.

- Phase 1 Coal Mining Risk Assessment. Rep No. ESP.8603.3901-00, dated June 2023.

A Phase 1 Geo-environmental desk study report was not commissioned as part of this assessment however a brief search of site history has been undertaken, see Section 3.0 for details.

A Ground Investigation was commissioned for a detailed assessment of the site, see Section 4.0 for more details.

This report has been carried out in accordance with the following UK legislation and regulatory guidance for site investigations: -

- BS EN 1997-1:2004 +A1:2013 Eurocode 7 Geotechnical design – Part 1 General rules;
- BS EN 1997-2 (2007) Eurocode 7 Geotechnical design – Part 2 Ground Investigation and testing;
- NA+A1:2014 to BS EN 1997-1:2004 +A1:2013 UK National Annex to Eurocode 7: Geotechnical design – Part 1: General rules,

- NA to BS EN 1997-2:2007 UK National Annex to Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing;
- BS 5930 (2015) + A1 (2020) Code of Practice for site investigations;
- BS 8004 (2015) + A1 (2020) Code of Practice for Foundations;
- BS 10175 (2011) + A2: (2017) Investigation of Potentially Contaminated Sites – Code of Practice;
- CLR 11 (2004) Contaminated Land Research Report, Defra/EA - Model Procedures for the Management of land contamination;
- BS EN 14688 – 1 (2002) + A1 (2013) Geotechnical investigation and testing. Identification and classification of soil. Identification and description.
- BS EN 14688 – 2 (2004) + A1 (2013) Geotechnical investigation and testing. Identification and classification of soil. Principals for a classification.
- BS EN 14689 – 1 (2003) Geotechnical investigation and testing. Identification and classification of rock. Identification and description.

It should be noted that any ground investigation provides only a small sampling of any site and that ground conditions may differ both laterally (across the site) and vertically (with depth) between sample points. Such differing conditions may thus remain undetected by fieldwork. Certain areas may not have been accessible to intrusive survey due to vegetation, live services or other obstructions.

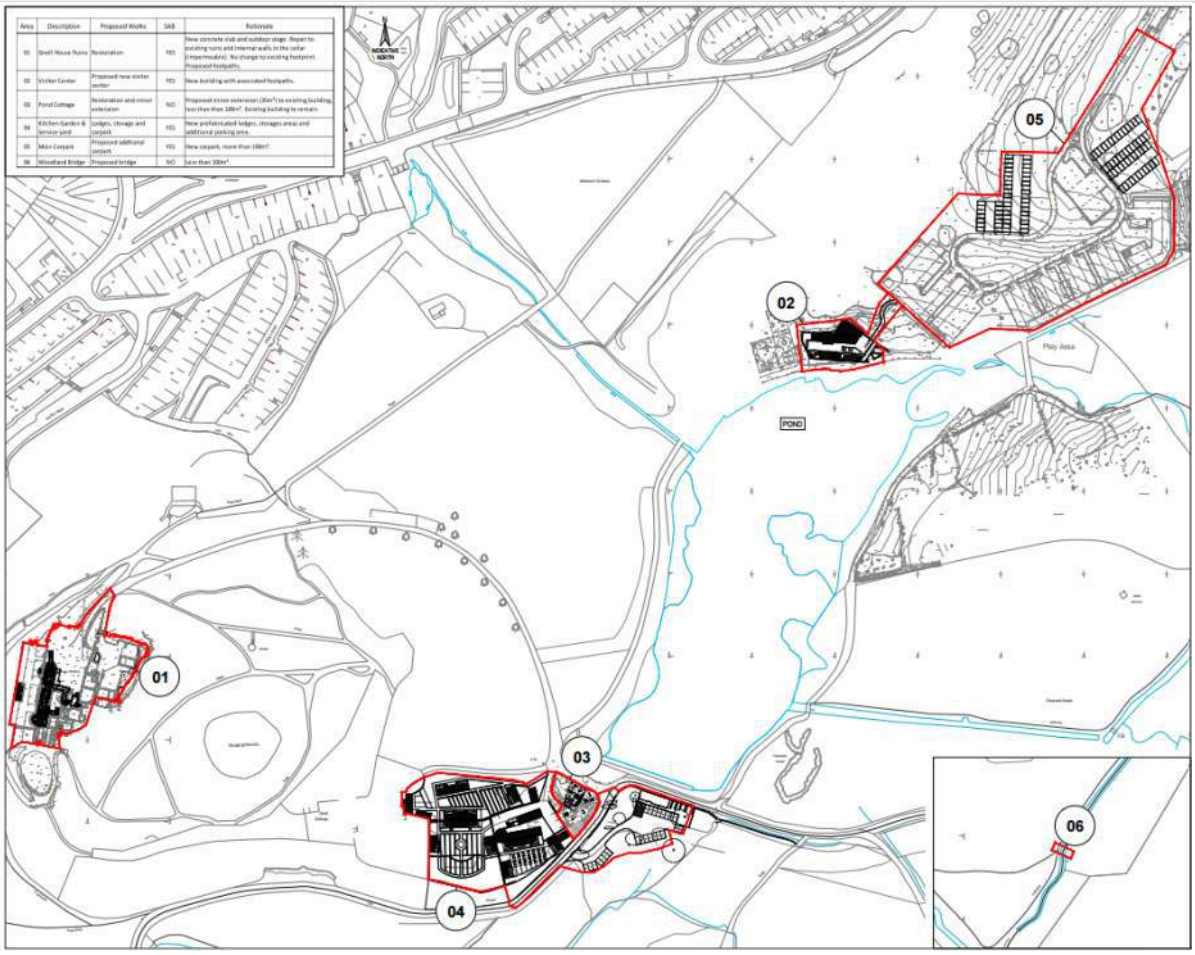
2 Site Setting

2.1 Site Location

The site is located around the Gnoll Country Park situated in the town of Neath, in South Wales, approximately 11km to the northeast of Swansea. The site is situated on the eastern fringes of the town with the main entrance over the northern part of the estate accessed off Fairyland, with a second entrance from the southern end via Rockwood Close off Cimla Road. The different areas of the site referred to in this report are outlined in Figure 1 below.

The River Neath is located just over 500m to the northwest of the site.

Figure 1: Site Location



The Ordnance Survey grid reference at the centre of the site is: E276468, N197398.

A site location plan and aerial photograph are reproduced in **Appendix A.**

2.2 Site Description

The proposed site development is split into six specific areas of the wider country park as per Figure 1. A description of each area and what it is referred to is as follows.

2.2.1 Area 1 – Gnoll House Ruins

The Area 1 boundary is situated at the western side of the park around the Gnoll House Ruins. This area comprises a mixture of exposed walls and partly demolished structures associated with the historic Gnoll House. The areas

around and in between the structures is a mix of gravel surfacing and soft landscaping. Area 1 is generally flat and level and is noted to be situated on the crest of Gnoll Hill. The topography beyond the area boundary slopes steeply down towards the northwest, west and southwest with residential housing below. The Area 1 elevation is approximately 30m above the adjacent Gnoll Crescent level, which is accommodated by a heavily vegetated slope on the western boundary of Area 1.

2.2.2 Area 2 – Gnoll Park Visitor Centre

Area 2 currently comprises the existing Gnoll Park visitors centre, which is single storey and of stone clad construction, with the surrounding area consisting of concrete slab/gravel footpaths and soft landscaping areas. A small wooden area borders the visitors centre to the north with the pedestrian access to the main car park (Area 5). A children's play area boarders Area 2 to the west with tarmac surfacing. Area 2 is generally flat and level with levels between 63.2 to 63.8mAOD with wider topographic levels gently increasing north towards the main car park.

2.2.3 Area 3 – Pond Cottage

Area 3 currently comprises an existing 2-storey cottage known as 'Pond Cottage' with a rear and side garden. The cottage is understood to be vacant with access into the building from the north side, with semi-mature to mature trees bordering the site. The area is generally flat and level, with a general elevation of around 63.5mAOD. The site begins to gently slope beyond southern boundary into the Kitchens Gardens (Area 4) with elevations between 64mAOD to 61mAOD.

2.2.4 Area 4 – Kitchen Gardens and Service Yard

Area 4 is located over the southern area of the estate and currently comprises an area known as 'Kitchen Gardens' to the west and 'Service Yard' to the east. The Kitchen Gardens area currently comprises a collection of vacant one-storey barns, stone sheds and storage containers with an overgrown gravel area surrounded with historic masonry walls to the north. The surfacing predominantly consists of gravel with soft scaping areas around the edge of the gardens, bordered by a variety of mature trees. The Kitchen Gardens is accessed via a gravel track through metal gates just west of Pond Cottage (Area 3). This area slopes to the south towards the southern boundary from 64mAOD to 61mAOD. The area is bordered by a retaining wall to the south for a road cutting which is the main southern access road into the country park off Cimla Road, the road level is approximately 58mAOD.

The service yard to the east is occupied by a collection of vacant one-storey stone sheds and shipping containers with access into the area just off the main road to the south. Based on historical maps from the ESP Coal Mining Risk Assessment, the buildings were once associated with Gnoll Cottage to the west of Area 4 but their historical use is not indicated on mapping. The area is covered by gravel surfacing with overgrown areas on the border along with a variety of mature trees. The area is bordered to the north by a brick retaining wall/dam for the central fishing lake, which is cut into the sides of the embankments with a pedestrian path along the top. The service yard sits at a lower level of approximately 56mAOD with the surrounding areas at a level of 62mAOD.

2.2.5 Area 5 – Main Car Park

Area 5 is located around the main carpark for the country park over the northwestern end of the estate. The area is split into predominantly three parking areas located to the east, southeast and eastern sides of the access road with tarmac surfacing for the associated roads and parking spaces. Landscaping areas with shrubs and juvenile trees divide the parking areas. A wooded area to the southwest divides Area 5 from Area 2 (Visitor Centre). The area gentle slopes down to the southeast towards the fishing lake, with a larger wooded area to the south.

2.2.6 Area 6 – Footbridge

Area 6 is currently located around Fishpond Wood, which is a wooded area situated over the eastern end of the country park. The area is accessed along the pedestrian footpath from pond cottage to the southwest. The area is located over a shallow stream cutting through banks on a rocky channel. Banks are composed of exposed soil and cobbles of sandstone with roots from existing trees. The stream is noted to form part of the surface water network which feeds the cascades through the woods adjacent to the fishing lake.

Ordnance survey maps show topographic levels of wooden area around Area 6 slopes down to the west towards the fishing lake with a drop in level of around 30mAOD.

2.3 Site Proposals

It is understood that the client is proposing to submit six different planning applications as part of this project, associated with the different areas described above. The current proposals for each area are as follows.

2.3.1 Area 1 – Gnoll House Ruins

This area is to be developed with following modifications:

- A raised platform to be formed to create performance space/ outdoor cinema. Platform to be formed with a low blockwork wall on foundations. The wall to support beam and block floor with floor to be screeded and finished with pavers.
- A new hoggin surface to replace former paths of formal Garden to Gnoll House. The hoggin surface is to be laid within new natural stone edging strips set in concrete haunching.
- Former footprint of Gnoll House to be reinstated with a new flexible terrace area.

2.3.2 Area 2 – Gnoll Visitor Centre

The existing visitor centre is proposed to be demolished and replaced with a 2-storey building with a podium and a first-floor timber frame building, with two cascade seating areas on the first floor and an external terrace.

2.3.3 Area 3 – Pond Cottage

The existing cottage is proposed to be refurbished into a café with public toilets and seating areas. The associated gardens will be outside seating areas with landscape areas. A one storey timber extension with a cantilever viewing platform is also proposed on the southern side of the existing cottage.

2.3.4 Area 4 – Kitchen Gardens and Service Yard

The Kitchen Gardens to the west are proposed to be converted into a mixture of approximately 16 no. 1-2 bed holiday lodges/ cabins with the form of construction not known, along with the existing access road to be retained. The surrounding areas will consist of ornamental gardens and landscaping areas with the existing woodland to the south retained. A bike shed and Linen store is proposed to the east along the access road.

The Service Yard to the east is proposed for improvements to create more appropriate storage facilities and car parking for the accommodation proposal in the Kitchen Gardens to the west.

2.3.5 Areas 5 & 6– Main Carpark/Footbridge/Adventure Play Area

The main car park to the north of Gnoll Country Park is proposed for expansion with the creation of two new car parking areas with one to the north and the other northeast of the existing access road within the current grass areas, with associated plants and shrubs dividing the parking lanes. The proposal is mainly for overflow parking to cater for increase visitor numbers.

In Area 6 a pedestrian footbridge is proposed over an existing water course to connect the Country Park to Woodland Trust land to the east.

An adventure playground is proposed within the wooded areas between the two areas.

Site proposal plans are included in **Appendix B.**

3 Desk Study Information

A Phase 1 desk-based study was not commissioned as part of this assessment. However, the historical maps from the previous Coal Mining Risk Assessment undertaken by Earth Science Partnership Ltd *(Ref: Phase One Coal Mining Risk Assessment, ESP.8603.3901, dated June 2023)* have been briefly assessed to understand the potential geoenviromental and geotechnical risks associated with the site's history.

3.1 Published Geology

The online BGS Geology of Britain Viewer and the 1:10,560 Geological Sheet (Sheet SS79NE) show Areas 2 and 5 over the northern part of the site, to be underlain by the Brithdir Sandstone Member, which is overlain by superficial deposits of Glacial Till (Diamicton). Areas 1, 3, 4 & 6 to the south are shown to be directly underlain by the Swansea Sandstone Member. Both Members are described as micaceous sandstones with thin interbeds of mudstone/siltstone and thin coals beds. These formations form part of the Pennant Sandstone parent group.

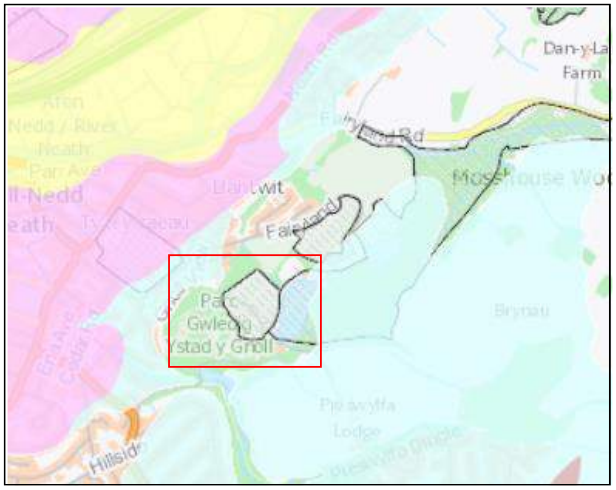


Figure 2: Superficial Geology (BGS)

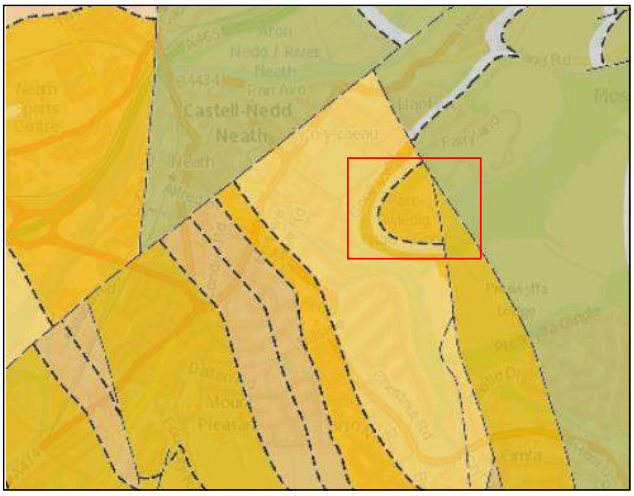


Figure 3: Bedrock Geology and Linear Features

The Brithdir beds (shown as green in figure 3) lies within a triangular fault block defined by the Gnoll Fault to the east and two unnamed faults to the north and south. In the eastern part of this fault block, the strata is indicated to dip to the west at 30 to 40°. The Swansea Beds strata (shown as the light and dark orange) is indicated to dip to the north-east at between 12 and 15°.

The Swansea Beds contain the Swansea Five Feet coal seam, which subcrops under the western part of the site and is shown to loop around to the west in the area of Gnoll House (Area 1) and is shown east-west across Area 3 and 4.

The BGS mapping also indicates artificial ground located around the northern area of the country park extending across the existing lakes and the wooden area to the east. This is described as landscaped ground where the land surface has been extensively remodelled.

3.2 Coal Mining Risk

Earth Science Partnership Ltd (ESP), were initially instructed by Andrew Scott to prepare a Phase One (desk study based) Coal Mining Risk Assessment (CMRA) to evaluate the potential risks to the development from past abandoned mine workings beneath the site.

To summarise, the main area of the site where there appears to be risk from unrecorded coal mining is to the southwest around Area 3 and Area 4. The outcrop of the Swansea Five Feet coal seam is shown to loop around to the west in the area of Gnoll House (Area 1) and is shown east-west across Area 3 and 4. These areas are therefore deemed 'high development risk' as could have been worked by shallow mining methods before records

began. This presents a risk of deep made ground where the seam was worked and backfilled or there is the possibility of unrecorded mine entries such as bell pits.

The report also shows the wooded area to the southeast of existing reservoir has two recorded mine shaft entries (although one likely a duplication) according to historical records, therefore the Coal Authority have also deemed this area also a 'high development risk zone'.

The areas to the north of the reservoir around Areas 2 and 5 appears to be at less of a risk from mining. The probable Brithdir Rider coal seam is shown to crop out in a south-west to north-east orientation some 240m to the north-west, in the area of the former mine entries identified on historical maps. The conjectural outcrop of the Glyngwilym coal seam is shown some 360m to the east. Given the distance from the site and the fact this area of the site is shown to be underlain by *massive* sandstone, the risk of shallow mining activities in these areas is considered low.

The area of the ruins (Area 1) was outside the CMRA but there are no shafts recorded in that area and the house was built in the 1700s so could be argued that it predates any historical mining.

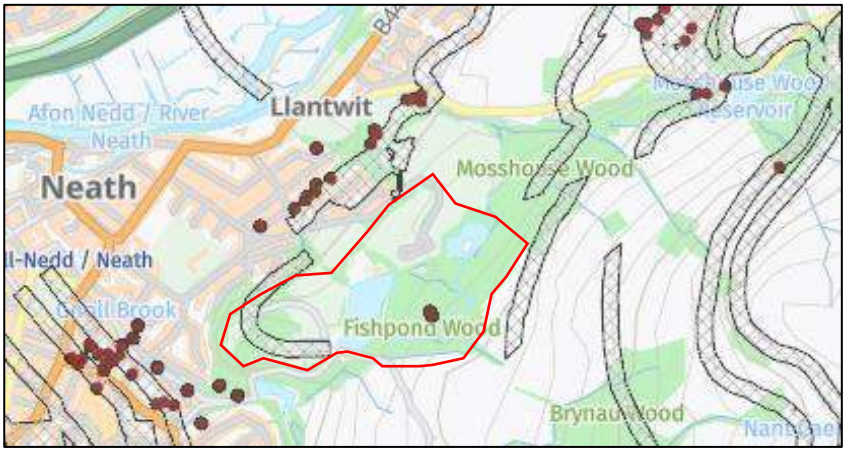


Figure 4: Extract from Coal Authority website, showing Zones of 'Development High Risk' and Mine Shaft Entries

It should be noted that the CMRA does not included the mine entry data sheets for the recorded mine shafts within the wooden area. We therefore recommend that these are obtained as part of any additional works and the CMRA updated accordingly with the findings.

3.3 Hydrogeology

The solid geology (Pennant Sandstone Formation) beneath the site is classed as Secondary 'A' Aquifer, based on the Environment Agency's (EA) interactive aquifer designation map.

Secondary A aquifers are defined as "*secondary A aquifers comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers".*

The EA describes the vulnerability of the aquifers in terms of high, medium and low risk. The solid geology is classified as medium vulnerability.

The site is not within a groundwater Source Protection Zone (SPZ).

3.4 Hydrology

The main surface water feature in the immediate vicinity of the site is the River Neath, which is located just over 500m to the northwest of the site.

Other surface water features on site includes the central fishing lake in the middle of the country park and a smaller fishing lake located to the northeast of the park. The two reservoirs are fed by a network of streams

which appear to flow from the northeast/east up gradient from the wooden area. Water is discharged from the central lake via a stream flowing down gradient to the west before assumed culverted from Ivy Lane.

Given the greenfield nature of the site, most surface water will drain through the soft scaping areas and little surface water runoff is expected.

The site is not located within a floodplain from rivers and sea or surface water flooding.

3.5 Radon Risk

The radon risk is reported on the UK Radon Atlas (ukradon.org). The guidance indicates that the site is in a moderate probability radon area (5 – 10% of homes are estimated to be at or above the Action Level) and therefore basic radon protection methods are required for construction of new buildings/dwellings.

A site-specific radon report is recommended to confirm this guidance is correct.

3.6 Site History

In summary, the site appears to have remained similar in terms of its features except for the extension of the woodland by the 1960s and in the 1980s, when the visitors centre was built. There is evidence of past mining features, in the form of the old mine shaft located within the woods in the south-east part of the site.

3.7 Preliminary Risk Assessment (Contamination

The potential contaminants described below have been identified from a study of the site history. The principal contaminative sources are as follows:

- Metals, metalloids – from unknown Made Ground sources or unknown coal mining areas.
- Hydrocarbons, PAHs, organics – from existing car parks or Made Ground sources/unknown coal mining areas.
- Asbestos/ACM – from Made Ground sources and existing shed/barns and outbuildings in Area 4.

4 Ground Investigation Works

4.1 General

A ground investigation was undertaken by Terra Firma (Wales) after being scoped by Jubb based on the requirements and proposed hole locations provided by the client. The ground investigation comprised trial pitting, soakaways, hand pits and TRL DCP's. The site works were carried out between the dates 5th to 7th June and 2nd to 3rd August 2023.

The site investigation works comprised:

- 12no Machine Excavated Trial Pits.
- 10no BRE 365 Soakaway Tests.
- 21no TRL DCPs.
- 8no Hand Excavated Foundation Pits.

The exploratory hole locations were decided via consultation between Jubb and Andrew Scott, based on the proposed development layouts with holes being moved accordingly with regards to site constraints at the time of the siteworks. No known previous investigations have been undertaken on site.

The factual ground investigation works are detailed in the Terra Firma factual ground investigation report (Ref No. 14092023-17887-1) which is contained in **Appendix G.**

A site walkover was undertaken by Jubb during the site investigation being undertaken, and the existing site conditions were inspected. This walkover, in combination with the review of site history, allowed the investigation to be targeted as follows:

Exploratory Hole	Area works carried out	Notes/Rational
TP01, TP11, TP12	Area 5	Trial pits were positioned in the proposed car park locations to confirm ground conditions and perform soakaway tests.
TP02, TP03, TP04, TP05, TP06, TP07, TP08, TP09, TP10	Area 2, Area 3, Area 4	Trial Pits were positioned in proposed building areas to confirm ground conditions and inform Geotechnical/foundation design. Also potential soakaway locations for the proposed developments.
HP01 to HP08	Area 1, Area 2, Area 3, Area 4, Area 6	Hand excavated pits were positioned around the existing buildings to prove foundation type, depth and dimensions.
DCP1 to DCP21	Area 1, Area 4, Area 5. Area 6 and proposed areas of pavement improvements as shown in **Appendix C**.	The DCP TRL locations were positioned in areas proposed for pavements and roads.

Table 1: Sampling Strategy

4.1.1 Trial Pits

Twelve trial pits (TP01 to TP12) were excavated using a 13-tonne tracked excavator and extended to depths of between 0.9m and 2.1m below existing ground levels. After detailed examination, measurement and sampling, the excavations were backfilled with arisings and compacted in layers using the machines bucket.

4.1.2 Soakaway Testing

Ten soakaway tests were undertaken within selected trial pits (TP01, TP02, TP03, TP04, TP06, TP07, TP08, TP09, TP11, TP12) at depths ranging between 1.10m to 2.10m below existing ground levels. Three fillings were achieved in the majority of pits except for TP04 and TP09 where insufficient drainage occurred during the first test.

4.1.3 Hand Excavated Pits

Eight hand excavated pits were excavated using appropriate hand tools and extended to a maximum depth of 1.20m below existing ground levels. After detailed examination, measurement and sampling, the excavations were backfilled with arisings and compacted in layers with any hardstanding reinstated.

4.2 Geotechnical Testing

Geotechnical testing was carried out by ASL Ltd in accordance with *BS1377: Methods of test for soils for civil engineering purposes*, as listed in the table below.

No. of Tests	Test	Test Method
	Classification Tests	
6	Liquid and plastic (Atterberg) limits.	BS1377: Part 2.
6	Moisture Content	BS1377: Part 2.
5	Particle Size Distribution Sieving	BS1377: Part 2.
	Compaction Tests	
3	Dry Density/OMC with 2.5kg rammer	BS1377: Part 4
	Chemical Test: Soil	
6	Water soluble sulphate, total (acid soluble) sulphate and total sulphur contents and pH value.	BRE SD 1

Table 2: Geotechnical Testing

4.3 Contamination Testing

The sampling strategy was based on obtaining sufficient samples from across the site for general coverage. Samples were submitted for a general 'greenfield' and 'brownfield' suite of testing, determinants as detailed below.

Suite	Determinants
Pathfinder Suite A - Greenfield	As, Cd, Cr, Cu, Pb, Ni, Se, V, Zn, Hg, pH, B, Cr(III), Cr(IV), PAH's
Pathfinder Suite B – Brownfield	As, Cd, Cr, Cu, Pb, Ni, Se, V, Zn, Hg, pH, B, Cr(III), Cr(IV), PAH's and Speciated Hydrocarbons (C10-C40), TOC and Asbestos screening

Table 3: Contamination Suite

The geo-environmental testing was carried out by Eurofins Ltd, a UKAS and MCERTS accredited laboratory. Sub-samples were taken from the exploratory holes and placed in appropriate environmental containers before being sent by courier to the laboratory in cool boxes. The number of soil samples tested are summarised in the table below:

Exploratory Hole	Depth (mbgl)	Analysis Undertaken
TP01, TP03	0.50, 0.20	Pathfinder Suite A - Greenfield
TP02, TP04, TP05, TP06, TP07, TP08, TP09, TP10, HP06	0.20, 0.30, 0.60, 0.4, 1.15, 0.50, 0.50, 0.60, 0.30.	Pathfinder Suite B – Brownfield

Table 4: Soil Contamination Testing

5 Ground Conditions

5.1 Ground Conditions Encountered

The ground conditions encountered across the site are summarised in the table below:

Description	Stratum	Encountered in	Typical depth to top of stratum (m bgl)	Typical depth to base of stratum (m bgl)	Average thickness (m)
Grass over firm light brown slightly sandy gravelly silty CLAY	Topsoil	TP02, TP03, TP11, TP12, HP-B	G.L	0.30	0.30
Dark grey very sandy silty angular and subangular fine to coarse brick fragment, concrete, slag, glass and sandstone GRAVEL. Occasional bricks and timber fragments.	Made Ground	TP04, TP05, TP06, TP08, TP09, TP10, HP01, HP02, HP03, HP04, HP05, HP06, HP-A	G.L	0.35 – 1.40	0.80
Firm brown sandy gravelly silty CLAY or Brown medium dense to dense at base sandy silty angular and subrounded fine to coarse tabulate sandstone GRAVEL	Weathered Pennant Sandstone Formation	TP01, TP02, TP03, TP11, TP12, TP04, TP05, TP06, TP07, TP08, TP09, TP10, HP02, HP03, HP07, HP-B	0.35 – 1.40	>3.20	-

Table 5: Ground Conditions Summary for Areas 1 - 6

5.1.1 Topsoil

5.1.1.1 Area 1

Topsoil was only encountered within a wooded grass area outside the Gnoll house ruins to the south with HP-B. The material comprised a brown sandy gravelly silty clay to a depth of 0.40m below ground level.

5.1.1.2 Area 2

Topsoil was encountered TP02 and TP03 within the grassed area west of the existing visitors' centre. The material typically comprised a brown sandy silty gravelly clay in TP02 and a brown silty sandy gravel in TP03 to a depth of 0.30m below ground level.

5.1.1.3 Area 5

Topsoil was encountered in TP11 and TP12 in the northern grass areas around the existing access road into the country park. The material typically comprised a brown sandy gravelly silty clay to a depth between 0.20m to 0.40m below ground level.

5.1.2 Made Ground

5.1.2.1 Area 1

Made Ground was encountered in HP02, HP03 and HP-A within Gnoll house ruins. The material typically comprised imported gravel surfacing over natural soils within HP02 and HP03, extending to depths between 0.12 to 0.20m below ground level.

HP-A encountered Made Ground in the form a brown sandy clay with gravels of sandstone, mudstone, slate, mortar and shale with the base of the material not proven (>1.20m). This material is likely backfill during the historic removal/demolition of Gnoll House.

5.1.2.2 Area 3

Made Ground was encountered in HP04 during foundation exposure of Pond Cottage. The material comprised a 80mm thick crushed concrete gavel at surface, overlying a brown sandy gravelly ashy clay with anthropogenic components of clinker, coal, ash, glass and brick fragments. The depth of the material could not be proven beyond 0.80m below ground level. This fill material likely used a backfill for the foundation excavations during the construction of Pond Cottage.

5.1.2.3 Area 4

Made Ground was encountered in TP04, TP05, TP06, TP08, TP09 and TP10 which typically comprised a sandy silty gravel comprising sandstone and anthropogenic components of brick, concrete, slag, coal, clinker, glass and timber. The material extended to depths of between 0.35m to 1.40m below existing ground levels.

The composition of the material specifically the presence of slag and clinker within TP04, TP05, TP06 and TP08 suggests the Kitchen Garden Area (Area 4) was used previously used for unknown industrial activities associated with the former Gnoll Cottage.

The Made Ground was encountered to a maximum depth of 1.40m within TP10. Based on historical maps from 1964, this area is shown to be a playground. This could be attributed to past site level raising to form a level platform for the playground.

5.1.3 Weathered Pennant Sandstone Formation

The weathered Pennant Sandstone Formation was encountered across all areas of site underlying the topsoil and made ground. The material typically comprised a firm brown, slightly sandy, gravelly silty clay at shallow depths before becoming brown slightly silty, gravel of sandstone.

The trial pits (TP01 to TP12) terminated between 1.20 to 2.40m depth with base of the weathered bedrock not proven. However, the termination of the pits was due to hard digging/ground so the termination depths could give an approximate indication of the depth of rock head.

5.2 Groundwater

No groundwater was encountered during the site works and no long term groundwater monitoring was carried out.

6 Material Properties

6.1 Weathered Pennant Sandstone Formation

The residual deposits of the weathered bedrock typically comprised a firm brown, slightly sandy, gravelly silty clay at shallow depths before typically grading into a destructured sandstone recovered as medium dense to dense brown slightly silty gravel.

6.1.1 Classification Properties

8no. samples were obtained from the residual soils for Atterberg testing, with all tests undertaken on the shallow cohesive material.

The samples of cohesive soil had natural moisture contents between 9% and 22% and a modified plasticity index of between 1% and 8% indicating the soil to be non-shrinkable. The sample comprised between 11% and 62% clay/ silt content.

The results are summarised in the table below and plotted on the A-Line chart in Figure 5.

	Minimum	Maximum	Average
Natural Moisture Content	9	22	14
Liquid Limit	25	36	31
Plastic Limit	16	36	20
Modified Plasticity Index	1	8	4

Table 6: Atterberg Limit Tests

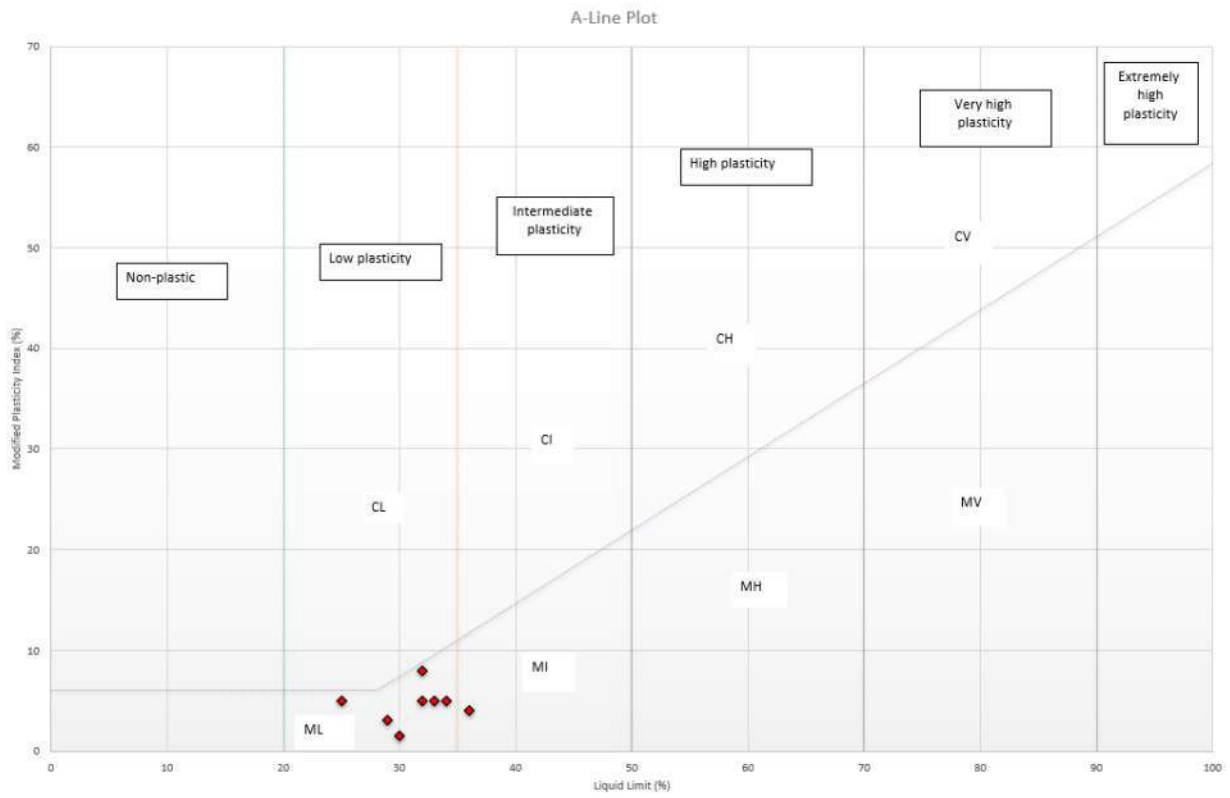


Figure 5: Summary of Plasticity Tests for Pennant Sandstone Formation

Taking into account the portion of the sample passing the 425μm sieve, the reported plasticity index values can be modified in accordance with NHBC standards Chapter 4.2 'Building Near Trees'. Based on this the samples all have a non-shrinkable potential and so no requirement on a minimum foundation depth when building near tress, when foundations are placed within the shallow cohesive residual soils.

5no. particle size distribution test (PSD) was carried out on the residual soils, the result is summarised below:

Particle Size	Minimum	Maximum	Average
Cobbles	0	0	0
Gravel	12	79	45
Sand	11	45	29
Silt/Clay	10	43	26

Table 7: Particle size distribution testing

Based on the single PSD results, the residual soils could be typically classed as clayey/silty sandy gravel. The PSD curves show two sets of different gradings suggesting the residual soils are slightly varied across whole site, but appears to become more granular with depth as shown both below and the exploratory hole logs contained in **Appendix G**.

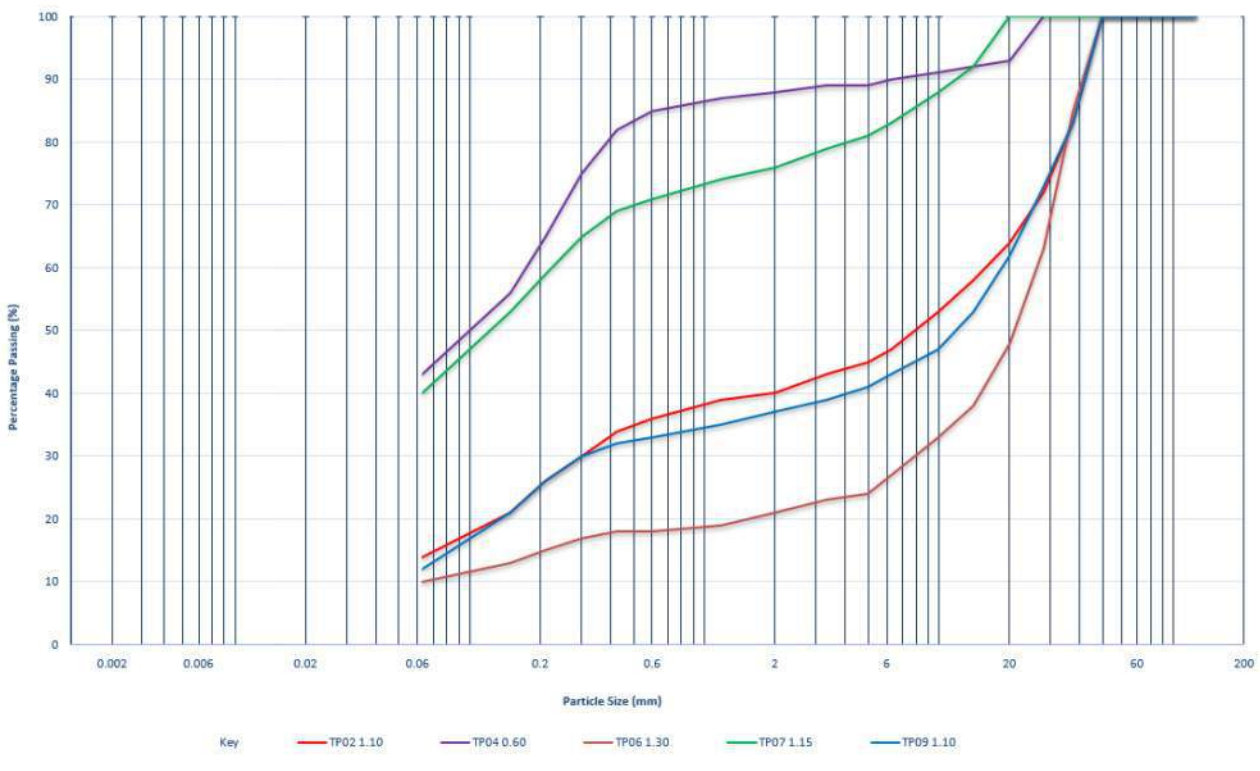


Figure 6: Weathered Pennant Sandstone Formation PSD Curve

7 Generic Quantitative Risk Assessment (Contamination)

7.1 General

The following comprises a Generic Quantitative Risk Assessment (GQRA) of contamination risk, in accordance with the methodology set out in **Appendix D**.

The following updated conceptual model information has been taken from the information obtained in **section 3.0 - 5.0** and from the site walkover**.**

7.2 Risks to Human Health

7.2.1 Soils

A summary of the chemical test results and a comparison against the relevant assessment criteria used in this case, are given in the tables below.

The generic assessment criteria used in this case are generally the LQM/CIEH Suitable 4 Use Levels (S4ULs), based on minimal or tolerable risk and are intended to be protective of human health. Different criteria are provided for a variety of land use, and the criteria for "Public Open Space (POS) (Park) end-use" has been adopted here based on the setting within a country park. It could be debatable whether Area 4 given its proposed development, is compared against the criteria "Residential without Plant Uptake end-use", but given the relatively short term exposure expected POS guidelines have been adopted for this analysis.

The exception to this is use of the C4SL levels for Lead, as S4UL are not provided for this substance.

Both the C4SL and S4UL are based on current best practice and reflect the most up to date guidance and legislation.

In accordance with best practice, individual exceedances of the relevant assessment criteria have been identified and comment provided where necessary.

7.2.1.1 Metals & Semi-metals

The tables below summarise the chemical results for metals and semi-metals across the site from the investigation:

Table 8: Summary of Soil Contamination – Metals and Semi Metals

Contaminant	C4SL/ S4UL (Commercial) mg/kg	Source	Measured concentrations mg/kg		95% UCL***	Number of individual exceedances
			Minimum	Maximum		
Arsenic (mg/kg)	170	S4UL	12	38	-	0/13
Cadmium (mg/kg)	532	S4UL	<0.10	0.45	-	0/13
Chromium (mg/kg)	33000	S4UL	12	26	-	0/13
Lead (mg/kg)	580		26	54	-	0/13
Mercury (mg/kg)	240	S4UL	0.06	0.27	-	0/13
Selenium (mg/kg)	1800	S4UL	0.63	1.0	-	0/13

Copper (mg/kg)	44000	S4UL	22	54	-	0/13
Nickel (mg/kg)	3400	S4UL	18	43	-	0/13
Zinc (mg/kg)	170000	CIEH	71	170	-	0/13
Total Cyanide (mg/kg)	480	CLEA	<0.50	0.60	-	0/13

- C4SL – DEFRA Category 4 Screening Levels (2014);
- S4UL – CIEH/LQM Suitable 4 use levels (2015);
- 95% Upper Confidence Limit (UCL) statistical analysis not undertaken where there are no contaminant exceedances and/or insufficient number of samples.

All samples tested were below the relevant guideline values within all areas.

7.2.1.2 Polyaromatic Hydrocarbons

The tables below summarise the results for speciated PAHs on site for all areas and have been split into two separate tables, one in samples tested from within the Made Ground and the second for samples tested within the natural soils.

The table below shows the results of the samples tested from within the made ground.

Table 9: Summary of Soil Contamination – PAHs – Made Ground

Contaminant	SGV/ GAC (mg/kg)	Source	Measured concentrations (mg/kg)		95% UCL	Number of individual exceedances
			Minimum	Maximum		
Acenaphthene	29000	CIEH	<0.10	0.61	-	0/7
Acenaphthylene	29000	CIEH	<0.10	1.2	-	0/7
Anthracene	150000	CIEH	<0.10	2.2	-	0/7
Benz[a]anthracene	49	CIEH	<0.10	12	-	0/7
Benzo[a]pyrene	11	CIEH	<0.10	10	-	0/7
Benzo[b]fluoranthene	13	CIEH	<0.10	14	-	1/7
Benzo[ghi]perylene	1400	CIEH	<0.10	6.4	-	0/7
Benzo[k]fluoranthene	370	CIEH	<0.10	5.4	-	0/7
Chrysene	13	CIEH	<0.10	12	-	0/7
Dibenz[ah]anthracene	1.1	CIEH	<0.10	2.3	-	1/7
Fluoranthene	6300	CIEH	<0.10	16	-	0/7
Fluorene	20000	CIEH	<0.10	0.59	-	0/7
Indeno[123-cd]pyrene	150	CIEH	<0.10	7.4	-	0/7
Naphthalene	1200	CIEH	<0.10	0.33	-	0/7
Phenanthrene	6200	CIEH	<0.10	4.4	-	0/7

Pyrene	15000	CIEH	<0.10	14	-	0/7

Notes:

- CIEH – Chartered Institute of Environmental Health Land Quality Management Generic
- Assessment Criteria (based upon worse-case 1% SOM content)
- - 95% Upper Confidence Limit (UCL) statistical analysis not undertaken where there are no contaminant exceedances and/or insufficient number of samples

The only exceedances encountered were from the sample taken in TP06 at 0.40m, in the following contaminants:

- Benzo[b]fluoranthene – 14mg/kg
- Dibenz[ah]anthracene – 2.3mg/kg

The elevation is likely attributed to the anthropogenic inclusions within the Made Ground including slag, likely associated with historical industrial activities in the area, although based on the PAH double ratio plot is likely to be coal derived, but presents a potential human health risk to future end users.

The table below shows the samples tested from within the natural soils.

Table 10: Summary of Soil Contamination – PAHs – Natural Soils

Contaminant	SGV/ GAC (mg/kg)	Source	Measured concentrations (mg/kg)		95% UCL	Number of individual exceedances
			Minimum	Maximum		
Acenaphthene	29000	CIEH	<0.10	6.6	-	0/6
Acenaphthylene	29000	CIEH	<0.10	43	-	0/6
Anthracene	150000	CIEH	<0.10	<0.10	-	0/6
Benz[a]anthracene	49	CIEH	<0.10	0.79	-	0/6
Benzo[a]pyrene	11	CIEH	<0.10	<0.10	-	0/6
Benzo[b]fluoranthene	13	CIEH	<0.10	<0.10	-	0/6
Benzo[ghi]perylene	1400	CIEH	<0.10	78	-	0/6
Benzo[k]fluoranthene	370	CIEH	<0.10	<0.10	-	0/6
Chrysene	13	CIEH	<0.10	0.36	-	0/6
Dibenz[ah]anthracene	1.1	CIEH	<0.10	35	-	1/6
Fluoranthene	6300	CIEH	<0.10	0.64	-	0/6
Fluorene	20000	CIEH	<0.10	29	-	0/6
Indeno[123-cd]pyrene	150	CIEH	<0.10	84	-	0/6
Naphthalene	1200	CIEH	<0.10	23	-	0/6
Phenanthrene	6200	CIEH	<0.10	0.15	-	0/6
Pyrene	15000	CIEH	<0.10	0.82	-	0/6

There was one exceedance of Dibenz[ah]anthracene encountered within TP07 at 1.15m in Area 3 (Pond Cottage) with a concentration of 35mg/kg, when compared against POS GAC's.

The sample from TP07 at 1.15m is logged as natural clay and no inclusions of coal are recorded or visual evidence of contamination identified. Given the depth of the sample and that future end-users are unlikely to come into contact with this material, therefore there is no pathway and the risk to end users is considered low.

7.2.1.3 Total Hydrocarbons

The only samples to record TPH above the detection limits were from TP06 at 0.40m and TP07 at 1.15m, where total TPH values of 330mg/kg and 43mg/kg were recorded.

No speciated TPH testing was carried out but given that these values are well below any of the individual guideline acceptance criteria for the individual species for public open space end use, then no exceedances of GAC are recorded.

7.2.2 Radon

The radon risk is reported on the UK Radon Atlas (ukradon.org). The guidance indicates that the site is in a moderate probability radon area (5 – 10% of homes are estimated to be at or above the Action Level) and therefore basic radon protection methods are required for construction of new buildings/dwellings.

A site-specific radon report is recommended to confirm this guidance is correct.

7.3 Ground Gas

No sources of gas were identified within Area 1, 2, 5 and 6, therefore the risk is considered negligible.

In Area 3 and 4 a thickness of made ground was encountered although no degradable material encountered, there's a residual risk from potential coal workings within Area 4. Confirmatory boreholes to investigate the potential of any unrecorded coal workings in the area and subsequent gas monitoring is recommended as per the previous coal mining risk assessment. This is however on the basis that the proposed buildings in this area are not suspended as camping type pods usually are.

7.4 Asbestos

Asbestos identification was carried out on 10no. samples across all areas of the site. No asbestos was detected in any of the samples screened.

7.5 Risk to Controlled Waters

No groundwater was encountered during the investigation. Given no significant visual/olfactory indications of contamination were noted during the investigation and the very limited amounts of Made Ground encountered across the site, the leaching risk to groundwater is considered very low.

The only minor elevations of PAH occurred within TP6 and TP7 which, based on topographic levels, are down gradient from the southwest surface water, therefore, the risk to surface waters is considered low.

7.6 Risks to Flora and Fauna

Based on the current design there are small areas of soft landscaping within the development and consequently a plant life risk assessment has been undertaken to assess the suitability of site won soils for re-use in these areas.

Generally copper, nickel, zinc, cadmium and mercury can inhibit plant growth so the results for these have been compared with values given in the Department of Environments, Code of Practice for Agricultural Use of Sewage Sludge, 1996. All values were below these concentrations and therefore no site to flora or fauna has been identified.

7.7 Risks to Adjacent Land and Third Parties

No significant risk to neighbouring occupiers has been identified.

7.8 Potential Geo-Environmental Liabilities

Potential geo-environmental liabilities under Part 2A of the Environmental Protection Act 1990 (as amended) and the Groundwater Regulations (GWR) 2009, relating to the site in its current condition is not considered likely based on the tests data available.

7.9 Off Site Disposal

A waste assessment of the soils in accordance with WM3 has been undertaken, in order to support further decisions regarding material movement and earthworks at the site. All 13no. samples tested were classified as non-hazardous using HazWasteOnline, therefore they can be deposited at a non-hazardous or an inert landfill.

The waste classification reports for each sample tested, are contained in **Appendix E**.

7.10 Updated Conceptual Site Model

Table 11 below shows the updated conceptual site model for all areas, which has been formulated based on the information obtained in the ground investigation and historic data.

Table 11 - Conceptual Site Model

Sources	Receptor	Pathway	Consequence	Probability	Risk	Recommended Action (to clarify level of risk and assess suitable mitigation measures or to mitigate the risk)
Metals, metalloids from Made Ground and natural sources	End Users	Ingestion Inhalation Direct Contact	Medium	Unlikely	Low Risk	No elevations above relevant GAC values.
	Groundwater Surface water	Leaching through unsaturated zone Surface wate runoff or drainage	Mild	Unlikely	Low Risk	No elevations so risk to controlled waters considered low.
Hydrocarbons, PAHs, organics – from Made Ground and natural sources	End Users	Ingestion Inhalation Direct Contact	Medium	Low likelihood	Low/Moderate Risk	PAH exceedance in two samples one within made ground and one in natural soil. Source of elevation likely attributed to anthropogenic material within Made Ground and coal fragments within weathered coal bearing strata Depth of contamination likely to come into contact with future end-users so mitigation measures in form of clean cover system is likely required around the TP06 area. Given the depth of the sample within TP07, future end-users are unlikely to come into contact with this material, therefore the pathway is severed and the risk to human health is considered low around TP07. Groundworkers likely to come in contact with material so use of suitable PPE and good hygiene practice on the site to mitigate risk. Toolbox talks and relevant information for groundworkers.
	Groundwater Surface water	Leaching through unsaturated zone Surface wate runoff or drainage	Medium	Unlikely	Low Risk	Given the marginal exceedances of contaminants, underlying natural soils being cohesive around TP07 and the contaminated soils being down gradient of surface water features, the leaching risk to groundwater and surface water features is considered low, therefore no further action is warranted.
Asbestos	End Users	Ingestion Inhalation Direct Contact	Medium	Unlikely	Low Risk	No Asbestos detected.
Ground gases	End Users	Inhalation	Medium	Unlikely	Very Low Risk/Low risk	No sources of gas were identified within Area 1, 2, 5 and 6.

Sources	Receptor	Pathway	Consequence	Probability	Risk	Recommended Action (to clarify level of risk and assess suitable mitigation measures or to mitigate the risk)
	Buildings	Migration into structure (explosive/fire risk)	Medium	Unlikely	Very Low Risk/Low risk	In Area 3 and 4 a thickness of made ground was encountered although no degradable material encountered, although residual risk from potential underground coal workings. Confirmatory boreholes to investigate the potential of any unrecorded coal workings in the area and subsequent gas monitoring is recommended as per the previous coal mining risk assessment.

7.11 Contamination Risk Summary

In summary, the following contamination risks has been identified:

Human Health

- Exceedance of Dibenz[ah]anthracene was encountered in TP07 at 1.15m – *low risk to human health.*
- Total TPH value of 43mg/kg recorded in TP07 at 1.15m above detection limit but below any individual species GAC – *low risk to human health.*
- Exceedance of Dibenz[ah]anthracene and Benzo[b]fluoranthene encountered in TP06 within Made Ground at 0.40m – low/*moderate risk to human health.*
- Total TPH value of 330mg/kg recorded in TP06 at 0.40m above detection limit but below any individual species GAC – *low risk to human health .*

Controlled Waters

- No groundwater was encountered during the investigation. Given no significant visual/olfactory indications of contamination were noted during the investigation and the very limited amounts of Made Ground encountered across the site, the leaching risk to groundwater is considered very low.
- Based on topographic levels and River Neath to the west, no significant visual/olfactory indications of contamination within soils and TP07 and TP06 are likely down gradient from the southwest surface water, therefore, the risk to surface waters is considered low.

Ground Gas

- No ground gas source encountered therefore very low gas risk in Area 1,2,5 and 6.
- In Area 3 and 4 a thickness of made ground was encountered although no degradable material encountered, there's a residual risk from potential unrecorded underground coal workings within Area 4. Confirmatory boreholes to investigate the potential of any unrecorded coal workings in the area and subsequent gas monitoring is recommended as per the previous coal mining risk assessment.

Based on the above, overall contamination risk within Area 1, 2, 3,5 and 6 is considered low. Exceedances of PAH's was recorded within a localised area of Made Ground within Area 4. Due to the limited number of exploratory holes and limited data set of tested samples, the elevated concentrations of PAH within the Made Ground around TP06 is assumed pervasive throughout Area 4. The soils therefore present a pathway to end users so mitigation measures likely required. The overall contamination risk in this area is considered low/moderate.

All samples tested were classified as non-hazardous for waste disposal purposes.

7.12 Mitigation Measures

Exceedances several PAH species were observed in the Made Ground within Area 4, so a source exists on site that is potentially harmful to human health. It is proposed that the site is to be covered either by the small lodges or large landscaped or courtyard areas and over the majority of the area. So, the pathway between the source and receptor will likely be present, with the landscaped areas that are in continuity with the underlying Made Ground.

In areas of Area 4 (Kitchen Gardens) that are to be covered by the proposed buildings and by hardstanding, the Made Ground will be covered thus sealing of the source from future human contact. Based on BRE (BR465, 2004), assuming imported material meets the adopted general acceptance criteria, it is recommended that a preliminary 550mm simple cover system is used, comprising at least 150mm topsoil layer, which should be tested to ensure it is uncontaminated and validated. A subsequent Remediation strategy and Verification Plan will be required to further detail the remedial works and provide validation for appropriate implementation of remedial measures.

Once final engineering levels of Area 4 are known, the recommended remedial measure above should be reviewed as placing the clean cover system may remove the contaminated Made Ground from site, thus making this mitigation measures unnecessary.

To protect against risks of short-term contact with the site soils, site workers, all groundworkers and workers handling soils should use suitable site-specific PPE (including gloves and eyewear). Good hygiene and site management practices will be required (i.e. provision of hand washing and welfare facilities etc.).

Given the existence of Made Ground across the site, a watching brief should be maintained during groundworks and construction phases and any future significant earthworks, in particular in the area underlain by Made Ground, to ensure any unexpected contamination is dealt with correctly.

8 GEOTECHNICAL ASSESSMENT

8.1 Introduction

The proposed development across the various areas is likely to comprise several new buildings such as the new visitor centre (Area 2), extension to Pond Cottage (Area 3), footbridge (Area 6) and likely slabs for the proposed lodges (Area 4).

No proposed loads have been provided and the below is based on general recommendations of what would be expected from a traditional one/two storey residential development and may need revisiting once final designs are known.

In addition to the above it is proposed to extend existing car park (Area 5), create a new viewing platform around Gnoll House Ruins (Area 1) and the creation of a new adventure play area (near Area 6). The proposed plans for each area are contained within Appendix B.

8.2 Excavations

Excavation of shallow soils should be readily achievable using conventional plant and equipment. Made ground is likely to be encountered in areas across the site and likely comprises sand and/or gravel with anthropogenic components of brick, concrete, slag, glass and timber. Although not encountered during the investigation, obstructions within the Made Ground in the form of cobbles and boulders of concrete and brick, associated with historic structures around Gnoll Cottage, should be expected.

Elsewhere, where excavations extend towards the deeper granular residual soils or where there are more granular layers then some spalling of the excavation sides should be expected, especially around Area 1 and 2 of the site where the granular layer appears shallower. Potential spalling of excavation sides should also be expected with the relatively deep Made Ground encountered within Area 4.

Temporary excavations within the cohesive deposits should be stable in the short term at angles of no greater than 1V:1.5H (33°) but where the excavations extend into the more granular material then these should be reduced to 1V:2H (26°).

A risk assessment of the stability of any open excavation should be undertaken by a competent person and appropriate measures adopted to ensure safe working practise in and around open excavations. Further guidance on responsibilities and requirements for working near, and in, excavations can be obtained from the Construction Design and Management Regulations (2015); Construction Information Sheet 47: Inspections and Reports (2005) and HSG47: Avoiding Danger from Underground Services.

It is recommended a suitable easement zone for any excavations and enabling works is considered for the existing retaining wall for the southern access road cutting on the southern area boundary for Areas 3 and 4 to avoid undermining the structure.

Groundwater was not encountered during the investigation so unlikely to be encountered during site works, although water ingress after prolonged wet periods should be expected in the more granular material. Should any groundwater inflow be encountered, it should be readily controlled by traditional groundwater control methods such as sump and pump techniques in accordance with CIRIA Report C750 Groundwater Control.

8.3 Foundation Options

8.3.1 Area 1 – Gnoll House Ruins

Traditional strip foundations will likely be suitable within Area 1, extending through any Made Ground and into the cohesive residual soils of the Pennant Sandstone Formation that are at least firm in strength, encountered from a depth of 0.40m bgl. Based on a low plasticity clay, using a 0.6m wide foundation, within the firm clay with an undrained shear strength of at least 50kPa, would give an allowable bearing pressure in the order 100kPa.

8.3.2 Area 2 – Visitor Centre

Traditional strip foundations will likely be suitable within Area 2, extending through any Made Ground and into the granular residual soils of the Pennant Sandstone Formation. Based on a traditional 0.6m wide foundation, founding at a minimum depth 0.45m within the slightly silty angular gravel an allowable bearing pressure in the order 125kPa should be achievable.

The hand inspection pit carried out around the existing foundations extended 0.8m and showed the existing foundations placed within the cohesive Made Ground. Foundations within the footprint of the existing building will need to extend through any Made Ground and into the underlying natural weathered granular deposits.

Once the existing structure is demolished it may be prudent to carry out additional trial pits within the footprint and on the eastern side of the visitor centre to confirm ground conditions remain similar to findings in TP02 and TP03.

8.3.3 Area 3 – Pond Cottage

Traditional strip foundations will likely be suitable within Area 3, extending through any Made Ground and the upper dark brown silty material and into the cohesive residual soils of the Pennant Sandstone Formation that are at least firm in strength, encountered from a depth of 1.1m bgl. Based on a low plasticity clay, using a 0.6m wide foundation, within the firm clay with an undrained shear strength of at least 50kPa, would give an allowable bearing pressure in the order 100kPa.

8.3.4 Area 4 – Kitchen Gardens and Service Yard

Traditional strip foundations will likely be suitable within Area 4, extending through any Made Ground and into the cohesive residual soils of the Pennant Sandstone Formation that are at least firm in strength at a minimum foundation depth of 0.75mbgl. Based on a low plasticity clay, using a 0.6m wide foundation, within the firm clay with an undrained shear strength of at least 50kPa, would give an allowable bearing pressure in the order 100kPa.

In the areas of TP06, TP08 and TP09, granular soils were encountered from a depth of between 0.60 to 0.95m. Foundations in these areas should extend through the Made Ground and placed within the granular deposits where similar bearing pressures to above can be expected. Given that the area is shown to be covered by both cohesive and granular deposits at foundation level, it is recommended that foundations within individual structures are placed within the same founding material.

In this area there is a risk from unrecorded shallow coal workings, should deeper areas of Made Ground be encountered during any further works then a raft foundation solution should be considered for the pods to mitigate the risk.

8.3.5 Area 6 – Pedestrian Footbridge

Traditional pad foundations will likely be suitable within Area 6, extending through any topsoil into the granular residual soils of the Pennant Sandstone Formation. Based on a traditional 1m wide foundation, founding at a minimum depth 0.45m within the silty sandy angular gravel an allowable bearing pressure in the order 100kPa should be achievable.

All formations should be inspected by a geotechnical engineer, to confirm founding stratum is of suitable strength for the proposed loads. Any sub formation materials deemed as unsuitable such as soft or loose zones should be excavated and replaced with well compacted suitable granular fill or lean mix concrete. Foundation excavations should be protected from water and inclement weather including frost and any water should be removed by pumping from a sump in the base of the excavation, prior to pouring of concrete.

8.4 Floor Slabs

8.4.1 Area 2 – Visitor Centre

Subject to confirmation of removal of Made Ground and the presence of granular soils, a ground bearing slab founding on the granular deposits should be suitable in this area.

8.4.2 Area 3 – Pond Cottage

The proposed extension in this area will require a suspended floor slab given the cohesive nature of the natural soils and that a greater thickness of Made Ground was encountered in HP04, as recommended in the National House-Building Council (NHBC) standards.

8.4.3 Area 4 – Kitchen Gardens

In this area slabs will likely be required as the base for any of the proposed lodges. Any Made Ground under the slabs should be removed and to expose the natural subgrade material. The material should be prepared and brought up to proposed site levels using suitable granular engineered fill and suitably compacted. If as mentioned above, a greater thickness of Made Ground associated with any backfill of shallow coal workings is encountered, then a thickened raft slab may be required.

8.5 Protection of Buried Concrete

The site generally classed as greenfield with Area 4 being classed as brownfield. The groundwater is assumed to be mobile. Sulphate testing in accordance with BRE SD1:2005 was carried out on selected samples across all areas of the site, the results of which are summarised in the table below.

Location	Depth	Total Sulphur (%)	Total Potential Sulphate (%)	Total Sulphate (%SO_4)	2:1 Water Soluble Sulphate (mg/l)	Oxidisable Sulphides (%)	pH
Made Ground							
TP06	0.40	0.01	0.03	0.03	14	0.06	7.9
TP08	0.80	0.01	0.03	0.03	10	0.01	8.1
Residual Soils – Pennant Sandstone Formation							
TP02	0.20	0.01	0.03	0.03	10	0.02	7.3
TP04	1.20	0.01	0.03	0.03	10	0.02	7.7
TP05	2.10	0.01	0.03	0.03	10	0.15	8.3
TP10	2.10	0.01	0.03	0.03	10	0.01	8.2
Characteristic Value		**0.01**	**0.03**	**0.03**	**14**	**0.15**	**8.3**

Table 12: BRE Sulphate Test Results

The characteristic value for each stratum was calculated and used to ascertain the relevant sulphate class for each material. Based on Table C2 of the BRE Special Digest 1:2005, the following concrete classifications for the different stratum have been obtain.

Oxidisable sulphides are all below 0.3% so it is assumed pyrite is not present and the following classification is based on water soluble sulphate results.

Made Ground: **DS-1 AC-1**

Residual Soils: **DS-1 AC-1.**

The concrete designer should use the above values to obtain the Design Chemical (DC) class and any additional protective measures (APM) required, in order to produce the concrete specification.

8.6 Earthworks

The proposed site levels have not been determined at this stage but given the relative flat nature of Area 1, 2, and 3, 5 and 6 these are expected to be similar to existing site levels.

The proposed site levels have not been determined at this stage for Area 4, but giving the sloping nature of the site, some minor earthworks is expected to create levelled platforms for the proposed holiday lodges. The main

materials likely subject to any earthworks will be some made ground that was encountered across the area and the underlying cohesive residual soils of the Pennant Sandstone.

Based on the classification testing of the residual soils of the Pennant Sandstone Formation, the cohesive soils would likely fall into 2C (Stoney Cohesive Material) when used as general fill, and the granular soils would either fall into Class 1A (Well graded granular material) or 2B (Uniformly graded granular material)in accordance with the SHW Series 600 – Manual of Contract Documents for Highway Works.

8.7 Pavement Design

In situ CBR testing was carried out by TRL dynamic cone penetration tests at locations adjacent to the trial pits to maximum depths of 0.90m bgl. The number of blows and amount of penetration was used to correlate the California Bearing Ratio (CBR). This correlation was conducted in accordance with the Interim Advice Note 73/06 Revision 1 (2009), design Guidance for Road Pavement Foundations (Draft HD25).

Where cohesive subgrade is encountered then it is recommended that a Restricted Design Approach is followed and based on typical CBR values from the table contained within the *Highways Agency Advice Note (73/06) Design Guidance for Road Pavement Foundations (linked to HD26/06),* based on plasticity index of less than 20% and assuming a thin layered construction of depth to subgrade of 300mm, then a conservative design equilibrium CBR value of 3% should be adopted.

In the areas of proposed pavements where granular subgrade is exposed then a preliminary design CBR of 8% can be used. In these areas it is recommended that a Performance Design Approach in accordance with CD 225 Design for new pavement foundations, is followed, with a testing regime to confirm that the performance criteria has been achieved in line with the design.

Where cohesive subgrade is exposed such as Area 5, then it is recommended that a Restricted Design Approach is followed an

The exposed subgrade should be proof rolled prior to placement of any capping material with any soft spots, such as any unexpected made ground and high natural moisture contents, are likely to have lower CBR values so they should be removed and replaced with a suitable engineered fill.

If following a period of disturbance, weathering or significant increase in moisture content, the CBR is found to be less than 2%, the sub-grade may be unsuitable for both the trafficking of site plant and as support for a permanent foundation, without improvement works being undertaken. Improvement works should be carried out in accordance with CD225. In summary, consideration may be given to the following potential remedial techniques:

- excavation and re-engineering or replacement of weaker soils;
- the inclusion of geosynthetic reinforcement within the unbound layers of the capping and sub-grade;
- where cohesive soils are present, and they are deemed suitable for treatment with hydraulic binders;
- to employ modification and/or stabilisation techniques on the formation.

8.8 Soakaway Design

The drainage strategy for the site suggests the surface water drainage option as infiltration via soakaways. Soakaway testing was carried out in the different areas and the following infiltration rates were calculated.

Test Location	Area	Depth of Base of Pit	Infiltration Rate	Strata
TP1	Area 5 – Car Park	2.0	2.14 x10^{-4} m/s Test 1 9.62 x10^{-5} m/s Test 2 7.69 x10^{-5} m/s Test 1	Weathered Bedrock
TP2	Area 2 – Visitor centre	1.4	8.74 x10^{-3} m/s Test 1	Weathered Bedrock

			6.94 x10^{-5} m/s Test 2 6.94 x10^{-5} m/s Test 3	
TP3	Area 2 – Visitor centre	1.4	1.60 x10^{-4} m/s Test 1 7.72 x10^{-5} m/s Test 2 6.94 x10^{-5} m/s Test 3	Weathered Bedrock
TP4	Area 4 – Kitchen Gardens	1.9	Insufficient Infiltration	Residual Clay
TP6	Area 4 – Kitchen Gardens	2.1	2.66 x10^{-4} m/s Test 1 1.10 x10^{-3} m/s Test 2 1.74 x10^{-4} m/s Test 3	Weathered Bedrock
TP7	Area 3 – Pond Cottage	1.1	5.45 x10^{-5} m/s Test 1 5.45 x 10^{-5} m/s Test 2 4.74 x10^{-5} m/s Test 3	Residual Clay
TP8	Area 4 – Kitchen Gardens	2.0	1.05 x10^{-3} m/s Test 1 3.51 x10^{-4}m/s Test 2 2.63 x10^{-4} m/s Test 3	Weathered Bedrock
TP9	Area 4 – Service Yard	1.6	Insufficient infiltration	Weathered Bedrock
TP11	Area 5 – Car Park	1.5	Insufficient infiltration	Residual Clay
TP12	Area 5 – Car Park	1.5	Insufficient infiltration	Residual Clay
HP-A	Area 1 – Gnoll Ruins	1.0	Insufficient infiltration	Made Ground
HP-B	Area 1 – Gnoll Ruins	1.2	Insufficient infiltration	Residual Clay

Table 13 : Soakaway Test Results Summary

The results show that infiltration will likely be possible in areas 2, 4 and 5, where the base of the soakaway is within the weathered bedrock material, the exception being in Area 4 where TP9 despite having the base within the weathered bedrock failed to infiltrate sufficiently to produce an infiltration rate. Infiltration rates of between 1.74 x10^{-4} m/s and 7.69 x10^{-5} m/s were recorded and the results from Test 3 of each test should be used for the corresponding areas for design purposes.

Where the soakaway tests were carried out with the base of the pit within the residual clays then infiltration was insufficient for an infiltration rate to be calculated, therefore soakaways via infiltration are not recommended in these areas. Although if taken deeper below the cohesive deposits and into the more granular weathered material they may be suitable, subject to testing.

8.9 Coal Mining Risk

8.9.1 Area 1 – Gnoll House Ruins

The area of the ruins (Area 1) was outside the CMRA but there are no shafts recorded in this area and the house was built in the 1700s so could be argued that it predates any historical mining. Therefore the risk from any unrecorded workings in this area is not considered low.

8.9.2 Area 2 – Visitor Centre

The BGS geological mapping (1:63,360, Glamorgan Coalfield, 1872) suggest crop workings 300m northwest of the Visitor Centre and dipping in a southeast direction. Therefore, the seam will likely dip below Area 2, but given the rate of dip as 7° based on the information given on the Coal Authority interactive viewer, the seam will be expected greater than 30m beneath this area. Given the relatively small footprint of the visitor centre and past construction work, the risk of unrecorded shafts is considered low. The findings from the previous CMRA also confirm no recorded mine shaft entries within 100m of the area. Therefore the risk from coal mining is considered low.

8.9.3 Area 3 – Pond Cottage

Area 3 is in an area that is shown to be close or within the high development risk area, associated with the Swansea Five Feet coal seam which is shown to crop through the area. Although unlikely to have been worked under Pond Cottage, confirmatory boreholes to investigate the potential of any unrecorded coal workings in the area is recommended.

8.9.4 Area 4 – Kitchen Gardens and Service Yard

Area 4 is in an area shown to be within a high development risk area, associated with the Swansea Five Feet coal seam which is shown to crop through the area. This presents a risk of deep made ground where the seam was worked and backfilled or there's the possibility of unrecorded mine entries such as bell pits. Made Ground was encountered across the area varying between 0.35 to 0.90m below ground level, so not excessive as would be expected if the area was extensively mined.. No other evidence of previous coal mining was encountered within Area 4 during the investigation. Confirmatory boreholes to investigate the potential of any unrecorded shallow coal workings in the area is recommended as per the previous coal mining risk assessment.

8.9.5 Area 5 – Main Car Park

Area 5 is away from the development high risk area and there are no underground recorded coal workings in this area, therefore there is not considered a risk from any coal mining risk.

8.9.6 Area 6 – Pedestrian Footbridge

Area 6 is away from the development high risk area and there are no underground recorded coal workings in this area, therefore there is not considered a risk from any coal mining risk.

There is a recorded coal mine entry approximately 30m away from the proposed adventure playground. It is recommended that the mine entry data sheet is obtained for this and a visual inspection of the location is carried out as part of any additional works.

8.10 Further Work

The following further work is recommended:

- Coal Mining ground investigation comprising of rotary boreholes to investigate any potential shallow coal seam workings beneath Area 4 (Kitchen Gardens).
- Subsequent Remediation Strategy and Verification Plan will be required to be submitted to the local authority for all proposed remedial measures.

9 GEOTECHNICAL RISK REGISTER

A Geotechnical Risk Register is a method of identifying hazards which may arise during the construction phase of works based on the data currently obtained for the site. The register is a work in progress and as further information arises, it should be updated in order to quantify the risk. At this stage, the aspects covered by the register are attributed to Cost and Health and Safety, although as site works commence, programme may become a prominent factor.

A Ground Risk Register that was started at the commencement of the ground investigation is contained within **Appendix F.**

10 References

[1] The British Standards Institution, BS EN 1997-1:2004+A1:2013 Incorporating corrigendum February 2009 Eurocode 7: Geotechnical design - Part 1: General rules, London: BSI Standards Limited, 2014.

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[3] The British Standards Institution, NA+A1:2014 to BS EN 1997-1:2004+A1:2013 Incorporating Corregendum No. 1 UK National Annex to Eurocode 7: Geotechnical design - Part 1: General rules, London: BSI Standards Limited, 2014.

[4] The British Standards Institution, "NA to BS EN 1997-2:2007 UK National Annex to Eurocode 7: Geotechnical design - Part 2: Ground investigation and testing," BSI Standards Limited, London, 2009.

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[7] The British Standards Institution, "BS 10175:2011 + A2:2017 Investigation of potentially contaminated sites - code of practice," BSI Standard Limited, London, 2017.

[8] Defra/Environment Agency, "CRL 11 (2004) contaminated land research report - Model procedures for the management of land contamination," Environment Agency, Bristol, 2004.

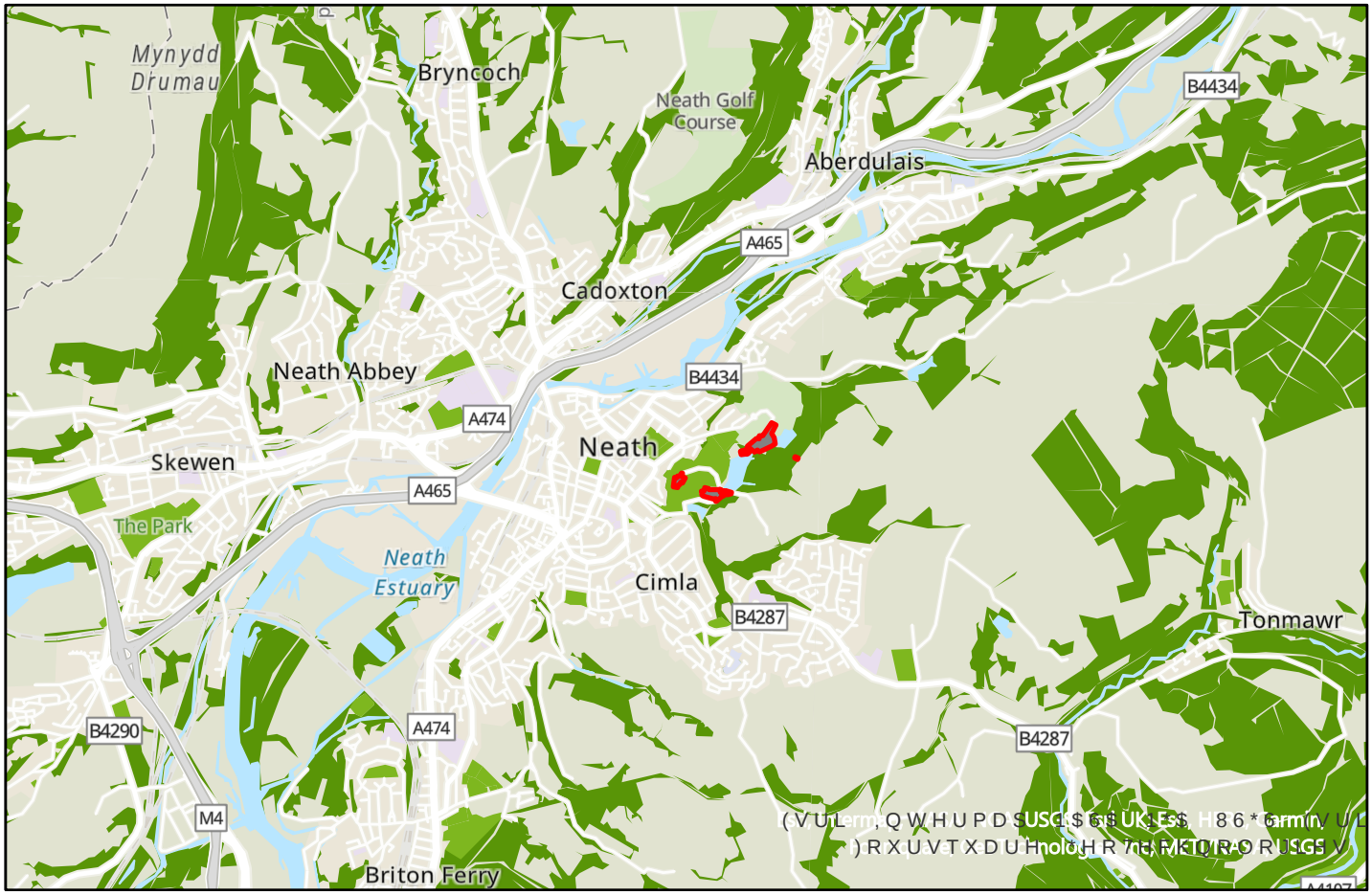
[9] The British Standards Institution, "BS EN 14688-1:2002 + A1:2013 Geotechnical investigation and testing. Identification and classification of soil. Identification and description," BSI Standards Limited, London, 2013.

[10] The British Standards Institution, "BS EN 14688-2:2004 + A1:2013 Geotechnical investigation and testing. Identification and classification of soil. Principles for a classification," BSI Standards Limited, London, 2004.

[11] The British Standards Institution, "BS EN 14689-1:2003 Geotechnical investigation and testing. Identification and classification of rock. Identification and description," BSI Standards Limited, London, 2003.

[12] Carter, M, and Bentley, S, P. (1991). *Correlations of soil properties.* Michigan: Pentech.

APPENDIX A: SITE LOCATION PLAN



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APPENDIX B: PROPOSED SITE DEVELOPMENT PLAN

Notes:

Responsibility is not accepted for errors made by others scaling from this drawing.

All construction information should be taken from figured dimensions only. Dimensions are in millimetres unless otherwise stated.

All dimensions and conditions are to be checked on site prior to preparing drawings or commencing any work.

Any variations or supplementary drawings are to be approved by The Architect.

All details are to be read in strict accordance with GA drawings and construction notes

All steelwork sizes, padstones, blockwork strengths and associated structural design to be in accordance with structural engineers design and requirements. Hiraeth Architecture accepts no liability to any discrepancies in the structural design indicated on these drawings. Any structural related queries should be directed to the project engineer immediately.

01310.1 GROUND FLOOR PLAN
SCALE 1:100 @ A1, 1:200 @ A3

SERIES	PROPOSED
SUITABILITY	S2 - ISSUED FOR INFORMATION

REV	DATE	NOTE
P1	01/06/2023	Issued for Information

Hiraeth.

job number 2325 Zone 02

Neath Port Talbot CBC
GNOLL PARK

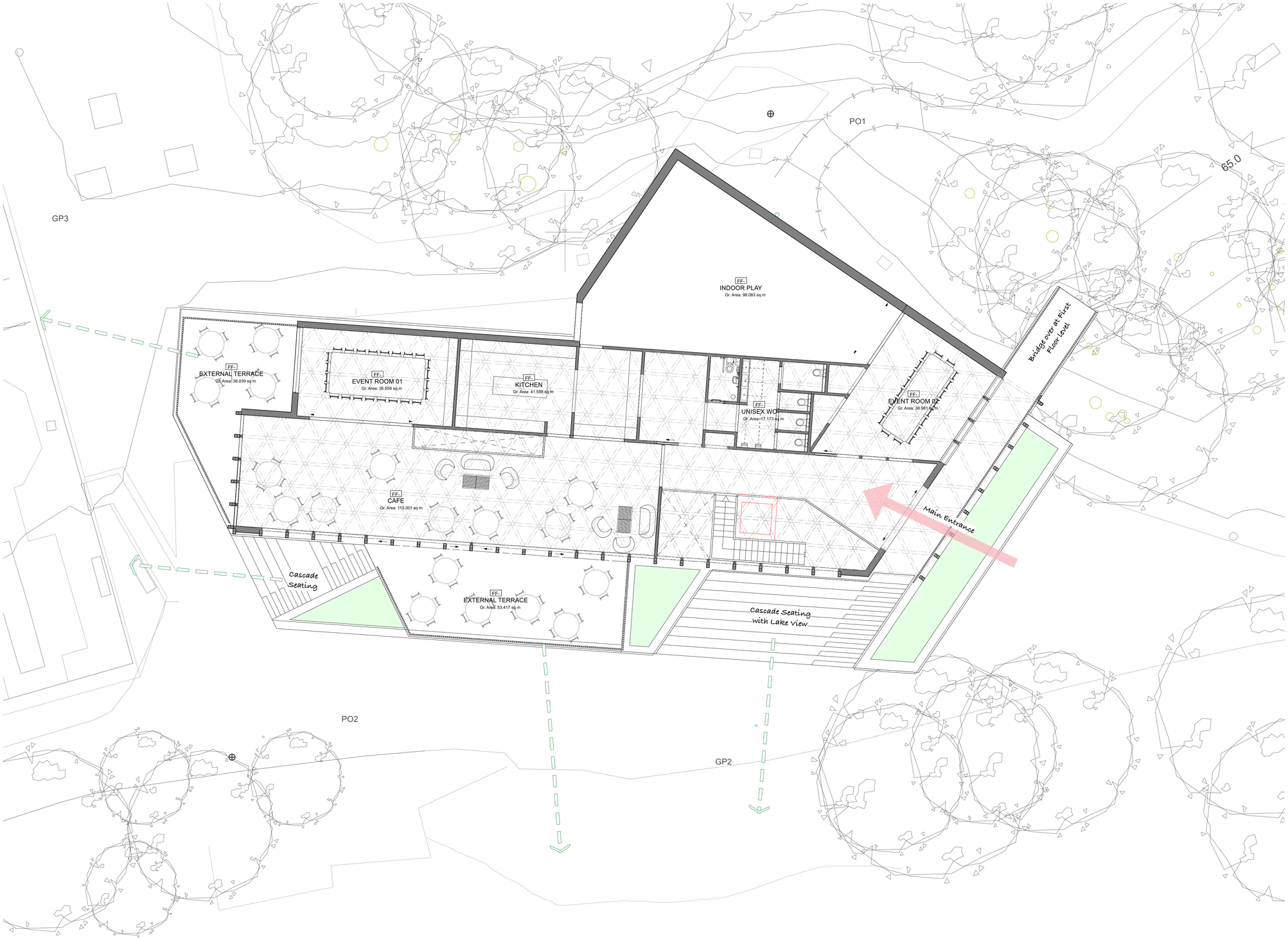
Ground Floor Plan

Scale **1:100 @ A1** Date **05/23**

02920 025814 | office@hiraetharchitecture.co.uk
The Maltings | East Tyndall St | Cardiff | CF24 5EA

UPRN	Zone	Originator	Role	Type	Sht number	S Code	Rev
2080	02	HIR	A	DR	01310	S2	P1

do not scale from this drawing | all dimensions to be verified on site | notify architect of all discrepancies | copyright Hiraeth architecture



Notes:

Responsibility is not accepted for errors made by others scaling from this drawing.

All construction information should be taken from figured dimensions only. Dimensions are in millimetres unless otherwise stated.

All dimensions and conditions are to be checked on site prior to preparing drawings or commencing any work.

Any variations or supplementary drawings are to be approved by The Architect.

All details are to be read in strict accordance with GA drawings and construction notes

All steelwork sizes, padstones, blockwork strengths and associated structural design to be in accordance with structural engineers design and requirements. Hiraeth Architecture accepts no liability to any discrepancies in the structural design indicated on these drawings. Any structural related queries should be directed to the project engineer immediately.

01320.1 FIRST FLOOR PLAN
SCALE 1:100 @ A1, 1:200 @ A3

SERIES	PROPOSED
SUITABILITY	S2 - ISSUED FOR INFORMATION

REV	DATE	NOTE
P1	01/06/2023	Issued for information

Hiraeth.

job number 2325 Zone 02

Neath Port Talbot CBC
GNOLL PARK

First Floor Plan

Scale **1:100 @ A1** Date **05/23**

02920 025814 | office@hiraetharchitecture.co.uk
The Maltings | East Tyndall St | Cardiff | CF24 5EA

UPRN	Zone	Originator	Role	Type	Sht number	S Code	Rev
2080	02	HIR	A	DR	01320	S2	P1

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APPENDIX C: EXPLORATORY HOLE LOCATION PLAN

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Bristol, Cardiff, Plymouth, Winchester
St James Court, St James Parade, Bristol BS1 3LH
jubb.uk.com
+44(0)117 922 6266

APPENDIX D: CONTAMINATION RISK ASSESSMENT METHODOLOGY AND DEFINITIONS

CONTAMINATION ASSESSMENT METHODOLOGY

The DEFRA and Environment Agency Contaminated Land Report 11 (CLR11) 'Model Procedures for the Management of Land Contamination' provides a technical framework for structured decision making about land contamination.

A1. Definition of Risk

CLR11 defines risk as "a combination of probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence".

A2. The Concept of the 'Pollutant Linkage'

In the context of contaminated land, there are three essential elements to any risk:

- a **contaminant (or source)** – a substance that is in, on or under land and has the potential to cause harm or cause pollution of controlled waters.
- a **receptor** - humans, ecological system, water body or property.
- a **pathway** – a route or means by which a receptor can be exposed to, or affected by, a contaminant.

Each of these elements can exist separately; however, they create a risk only where they are linked together forming a **pollutant linkage**.

A3. Conceptual Site Models

A conceptual site model represents the characteristics of the site in diagrammatic or written form that shows the possible relationships between contaminants, pathways and receptors (pollutant linkages).

For all potential pollutant linkages identified, the *consequence* and *probability* of occurrence is qualitatively assessed, and a *risk* assigned.

A4. The Tiered Risk Assessment Approach

CLR11 presents a tiered approach to risk:

Tier 1 *Preliminary risk assessment (PRA)*
The purpose of the preliminary risk assessment is to develop an initial conceptual model of the site and to establish whether or not there are potentially unacceptable risks. If potential risks are identified the initial conceptual model is developed in subsequent tiers of the risk assessment process.

Tier 2 *Generic quantitative risk assessment (GQRA)*
The purpose of the generic quantitative risk assessment is to establish whether generic assessment criteria and assumptions are appropriate for assessing the risks and, if so, to apply them to establish whether there are actual or potential unacceptable risks. It also determines whether further detailed quantitative risk assessment is required.

Tier 3 *Detailed quantitative risk assessment (DQRA)*
The purpose of the detailed quantitative risk assessment is to establish and use more detailed site-specific information and criteria to decide whether there are unacceptable risks. It may be used as the sole method of quantitative assessments of risks, or it may be used to refine earlier assessments using generic assessment criteria.

B. RISK ASSESSMENT DEFINITIONS

B1. General

The following classification and definition of risk assessment has been based on that set out in NHBC and EA Publication R&D 66 – Guidance on the Safe Development of Housing on Land Affected by Contamination (2008).

The key to the classification is that the designation of risk is based upon the consideration of both:

a) **the magnitude of the potential consequence (i.e., severity)**, which considers both the potential severity of the hazard, and the sensitivity of the receptor**.**

b) **the magnitude of probability (i.e., likelihood)**, which considers both the presence of the hazard, the receptor, and the integrity of the pathway.

B2. Classification of Consequence

Classification	Definition	Examples
Severe	Highly elevated concentrations likely to result in "significant harm" to human health as defined by the EPA 1990, Part 2A, if exposure occurs. Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce. Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.	Significant harm to humans is defined in circular 01/2006 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Major fish kill in surface water from large spillage of contaminants from site. Highly elevated concentrations of List I and II substances present in groundwater close to small potable abstraction (high sensitivity). Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).
Medium	Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs. Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce. Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.	Significant harm to humans is defined in circular 01/2006 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Damage to building rendering it unsafe to occupy e.g., foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.
Mild	Exposure to human health unlikely to lead to "significant harm". Equivalent to EA Category 3 pollution incident including minimal or short-lived effect on water quality; marginal effect on amenity value, agriculture or commerce. Minor or short-lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population. Minor damage to crops, buildings or property.	Exposure could lead to slight short-term effects (e.g., mild skin rash). Surface spalling of concrete.
Minor	No measurable effect on humans. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects of damage to buildings, structures and services.	The loss of plants in a landscaping scheme. Discoloration of concrete.

** For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned.*

B3. Classification of Probability

Only applies if there is a possibility of a pollutant linkage being present.

Classification	Definition	Examples
High likelihood	There is pollutant linkage, and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.	*a) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden.* *b) Ground/groundwater contamination could be present from chemical works, containing a number of USTs, having been in operation on the same site for over 50*
Likely	There is pollutant linkage, and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	*a) Elevated concentrations of toxic contaminants are present in soils at depths of 0.5-1.0m in a residential garden, or the top 0.5m in public open space.* *b) Ground/groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.*
Low likelihood	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place and is less likely in the shorter term.	*a) Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5-1.0m in public open space.* *b) Ground/groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.*
Unlikely	There is pollutant linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.	*a) Elevated concentrations of toxic contaminants are present below hard standing.* *b) Light industrial unit <10 yrs. old containing a double-skinned UST with annual integrity testing results available.*

Note: A pollution linkage must first be established before probability is classified. If there is no pollution linkage, then there is no potential risk. If there is no pollution linkage, then there is no need to apply tests for probability and consequence.

For example, if there is surface contamination and a major aquifer is present at depth, but this major aquifer is overlain by an aquiclude of significant thickness then there is no pollution linkage and the risks to the major aquifer are not assessed. The report should identify both the source and the receptor but state that because there is no linkage there are no potential risks.

B4. The Classification of Risk

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High likelihood**	Very high risk	High risk	Moderate risk	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

B5. Description of the Classified Risks

Very high risk

There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.

High risk
Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.

Moderate risk
It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.

Low risk
It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.

Very low risk
It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

No potential risk
There is no potential risk if no pollution linkage has been established.

B6. Definitions

Term	Definition
Hazard	A property or situation which in certain circumstances could lead to harm. The properties of different hazards must be assessed in relation to their potential to affect the various receptors.
Risk	A combination of the probability or frequency of the occurrences of a defined hazard AND the magnitude of the consequences of that occurrence.
Probability	The mathematical expression of the chance of a particular event in a given period of time [e.g., probability of 0.2 is equivalent to 20% or a 1 in 5 chance].
Impact	The adverse effects (or harm) arising from a defined hazard which impairs the quality of the environment or human health in the short or longer term.
Pollution linkage	An identified pathway is capable of exposing a receptor to a contaminant and that contaminant is capable of harming the receptor.

APPENDIX E: HAZWASTE ASESSMENT

HazWasteOnline™

Waste Classification Report

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

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

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

GBZCN-XU2A8-7W145

Job name

Gnoll Country Park

Description/Comments

Project

23157

Site

Gnoll Country Park, Neath

Classified by

Name:
Philip Webber
Date:
13 Sep 2023 11:55 GMT
Telephone:
01752 222200

Company:
Jubb Consulting Engineers Ltd
Unit 1 Ensign House
Parkway Court
Marsh Mills
PL6 8LR

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

HazWasteOnline™ Certification: -

Course	Date
Hazardous Waste Classification	50% complete

Purpose of classification

2 - Material Characterisation

Address of the waste

134 Fairyland, Neath SA11 3EF **Post Code** SA11 3EF

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Brownfield site - phase 2 GI results classification to inform earthworks strategy.

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

Potential excavation works to accommodate development.

Description of the waste

Made Ground.

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP01	0.5	Non Hazardous		3
2	TP02	0.2	Non Hazardous		5
3	TP03	0.2	Non Hazardous		7
4	TP04	0.30	Non Hazardous		9
5	TP05	0.60	Non Hazardous		11
6	TP06	0.4	Non Hazardous		13
7	TP07	1.15	Non Hazardous		15
8	TP08	0.5	Non Hazardous		17
9	TP09	0.5	Non Hazardous		19
10	TP10	0.6	Non Hazardous		21
11	HP06	0.10	Non Hazardous		23
12	TP11	0.6	Non Hazardous		25
13	HP01	0.5	Non Hazardous		27

Related documents

#	Name	Description
1	General Brownfield Soils	waste stream template used to create this Job

Report

Created by: Philip Webber

Created date: 13 Sep 2023 11:55 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	29
Appendix B: Rationale for selection of metal species	30
Appendix C: Version	30

Classification of sample: TP01

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

Sample details

Sample name:		LoW Code:	
TP01		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.5 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		13	mg/kg	1.32	17.164	mg/kg	0.00172 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.15	mg/kg	1.285	0.193	mg/kg	0.000015 %		
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		26	mg/kg	1.462	38	mg/kg	0.0038 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	32	mg/kg	1.56	49.914	mg/kg	0.0032 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.06	mg/kg	1.353	0.0812	mg/kg	0.00000812 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		41	mg/kg	1.126	46.161	mg/kg	0.00462 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		29	mg/kg	1.579	45.805	mg/kg	0.00458 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.94	mg/kg	1.405	1.321	mg/kg	0.000132 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		12	mg/kg	1.245	14.937	mg/kg	0.00149 %		
10		pH			PH		7.9	pH		7.9	pH	7.9 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		4.1	mg/kg		4.1	mg/kg	0.00041 %		
12		acenaphthylene		205-917-1	208-96-8		0.34	mg/kg		0.34	mg/kg	0.000034 %		
13		acenaphthene		201-469-6	83-32-9		0.29	mg/kg		0.29	mg/kg	0.000029 %		
14		fluorene		201-695-5	86-73-7		0.19	mg/kg		0.19	mg/kg	0.000019 %		
15		phenanthrene		201-581-5	85-01-8		0.2	mg/kg		0.2	mg/kg	0.00002 %		
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				0.16	mg/kg		0.16	mg/kg	0.000016 %		
			205-912-4	206-44-0									
18	•	pyrene				0.15	mg/kg		0.15	mg/kg	0.000015 %		
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.0202 %		

Key

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

Classification of sample: TP02

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

Sample details

Sample name:
TP02
Sample Depth:
0.2 m

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

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		12	mg/kg	1.32	15.844	mg/kg	0.00158 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.1	mg/kg	1.285	<0.129	mg/kg	<0.00001 %		**<LOD**
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		12	mg/kg	1.462	17.539	mg/kg	0.00175 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	25	mg/kg	1.56	38.995	mg/kg	0.0025 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.06	mg/kg	1.353	0.0812	mg/kg	0.00000812 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		29	mg/kg	1.126	32.651	mg/kg	0.00327 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		23	mg/kg	1.579	36.328	mg/kg	0.00363 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.63	mg/kg	1.405	0.885	mg/kg	0.0000885 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		71	mg/kg	1.245	88.375	mg/kg	0.00884 %		
10		pH			PH		7.3	pH		7.3	pH	7.3 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
12		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
15		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
18	•	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
27	•	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
				TPH									
										Total:	0.0228 %		

Key

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

Classification of sample: TP03

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

Sample details

Sample name:		LoW Code:	
TP03		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.2 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		33	mg/kg	1.32	43.571	mg/kg	0.00436 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.6	mg/kg	1.285	0.771	mg/kg	0.00006 %		
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		14	mg/kg	1.462	20.462	mg/kg	0.00205 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	54	mg/kg	1.56	84.23	mg/kg	0.0054 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.1	mg/kg	1.353	0.135	mg/kg	0.0000135 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		51	mg/kg	1.126	57.42	mg/kg	0.00574 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		18	mg/kg	1.579	28.431	mg/kg	0.00284 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.97	mg/kg	1.405	1.363	mg/kg	0.000136 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		100	mg/kg	1.245	124.471	mg/kg	0.0124 %		
10		pH			PH		6.9	pH		6.9	pH	6.9 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		3.1	mg/kg		3.1	mg/kg	0.00031 %		
12		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthene		201-469-6	83-32-9		0.61	mg/kg		0.61	mg/kg	0.000061 %		
14		fluorene		201-695-5	86-73-7		0.14	mg/kg		0.14	mg/kg	0.000014 %		
15		phenanthrene		201-581-5	85-01-8		0.15	mg/kg		0.15	mg/kg	0.000015 %		
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				0.12	mg/kg		0.12	mg/kg	0.000012 %		
			205-912-4	206-44-0									
18	•	pyrene				0.11	mg/kg		0.11	mg/kg	0.000011 %		
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.0336 %		

Key

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

Classification of sample: TP04

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

Sample details

Sample name:		LoW Code:	
TP04		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.30 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		30	mg/kg	1.32	39.61	mg/kg	0.00396 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.69	mg/kg	1.285	0.887	mg/kg	0.000069 %		
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		21	mg/kg	1.462	30.693	mg/kg	0.00307 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	55	mg/kg	1.56	85.79	mg/kg	0.0055 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.1	mg/kg	1.353	0.135	mg/kg	0.0000135 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		55	mg/kg	1.126	61.924	mg/kg	0.00619 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		31	mg/kg	1.579	48.964	mg/kg	0.0049 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.91	mg/kg	1.405	1.279	mg/kg	0.000128 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		130	mg/kg	1.245	161.813	mg/kg	0.0162 %		
10		pH			PH		8.4	pH		8.4	pH	8.4 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
12		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
15		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
18	•	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
27	•	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
				TPH									
										Total:	0.0412 %		

Key

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

Classification of sample: TP05

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

Sample details

Sample name:		LoW Code:	
TP05		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.60 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		20	mg/kg	1.32	26.407	mg/kg	0.00264 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.1	mg/kg	1.285	<0.129	mg/kg	<0.00001 %		**<LOD**
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		16	mg/kg	1.462	23.385	mg/kg	0.00234 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	57	mg/kg	1.56	88.909	mg/kg	0.0057 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.1	mg/kg	1.353	0.135	mg/kg	0.0000135 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		23	mg/kg	1.126	25.895	mg/kg	0.00259 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		21	mg/kg	1.579	33.169	mg/kg	0.00332 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.52	mg/kg	1.405	0.731	mg/kg	0.0000731 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		69	mg/kg	1.245	85.885	mg/kg	0.00859 %		
10		pH			PH		7.9	pH		7.9	pH	7.9 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
12		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
15		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
18	•	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
27	•	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
				TPH									
										Total:	0.0264 %		

Key

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

Classification of sample: TP06

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

Sample details

Sample name:		LoW Code:	
TP06		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.4 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		25	mg/kg	1.32	33.008	mg/kg	0.0033 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.1	mg/kg	1.285	0.129	mg/kg	0.00001 %		
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		14	mg/kg	1.462	20.462	mg/kg	0.00205 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	140	mg/kg	1.56	218.374	mg/kg	0.014 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.2	mg/kg	1.353	0.271	mg/kg	0.0000271 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		41	mg/kg	1.126	46.161	mg/kg	0.00462 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		21	mg/kg	1.579	33.169	mg/kg	0.00332 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.83	mg/kg	1.405	1.166	mg/kg	0.000117 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		73	mg/kg	1.245	90.864	mg/kg	0.00909 %		
10		pH			PH		7.9	pH		7.9	pH	7.9 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		0.33	mg/kg		0.33	mg/kg	0.000033 %		
12		acenaphthylene		205-917-1	208-96-8		1.2	mg/kg		1.2	mg/kg	0.00012 %		
13		acenaphthene		201-469-6	83-32-9		0.42	mg/kg		0.42	mg/kg	0.000042 %		
14		fluorene		201-695-5	86-73-7		0.59	mg/kg		0.59	mg/kg	0.000059 %		
15		phenanthrene		201-581-5	85-01-8		4.4	mg/kg		4.4	mg/kg	0.00044 %		
16		anthracene		204-371-1	120-12-7		2.2	mg/kg		2.2	mg/kg	0.00022 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				16	mg/kg		16	mg/kg	0.0016 %		
			205-912-4	206-44-0									
18	•	pyrene				14	mg/kg		14	mg/kg	0.0014 %		
			204-927-3	129-00-0									
19		benzo[a]anthracene				11	mg/kg		11	mg/kg	0.0011 %		
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				12	mg/kg		12	mg/kg	0.0012 %		
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				14	mg/kg		14	mg/kg	0.0014 %		
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				5.3	mg/kg		5.3	mg/kg	0.00053 %		
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				10	mg/kg		10	mg/kg	0.001 %		
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				7.4	mg/kg		7.4	mg/kg	0.00074 %		
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				2.3	mg/kg		2.3	mg/kg	0.00023 %		
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				6.4	mg/kg		6.4	mg/kg	0.00064 %		
			205-883-8	191-24-2									
27	•	TPH (C6 to C40) petroleum group				330	mg/kg		330	mg/kg	0.033 %		
				TPH									
										Total:	0.0803 %		

Key

	User supplied data
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because Not likely to be flammable below this concentration.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.033%)

Classification of sample: TP07

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

Sample details

Sample name:		LoW Code:	
TP07		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
1.15 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		20	mg/kg	1.32	26.407	mg/kg	0.00264 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.17	mg/kg	1.285	0.218	mg/kg	0.000017 %		
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20	mg/kg	1.462	29.231	mg/kg	0.00292 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	38	mg/kg	1.56	59.273	mg/kg	0.0038 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.1	mg/kg	1.353	0.135	mg/kg	0.0000135 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		49	mg/kg	1.126	55.169	mg/kg	0.00552 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		40	mg/kg	1.579	63.18	mg/kg	0.00632 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	1.405	1.405	mg/kg	0.000141 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		110	mg/kg	1.245	136.919	mg/kg	0.0137 %		
10		pH			PH		5.4	pH		5.4	pH	5.4 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		23	mg/kg		23	mg/kg	0.0023 %		
12		acenaphthylene		205-917-1	208-96-8		43	mg/kg		43	mg/kg	0.0043 %		
13		acenaphthene		201-469-6	83-32-9		6.6	mg/kg		6.6	mg/kg	0.00066 %		
14		fluorene		201-695-5	86-73-7		29	mg/kg		29	mg/kg	0.0029 %		
15		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				0.64	mg/kg		0.64	mg/kg	0.000064 %		
			205-912-4	206-44-0									
18	•	pyrene				0.82	mg/kg		0.82	mg/kg	0.000082 %		
			204-927-3	129-00-0									
19		benzo[a]anthracene				0.79	mg/kg		0.79	mg/kg	0.000079 %		
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.36	mg/kg		0.36	mg/kg	0.000036 %		
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				84	mg/kg		84	mg/kg	0.0084 %		
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				35	mg/kg		35	mg/kg	0.0035 %		
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				78	mg/kg		78	mg/kg	0.0078 %		
			205-883-8	191-24-2									
27	•	TPH (C6 to C40) petroleum group				43	mg/kg		43	mg/kg	0.0043 %		
				TPH									
										Total:	0.0695 %		

Key

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

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because Not likely to be flammable below this concentration.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0043%)

Classification of sample: TP08

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

Sample details

Sample name:		LoW Code:	
TP08		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.5 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		35	mg/kg	1.32	46.211	mg/kg	0.00462 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.75	mg/kg	1.285	0.964	mg/kg	0.000075 %		
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		21	mg/kg	1.462	30.693	mg/kg	0.00307 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	120	mg/kg	1.56	187.178	mg/kg	0.012 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.26	mg/kg	1.353	0.352	mg/kg	0.0000352 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		90	mg/kg	1.126	101.33	mg/kg	0.0101 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		27	mg/kg	1.579	42.646	mg/kg	0.00426 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	1.405	1.405	mg/kg	0.000141 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		180	mg/kg	1.245	224.049	mg/kg	0.0224 %		
10		pH			PH		8.3	pH		8.3	pH	8.3 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
12		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
15		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				0.18	mg/kg		0.18	mg/kg	0.000018 %		
			205-912-4	206-44-0									
18	•	pyrene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
			204-927-3	129-00-0									
19		benzo[a]anthracene				0.35	mg/kg		0.35	mg/kg	0.000035 %		
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				0.22	mg/kg		0.22	mg/kg	0.000022 %		
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
27	•	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
				TPH									
										Total:	0.058 %		

Key

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

Classification of sample: TP09

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

Sample details

Sample name:		LoW Code:	
TP09		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.5 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		34	mg/kg	1.32	44.891	mg/kg	0.00449 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.7	mg/kg	1.285	0.9	mg/kg	0.00007 %		
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20	mg/kg	1.462	29.231	mg/kg	0.00292 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	120	mg/kg	1.56	187.178	mg/kg	0.012 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.25	mg/kg	1.353	0.338	mg/kg	0.0000338 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		88	mg/kg	1.126	99.078	mg/kg	0.00991 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		26	mg/kg	1.579	41.067	mg/kg	0.00411 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.91	mg/kg	1.405	1.279	mg/kg	0.000128 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		170	mg/kg	1.245	211.601	mg/kg	0.0212 %		
10		pH			PH		8.5	pH		8.5	pH	8.5 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
12		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
15		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
18	•	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
27	•	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
				TPH									
										Total:	0.056 %		

Key

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

Classification of sample: TP10

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

Sample details

Sample name:		LoW Code:	
TP10		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.6 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		38	mg/kg	1.32	50.172	mg/kg	0.00502 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.22	mg/kg	1.285	0.283	mg/kg	0.000022 %		
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		19	mg/kg	1.462	27.77	mg/kg	0.00278 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	67	mg/kg	1.56	104.508	mg/kg	0.0067 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.2	mg/kg	1.353	0.271	mg/kg	0.0000271 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		120	mg/kg	1.126	135.107	mg/kg	0.0135 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		29	mg/kg	1.579	45.805	mg/kg	0.00458 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1.1	mg/kg	1.405	1.546	mg/kg	0.000155 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		150	mg/kg	1.245	186.707	mg/kg	0.0187 %		
10		pH			PH		8.3	pH		8.3	pH	8.3 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
12		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
15		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
18	•	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
27	•	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
				TPH									
										Total:	0.0526 %		

Key

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

Classification of sample: HP06

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

Sample details

Sample name:		LoW Code:	
HP06		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.10 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	21.125	mg/kg	0.00211 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.1	mg/kg	1.285	0.129	mg/kg	0.00001 %		
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20	mg/kg	1.462	29.231	mg/kg	0.00292 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	23	mg/kg	1.56	35.876	mg/kg	0.0023 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.06	mg/kg	1.353	0.0812	mg/kg	0.00000812 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		23	mg/kg	1.126	25.895	mg/kg	0.00259 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		36	mg/kg	1.579	56.862	mg/kg	0.00569 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.8	mg/kg	1.405	1.124	mg/kg	0.000112 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		83	mg/kg	1.245	103.311	mg/kg	0.0103 %		
10		pH			PH		8.6	pH		8.6	pH	8.6 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
12		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
15		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
18	•	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
27	•	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
				TPH									
										Total:	0.0272 %		

Key

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

Classification of sample: TP11

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

Sample details

Sample name:		LoW Code:	
TP11		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.6 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		25	mg/kg	1.32	33.008	mg/kg	0.0033 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.45	mg/kg	1.285	0.578	mg/kg	0.000045 %		
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20	mg/kg	1.462	29.231	mg/kg	0.00292 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	310	mg/kg	1.56	483.543	mg/kg	0.031 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.27	mg/kg	1.353	0.365	mg/kg	0.0000365 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		54	mg/kg	1.126	60.798	mg/kg	0.00608 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		30	mg/kg	1.579	47.385	mg/kg	0.00474 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	1.405	1.405	mg/kg	0.000141 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		170	mg/kg	1.245	211.601	mg/kg	0.0212 %		
10		pH			PH		8.2	pH		8.2	pH	8.2 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
12		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
15		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
18	•	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.0696 %		

Key

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

Classification of sample: HP01

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

Sample details

Sample name:		LoW Code:	
HP01		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.5 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		13	mg/kg	1.32	17.164	mg/kg	0.00172 %		
2		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.13	mg/kg	1.285	0.167	mg/kg	0.000013 %		
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		18	mg/kg	1.462	26.308	mg/kg	0.00263 %		
4		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	16	mg/kg	1.56	24.957	mg/kg	0.0016 %		
5		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.06	mg/kg	1.353	0.0812	mg/kg	0.00000812 %		
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		22	mg/kg	1.126	24.77	mg/kg	0.00248 %		
7		nickel { nickel dihydroxide }	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]		28	mg/kg	1.579	44.226	mg/kg	0.00442 %		
8		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	1.405	1.405	mg/kg	0.000141 %		
9		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		77	mg/kg	1.245	95.843	mg/kg	0.00958 %		
10		pH			PH		7.1	pH		7.1	pH	7.1 pH		
11		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
12		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
13		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
14		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
15		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
16		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
17	•	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-912-4	206-44-0									
18	•	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			204-927-3	129-00-0									
19		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
20		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
21		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
22		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
23		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
24	•	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-893-2	193-39-5									
25		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
26	•	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
			205-883-8	191-24-2									
27	•	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
				TPH									
										Total:	0.0238 %		

Key

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

Appendix A: Classifier defined and non GB MCL determinands

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

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

- **pH** (CAS Number: PH)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

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

Worst case species based on hazard statements

lead {lead chromate}

Worst case species based on hazard statements

mercury {mercury dichloride}

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

nickel {nickel dihydroxide}

Worst case species based on hazard statements

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

Worst case species based on hazard statements

zinc {zinc oxide}

Most likely to occur in oxides form in soils.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.2.GB - Oct 2021
HazWasteOnline Classification Engine Version: 2023.237.5731.10565 (25 Aug 2023)
HazWasteOnline Database: 2023.237.5731.10565 (25 Aug 2023)

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

APPENDIX F: GEOTECHNICAL RISK REGISTER

GEOTECHNICAL RISK REGISTER
GNOLL COUNTRY PARK, NEATH

Client: Andrew Scott
Principal Designer: TBC
Principal Contractor: TBC

No.	Hazard	Cause	Potential Impact					Risk Rating Before Control			Risk Control Measure	Risk Rating following control			Method of Communication
			Category				Consequence								
			H&S	Environmental	Programme	Cost		Likelihood	Effect	Risk Rating		Likelihood	Effect	Risk Rating	
1	Excavations - Collapse/Instability	Excessive Groundwater/ Rainfall Soft Ground Conditions Cuttings too steep/insufficient support. Granular nature of soils.	x		x	x	Damage to Plant and Equipment Death or Serious Injury.	2	5	10	Review ground investigation report for specific locality excavated. Provide briefing and method of safe working practice Ensure pumping and side support equipment are readily available Temporary batter slopes at safe angles to be determined by ground conditions.	1	5	5	Site investigation report Ground Conditions Assessment Report
2	Excavations – Surface water flooding	Excessive Rainfall event Prolonged periods of steady rainfall Western boundary in area at risk of surface water flooding			x		Collapse/ instability of excavations Delays to program	3	3	9	Forecast to be checked a week in advance and changes to works made to suit. Seasonal working. Provision of pumping equipment. Drains around upslope of any excavations. Management of surface water and run off.	1	3	3	Ground Conditions Assessment Report.
3	Contamination – Site Soils	Contamination from made ground on site.		x		x	Human Health Issues Increased Disposal Costs	1	4	4	Ground investigation to determine contamination status	1	4	4	Ground Conditions Assessment Report
4	Aggressive Chemicals (Sulphates)	Sulphate Levels				x	Degradation of concrete used in the ground Failure of foundations to meet required standards	2	3	6	BRE SD1 testing carried out. DS-1 AC-1 Concrete classification	1	3	3	Ground Conditions Assessment Report
5	Silt Run Off	Excessive rainfall		x			Silt run off into adjacent roadway and drains	4	2	8	Silt control measures should be in place on site	1	2	2	Construction Management Plan
6	Foundation - Ultimate limit state failure (Bearing Capacity)	Unknown loadings Degradation of concrete Insufficient depth of foundations	x			x	Building collapse/ need to rebuild	2	5	10	Ground investigation to be carried out to determine suitable foundation depth	1	5	5	Ground Conditions Assessment Report foundation section.
7	Serviceability limit state failure (settlement)	Plasticity Clays				x	Cracking/deformation of slabs	3	3	9	Plasticity testing of clays	1	3	3	Ground Conditions Assessment Report. NHBC Guidelines
8	Obstructions in natural soils	Cobbles			x	x	Unable to excavate through. Increased cost of disposal and earthworks.	2	3	6	Provision should be made in advance for dealing with cobbles and boulders, and exploratory logs inspected. Large plant with toothed buckets to excavate dense material.	1	3	3	Ground Investigation Report.
9	Buried Services	Exploratory holes located over buried services noticed to run through site	x				Damage to services, plant and personnel.	1	3	3	No known underground services under site. Obtain underground survey search prior to breaking ground.	1	3	3	Service drawings, constraints plan.
10	Groundwater	Shallow groundwater		x	x	x	Require the use of de-watering techniques. Discharge consents.	2	3	6	Groundwater not encountered during excavation. Any excavations that encounter groundwater will likely require dewatering.	1	3	3	Ground Conditions Assessment Report
11	Unexploded Ordnance	Striking underground UXO	x				Damage/death to plant and personnel	1	4	4	Site in a low bomb risk area.	1	4	4	Site in low risk area.
12	Radon	Site not in an area requiring radon protection measures				x	Inhalation of radon gas	1	4	4	Basic Protection Measures required although confirmation is required in the form of a site-specific radon report.	1	4	4	Ground Investigation Report.

GEOTECHNICAL RISK REGISTER
GNOLL COUNTRY PARK, NEATH

Client: Andrew Scott
Principal Designer: TBC
Principal Contractor: TBC

Probability	(P)		Impact	(I)		Risk	(R)
Very likely	5	x	Very high	5	=	Severe	20-25
Likely	4		High	4		Substantial	15-19
Plausible	3		Medium	3		Moderate	10-14
Unlikely	2		Low	2		Minor	5-9
Very Unlikely	1		Very low	1		Negligible	1-4

APPENDIX G: TERRA FIRMA – FACTUAL REPORT

terra firma

Geotechnical & Geoenvironmental Specialists

Ground Investigation Factual Report

Site: Gnoll Country Park, Neath, SA11 3EF

Prepared For: Jubb Consulting Engineers Limited

Issue Date: September 2023

Job No: 17887

info@terrafirmawales.co.uk

www.terrafirmawales.co.uk

V3

REPORT TITLE : **Ground Investigation Factual Report, Gnoll Country Park**

JOB NUMBER : **17887**

ISSUE DATE : **September 2023**

REPORT REFERENCE : **14092023-17887-1**

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	Name	Signature
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Checked	**James Rhys Williams** BSc, FGS, SGPV	
Approved	**Mathew Lake** Meng, FGS, Tech IOSH	

TABLE OF CONTENTS

SECTION 1 Introduction and Proposed Development 1

1.1 Introduction 1
1.2 Limitations and Exceptions of Investigation 1
1.3 Quality Assurance 1

SECTION 2 Review of Existing Data 2

2.1 Physical Setting and Current Site Use 2

SECTION 3 Field Investigation 1

3.1 Site Works 1
3.2 Ground Conditions 2
3.2.1 Miscellaneous Ground Conditions 2
3.3 Groundwater 2
3.4 Stability and Obstructions 2
3.5 Laboratory Chemical Testing 3
3.5.1 Sampling Strategy 3
3.5.2 Soil Laboratory Analysis 4
3.6 Soil Property Testing 5
3.6.1 In-situ Permeability Testing 5
3.6.2 Laboratory Geotechnical Testing 5

Tables

Table 3.1 Summary of Typical Ground Conditions 2
Table 3.2 Sample Locations and Depths 3
Table 3.3 Soil Laboratory Analysis 4
Table 3.4 Summary of Soakaway Results 5
Table 3.5 Summary of Geotechnical Testing 5

Annexes

ANNEX A Trial Pit Logs
ANNEX B Hand Pit Logs
ANNEX C Soakaway Calculation Sheets
ANNEX D TRL DCP Log Sheets
ANNEX E Chemical Test Results
ANNEX F Geotechnical Test Results

Drawings

Drawing 01, 02, 03 And 04 Site Layout

Hand Pit Foundation Drawings

SECTION 1 Introduction and Proposed Development

1.1 Introduction

TFW Group Ltd have been commissioned by Jubb Consulting Engineers Ltd to undertake a ground investigation at Gnoll Country Park, Neath

Jubb has provided the specification by which TFW Group Ltd are to work to while conducting the site investigation, of which the scope is as follows:

- Updated Factual Ground Investigation Report
- Professional Attendance by a TFW Group Ltd Engineer for all site works
- Surveying of Locations, Logging and Sampling
- Trial Pitting including select Soil Infiltration Tests
- In-Situ CBR testing using TRL DCP
- Laboratory Soil Property Testing
- Laboratory Soil Chemical Testing

A detailed specification is found in Appendix B of The Gnoll Country Park. Neath Ground Engineering Services – Ground Investigation Tender document supplied by Jubb Consulting Engineers Ltd.

In order to achieve the above objectives, TFW Group Ltd carried out an assessment programme consisting of a field investigation to collect geotechnical and geoenvironmental data from selected locations provided by Jubb.

1.2 Limitations and Exceptions of Investigation

The Ground Investigation was conducted, and this report has been prepared for the sole internal reliance of the Client and their design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of TFW Group Ltd. If an unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geoenvironmental and geotechnical consultants. TFW Group Ltd does not provide legal advice and the advice of lawyers may be required.

The subsurface geological profiles, any contamination and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

The investigation was performed in two phases from the 5th to the 7th of June and the 2nd and 3rd of August.

1.3 Quality Assurance

The quality and environmental aspects of the assessment comply with TFW Group Ltd business management system which is UKAS Accredited to ISO 9001:2015 and ISO 14001:2015 standards.

SECTION 2 Review of Existing Data

2.1 Physical Setting and Current Site Use

The site is irregular in shape and locates in its entirety within Gnoll Country Park, Neath.

The site is comprised of a mix of open lawn and woodland, alongside a lake to the south of the site, with several small streams running throughout.

Site boundaries are defined by Fairlyland estate to the northwest, Clima Crescent road and estate to the south, open fields and woodland to the east and north.

Offsite features include the town of Neath immediately to the southwest of the site

The site generally slopes towards the south with shallow slopes oriented towards the lake in the centre, which is contained by a dam.

The Site location and locations of each Trial Pit, Soakaway, Foundation Pit and DCP location may be found in **Drawings 01** to **04**

SECTION 3 Field Investigation

3.1 Site Works

A geotechnical and geoenvironmental site investigation comprising Trial Pitting with selected soakaway infiltration tests, TRL DCP tests and Hand pits were conducted in the following locations on the following dates:

Date	Location
5th June	TP04, TP07, TP10, TRL12, TRL13, TRL14, TRL15, TRL08
6th June	HP05, HP06, HP07, TP05, TP06, TP08, TP09, TRL10, TRL11, TRL9
7th June	TP01, TP02, TP03, TRL1, TRL2, TRL3, TRL16, TRL18
2nd August	HP-A, HP-B, TP11, TP12
3rd August	HP01, HP02, HP03, HP04

The fieldwork was supervised by TFW Group Ltd, who logged the exploratory holes to the requirements of BS 5930:2015+A1:2020. The proposed locations of the exploratory holes were determined by TFW Group Ltd in general accordance with BS 10175:2011+A2:2017 in order to assess the findings of the preliminary conceptual site model.

The ground levels and coordinates at each exploratory hole were established by TFW Group Ltd using GPS techniques.

Trial pits referenced TP01 to TP12, were formed using a JCB 3CX excavator with a 0.60m wide bucket.

Representative disturbed samples were taken and retained in airtight containers for environmental and geotechnical testing.

On completion all trial pits were backfilled with materials arisings compacted in layers using the excavator bucket. The ground surface was left proud to accommodate future settlement of backfilled materials.

The trial pit logs are presented in **Annex A.**

Hand Pits HP01 to HP07, including HP-A and HP-B were hand dug, Representative disturbed samples were taken and retained in airtight containers for environmental and geotechnical testing. Upon completion Hand Pots were backfilled with materials arising.

The Hand Pot logs are presented in **Annex B**

Soakaway tests were carried out in trial pits TP01, TP02, TP03, TP04, TP06, TP07, TP08, TP09, TP11 and TP12 in general accordance with BRE DG 365:2016. The excavation sides were squared using the excavator bucket and dimensions recorded within the test section. The trial pit was partially filled with clean water using a dedicated bowser with a 75mm diameter outlet and the fall in level recorded against time. The results are presented in **Annex C.**

Exploratory hole locations are shown on **Drawing 01** and **02**.

Dynamic Cone Penetrometer tests, referenced TRL01 to TRL21were carried out using a CNS Farnell A2465 dynamic cone penetrometer. Probe depths were measured with respect to ground level and the number of blows for the penetration of the probe was recorded. Equivalent CBR values have been calculated and presented with the results in **Annex D**.

HP08 and DCP19 could not be completed due to the steep topography, overgrown and riverine nature of the locations.

3.2 Ground Conditions

The ground conditions encountered by the exploratory holes can in general be summarised as shown in **Table 3.1**.

Table 3.1 Summary of Typical Ground Conditions

Depth (m)			Thickness (m)	Stratum
Trial Pits				
0.00	-	0.30/1.90	0.30/1.90	Slightly sandy gravelly CLAY/SILT
0.30/1.00	-	2.00/3.20	0.70/2.20	Sandy clayey GRAVEL
1.00	-	1.40/2.10	0.40/1.10	Sandy Silty GRAVEL (POSSIBLE BEDROCK) TP02, TP03. TP06 and TP09 only
Hand Pits				
0.0	-	0.60/0.80	0.60/0.80	Sandy gravelly CLAY (MADE GROUND)/Slightly sandy gravelly silty CLAY

3.2.1 Miscellaneous Ground Conditions

TP04 and TP05 exhibited sandy silty GRAVEL that was MADE GROUND between 0.35m and 0.60m

HP06 exhibited dense slightly sandy silty GRAVEL (MADE GROUND) between 1.00m to 1.10m.

3.3 Groundwater

Groundwater was not encountered during the investigation in any of the locations.

3.4 Stability and Obstructions

Trial pits remained stable and vertical during excavation.

Advancement of trial pit TP02, TP03, TP06 and TP09 was obstructed at 1.40m, 1.40m, 2.10m and 1.60m due to suspected bedrock.

3.5 Laboratory Chemical Testing

3.5.1 Sampling Strategy

Soil sampling locations were selected on a non-targeted basis to characterise the contamination status of a defined area of a site.

Sample locations, and depths are summarised in **Table 3.2**:

Table 3.2 Sample Locations and Depths

Location	Depth (m)
TP01	0.50
TP01	1.50
TP02	0.20
TP02	1.10
TP03	0.20
TP03	0.80
TP04	0.30
TP04	0.50
TP04	1.20
TP05	0.20
TP05	0.60
TP05	2.10
TP06	0.40
TP06	1.30
TP07	0.30
TP07	1.15
TP08	0.50
TP08	1.50
TP09	0.50
TP09	1.10
TP10	0.60
TP10	2.10
TP11	0.50
TP12	0.50
TP12	1.00
HP01	0.50
HP02	0.60
HP03	0.50
HP03	1.00
HP04	0.50
HP04	0.80
HP06	0.10
HP07	0.30
HP-A	0.60
HP-A	1.00
HP-B	0.80

3.5.2 Soil Laboratory Analysis

During the site investigation works soil samples were taken and despatched to the accredited laboratories of Eurofins Chemtest for laboratory chemical testing. Soil samples were tested for the determinands listed in **Table 3.3**.

Table 3.3 Soil Laboratory Analysis

Pathfinder A Suite	Pathfinder B Suite
Sulphate (Total)	Sulphate (Total)
Cyanide (Total)	ACM Type
Chromium (Trivalent)	Asbestos by Gravimetry Trigger
Chromium (Hexavalent)	Asbestos Identification
Dry Soil DCM/Docosane Pre	Cyanide (Total)
Organic Matter	Chromium (Trivalent)
Chrysene	Chromium (Hexavalent)
Benzo(b)fluoranthene	Dry Soil DCM/Docosane Pre
Benzo(a)pyrene	Organic Matter
Indenol(1,2,3-c,d)Pyrene	Chrysene
Dibenz(a,h)Anthracene	Benzo(b)fluoranthene
Benzo(g,h,i)perylene	Benzo(a)pyrene
Naphthalene	Indenol(1,2,3-c,d)Pyrene
Acenaphthylene	Dibenz(a,h)Anthracene
Acenaphthene	Benzo(g,h,i)perylene
Fluorine	Naphthalene
Phenanthrene	Acenaphthylene
Anthracene	Acenaphthene
Fluoranthene	Fluorine
Pyrene	Phenanthrene
Benzo(a)anthracene	Anthracene
Total (PAH)	Fluoranthene
Total Phenols	Pyrene
pH	Benzo(a)anthracene
Arsenic	Total (PAH)
Cadmium	Total Phenols
Chromium	pH
Copper	Arsenic
Mercury	Cadmium
Nickel	Chromium
Lead	Copper
Selenium	Mercury
Zinc	Nickel
	Lead
	Selenium
	Zinc
	Total TPH >C6-C40

The laboratory test results certificates may be found in **Annex E**.

3.6 Soil Property Testing

3.6.1 In-situ Permeability Testing

During the site investigation ten trial pit soakaway test were undertaken in TP01, TP02, TP03, TP04, TP06, TP07, TP08, TP09, TP11 and TP12 and carried out in general accordance with BRE DG 365:2016.

Soakaway test results are summarised in **Table 3.4**.

Table 3.4 Summary of Soakaway Results

Trial Pit	Depth Range of Test (m)	Infiltration Rate (ms^{-1})
TP01	1.50-2.00	7.69 x 10-5
TP02	0.90-1.40	6.94 x 10-5
TP03	0.90-1.40	6.94 x 10-5
TP04	1.28-1.90	Too Little Intake to Calculate Infiltration Rate
TP06	0.50-2.10	1.74 x 10-4
TP07	0.50-1.10	4.74 x 10-5
TP08	1.40-2.00	2.63 x 10-4
TP09	1.10-1.60	Too Little Intake to Calculate Infiltration Rate
TP11	1.00-1.50	Too Little Intake to Calculate Infiltration Rate
TP12	1.00-1.50	Too Little Intake to Calculate Infiltration Rate

The calculation sheets may be found in **Annex C**.

3.6.2 Laboratory Geotechnical Testing

A schedule of laboratory tests was prepared by TFW Group Ltd and samples were despatched to the accredited laboratories of Apex Testing Solutions. A summary of the testing carried out is presented in **Table 3.5**.

Table 3.5 Summary of Geotechnical Testing

Geotechnical Test	Standard (BS1377:1990)	No. Tested
Moisture Content	Part 2, Clause 3.2	8
4 Point Liquid and Plastic Limit	Part 2, Clause 4.3 & 5.3	8
PSD Wet Sieve Method	Part 2, Clause 9.2	5
Dry Den/MC (2.5kg Rammer Method 1 Litre Mould)	Part 4, Clause 4.3	3

The test results are presented in **Annex F**

ANNEX A
Trial Pit Logs

terra firma
Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: TP01

Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276604.00 - 197560.00 Level: 67.40	Date: 07/06/2023
Location: Neath		Dimensions: 1.50 × 0.60 Depth 2.00	Scale: 1:25
Client: Jubb			Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.50						Grass over firm light brown slightly sandy gravelly silty CLAY. Gravels are angular and subangular fine to coarse sandstone.
	1.50			1.40	66.00		Medium dense brown slightly sandy clayey angular to subrounded fine to coarse sandstone GRAVEL.
				2.00	65.40		End of Pit at 2.000m

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit terminated at 2.00m due to achievement of depth. On completion, trial pit backfilled with materials arising.

terra firma
Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: TP02

Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276478.10 - 197510.20 Level: 64.70	Date: 07/06/2023
Location: Neath		Dimensions: 1.50 × 0.60	Scale: 1:25
Client: Jubb		Depth 1.40	Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20			0.30	64.40		Grass over firm light brown slightly sandy gravelly silty CLAY. Gravels are angular and subangular fine to coarse sandstone.
				1.00	63.70		Medium dense tending to dense at base brown slightly silty sandy angular and subangular fine to coarse tabulate sandstone GRAVEL.
	1.10			1.40	63.30		Very dense brown sandy angular and subangular tabulate sandstone GRAVEL. (POSSIBLE BEDROCK)
							End of Pit at 1.400m

1 2 3 4 5

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit refused at 1.40m depth due to suspected bedrock. On completion, trial pit backfilled with materials arising.

terra firma
Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: TP03

Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276443.40 - 197474.20 Level: 63.00	Date: 07/06/2023
Location: Neath		Dimensions: 1.50 × 0.60	Scale: 1:25
Client: Jubb		Depth 1.40	Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20			0.30	62.70		Grass over dense reddish brown sandy silty angular and subangular fine to coarse tabulate sandstone GRAVEL.
	0.80			1.00	62.00		Medium dense tending to dense at baseorangish brown slightly silty sandy angular and subangular fine to coarse tabulate sandstone GRAVEL.
				1.40	61.60		Very dense brown sandy angular and subangular tabulate sandstone GRAVEL. (POSSIBLE BEDROCK)
							End of Pit at 1.400m

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit refused at 1.40m depth due to suspected bedrock. On completion, trial pit backfilled with materials arising.

terra firma
Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: TP04
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276304.00 - 197218.00 Level: 64.00	Date: 05/06/2023
Location: Neath		Dimensions: 1.50 × 0.60	Scale: 1:25
Client: Jubb		Depth 1.90	Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.30			0.40	63.60		Medium dense to dense dark grey very sandy silty angular and subangular fine to coarse brick fragment, concrete, slag, glass and sandstone GRAVEL. Frequent bricks and timber fragments. (MADE GROUND)
	0.50 1.20			1.90	62.10		Firm orangish brown slightly sandy slightly gravelly silty CLAY. Gravels are subrounded and subangular fine to coarse sandstone.
							End of Pit at 1.900m

1 2 3 4 5

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit terminated at 1.90m depth due to achievement of depth. On completion, trial pit backfilled with materials arising.

terra firma
Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: TP05

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276287.00 - 197191.00 Level: 63.80	Date: 06/06/2023
Location: Neath		Dimensions: 2.00 × 0.60	Scale: 1:25
Client: Jubb		Depth 2.40	Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.20						Medium dense to dense dark grey very sandy silty angular and subangular fine to coarse brick fragment, concrete, slag, glass and sandstone GRAVEL. Frequent bricks and timber fragments. (MADE GROUND)
				0.35	63.45		
	0.60						Firm orangish brown slightly sandy slightly gravelly silty CLAY. Gravels are subrounded and subangular fine to coarse sandstone.
				1.80	62.00		
	2.10						Medium dense to dense at base brown sandy silty angular and subrounded fine to coarse tabulate sandstone GRAVEL. Low sandstone cobble content becoming frequent at base.
				2.40	61.40		End of Pit at 2.400m

1 2 3 4 5

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit terminated at 2.40m depth due to achievement of depth. On completion, trial pit backfilled with materials arising.

terra firma
Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: TP06
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276272.00 - 197188.00 Level: 63.75	Date: 06/06/2023
Location: Neath		Dimensions: 2.00 × 0.60 Depth 2.10	Scale: 1:25
Client: Jubb			Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.40			0.60	63.15		Medium dense to dense dark grey very sandy silty angular and subangular fine to coarse brick fragment, concrete, slag, glass, ash and sandstone GRAVEL. Frequentl bricks, plastic sheeting and timber fragments. (MADE GROUND)
	1.30			2.00	61.75		Medium dense to dense at base brown sandy silty angular and subrounded fine to coarse tabulate sandstone GRAVEL. Occasional sandstone cobbles becoming frequent at base.
				2.10	61.65		Dense to very dense brown sandy angular and subangular tabulate sandstone GRAVEL. (POSSIBLE BEDROCK) End of Pit at 2.100m

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit refused at 2.10m depth due to suspected bedrock. On completion, trial pit backfilled with materials arising.

terra firma
Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: TP07

Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276336.00 - 197220.00 Level: 62.00	Date: 05/06/2023
Location: Neath		Dimensions: Depth 1.20 (0.50 × 0.50)	Scale: 1:25
Client: Jubb			Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.30						Soft locally firm dark brown slightly gravelly sandy clayey SILT. Gravels are rounded to subangular fine to coarse sandstone and mudstone.
	1.15			1.10	60.90		Firm orangish brown slightly sandy slightly gravelly silty CLAY. Gravels are subrounded and subangular fine to coarse sandstone.
				1.20	60.80		End of Pit at 1.200m

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit terminated at 1.20m depth due to maximum achievable depth. On completion, trial pit backfilled with materials arising.

terra firma
Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: TP08

Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276311.00 - 197174.00 Level: 62.70	Date: 06/06/2023
Location: Neath		Dimensions: 1.60 × 0.60	Scale: 1:25
Client: Jubb		Depth 2.00	Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.50			0.90	61.80		Firm dark brown slightly sandy gravelly clayey SILT/silty CLAY. Gravels are angular to subrounded sandstone, brick fragments, coal and cinter. (MADE GROUND)
	1.50			2.00	60.70		Brown medium dense to dense at base sandy silty angular and subrounded fine to coarse tabulate sandstone GRAVEL.Medium sandstone cobble content becoming high at base.
							End of Pit at 2.000m

1 2 3 4 5

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit terminated at 2.00m due to achievement of depth. On completion, trial pit backfilled with materials arising.

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Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: TP09

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276372.00 - 197213.00 Level: 62.10	Date: 06/06/2023
Location: Neath		Dimensions: 2.00 × 0.60	Scale: 1:25
Client: Jubb		Depth 1.60	Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.50			0.95	61.15		Very dense greyish brown slightly sandy clayey angular to rounded fine to coarse sandstone and concrete GRAVEL. Occasional sandstone cobbles.
	1.10			1.60	60.50		Dense to very dense brown clayey sandy angular and subangular tabulate sandstone GRAVEL. (POSSIBLE BEDROCK) End of Pit at 1.600m

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit refused at1.60m depth due to suspected bedrock. On completion, trial pit backfilled with materials arising.

terra firma
Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: TP10
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276258.00 - 197237.00 Level: 66.60	Date: 05/06/2023
Location: Neath		Dimensions: 2.00 × 0.60	Scale: 1:25
Client: Jubb		Depth 3.20	Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.60			1.40	65.20		Grass over firm light brown slightly sandy gravelly silty CLAY. Gravels are angular and subangular fine to coarse sandstone and concrete. (MADE GROUND)
	2.10			3.20	63.40		Medium dense to dense at base brown sandy silty angular and subrounded fine to coarse tabulate sandstone GRAVEL. Occasional sandstone cobbles becoming frequent at base.
							End of Pit at 3.200m

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit refused at 3.20m due to dense ground conditions. On completion, trial pit backfilled with materials arising.

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Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: TP11
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276676.00 - 197601.00 Level: 65.00	Date: 02/08/2023
Location: Neath		Dimensions: Depth 1.50, 2.00 × 0.60	Scale: 1:25
Client: Jubb			Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Grass over firm light brown slightly sandy gravelly silty CLAY. Gravels are angular and subangular fine to coarse sandstone.
				0.40	64.60		Medium dense brown sandy very clayey angular to subrounded fine to coarse sandstone GRAVEL.
	0.60			0.65	64.35		Firm locally stiff dark brown sandy gravelly CLAY. Gravels are angular to subrounded fine to coarse sandstone. Low cobble content.
	1.10						
				1.50	63.50		End of Pit at 1.500m

1 2 3 4 5

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit refused at 1.50m due to achievement of depth. On completion, trial pit backfilled with materials arising.

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info@terrafirmawales.co.uk
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Trial Pit Log

Trial Pit No: TP12

Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276631.00 - 197719.00 Level: 72.00	Date: 02/08/2023
Location: Neath		Dimensions: 2.00 × 0.60 Depth 1.50	Scale: 1:25
Client: Jubb			Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20	71.80		Grass over firm greyish brown sandy gravelly silty CLAY. Gravels are angular and subangular fine to coarse sandstone.
	0.50			0.80	71.20		Firm locally stiff dark brown sandy gravelly CLAY. Gravels are angular to subrounded fine to coarse sandstone. Low cobble content.
	1.00			1.50	70.50		Firm light greyish brown very sandy gravelly CLAY. Gravels are angular to subrounded fine to coarse sandstone. Low cobble content at top tending to high cobble content at base.
							End of Pit at 1.500m

1 2 3 4 5

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Trial Pit refused at 1.50m due to achievement of depth. On completion, trial pit backfilled with materials arising.

ANNEX B
Hand Pit Logs

terra firma
Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: HP01
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276485.00 - 197497.00 Level: 65.00	Date: 03/08/2023
Location: Neath		Dimensions: 0.50 × 0.50 Depth 0.80	Scale: 1:25
Client: Jubb			Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.04	64.96		CONCRETE slab comprised of light greyish brown matrix supported angular fine to medium aggregate gravel in a light grey sandy cement. (MADE GROUND)
	0.50						Firm dark brown sandy gravelly ashy CLAY. Gravels are angular and subangular fine to coarse sandstone, cinter, coal, ash, glass and brick fragments. (MADE GROUND)
				0.80	64.20		End of Pit at 0.800m

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Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Hand pit terminated at 0.80m due to achievement of objective. Upoin completion Hand Pit backfilled with arisings.

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Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: HP02
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276050.34 - 197295.30 Level: 67.00	Date: 03/08/2023
Location: Neath		Dimensions: 0.70 × 0.50	Scale: 1:25
Client: Jubb		Depth 0.80	Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.15	66.85		Loose red sandy angular and subangular fine to medium aggregate GRAVEL. (MADE GROUND)
				0.25	66.75		Medium dense dark grey angular and subangular medium to coarse aggregate GRAVEL. (MADE GROUND)
	0.60						Firm light brown sandy gravelly CLAY. Gravels are subangular and subrounded fine to coarse sandstone.
				0.80	66.20		End of Pit at 0.800m

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Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Hand pit terminated at 0.80m due to achievement of objective. Upoin completion Hand Pit backfilled with arisings.

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Tel: 02920 735354
info@terrafirmawales.co.uk
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Trial Pit Log

Trial Pit No: HP03
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276023.50 - 197271.30 Level: 66.70	Date: 03/08/2023
Location: Neath		Dimensions: 0.80 × 0.50	Scale: 1:25
Client: Jubb		Depth 0.60	Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.12	66.58		Loose dark grey angular and subangular fine to medium aggregate GRAVEL. (MADE GROUND)
							Firm brown sandy gravelly silty CLAY. Gravels are angular to subrounded fine to coarse sandstone.
	0.60			0.60	66.10		End of Pit at 0.600m
	1.00						

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Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Hand pit terminated at 0.60m due to achievement of objective. Upoin completion Hand Pit backfilled with arisings.

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Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: HP04
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276345.00 - 197208.00 Level: 63.00	Date: 03/08/2023
Location: Neath		Dimensions: 0.60 × 0.50	Scale: 1:25
Client: Jubb		Depth 0.80	Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.08	62.92		CONCRETE slab comprised of light greyish brown matrix supported angular fine to medium aggregate gravel in a light grey sandy cement. (MADE GROUND)
	0.50						Firm dark brown sandy gravelly ashy CLAY. Gravels are angular and subangular fine to coarse sandstone, cinter, coal, ash, glass and brick fragments. (MADE GROUND)
				0.80	62.20		End of Pit at 0.800m

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Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Hand pit terminated at 0.80m due to achievement of objective. Upoin completion Hand Pit backfilled with arisings.

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Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: HP05
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276324.00 - 197208.00 Level: 63.10	Date: 06/06/2023
Location: Neath		Dimensions: 0.50 × 0.50 Depth 0.90	Scale: 1:25
Client: Jubb			Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.90	62.20		Soft locally firm light brown slightly gravelly slightly sandy silty CLAY. Gravels are angular and subrounded fine to medium sandstone, mudstone, mortar and coal. (MADE GROUND)
							End of Pit at 0.900m

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Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Hand pit terminated at 0.90m due to achievement of objective. Upoin completion Hand Pit backfilled with arisings.

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Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: HP06
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276325.00 - 197196.00 Level: 62.80	Date: 06/06/2023
Location: Neath		Dimensions: 0.50 × 0.50 Depth 1.10	Scale: 1:25
Client: Jubb			Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10						Soft locally firm light brown slightly gravelly slightly sandy silty CLAY. Gravels are angular and subrounded fine to medium sandstone, mudstone, mortar and coal. (MADE GROUND)
				1.00	61.80		Dense dark brown angular and subangular fine to coarse silty sandy aggregate GRAVEL.
				1.10	61.70		End of Pit at 1.100m

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Hand pit terminated at 1.10m due to achievement of objective. Upoin completion Hand Pit backfilled with arisings.

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Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Trial Pit Log

Trial Pit No: HP07
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276853.00 - 197443.00 Level: 93.50	Date: 06/06/2023
Location: Neath		Dimensions: 0.50 × 0.50	Scale: 1:25
Client: Jubb		Depth 1.10	Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.30			1.10	92.40		Dense light brown slightly sandy silty angular to subrounded fine to coarse sandstone GRAVEL beconing increasingly clayey with depth. End of Pit at 1.100m

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Hand pit terminated at 1.10m due to achievement of objective. Upoin completion Hand Pit backfilled with arisings.

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Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
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Trial Pit Log

Trial Pit No: HP-A

Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276051.00 - 197283.00 Level: 63.80	Date: 02/08/2023
Location: Neath		Dimensions: 0.50 × 0.50 Depth 1.00	Scale: 1:25
Client: Jubb			Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.60						Grass over firm brown sandy gravelly CLAY. Gravels are angular and subangular fine to coarse sandstone, mudstone, slate, mortar and shale. (MADE GROUND)
	1.00			1.00	62.80		End of Pit at 1.000m

1 2 3 4 5

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Hand pit terminated at 1.00m due to achievement of objective. Upoin completion Hand Pit backfilled with arisings.

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Geotechnical & Geoenvironmental Specialists
Tel: 02920 735354
info@terrafirmawales.co.uk
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Trial Pit Log

Trial Pit No: HP-B
Sheet 1 of 1

Project Name: Gnoll Country Park	Project No: 17887 - Final	Co-ords: 276019.00 - 197238.00 Level: 64.10	Date: 02/08/2023
Location: Neath		Dimensions: 0.50 × 0.50 Depth 1.20	Scale: 1:25
Client: Jubb			Logged: JM

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							Grass over brown sandy gravelly silty CLAY. Gravels are angular to subrounded fine to coarse sandstone.
				0.40	63.70		Firm light brown sandy gravelly CLAY. Gravels are subangular and subrounded fine to coarse sandstone.
	0.80						
				1.20	62.90		End of Pit at 1.200m

Stability: Trial Pit Remained Stable

Remarks: Groundwater was not encountered during excavation. Hand pit terminated at 1.20m due to achievement of objective. Upoin completion Hand Pit backfilled with arisings.

ANNEX C
Soakaway Calculation Sheets

SOAKAWAY TEST

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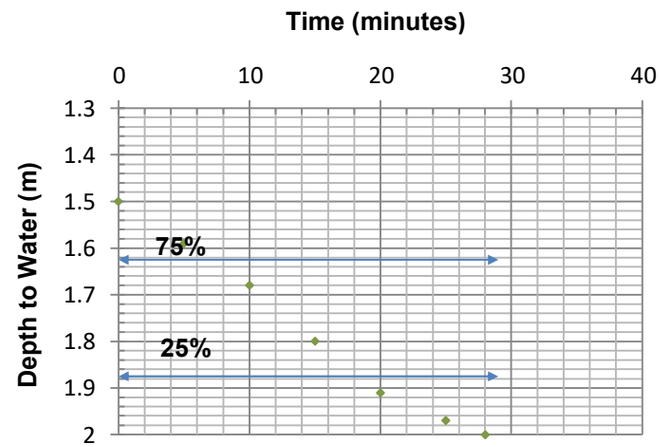
Site Name: Gnoll County Park
Project Number: 17887
Date: 07/06/2023
Engineer: JM

Trial Pit: **TP01**

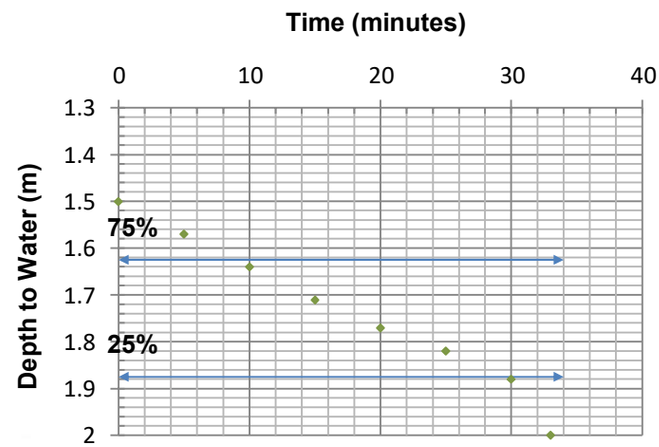
TEST 1

Length	1.50	m
Width	0.60	m
Depth	2.00	m
Fill Level	1.50	m
V_{p75-25}	0.225	m^3
a_{p50}	1.95	m^2
t_{p75-25}	9	minutes
Soil Infiltration Rate, f	**2.14E-04**	**ms^{-1}**



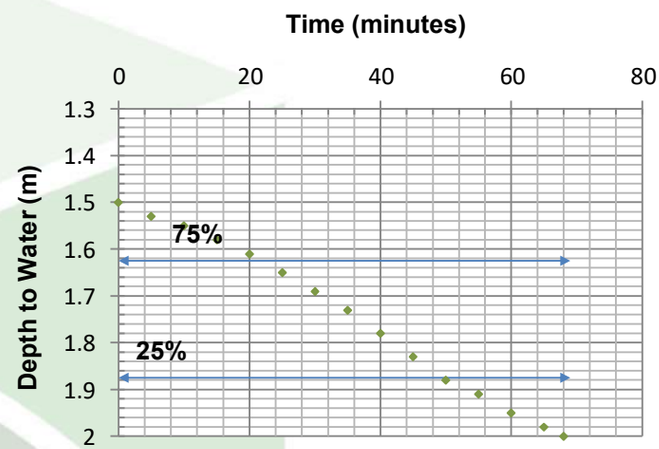
TEST 2

Length	1.50	m
Width	0.60	m
Depth	2.00	m
Fill Level	1.50	m
V_{p75-25}	0.225	m^3
a_{p50}	1.95	m^2
t_{p75-25}	20	minutes
Soil Infiltration Rate, f	**9.62E-05**	**ms^{-1}**



TEST 3

Length	1.50	m
Width	0.60	m
Depth	2.00	m
Fill Level	1.50	m
V_{p75-25}	0.225	m^3
a_{p50}	1.95	m^2
t_{p75-25}	25	minutes
Soil Infiltration Rate, f	**7.69E-05**	**ms^{-1}**



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

SOAKAWAY TEST

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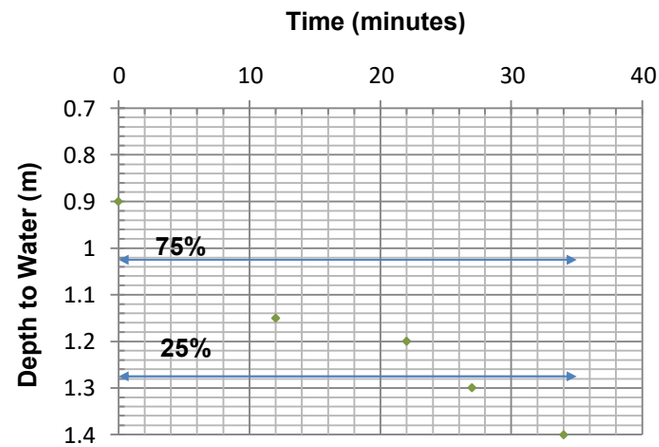
Site Name: Gnoll County Park
Project Number: 17887
Date: 07/06/2023
Engineer: JM

Trial Pit: **TP02**

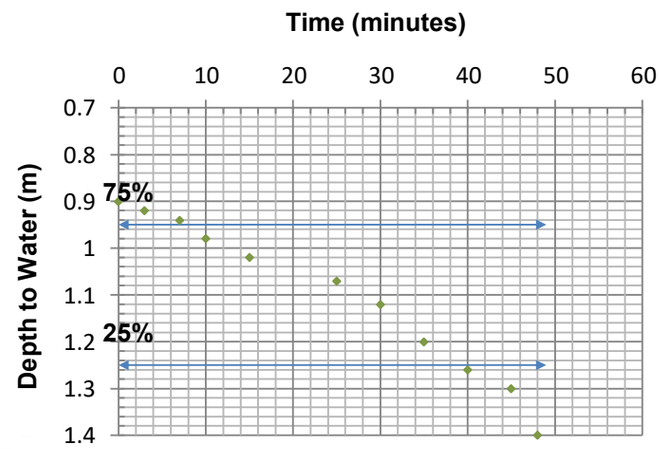
TEST 1

Length	1.50	m
Width	0.60	m
Depth	1.40	m
Fill Level	0.90	m
V_{p75-25}	0.225	m^3
a_{p50}	1.95	m^2
t_{p75-25}	0.22	minutes
Soil Infiltration Rate, f	**8.74E-03**	**ms^{-1}**



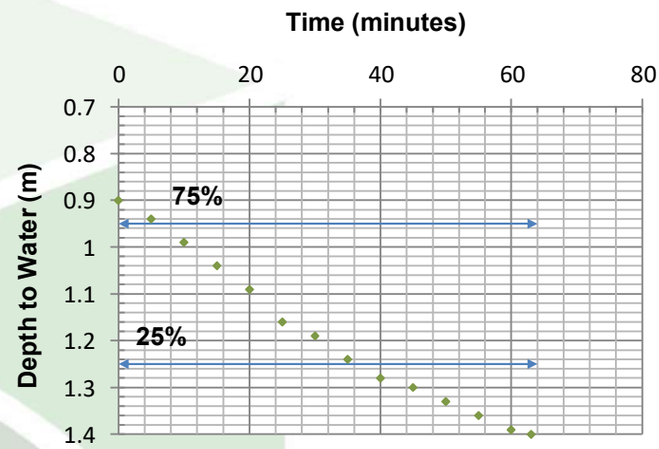
TEST 2

Length	1.50	m
Width	0.60	m
Depth	1.40	m
Fill Level	0.90	m
V_{p75-25}	0.27	m^3
a_{p50}	2.16	m^2
t_{p75-25}	30	minutes
Soil Infiltration Rate, f	**6.94E-05**	**ms^{-1}**



TEST 3

Length	1.50	m
Width	0.60	m
Depth	1.40	m
Fill Level	0.90	m
V_{p75-25}	0.27	m^3
a_{p50}	2.16	m^2
t_{p75-25}	30	minutes
Soil Infiltration Rate, f	**6.94E-05**	**ms^{-1}**



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

SOAKAWAY TEST

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Site Name: Gnoll County Park
Project Number: 17887
Date: 07/06/2023
Engineer: JM

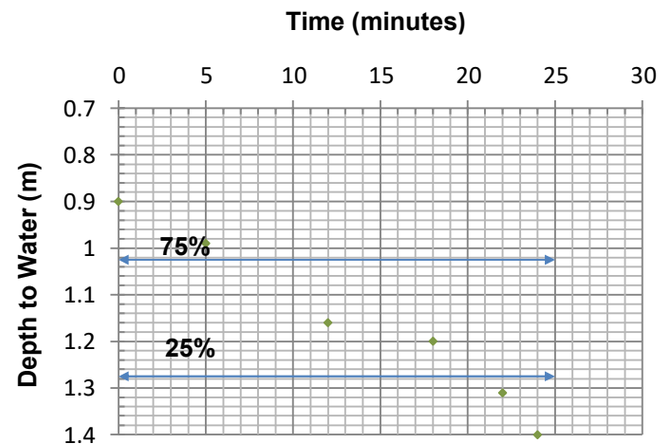
Trial Pit: **TP03**

TEST 1

Length	1.50	m
Width	0.60	m
Depth	1.40	m
Fill Level	0.90	m

V_{p75-25}	0.225	m^3
a_{p50}	1.95	m^2
t_{p75-25}	12	minutes

Soil Infiltration Rate, f **1.60E-04** **ms^{-1}**

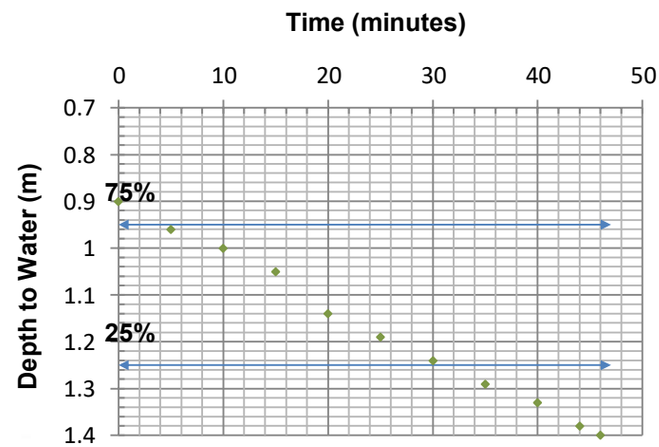


TEST 2

Length	1.50	m
Width	0.60	m
Depth	1.40	m
Fill Level	0.90	m

V_{p75-25}	0.27	m^3
a_{p50}	2.16	m^2
t_{p75-25}	27	minutes

Soil Infiltration Rate, f **7.72E-05** **ms^{-1}**

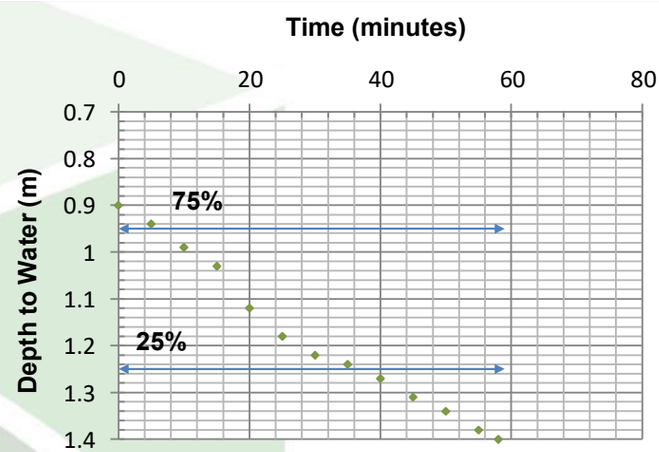


TEST 3

Length	1.50	m
Width	0.60	m
Depth	1.40	m
Fill Level	0.90	m

V_{p75-25}	0.27	m^3
a_{p50}	2.16	m^2
t_{p75-25}	30	minutes

Soil Infiltration Rate, f **6.94E-05** **ms^{-1}**



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

SOAKAWAY TEST

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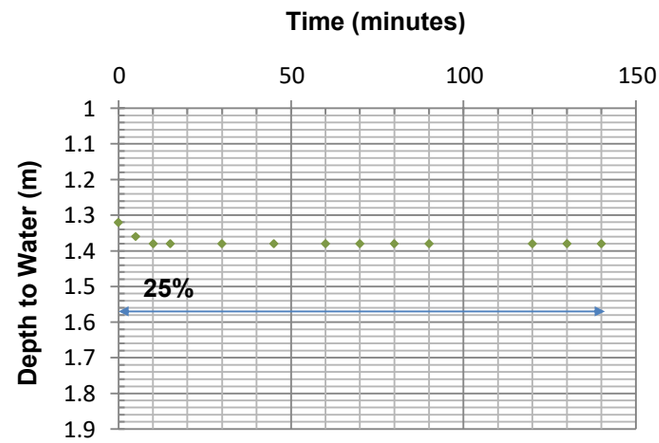
Site Name: Gnoll County Park
Project Number: 17887
Date: 05/06/2023
Engineer: JM

Trial Pit: **TP04**

TEST 1

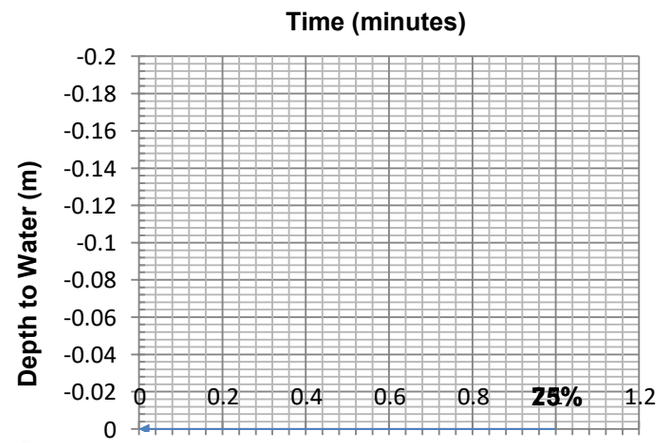
Length	1.50	m
Width	0.60	m
Depth	1.90	m
Fill Level	0.58	m
V_{p75-25}	0.594	m^3
a_{p50}	3.674	m^2
t_{p75-25}		minutes

Too Little Intake to calculate Infiltration



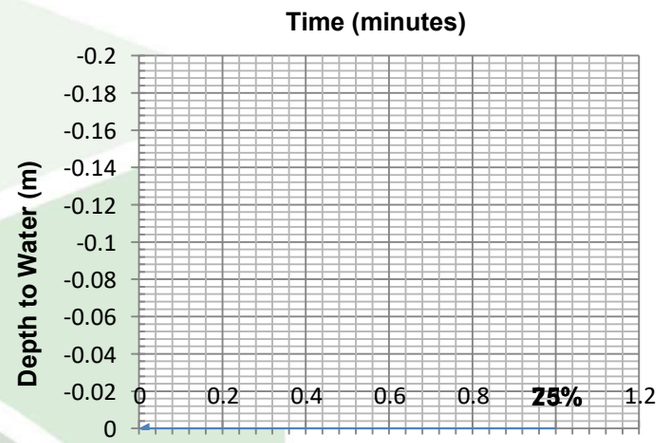
TEST 2

Length		m
Width		m
Depth		m
Fill Level		m
V_{p75-25}	0	m^3
a_{p50}	0	m^2
t_{p75-25}	0	minutes



TEST 3

Length		m
Width		m
Depth		m
Fill Level		m
V_{p75-25}	0	m^3
a_{p50}	0	m^2
t_{p75-25}	0	minutes



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

SOAKAWAY TEST

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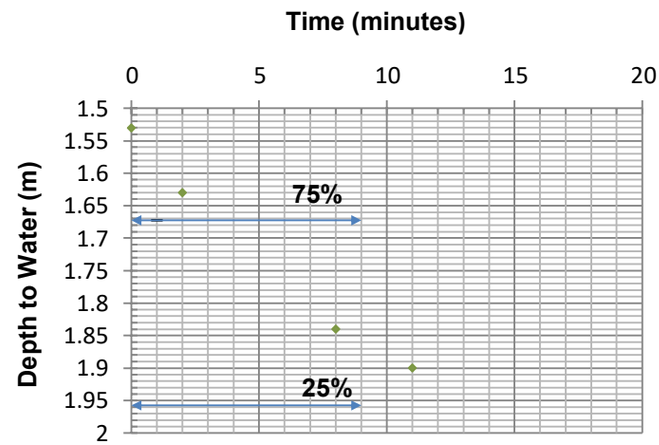
Site Name: Gnoll County Park
Project Number: 17887
Date: 06/06/2023
Engineer: JM

Trial Pit: **TP06**

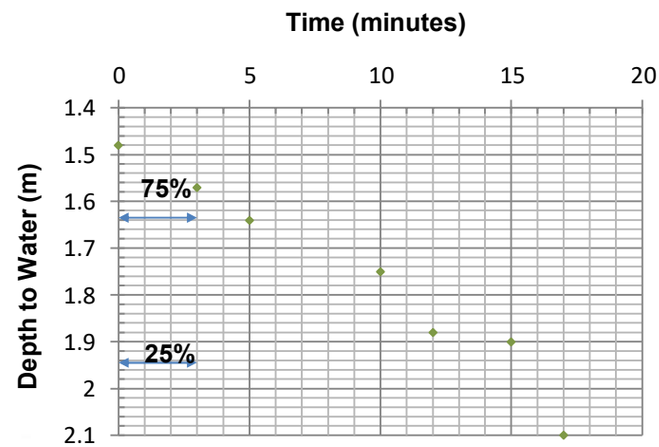
TEST 1

Length	2.00	m
Width	0.60	m
Depth	2.10	m
Fill Level	0.53	m
V_{p75-25}	0.342	m^3
a_{p50}	2.682	m^2
t_{p75-25}	8	minutes
Soil Infiltration Rate, f	**2.66E-04**	**ms^{-1}**



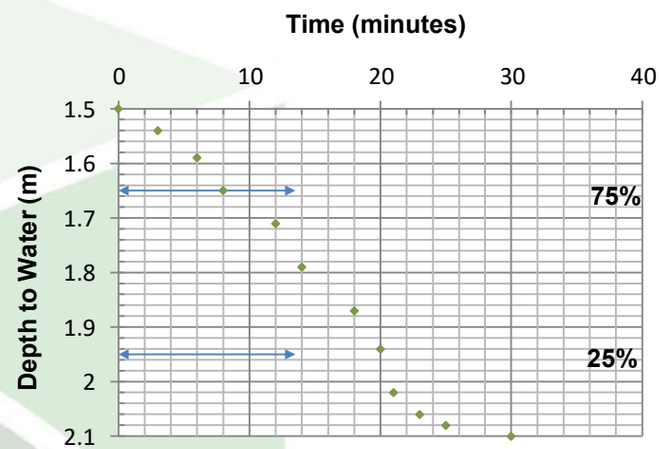
TEST 2

Length	2.00	m
Width	0.60	m
Depth	2.10	m
Fill Level	1.48	m
V_{p75-25}	0.372	m^3
a_{p50}	2.812	m^2
t_{p75-25}	2	minutes
Soil Infiltration Rate, f	**1.10E-03**	**ms^{-1}**



TEST 3

Length	2.00	m
Width	0.60	m
Depth	2.10	m
Fill Level	0.50	m
V_{p75-25}	0.36	m^3
a_{p50}	2.76	m^2
t_{p75-25}	12.5	minutes
Soil Infiltration Rate, f	**1.74E-04**	**ms^{-1}**



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

SOAKAWAY TEST

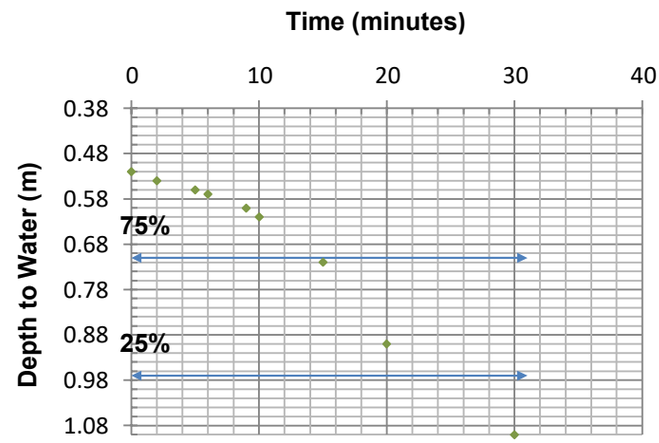
terra firma
Geotechnical & Geoenvironmental Specialists

Site Name: Gnoll County Park
Project Number: 17887
Date: 06/06/2023
Engineer: JM

Trial Pit: **TP07**

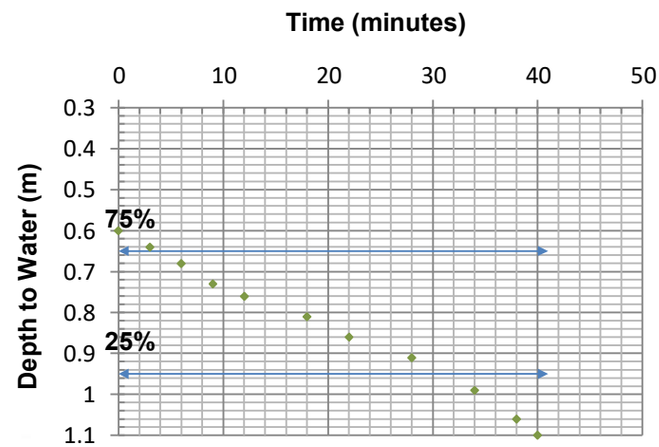
TEST 1

Length	0.50	m
Width	0.50	m
Depth	1.10	m
Fill Level	0.58	m
V_{p75-25}	0.065	m^3
a_{p50}	0.77	m^2
t_{p75-25}	0	minutes
Soil Infiltration Rate, f	**#DIV/0!**	**ms^{-1}**



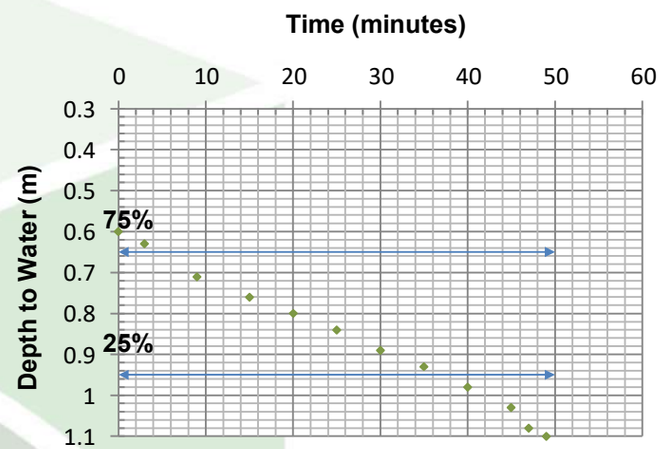
TEST 2

Length	0.50	m
Width	0.50	m
Depth	1.10	m
Fill Level	0.50	m
V_{p75-25}	0.075	m^3
a_{p50}	0.85	m^2
t_{p75-25}	27	minutes
Soil Infiltration Rate, f	**5.45E-05**	**ms^{-1}**



TEST 3

Length	0.50	m
Width	0.50	m
Depth	1.10	m
Fill Level	0.50	m
V_{p75-25}	0.075	m^3
a_{p50}	0.85	m^2
t_{p75-25}	31	minutes
Soil Infiltration Rate, f	**4.74E-05**	**ms^{-1}**



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

SOAKAWAY TEST

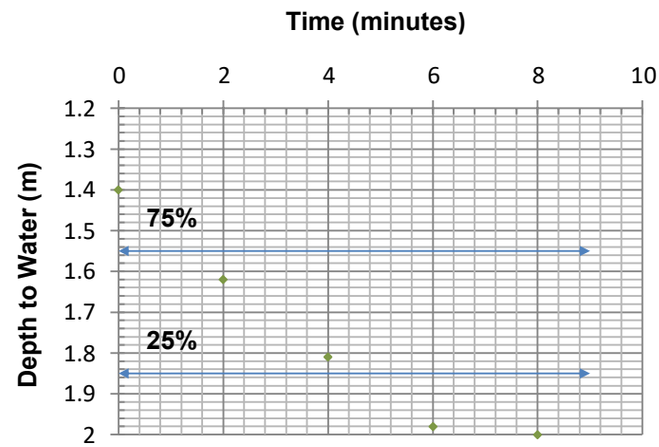
terra firma
Geotechnical & Geoenvironmental Specialists

Site Name: Gnoll County Park
Project Number: 17887
Date: 06/06/2023
Engineer: JM

Trial Pit: **TP08**

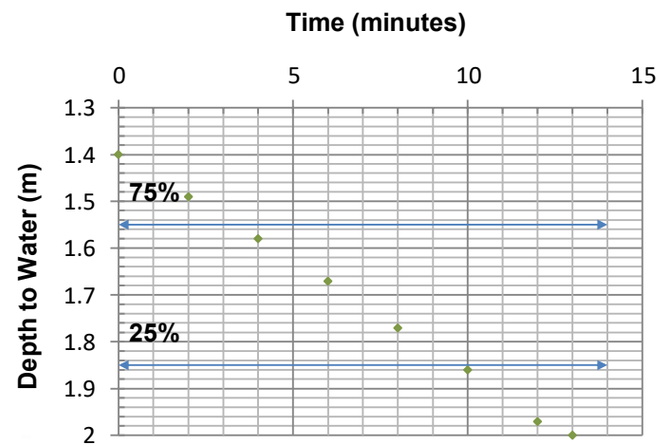
TEST 1

Length	1.60	m
Width	0.60	m
Depth	2.00	m
Fill Level	1.40	m
V_{p75-25}	0.288	m^3
a_{p50}	2.28	m^2
t_{p75-25}	2	minutes
Soil Infiltration Rate, f	**1.05E-03**	**ms^{-1}**



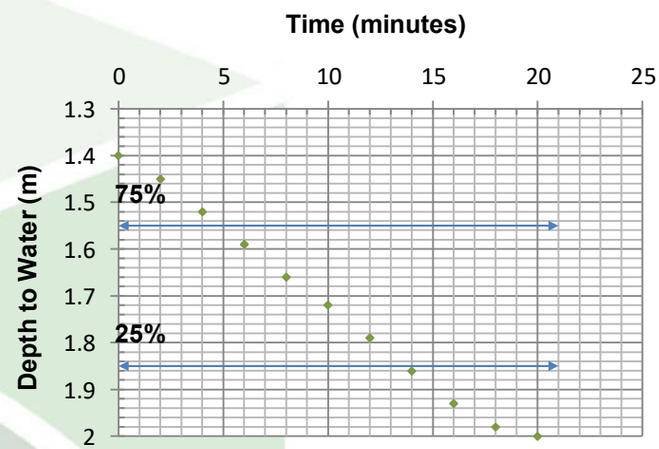
TEST 2

Length	1.60	m
Width	0.60	m
Depth	2.00	m
Fill Level	1.50	m
V_{p75-25}	0.288	m^3
a_{p50}	2.28	m^2
t_{p75-25}	6	minutes
Soil Infiltration Rate, f	**3.51E-04**	**ms^{-1}**



TEST 3

Length	1.60	m
Width	0.60	m
Depth	2.00	m
Fill Level	1.50	m
V_{p75-25}	0.288	m^3
a_{p50}	2.28	m^2
t_{p75-25}	8	minutes
Soil Infiltration Rate, f	**2.63E-04**	**ms^{-1}**



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

SOAKAWAY TEST

terra firma
Geotechnical & Geoenvironmental Specialists

Site Name: Gnoll County Park
Project Number: 17887
Date: 06/06/2023
Engineer: JM

Trial Pit: **TP09**

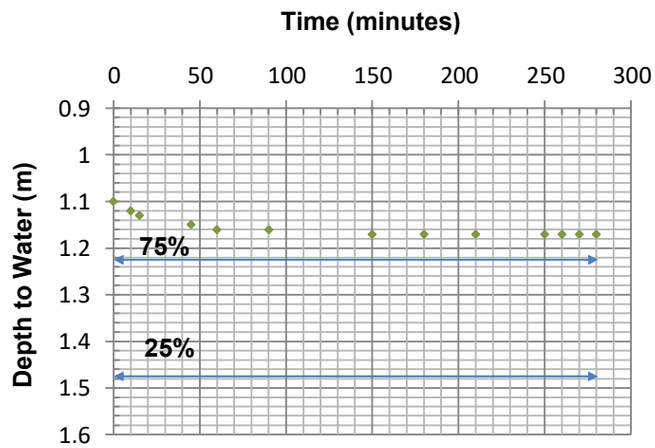
TEST 1

Length	2.00	m
Width	0.60	m
Depth	1.60	m
Fill Level	1.10	m

V_{p75-25}	0.3	m^3
a_{p50}	2.5	m^2
t_{p75-25}	0.22	minutes

9.09E-03 ms^{-1}

Too Little Infiltration, Did not achieve 75% Drai

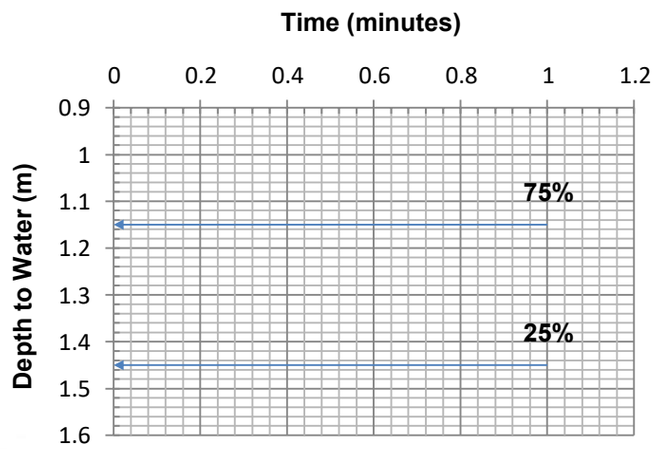


TEST 2

Length	2.00	m
Width	0.60	m
Depth	1.60	m
Fill Level	1.10	m

V_{p75-25}	0.36	m^3
a_{p50}	2.76	m^2
t_{p75-25}	0	minutes

Soil Infiltration Rate, f **#DIV/0!** **ms^{-1}**

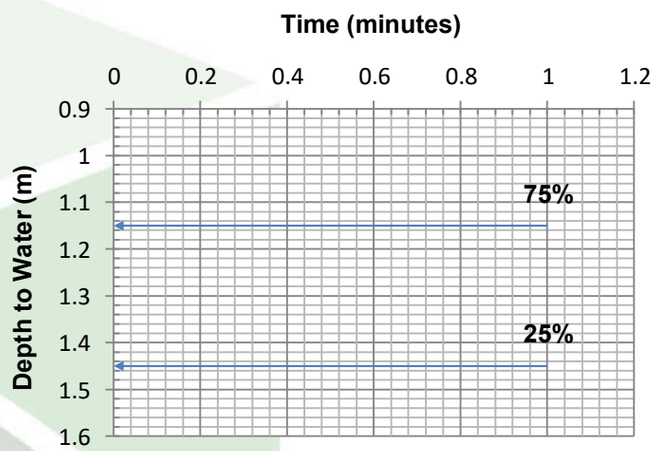


TEST 3

Length	2.00	m
Width	0.60	m
Depth	1.60	m
Fill Level	1.10	m

V_{p75-25}	0.36	m^3
a_{p50}	2.76	m^2
t_{p75-25}	0	minutes

Soil Infiltration Rate, f **#DIV/0!** **ms^{-1}**



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

SOAKAWAY TEST

terra firma
Geotechnical & Geoenvironmental Specialists

Site Name: Gnoll County Park
Project Number: 17887
Date: 03/08/2023
Engineer: JM

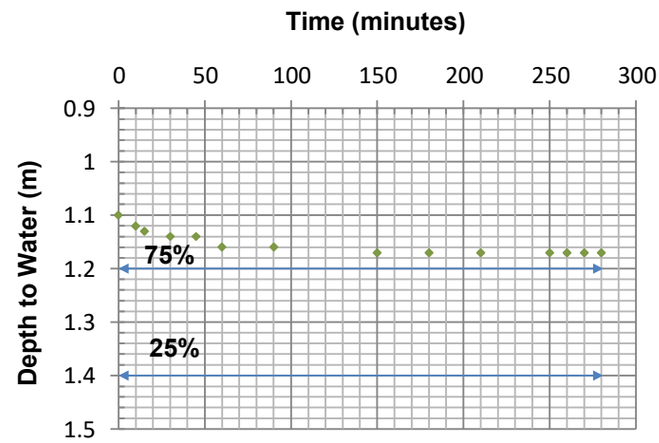
Trial Pit: **TP11**

TEST 1

Length	2.00	m
Width	0.60	m
Depth	1.50	m
Fill Level	1.10	m

V_{p75-25}	0.24	m^3
a_{p50}	2.24	m^2
t_{p75-25}	0.22	minutes

N/A
Too Little Infiltration, Did not achieve 75% Drai

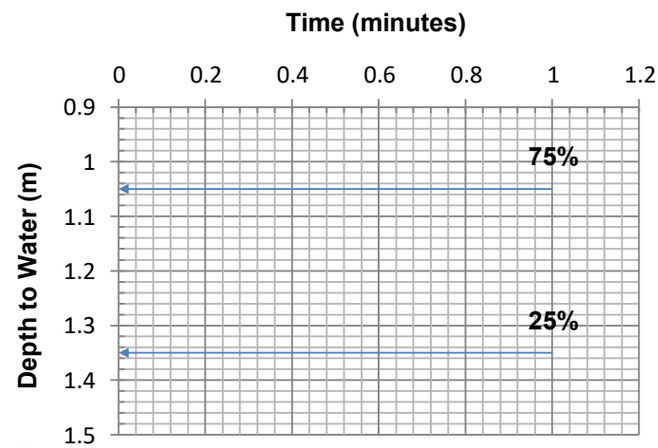


TEST 2

Length	2.00	m
Width	0.60	m
Depth	1.50	m
Fill Level	1.10	m

V_{p75-25}	0.36	m^3
a_{p50}	2.76	m^2
t_{p75-25}	0	minutes

Soil Infiltration Rate, f **#DIV/0!** **ms^{-1}**

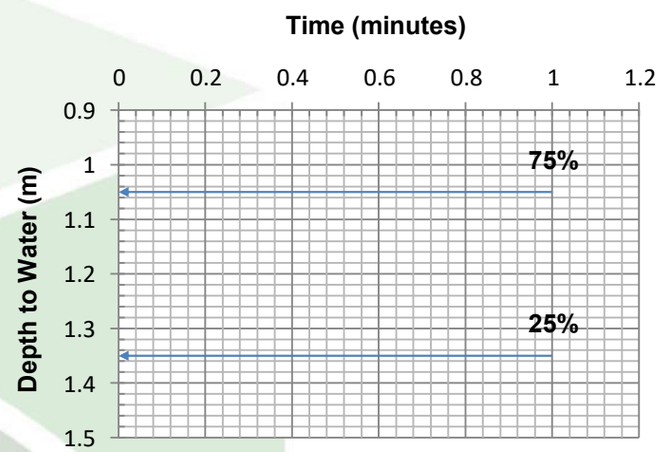


TEST 3

Length	2.00	m
Width	0.60	m
Depth	1.50	m
Fill Level	1.10	m

V_{p75-25}	0.36	m^3
a_{p50}	2.76	m^2
t_{p75-25}	0	minutes

Soil Infiltration Rate, f **#DIV/0!** **ms^{-1}**



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

SOAKAWAY TEST

terra firma
Geotechnical & Geoenvironmental Specialists

Site Name: Gnoll County Park
Project Number: 17887
Date: 03/08/2023
Engineer: JM

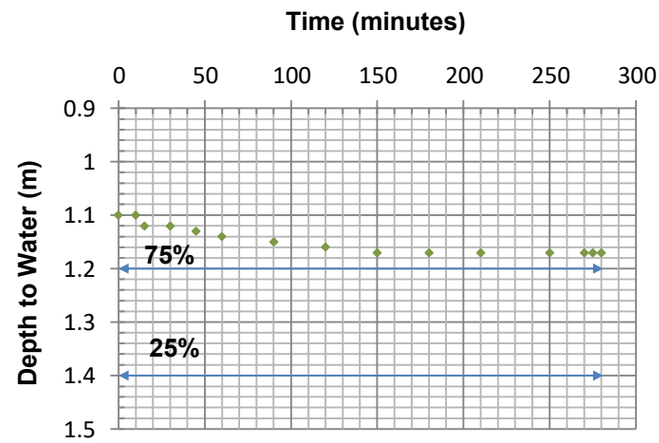
Trial Pit: **TP12**

TEST 1

Length	2.00	m
Width	0.60	m
Depth	1.50	m
Fill Level	1.10	m

V_{p75-25}	0.24	m^3
a_{p50}	2.24	m^2
t_{p75-25}	N/A	

Too Little Infiltration, Did not achieve 75% Drai

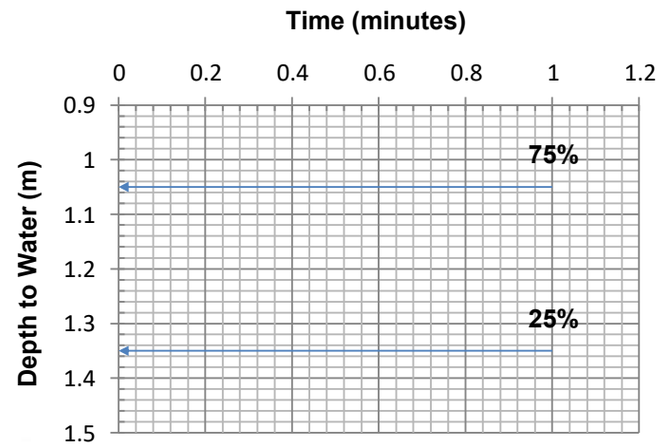


TEST 2

Length	2.00	m
Width	0.60	m
Depth	1.50	m
Fill Level	1.10	m

V_{p75-25}	0.36	m^3
a_{p50}	2.76	m^2
t_{p75-25}	0	minutes

Soil Infiltration Rate, f **#DIV/0!** **ms^{-1}**

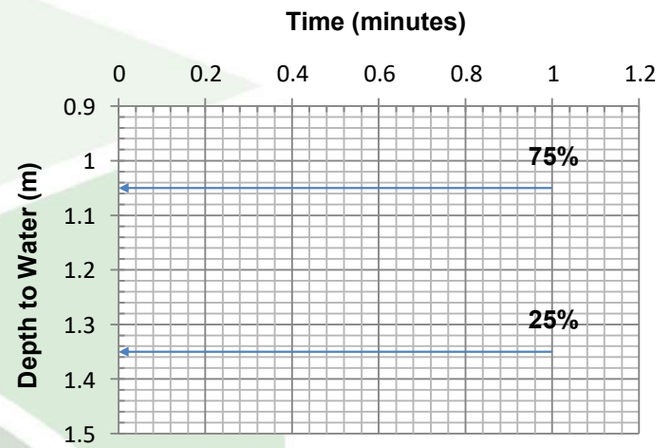


TEST 3

Length	2.00	m
Width	0.60	m
Depth	1.50	m
Fill Level	1.10	m

V_{p75-25}	0.36	m^3
a_{p50}	2.76	m^2
t_{p75-25}	0	minutes

Soil Infiltration Rate, f **#DIV/0!** **ms^{-1}**



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

SOAKAWAY TEST

terra firma
Geotechnical & Geoenvironmental Specialists

Site Name: Gnoll County Park
Project Number: 17887
Date: 02/08/2023
Engineer: JM

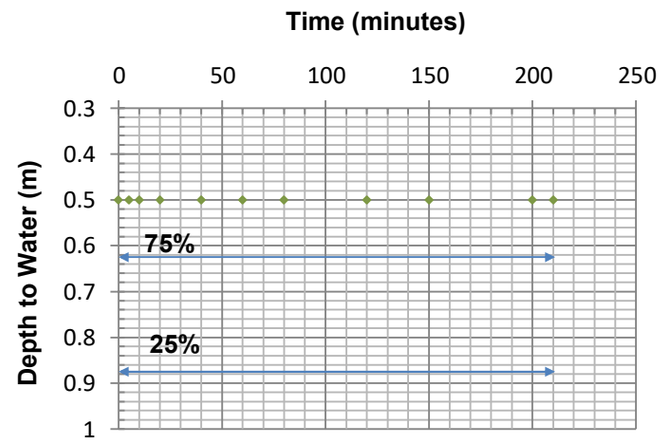
Trial Pit: **HP-A**

TEST 1

Length	0.50	m
Width	0.50	m
Depth	1.00	m
Fill Level	0.50	m

V_{p75-25}	0.063	m^3
a_{p50}	0.75	m^2
t_{p75-25}	N/A	

Too Little Infiltration, Did not achieve 75% Drai

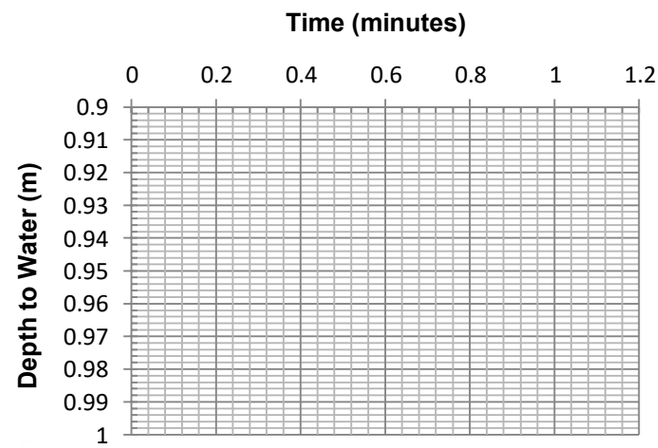


TEST 2

Length	0.50	m
Width	0.50	m
Depth	1.00	m
Fill Level	1.10	m

V_{p75-25}	0.075	m^3
a_{p50}	0.85	m^2
t_{p75-25}	0	minutes

Soil Infiltration Rate, f **#DIV/0!** **ms^{-1}**

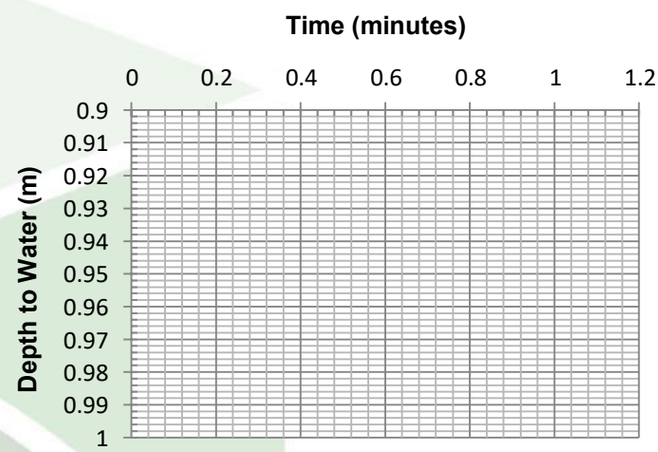


TEST 3

Length	0.50	m
Width	0.50	m
Depth	1.00	m
Fill Level	1.10	m

V_{p75-25}	0.075	m^3
a_{p50}	0.85	m^2
t_{p75-25}	0	minutes

Soil Infiltration Rate, f **#DIV/0!** **ms^{-1}**



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

SOAKAWAY TEST

terra firma
Geotechnical & Geoenvironmental Specialists

Site Name: Gnoll County Park
Project Number: 17887
Date: 02/08/2023
Engineer: JM

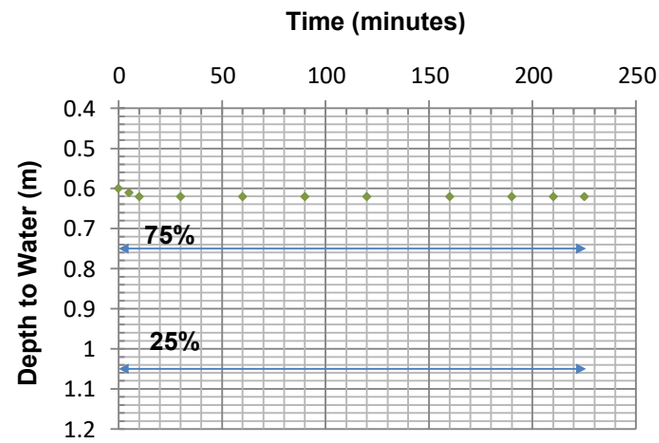
Trial Pit: **HP-B**

TEST 1

Length	0.50	m
Width	0.50	m
Depth	1.20	m
Fill Level	0.60	m

V_{p75-25}	0.075	m^3
a_{p50}	0.85	m^2
t_{p75-25}	N/A	

Too Little Infiltration, Did not achieve 75% Drai

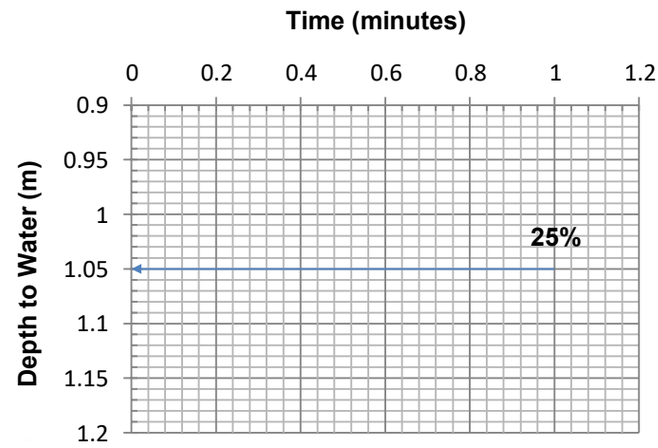


TEST 2

Length	0.50	m
Width	0.50	m
Depth	1.20	m
Fill Level	1.10	m

V_{p75-25}	0.075	m^3
a_{p50}	0.85	m^2
t_{p75-25}	0	minutes

Soil Infiltration Rate, f **#DIV/0!** **ms^{-1}**

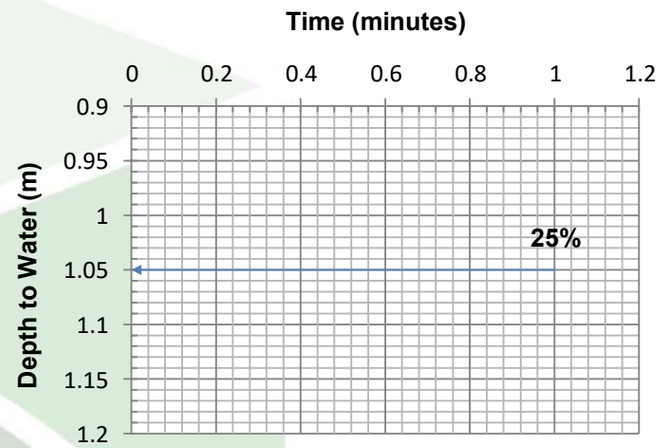


TEST 3

Length	0.50	m
Width	0.50	m
Depth	1.20	m
Fill Level	1.10	m

V_{p75-25}	0.075	m^3
a_{p50}	0.85	m^2
t_{p75-25}	0	minutes

Soil Infiltration Rate, f **#DIV/0!** **ms^{-1}**



REMARKS:
Test carried out in accordance with BRE Digest 365 (2016)

ANNEX D
TRL DCP Log Sheets

DYNAMIC CONE PENETROMETER TEST

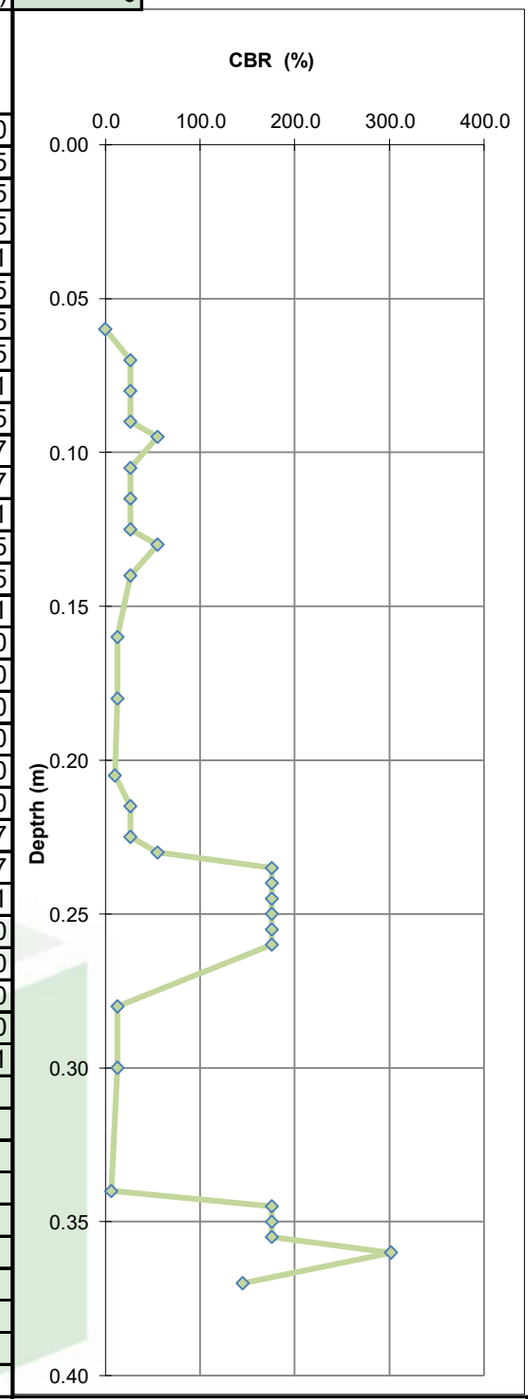
terra firma
Geotechnical & Geoenvironmental Specialists

Site Name: Gnoll Park
Project Number: 17887
Date: 07/06/2023
Engineer: JM

Test: **DCP 01**

Initial Scale Reading (mm): 60 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	60	0	0.06	0	0.0
1	70	10	0.07	10	26.5
1	80	10	0.08	10	26.5
1	90	10	0.09	10	26.5
1	95	5	0.10	5	55.1
1	105	10	0.11	10	26.5
1	115	10	0.12	10	26.5
1	125	10	0.13	10	26.5
1	130	5	0.13	5	55.1
1	140	10	0.14	10	26.5
1	160	20	0.16	20	12.7
1	180	20	0.18	20	12.7
1	205	25	0.21	25	10.1
1	215	10	0.22	10	26.5
1	225	10	0.23	10	26.5
1	230	5	0.23	5	55.1
3	235	5	0.24	2	176.0
3	240	5	0.24	2	176.0
3	245	5	0.25	2	176.0
3	250	5	0.25	2	176.0
3	255	5	0.26	2	176.0
3	260	5	0.26	2	176.0
1	280	20	0.28	20	12.7
1	300	20	0.30	20	12.7
1	340	40	0.34	40	6.1
3	345	5	0.35	2	176.0
3	350	5	0.35	2	176.0
3	355	5	0.36	2	176.0
5	360	5	0.36	1	302.0
5	370	10	0.37	2	145.1



terra firma
Geotechnical & Geoenvironmental Specialists

DYNAMIC CONE PENETROMETER TEST

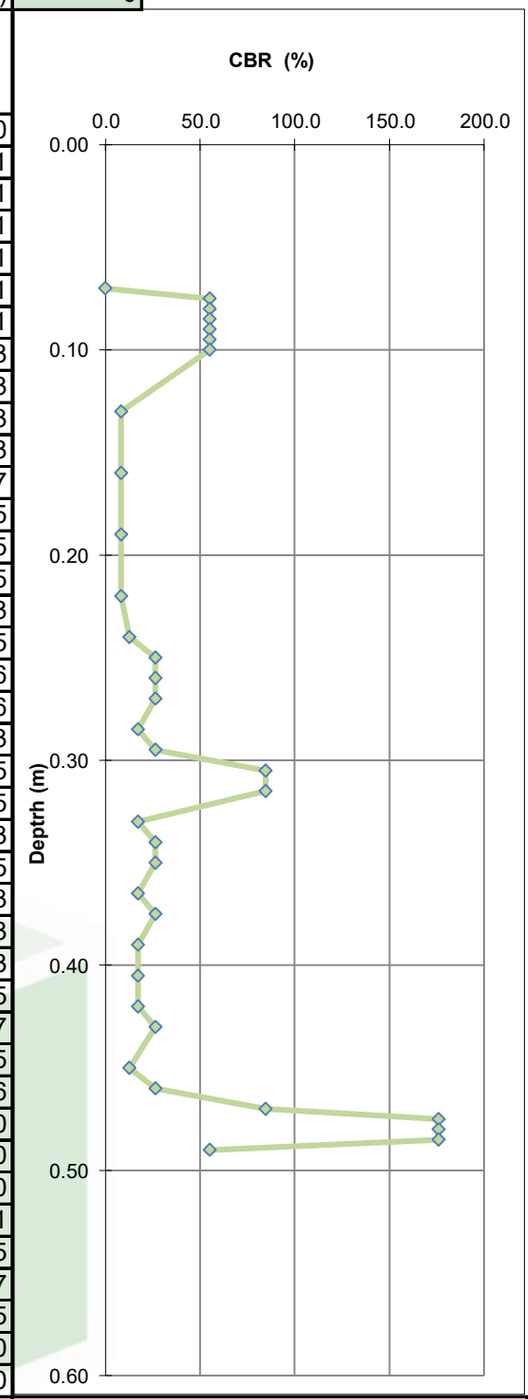
terra firma
Geotechnical & Geoenvironmental Specialists

Site Name: Gnoll Park
Project Number: 17887
Date: 07/06/2023
Engineer: JM

Test: **DCP 02**

Initial Scale Reading (mm): 70 | Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	70	0	0.07	0	0.0
1	75	5	0.08	5	55.1
1	80	5	0.08	5	55.1
1	85	5	0.09	5	55.1
1	90	5	0.09	5	55.1
1	95	5	0.10	5	55.1
1	100	5	0.10	5	55.1
1	130	30	0.13	30	8.3
1	160	30	0.16	30	8.3
1	190	30	0.19	30	8.3
1	220	30	0.22	30	8.3
1	240	20	0.24	20	12.7
1	250	10	0.25	10	26.5
1	260	10	0.26	10	26.5
1	270	10	0.27	10	26.5
1	285	15	0.29	15	17.3
1	295	10	0.30	10	26.5
3	305	10	0.31	3	84.6
3	315	10	0.32	3	84.6
1	330	15	0.33	15	17.3
1	340	10	0.34	10	26.5
1	350	10	0.35	10	26.5
1	365	15	0.37	15	17.3
1	375	10	0.38	10	26.5
1	390	15	0.39	15	17.3
1	405	15	0.41	15	17.3
1	420	15	0.42	15	17.3
1	430	10	0.43	10	26.5
1	450	20	0.45	20	12.7
1	460	10	0.46	10	26.5
3	470	10	0.47	3	84.6
3	475	5	0.48	2	176.0
3	480	5	0.48	2	176.0
3	485	5	0.49	2	176.0
1	490	5	0.49	5	55.1
1	500	10	0.50	10	26.5
1	520	20	0.52	20	12.7
1	530	10	0.53	10	26.5
5	535	5	0.54	1	302.0
5	540	5	0.54	1	302.0



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DYNAMIC CONE PENETROMETER TEST

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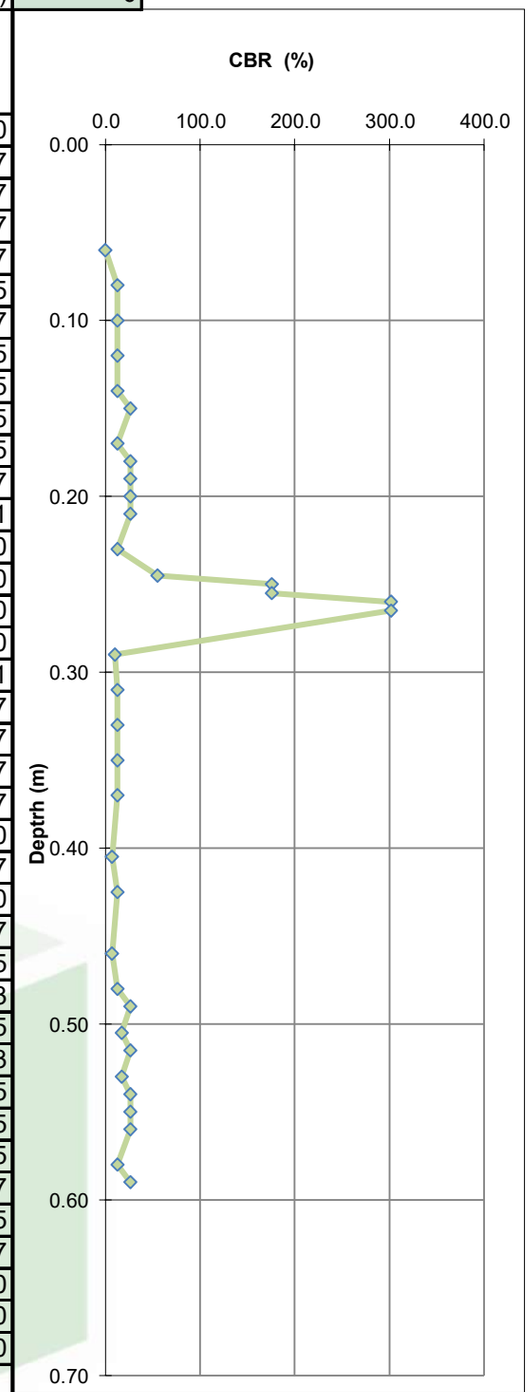
Site Name: Gnoll Park
Project Number: 17887
Date: 07/06/2023
Engineer: JM

Test: **DCP 03**

Initial Scale Reading (mm): 60 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	60	0	0.06	0	0.0
1	80	20	0.08	20	12.7
1	100	20	0.10	20	12.7
1	120	20	0.12	20	12.7
1	140	20	0.14	20	12.7
1	150	10	0.15	10	26.5
1	170	20	0.17	20	12.7
1	180	10	0.18	10	26.5
1	190	10	0.19	10	26.5
1	200	10	0.20	10	26.5
1	210	10	0.21	10	26.5
1	230	20	0.23	20	12.7
3	245	15	0.25	5	55.1
3	250	5	0.25	2	176.0
3	255	5	0.26	2	176.0
5	260	5	0.26	1	302.0
5	265	5	0.27	1	302.0
1	290	25	0.29	25	10.1
1	310	20	0.31	20	12.7
1	330	20	0.33	20	12.7
1	350	20	0.35	20	12.7
1	370	20	0.37	20	12.7
1	405	35	0.41	35	7.0
1	425	20	0.43	20	12.7
1	460	35	0.46	35	7.0
1	480	20	0.48	20	12.7
1	490	10	0.49	10	26.5
1	505	15	0.51	15	17.3
1	515	10	0.52	10	26.5
1	530	15	0.53	15	17.3
1	540	10	0.54	10	26.5
1	550	10	0.55	10	26.5
1	560	10	0.56	10	26.5
1	580	20	0.58	20	12.7
1	590	10	0.59	10	26.5
3	610	20	0.61	7	40.7
5	615	5	0.62	1	302.0
5	620	5	0.62	1	302.0
5	625	5	0.63	1	302.0



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DYNAMIC CONE PENETROMETER TEST

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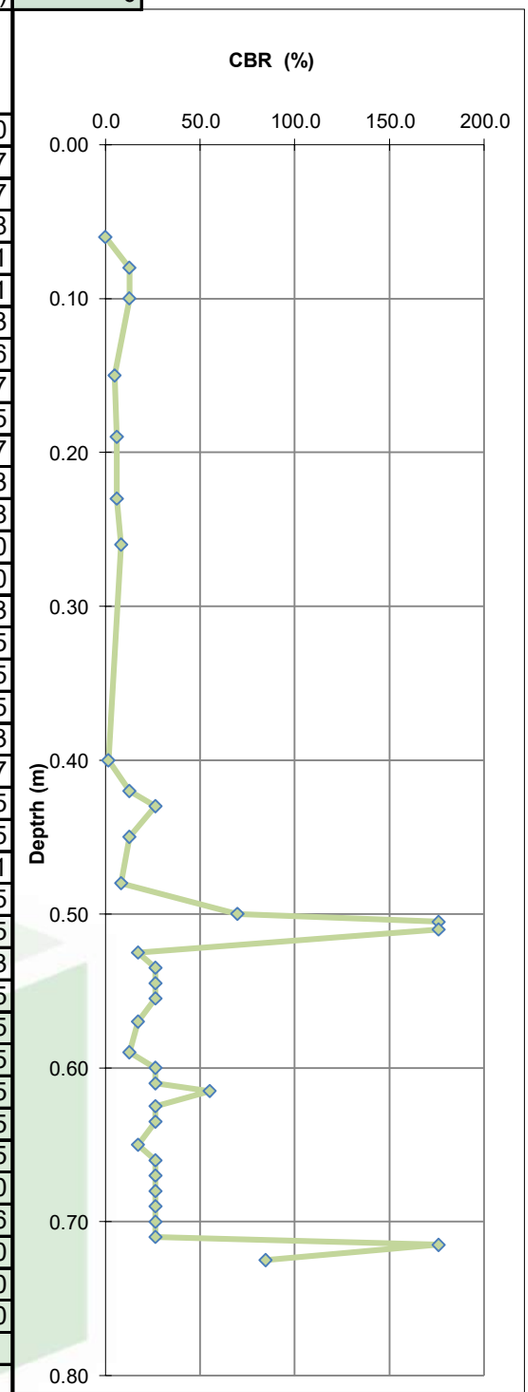
Site Name: Gnoll Park
Project Number: 17887
Date: 07/06/2023
Engineer: JM

Test: **DCP 04**

Initial Scale Reading (mm): 60 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	60	0	0.06	0	0.0
1	80	20	0.08	20	12.7
1	100	20	0.10	20	12.7
1	150	50	0.15	50	4.8
1	190	40	0.19	40	6.1
1	230	40	0.23	40	6.1
1	260	30	0.26	30	8.3
1	400	140	0.40	140	1.6
1	420	20	0.42	20	12.7
1	430	10	0.43	10	26.5
1	450	20	0.45	20	12.7
1	480	30	0.48	30	8.3
5	500	20	0.50	4	69.8
3	505	5	0.51	2	176.0
3	510	5	0.51	2	176.0
1	525	15	0.53	15	17.3
1	535	10	0.54	10	26.5
1	545	10	0.55	10	26.5
1	555	10	0.56	10	26.5
1	570	15	0.57	15	17.3
1	590	20	0.59	20	12.7
1	600	10	0.60	10	26.5
1	610	10	0.61	10	26.5
1	615	5	0.62	5	55.1
1	625	10	0.63	10	26.5
1	635	10	0.64	10	26.5
1	650	15	0.65	15	17.3
1	660	10	0.66	10	26.5
1	670	10	0.67	10	26.5
1	680	10	0.68	10	26.5
1	690	10	0.69	10	26.5
1	700	10	0.70	10	26.5
1	710	10	0.71	10	26.5
3	715	5	0.72	2	176.0
3	725	10	0.73	3	84.6
5	730	5	0.73	1	302.0
5	735	5	0.74	1	302.0
5	740	5	0.74	1	302.0



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DYNAMIC CONE PENETROMETER TEST

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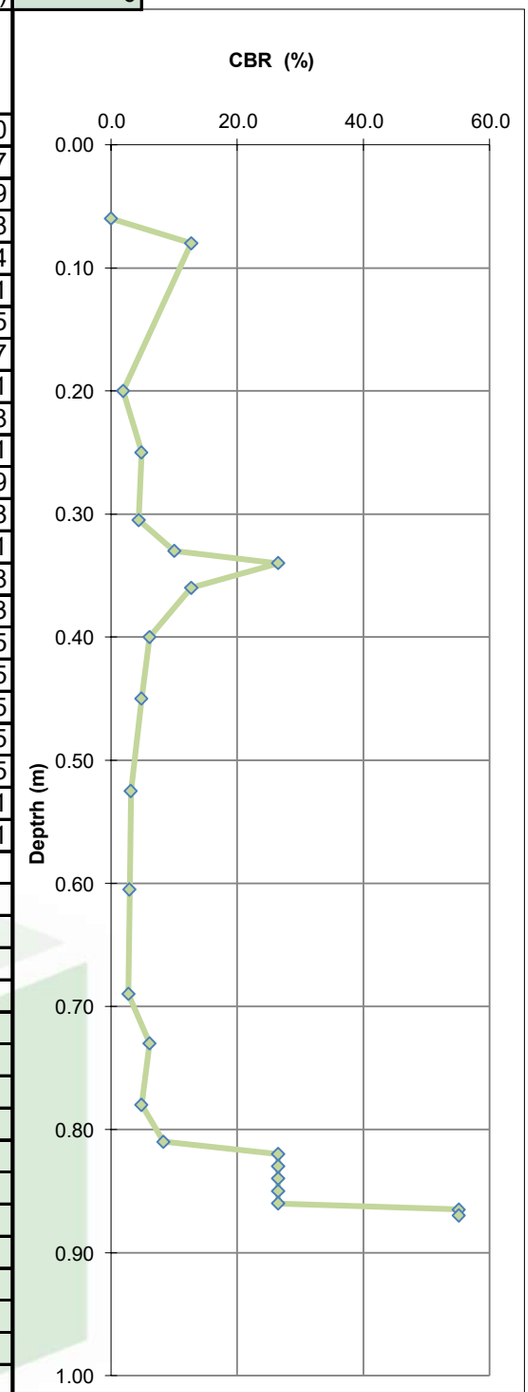
Site Name: Gnoll Park
Project Number: 17887
Date: 03/08/2023
Engineer: JM

Test: **DCP 05**

Initial Scale Reading (mm): 60 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	60	0	0.06	0	0.0
1	80	20	0.08	20	12.7
1	200	120	0.20	120	1.9
1	250	50	0.25	50	4.8
1	305	55	0.31	55	4.4
1	330	25	0.33	25	10.1
1	340	10	0.34	10	26.5
1	360	20	0.36	20	12.7
1	400	40	0.40	40	6.1
1	450	50	0.45	50	4.8
1	525	75	0.53	75	3.1
1	605	80	0.61	80	2.9
1	690	85	0.69	85	2.8
1	730	40	0.73	40	6.1
1	780	50	0.78	50	4.8
1	810	30	0.81	30	8.3
1	820	10	0.82	10	26.5
1	830	10	0.83	10	26.5
1	840	10	0.84	10	26.5
1	850	10	0.85	10	26.5
1	860	10	0.86	10	26.5
1	865	5	0.87	5	55.1
1	870	5	0.87	5	55.1



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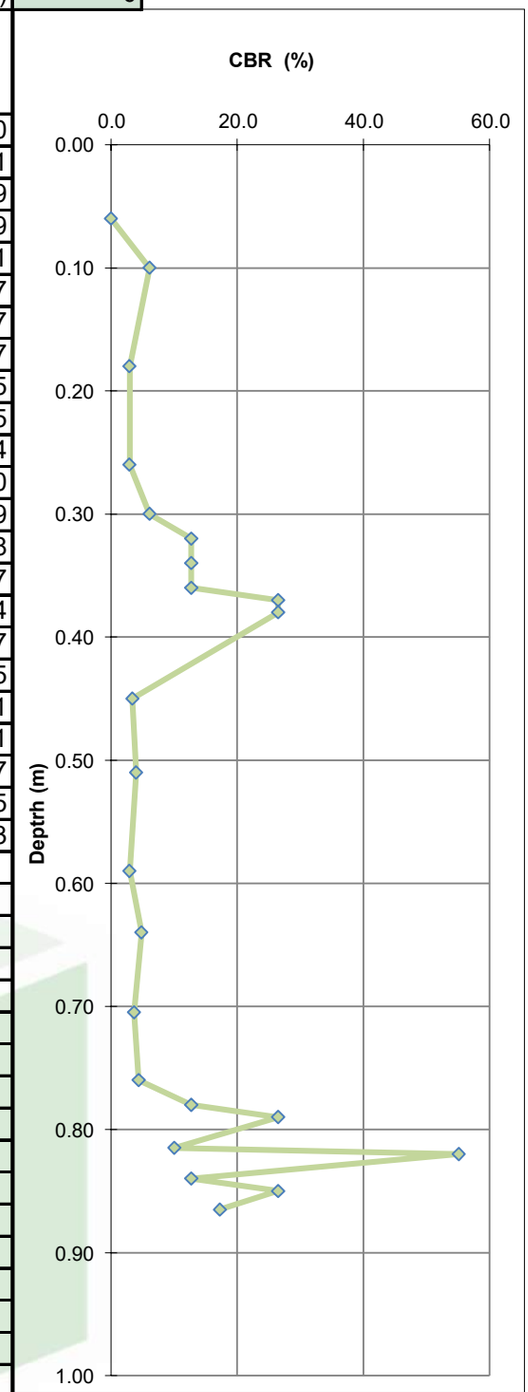
Site Name: Gnoll Park
Project Number: 17887
Date: 03/08/2023
Engineer: JM

Test: **DCP 06**

Initial Scale Reading (mm): 60 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	60	0	0.06	0	0.0
1	100	40	0.10	40	6.1
1	180	80	0.18	80	2.9
1	260	80	0.26	80	2.9
1	300	40	0.30	40	6.1
1	320	20	0.32	20	12.7
1	340	20	0.34	20	12.7
1	360	20	0.36	20	12.7
1	370	10	0.37	10	26.5
1	380	10	0.38	10	26.5
1	450	70	0.45	70	3.4
1	510	60	0.51	60	4.0
1	590	80	0.59	80	2.9
1	640	50	0.64	50	4.8
1	705	65	0.71	65	3.7
1	760	55	0.76	55	4.4
1	780	20	0.78	20	12.7
1	790	10	0.79	10	26.5
1	815	25	0.82	25	10.1
1	820	5	0.82	5	55.1
1	840	20	0.84	20	12.7
1	850	10	0.85	10	26.5
1	865	15	0.87	15	17.3



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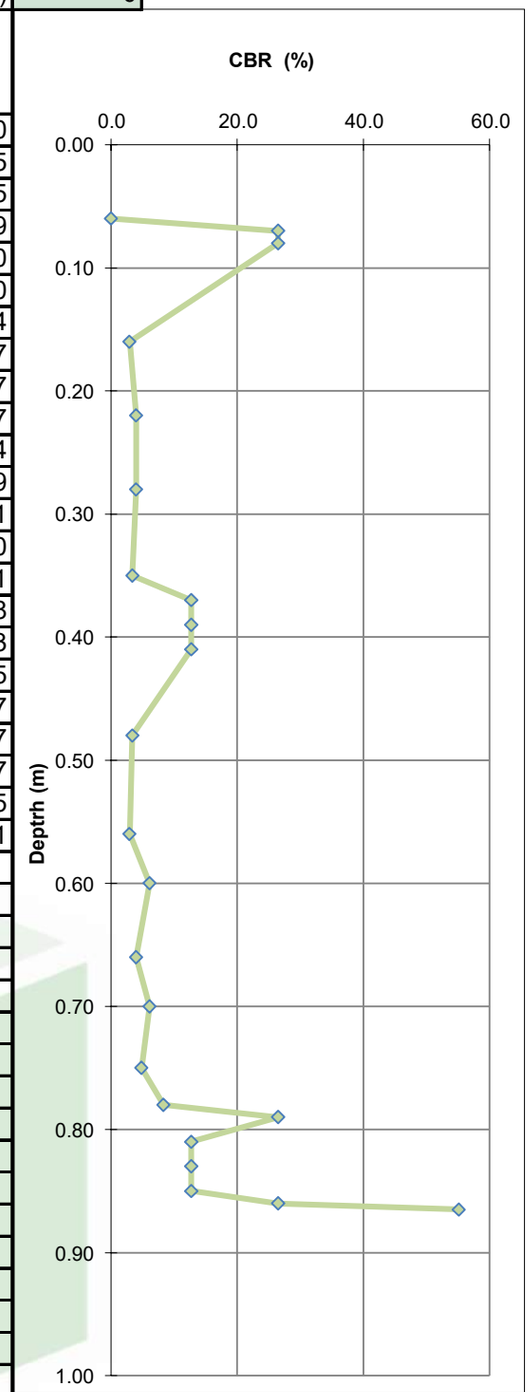
Site Name: Gnoll Park
Project Number: 17887
Date: 03/08/2023
Engineer: JM

Test: **DCP 07**

Initial Scale Reading (mm): 60 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	60	0	0.06	0	0.0
1	70	10	0.07	10	26.5
1	80	10	0.08	10	26.5
1	160	80	0.16	80	2.9
1	220	60	0.22	60	4.0
1	280	60	0.28	60	4.0
1	350	70	0.35	70	3.4
1	370	20	0.37	20	12.7
1	390	20	0.39	20	12.7
1	410	20	0.41	20	12.7
1	480	70	0.48	70	3.4
1	560	80	0.56	80	2.9
1	600	40	0.60	40	6.1
1	660	60	0.66	60	4.0
1	700	40	0.70	40	6.1
1	750	50	0.75	50	4.8
1	780	30	0.78	30	8.3
1	790	10	0.79	10	26.5
1	810	20	0.81	20	12.7
1	830	20	0.83	20	12.7
1	850	20	0.85	20	12.7
1	860	10	0.86	10	26.5
1	865	5	0.87	5	55.1



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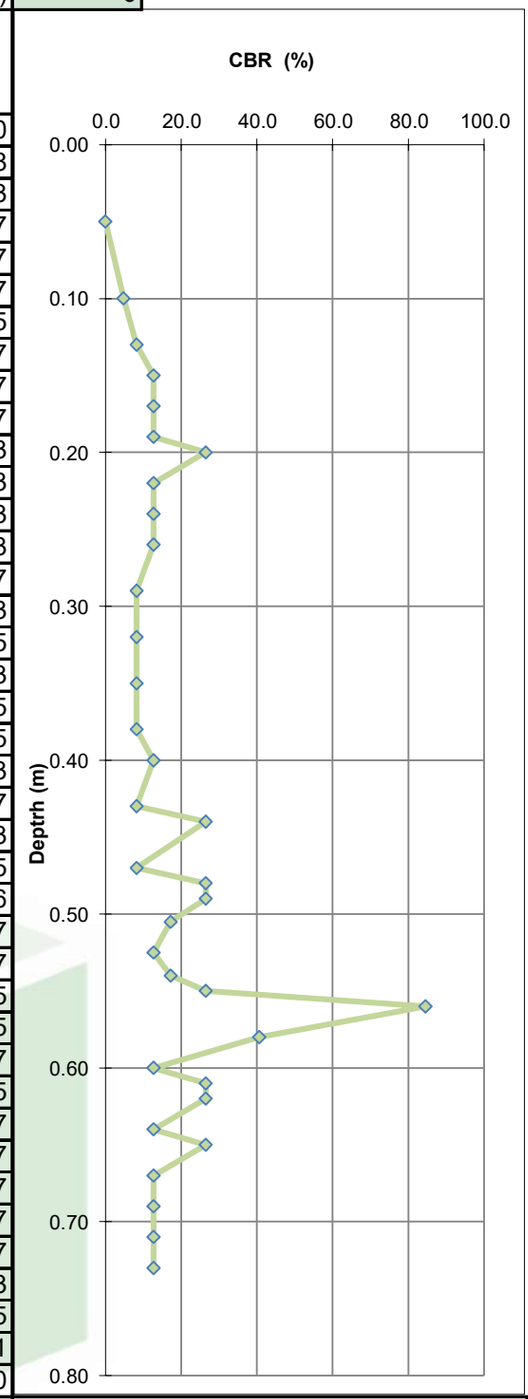
Site Name: Gnoll Park
Project Number: 17887
Date: 05/06/2023
Engineer: JM

Test: **DCP 08**

Initial Scale Reading (mm): 50 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	50	0	0.05	0	0.0
1	100	50	0.10	50	4.8
1	130	30	0.13	30	8.3
1	150	20	0.15	20	12.7
1	170	20	0.17	20	12.7
1	190	20	0.19	20	12.7
1	200	10	0.20	10	26.5
1	220	20	0.22	20	12.7
1	240	20	0.24	20	12.7
1	260	20	0.26	20	12.7
1	290	30	0.29	30	8.3
1	320	30	0.32	30	8.3
1	350	30	0.35	30	8.3
1	380	30	0.38	30	8.3
1	400	20	0.40	20	12.7
1	430	30	0.43	30	8.3
1	440	10	0.44	10	26.5
1	470	30	0.47	30	8.3
1	480	10	0.48	10	26.5
1	490	10	0.49	10	26.5
1	505	15	0.51	15	17.3
1	525	20	0.53	20	12.7
1	540	15	0.54	15	17.3
1	550	10	0.55	10	26.5
3	560	10	0.56	3	84.6
3	580	20	0.58	7	40.7
1	600	20	0.60	20	12.7
1	610	10	0.61	10	26.5
1	620	10	0.62	10	26.5
1	640	20	0.64	20	12.7
1	650	10	0.65	10	26.5
1	670	20	0.67	20	12.7
1	690	20	0.69	20	12.7
1	710	20	0.71	20	12.7
1	730	20	0.73	20	12.7
1	750	20	0.75	20	12.7
1	780	30	0.78	30	8.3
1	790	10	0.79	10	26.5
5	800	10	0.80	2	145.1
5	805	5	0.81	1	302.0
5	805	0	0.81	0	#NUM!



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DYNAMIC CONE PENETROMETER TEST

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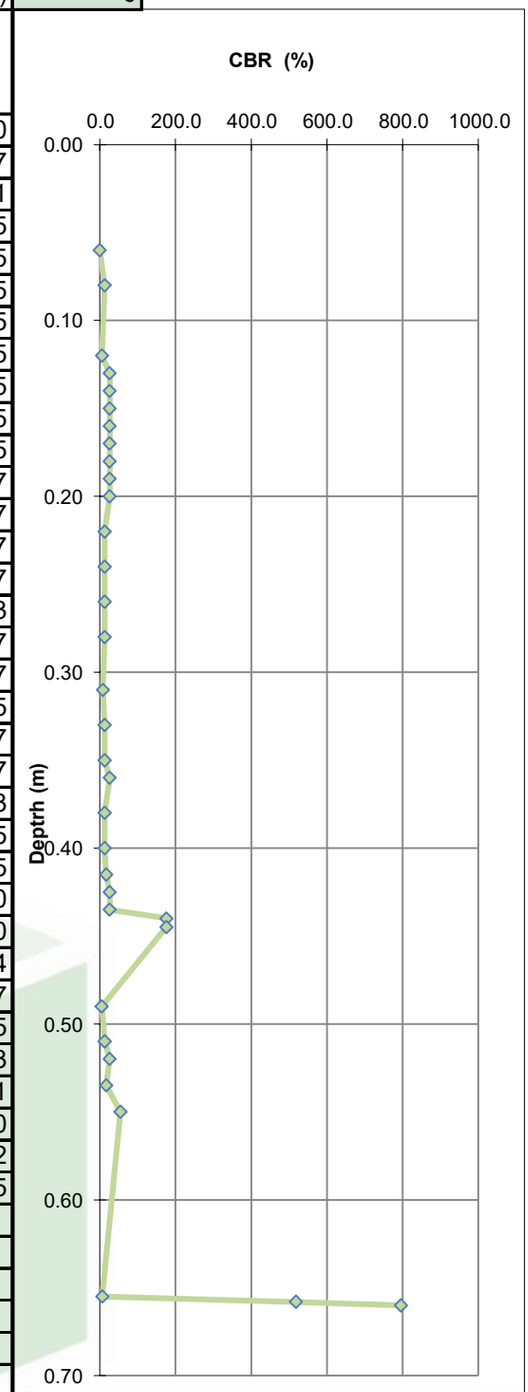
Site Name: Gnoll Park
Project Number: 17887
Date: 06/06/2023
Engineer: JM

Test: **DCP 09**

Initial Scale Reading (mm): 60 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	60	0	0.06	0	0.0
1	80	20	0.08	20	12.7
1	120	40	0.12	40	6.1
1	130	10	0.13	10	26.5
1	140	10	0.14	10	26.5
1	150	10	0.15	10	26.5
1	160	10	0.16	10	26.5
1	170	10	0.17	10	26.5
1	180	10	0.18	10	26.5
1	190	10	0.19	10	26.5
1	200	10	0.20	10	26.5
1	220	20	0.22	20	12.7
1	240	20	0.24	20	12.7
1	260	20	0.26	20	12.7
1	280	20	0.28	20	12.7
1	310	30	0.31	30	8.3
1	330	20	0.33	20	12.7
1	350	20	0.35	20	12.7
1	360	10	0.36	10	26.5
1	380	20	0.38	20	12.7
1	400	20	0.40	20	12.7
1	415	15	0.42	15	17.3
1	425	10	0.43	10	26.5
1	435	10	0.44	10	26.5
3	440	5	0.44	2	176.0
3	445	5	0.45	2	176.0
1	490	45	0.49	45	5.4
1	510	20	0.51	20	12.7
1	520	10	0.52	10	26.5
1	535	15	0.54	15	17.3
3	550	15	0.55	5	55.1
3	655	105	0.66	35	7.0
5	658	3	0.66	1	518.2
5	660	2	0.66	0	795.5



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DYNAMIC CONE PENETROMETER TEST

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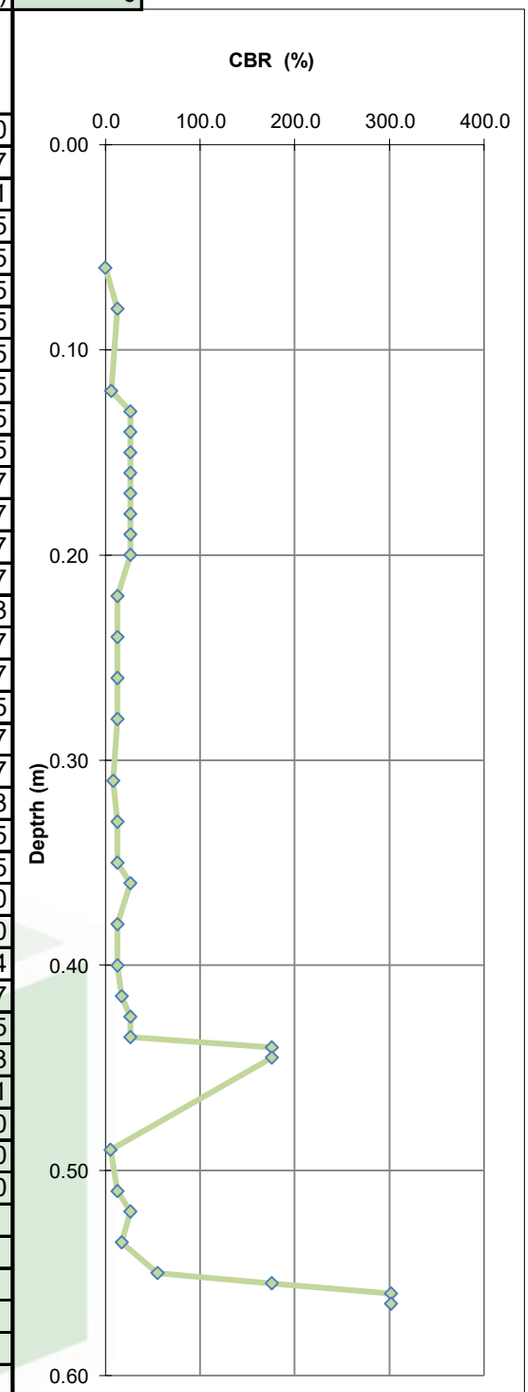
Geotechnical & Geoenvironmental Specialists

Site Name: Gnoll Park
Project Number: 17887
Date: 06/06/2023
Engineer: JM

Test: **DCP 10**

Initial Scale Reading (mm): 60
Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	60	0	0.06	0	0.0
1	80	20	0.08	20	12.7
1	120	40	0.12	40	6.1
1	130	10	0.13	10	26.5
1	140	10	0.14	10	26.5
1	150	10	0.15	10	26.5
1	160	10	0.16	10	26.5
1	170	10	0.17	10	26.5
1	180	10	0.18	10	26.5
1	190	10	0.19	10	26.5
1	200	10	0.20	10	26.5
1	220	20	0.22	20	12.7
1	240	20	0.24	20	12.7
1	260	20	0.26	20	12.7
1	280	20	0.28	20	12.7
1	310	30	0.31	30	8.3
1	330	20	0.33	20	12.7
1	350	20	0.35	20	12.7
1	360	10	0.36	10	26.5
1	380	20	0.38	20	12.7
1	400	20	0.40	20	12.7
1	415	15	0.42	15	17.3
1	425	10	0.43	10	26.5
1	435	10	0.44	10	26.5
3	440	5	0.44	2	176.0
3	445	5	0.45	2	176.0
1	490	45	0.49	45	5.4
1	510	20	0.51	20	12.7
1	520	10	0.52	10	26.5
1	535	15	0.54	15	17.3
3	550	15	0.55	5	55.1
3	555	5	0.56	2	176.0
5	560	5	0.56	1	302.0
5	565	5	0.57	1	302.0



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DYNAMIC CONE PENETROMETER TEST

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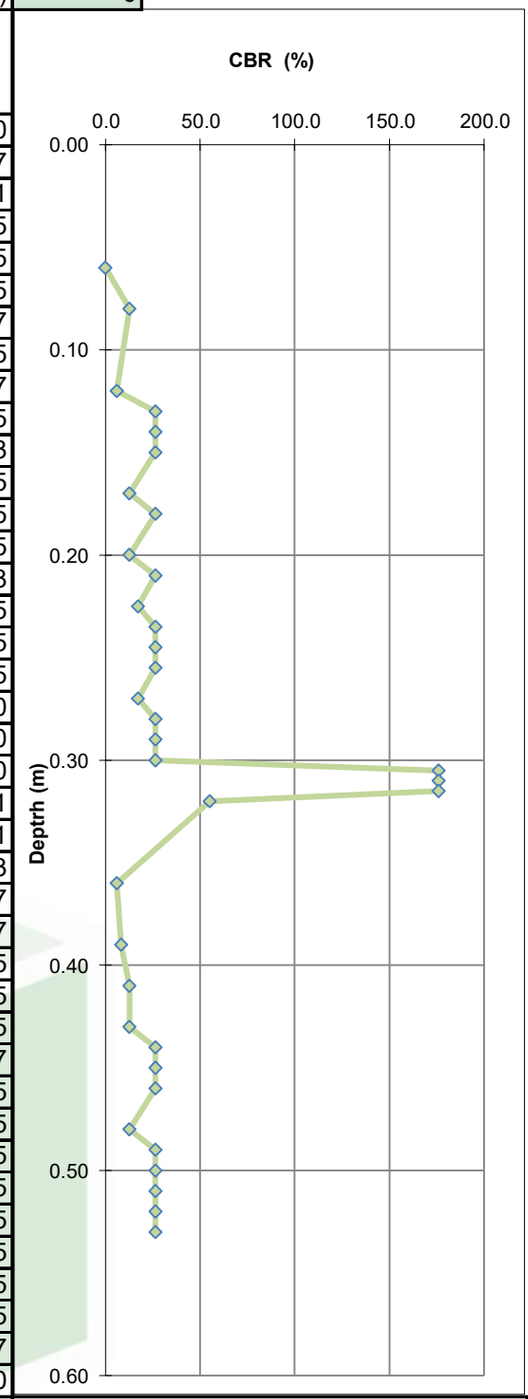
Site Name: Gnoll Park
Project Number: 17887
Date: 06/06/2023
Engineer: JM

Test: **DCP 11**

Initial Scale Reading (mm): 60 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	60	0	0.06	0	0.0
1	80	20	0.08	20	12.7
1	120	40	0.12	40	6.1
1	130	10	0.13	10	26.5
1	140	10	0.14	10	26.5
1	150	10	0.15	10	26.5
1	170	20	0.17	20	12.7
1	180	10	0.18	10	26.5
1	200	20	0.20	20	12.7
1	210	10	0.21	10	26.5
1	225	15	0.23	15	17.3
1	235	10	0.24	10	26.5
1	245	10	0.25	10	26.5
1	255	10	0.26	10	26.5
1	270	15	0.27	15	17.3
1	280	10	0.28	10	26.5
1	290	10	0.29	10	26.5
1	300	10	0.30	10	26.5
3	305	5	0.31	2	176.0
3	310	5	0.31	2	176.0
3	315	5	0.32	2	176.0
1	320	5	0.32	5	55.1
1	360	40	0.36	40	6.1
1	390	30	0.39	30	8.3
1	410	20	0.41	20	12.7
1	430	20	0.43	20	12.7
1	440	10	0.44	10	26.5
1	450	10	0.45	10	26.5
1	460	10	0.46	10	26.5
1	480	20	0.48	20	12.7
1	490	10	0.49	10	26.5
1	500	10	0.50	10	26.5
1	510	10	0.51	10	26.5
1	520	10	0.52	10	26.5
1	530	10	0.53	10	26.5
1	540	10	0.54	10	26.5
1	550	10	0.55	10	26.5
1	560	10	0.56	10	26.5
1	580	20	0.58	20	12.7
5	585	5	0.59	1	302.0
5	590	5	0.59	1	302.0



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DYNAMIC CONE PENETROMETER TEST

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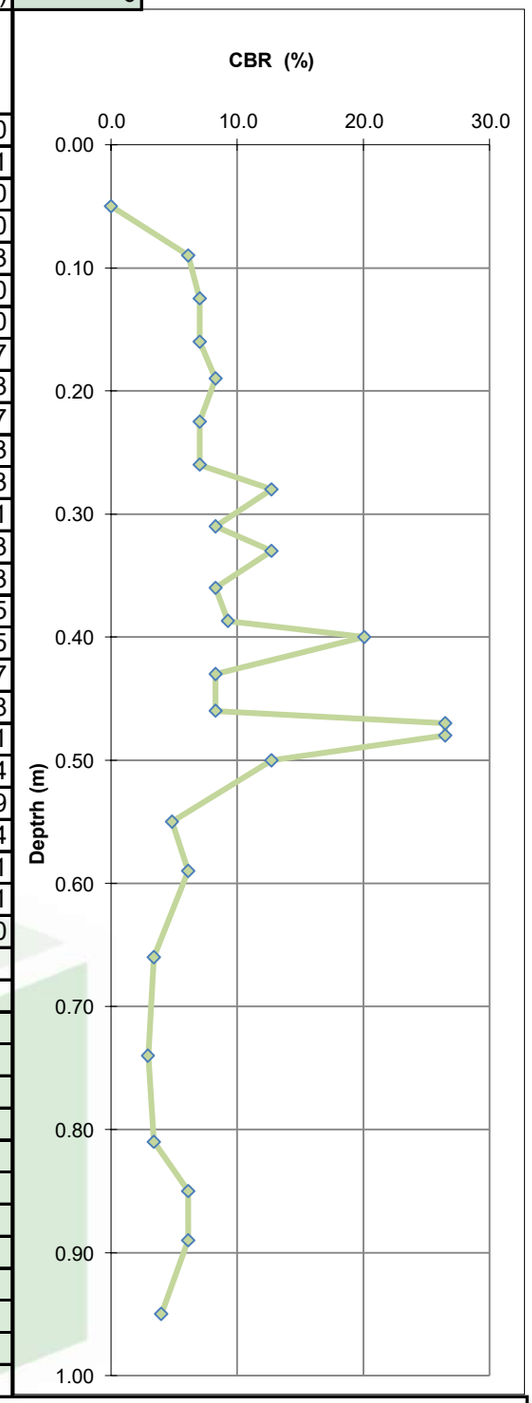
Site Name: Gnoll Park
Project Number: 17887
Date: 05/06/2023
Engineer: JM

Test: **DCP 12**

Initial Scale Reading (mm): 50 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	50	0	0.05	0	0.0
1	90	40	0.09	40	6.1
1	125	35	0.13	35	7.0
1	160	35	0.16	35	7.0
1	190	30	0.19	30	8.3
1	225	35	0.23	35	7.0
1	260	35	0.26	35	7.0
1	280	20	0.28	20	12.7
1	310	30	0.31	30	8.3
1	330	20	0.33	20	12.7
1	360	30	0.36	30	8.3
1	387	27	0.39	27	9.3
1	400	13	0.40	13	20.1
1	430	30	0.43	30	8.3
1	460	30	0.46	30	8.3
1	470	10	0.47	10	26.5
1	480	10	0.48	10	26.5
1	500	20	0.50	20	12.7
1	550	50	0.55	50	4.8
1	590	40	0.59	40	6.1
1	660	70	0.66	70	3.4
1	740	80	0.74	80	2.9
1	810	70	0.81	70	3.4
1	850	40	0.85	40	6.1
1	890	40	0.89	40	6.1
1	950	60	0.95	60	4.0



REMARKS:

Test carried out in accordance with operating instructions for the dynamic cone penetrometer Model A2465 by CNS Farnell Ltd.

CBR correlation based on the relationship Log10 (CBR) = 2.48 - 1.057 * Log10 (mm/blow) developed by TRL taken from The

Highways Agency Interim Advice Note 73/06 - Design Guidance for Road Pavement Foundations (2009)

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DYNAMIC CONE PENETROMETER TEST

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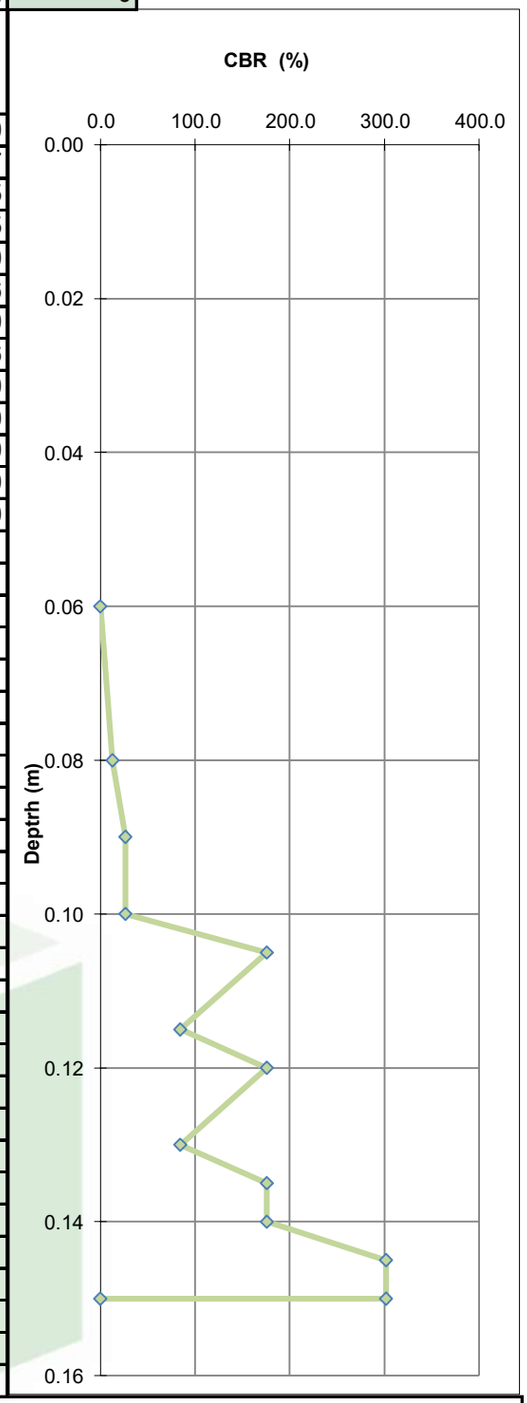
Site Name: Gnoll Park
Project Number: 17887
Date: 05/06/2023
Engineer: JM

Test: **DCP 13**

Initial Scale Reading (mm): 60 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	60	0	0.06	0	0.0
1	80	20	0.08	20	12.7
1	90	10	0.09	10	26.5
1	100	10	0.10	10	26.5
3	105	5	0.11	2	176.0
3	115	10	0.12	3	84.6
3	120	5	0.12	2	176.0
3	130	10	0.13	3	84.6
3	135	5	0.14	2	176.0
3	140	5	0.14	2	176.0
5	145	5	0.15	1	302.0
5	150	5	0.15	1	302.0
5	150	0	0.15	0	0.0



REMARKS:

Test carried out in accordance with operating instructions for the dynamic cone penetrometer Model A2465 by CNS Farnell Ltd.

CBR correlation based on the relationship Log10 (CBR) = 2.48 - 1.057 * Log10 (mm/blow) developed by TRL taken from The

Highways Agency Interim Advice Note 73/06 - Design Guidance for Road Pavement Foundations (2009)

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DYNAMIC CONE PENETROMETER TEST

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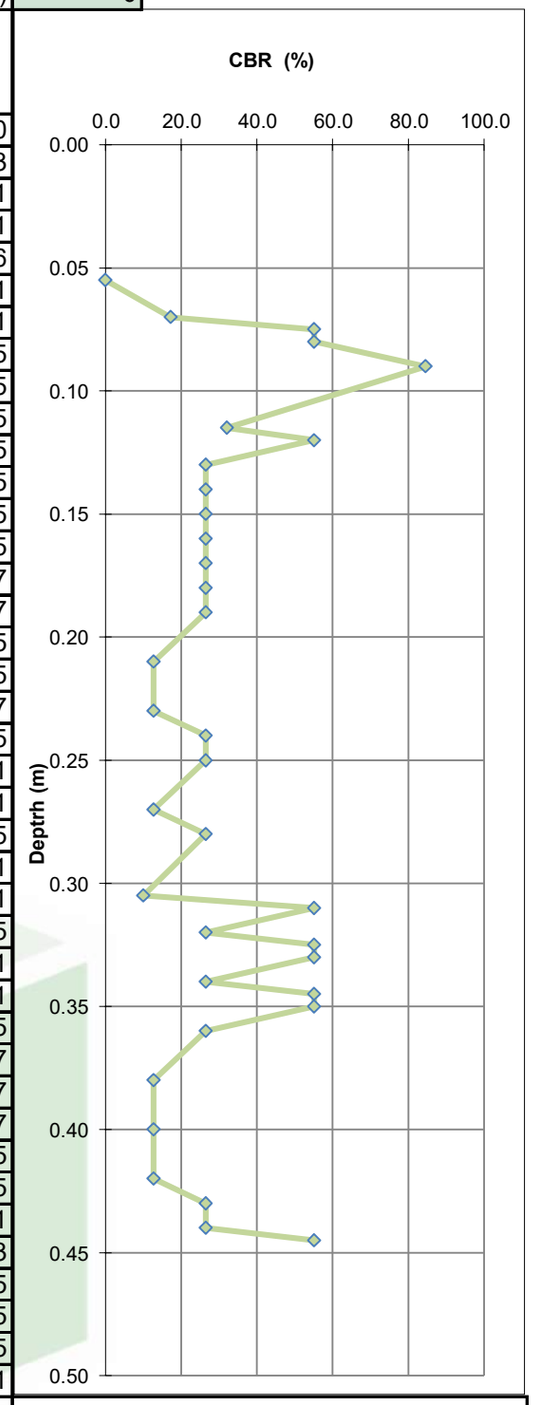
Site Name: Gnoll Park
Project Number: 17887
Date: 05/06/2023
Engineer: JM

Test: **DCP 14**

Initial Scale Reading (mm): 55 | Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	55	0	0.06	0	0.0
1	70	15	0.07	15	17.3
1	75	5	0.08	5	55.1
1	80	5	0.08	5	55.1
3	90	10	0.09	3	84.6
3	115	25	0.12	8	32.1
1	120	5	0.12	5	55.1
1	130	10	0.13	10	26.5
1	140	10	0.14	10	26.5
1	150	10	0.15	10	26.5
1	160	10	0.16	10	26.5
1	170	10	0.17	10	26.5
1	180	10	0.18	10	26.5
1	190	10	0.19	10	26.5
1	210	20	0.21	20	12.7
1	230	20	0.23	20	12.7
1	240	10	0.24	10	26.5
1	250	10	0.25	10	26.5
1	270	20	0.27	20	12.7
1	280	10	0.28	10	26.5
1	305	25	0.31	25	10.1
1	310	5	0.31	5	55.1
1	320	10	0.32	10	26.5
1	325	5	0.33	5	55.1
1	330	5	0.33	5	55.1
1	340	10	0.34	10	26.5
1	345	5	0.35	5	55.1
1	350	5	0.35	5	55.1
1	360	10	0.36	10	26.5
1	380	20	0.38	20	12.7
1	400	20	0.40	20	12.7
1	420	20	0.42	20	12.7
1	430	10	0.43	10	26.5
1	440	10	0.44	10	26.5
1	445	5	0.45	5	55.1
1	460	15	0.46	15	17.3
1	470	10	0.47	10	26.5
1	480	10	0.48	10	26.5
1	490	10	0.49	10	26.5
1	495	5	0.50	5	55.1
1	505	10	0.51	10	26.5
1	515	10	0.52	10	26.5
1	520	5	0.52	5	55.1



1	530	10	0.53	10	26.5	

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DYNAMIC CONE PENETROMETER TEST

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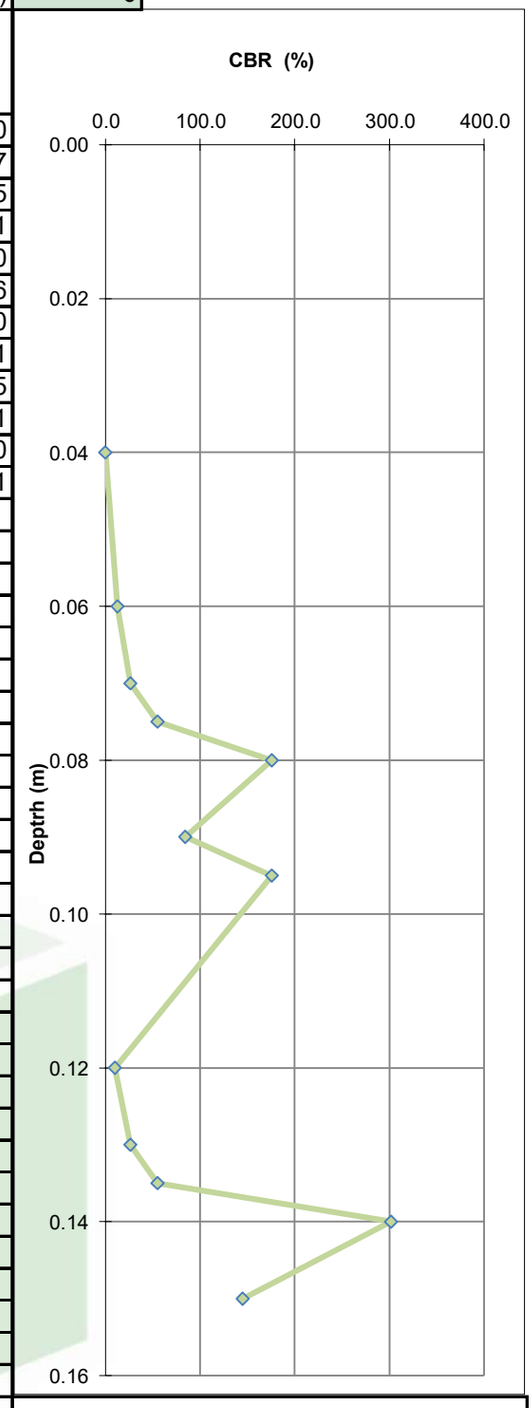
Site Name: Gnoll Park
Project Number: 17887
Date: 05/06/2023
Engineer: JM

Test: **DCP 15**

Initial Scale Reading (mm): 40 | Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	40	0	0.04	0	0.0
1	60	20	0.06	20	12.7
1	70	10	0.07	10	26.5
1	75	5	0.08	5	55.1
3	80	5	0.08	2	176.0
3	90	10	0.09	3	84.6
3	95	5	0.10	2	176.0
1	120	25	0.12	25	10.1
1	130	10	0.13	10	26.5
1	135	5	0.14	5	55.1
5	140	5	0.14	1	302.0
5	150	10	0.15	2	145.1



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DYNAMIC CONE PENETROMETER TEST

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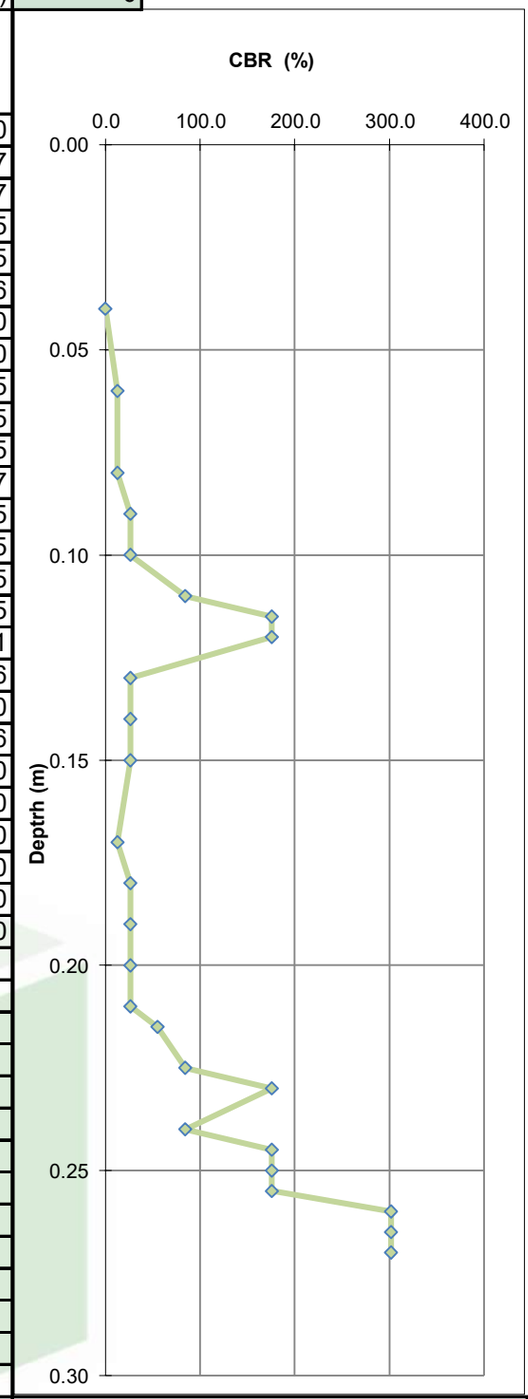
Site Name: Gnoll Park
Project Number: 17887
Date: 07/06/2023
Engineer: JM

Test: **DCP 16**

Initial Scale Reading (mm): 40 Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	40	0	0.04	0	0.0
1	60	20	0.06	20	12.7
1	80	20	0.08	20	12.7
1	90	10	0.09	10	26.5
1	100	10	0.10	10	26.5
3	110	10	0.11	3	84.6
3	115	5	0.12	2	176.0
3	120	5	0.12	2	176.0
1	130	10	0.13	10	26.5
1	140	10	0.14	10	26.5
1	150	10	0.15	10	26.5
1	170	20	0.17	20	12.7
1	180	10	0.18	10	26.5
1	190	10	0.19	10	26.5
1	200	10	0.20	10	26.5
1	210	10	0.21	10	26.5
1	215	5	0.22	5	55.1
3	225	10	0.23	3	84.6
3	230	5	0.23	2	176.0
3	240	10	0.24	3	84.6
3	245	5	0.25	2	176.0
3	250	5	0.25	2	176.0
3	255	5	0.26	2	176.0
5	260	5	0.26	1	302.0
5	265	5	0.27	1	302.0
5	270	5	0.27	1	302.0



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DYNAMIC CONE PENETROMETER TEST

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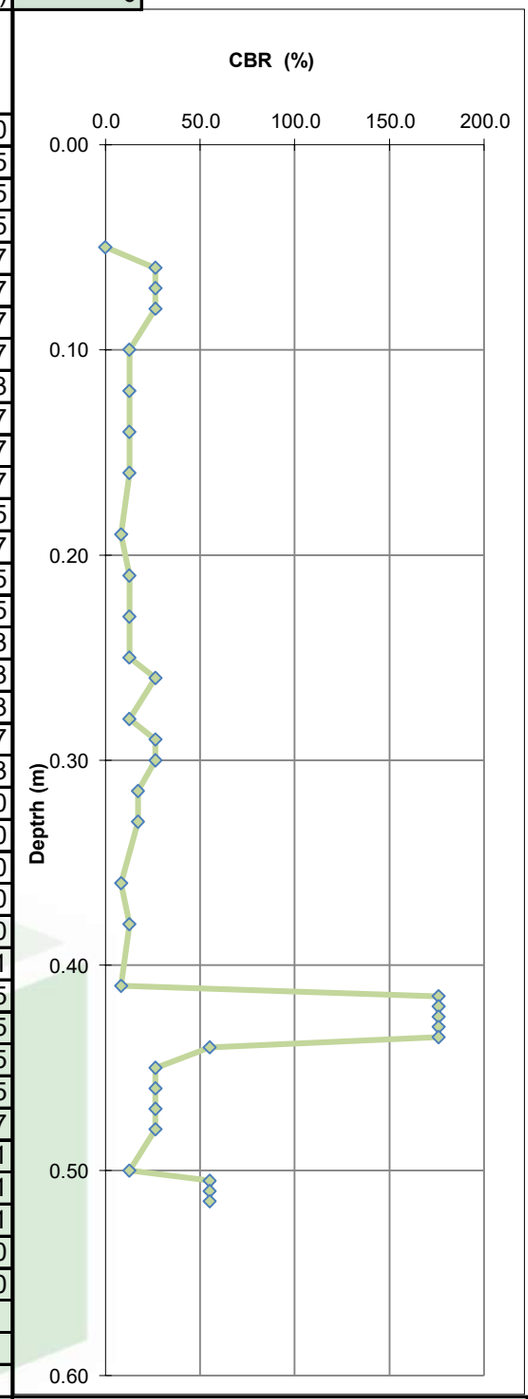
Site Name: Gnoll Park
Project Number: 17887
Date: 07/06/2023
Engineer: JM

Test: **DCP 18**

Initial Scale Reading (mm): 50 | Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	50	0	0.05	0	0.0
1	60	10	0.06	10	26.5
1	70	10	0.07	10	26.5
1	80	10	0.08	10	26.5
1	100	20	0.10	20	12.7
1	120	20	0.12	20	12.7
1	140	20	0.14	20	12.7
1	160	20	0.16	20	12.7
1	190	30	0.19	30	8.3
1	210	20	0.21	20	12.7
1	230	20	0.23	20	12.7
1	250	20	0.25	20	12.7
1	260	10	0.26	10	26.5
1	280	20	0.28	20	12.7
1	290	10	0.29	10	26.5
1	300	10	0.30	10	26.5
1	315	15	0.32	15	17.3
1	330	15	0.33	15	17.3
1	360	30	0.36	30	8.3
1	380	20	0.38	20	12.7
1	410	30	0.41	30	8.3
3	415	5	0.42	2	176.0
3	420	5	0.42	2	176.0
3	425	5	0.43	2	176.0
3	430	5	0.43	2	176.0
3	435	5	0.44	2	176.0
1	440	5	0.44	5	55.1
1	450	10	0.45	10	26.5
1	460	10	0.46	10	26.5
1	470	10	0.47	10	26.5
1	480	10	0.48	10	26.5
1	500	20	0.50	20	12.7
1	505	5	0.51	5	55.1
1	510	5	0.51	5	55.1
1	515	5	0.52	5	55.1
5	520	5	0.52	1	302.0
5	525	5	0.53	1	302.0



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DYNAMIC CONE PENETROMETER TEST

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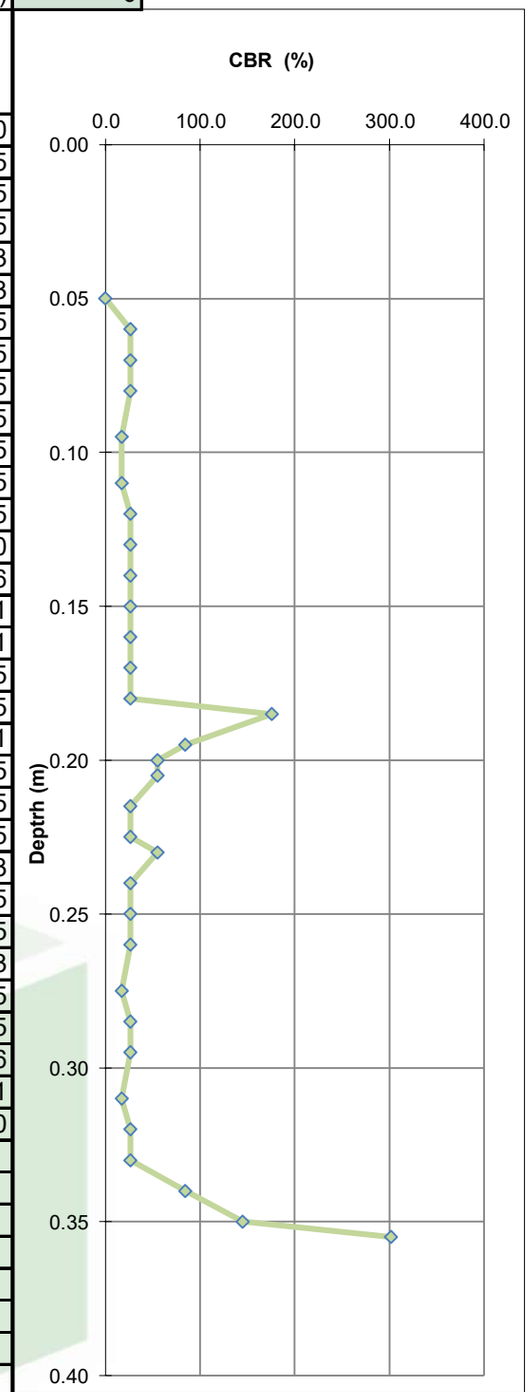
Site Name: Gnoll Park
Project Number: 17887
Date: 02/08/2023
Engineer: JM

Test: **DCP 20**

Initial Scale Reading (mm): 50 | Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	50	0	0.05	0	0.0
1	60	10	0.06	10	26.5
1	70	10	0.07	10	26.5
1	80	10	0.08	10	26.5
1	95	15	0.10	15	17.3
1	110	15	0.11	15	17.3
1	120	10	0.12	10	26.5
1	130	10	0.13	10	26.5
1	140	10	0.14	10	26.5
1	150	10	0.15	10	26.5
1	160	10	0.16	10	26.5
1	170	10	0.17	10	26.5
1	180	10	0.18	10	26.5
3	185	5	0.19	2	176.0
3	195	10	0.20	3	84.6
1	200	5	0.20	5	55.1
1	205	5	0.21	5	55.1
1	215	10	0.22	10	26.5
1	225	10	0.23	10	26.5
1	230	5	0.23	5	55.1
1	240	10	0.24	10	26.5
1	250	10	0.25	10	26.5
1	260	10	0.26	10	26.5
1	275	15	0.28	15	17.3
1	285	10	0.29	10	26.5
1	295	10	0.30	10	26.5
1	310	15	0.31	15	17.3
1	320	10	0.32	10	26.5
1	330	10	0.33	10	26.5
3	340	10	0.34	3	84.6
5	350	10	0.35	2	145.1
5	355	5	0.36	1	302.0



DYNAMIC CONE PENETROMETER TEST

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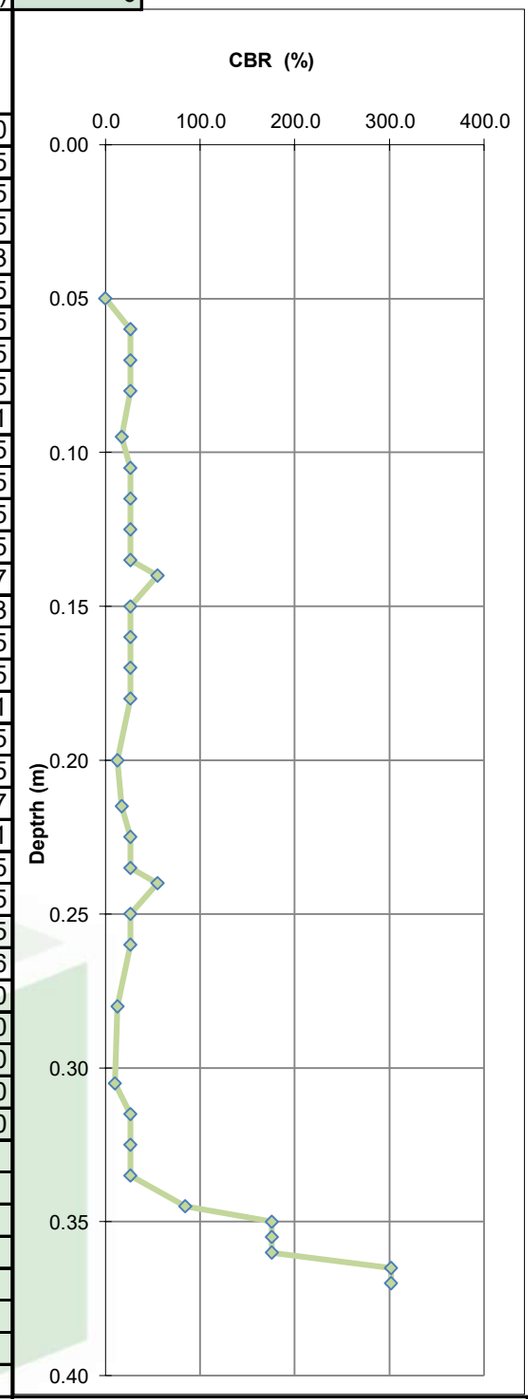
Geotechnical & Geoenvironmental Specialists

Site Name: Gnoll Park
Project Number: 17887
Date: 02/08/2023
Engineer: JM

Test: **DCP 21**

Initial Scale Reading (mm): 50 | Datum bgl (mm): 0

No. of blows	Scale reading (mm)	Penetration increment (mm)	Depth bgl (m)	DCP (mm/blow)	CBR (%)
1	50	0	0.05	0	0.0
1	60	10	0.06	10	26.5
1	70	10	0.07	10	26.5
1	80	10	0.08	10	26.5
1	95	15	0.10	15	17.3
1	105	10	0.11	10	26.5
1	115	10	0.12	10	26.5
1	125	10	0.13	10	26.5
1	135	10	0.14	10	26.5
1	140	5	0.14	5	55.1
1	150	10	0.15	10	26.5
1	160	10	0.16	10	26.5
1	170	10	0.17	10	26.5
1	180	10	0.18	10	26.5
1	200	20	0.20	20	12.7
1	215	15	0.22	15	17.3
1	225	10	0.23	10	26.5
1	235	10	0.24	10	26.5
1	240	5	0.24	5	55.1
1	250	10	0.25	10	26.5
1	260	10	0.26	10	26.5
1	280	20	0.28	20	12.7
1	305	25	0.31	25	10.1
1	315	10	0.32	10	26.5
1	325	10	0.33	10	26.5
1	335	10	0.34	10	26.5
3	345	10	0.35	3	84.6
3	350	5	0.35	2	176.0
3	355	5	0.36	2	176.0
3	360	5	0.36	2	176.0
5	365	5	0.37	1	302.0
5	370	5	0.37	1	302.0



ANNEX E
Chemical Test Results

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

Final Report

Report No.:	23-22704-1		
Initial Date of Issue:	12-Jul-2023		
Re-Issue Details:			
Client	Terra Firma (Wales) Ltd		
Client Address:	5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA		
Contact(s):	Info		
Project	Gnoll Park, Chippneham		
Quotation No.:	Q23-31814	**Date Received:**	04-Jul-2023
Order No.:		**Date Instructed:**	04-Jul-2023
No. of Samples:	15		
Turnaround (Wkdays):	6	**Results Due:**	11-Jul-2023
Date Approved:	12-Jul-2023		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Soil

Project: Gnoll Park, Chippneham

Client: Terra Firma (Wales) Ltd				**Chemtest Job No.:**	23-22704	23-22704	23-22704	23-22704	23-22704	23-22704	23-22704	23-22704	23-22704
Quotation No.: Q23-31814				**Chemtest Sample ID.:**	1668800	1668801	1668802	1668803	1668804	1668805	1668806	1668807	1668808
				Sample Location:	TP01	TP02	TP03	TP04	TP04	TP05	TP05	TP06	TP07
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.20	0.20	0.30	1.20	0.60	2.10	0.40	1.15
				Asbestos Lab:		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
Moisture	N	2030	%	0.020	9.9	12	9.7	5.6	17	15	9.3	13	17
pH	U	2010		4.0	[A] 7.9	[A] 7.3	[A] 6.9	[A] 8.4	[A] 7.7	[A] 7.9	[A] 8.3	[A] 7.9	[A] 5.4
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		[A] < 0.010			[A] < 0.010		[A] < 0.010	[A] 0.014	
Cyanide (Total)	U	2300	mg/kg	0.50	[A] 0.60	[A] < 0.50	[A] < 0.50	[A] < 0.50		[A] < 0.50		[A] < 0.50	[A] < 0.50
Sulphate (Total)	U	2430	%	0.010	[A] 0.011	[A] 0.063	[A] 0.078	[A] 0.048	[A] 0.045	[A] 0.076	[A] 0.048	[A] 0.18	[A] 0.079
Sulphate (Acid Soluble)	U	2430	%	0.010		[A] 0.11			[A] 0.048		[A] 0.065	[A] 0.22	
Arsenic	U	2455	mg/kg	0.5	13	12	33	30		20		25	20
Cadmium	U	2455	mg/kg	0.10	0.15	< 0.10	0.60	0.69		< 0.10		0.10	0.17
Chromium	U	2455	mg/kg	0.5	26	12	14	21		16		14	20
Copper	U	2455	mg/kg	0.50	41	29	51	55		23		41	49
Mercury	U	2455	mg/kg	0.05	0.06	0.06	0.08	0.10		0.11		0.16	0.12
Nickel	U	2455	mg/kg	0.50	49	23	18	32		21		21	40
Lead	U	2455	mg/kg	0.50	32	26	54	55		57		140	38
Selenium	U	2455	mg/kg	0.25	0.94	0.63	0.97	0.91		0.52		0.83	1.0
Zinc	U	2455	mg/kg	0.50	120	71	100	130		69		73	110
Chromium (Trivalent)	N	2490	mg/kg	1.0	26	12	14	21		16		14	20
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50		< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	[A] 1.4	[A] 9.7	[A] 5.7	[A] 13		[A] 4.2		[A] 14	[A] 1.5
Total TPH >C6-C40	U	2670	mg/kg	10		[A] < 10		[A] < 10		[A] < 10		[A] 330	[A] 43
Naphthalene	U	2700	mg/kg	0.10	[A] 4.1	[A] < 0.10	[A] 3.1	[A] < 0.10		[A] < 0.10		[A] 0.33	[A] 23
Acenaphthylene	U	2700	mg/kg	0.10	[A] 0.34	[A] < 0.10	[A] < 0.10	[A] < 0.10		[A] < 0.10		[A] 1.2	[A] 43
Acenaphthene	U	2700	mg/kg	0.10	[A] 0.29	[A] < 0.10	[A] 0.61	[A] < 0.10		[A] < 0.10		[A] 0.42	[A] 6.6
Fluorene	U	2700	mg/kg	0.10	[A] 0.19	[A] < 0.10	[A] 0.14	[A] < 0.10		[A] < 0.10		[A] 0.59	[A] 29
Phenanthrene	U	2700	mg/kg	0.10	[A] 0.20	[A] < 0.10	[A] 0.15	[A] < 0.10		[A] < 0.10		[A] 4.4	[A] < 0.10
Anthracene	U	2700	mg/kg	0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10		[A] < 0.10		[A] 2.2	[A] < 0.10
Fluoranthene	U	2700	mg/kg	0.10	[A] 0.16	[A] < 0.10	[A] 0.12	[A] < 0.10		[A] < 0.10		[A] 16	[A] 0.64
Pyrene	U	2700	mg/kg	0.10	[A] 0.15	[A] < 0.10	[A] 0.11	[A] < 0.10		[A] < 0.10		[A] 14	[A] 0.82
Benzo[a]anthracene	U	2700	mg/kg	0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10		[A] < 0.10		[A] 11	[A] 0.79
Chrysene	U	2700	mg/kg	0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10		[A] < 0.10		[A] 12	[A] 0.36
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10		[A] < 0.10		[A] 14	[A] < 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10		[A] < 0.10		[A] 5.3	[A] < 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10		[A] < 0.10		[A] 10	[A] < 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10		[A] < 0.10		[A] 7.4	[A] 84
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10		[A] < 0.10		[A] 2.3	[A] 35
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10	[A] < 0.10		[A] < 0.10		[A] 6.4	[A] 78
Total Of 16 PAH's	U	2700	mg/kg	2.0	[A] 5.4	[A] < 2.0	[A] 4.2	[A] < 2.0		[A] < 2.0		[A] 110	[A] 300
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10		< 0.10	< 0.10

Results - Soil

Project: Gnoll Park, Chippneham

Client: Terra Firma (Wales) Ltd				**Chemtest Job No.:**	23-22704	23-22704	23-22704	23-22704	23-22704	23-22704
Quotation No.: Q23-31814				**Chemtest Sample ID.:**	1668809	1668810	1668811	1668812	1668813	1668814
				Sample Location:	TP08	TP08	TP09	TP10	TP10	HP06
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	1.50	0.50	0.60	2.10	0.10
				Asbestos Lab:	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
Moisture	N	2030	%	0.020	3.5	10	7.3	9.7	8.4	9.4
pH	U	2010		4.0	[A] 8.3	[A] 8.1	[A] 8.5	[A] 8.3	[A] 8.2	[A] 8.6
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		[A] < 0.010			[A] < 0.010	
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50		[A] < 0.50	[A] < 0.50		[A] < 0.50
Sulphate (Total)	U	2430	%	0.010	[A] 0.036	[A] 0.090	[A] 0.074	[A] 0.033	[A] 0.028	[A] 0.029
Sulphate (Acid Soluble)	U	2430	%	0.010		[A] 0.080			[A] 0.040	
Arsenic	U	2455	mg/kg	0.5	35		34	38		16
Cadmium	U	2455	mg/kg	0.10	0.75		0.70	0.22		0.10
Chromium	U	2455	mg/kg	0.5	21		20	19		20
Copper	U	2455	mg/kg	0.50	90		88	120		23
Mercury	U	2455	mg/kg	0.05	0.26		0.25	0.21		0.06
Nickel	U	2455	mg/kg	0.50	27		26	29		36
Lead	U	2455	mg/kg	0.50	120		120	67		23
Selenium	U	2455	mg/kg	0.25	1.0		0.91	1.1		0.75
Zinc	U	2455	mg/kg	0.50	180		170	150		83
Chromium (Trivalent)	N	2490	mg/kg	1.0	21		20	19		20
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50		< 0.50	< 0.50		< 0.50
Organic Matter	U	2625	%	0.40	[A] 12		[A] 1.1	[A] 2.6		[A] 22
Total TPH >C6-C40	U	2670	mg/kg	10	[A] < 10		[A] < 10	[A] < 10		[A] < 10
Naphthalene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Acenaphthylene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Acenaphthene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Fluorene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Phenanthrene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Anthracene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Fluoranthene	U	2700	mg/kg	0.10	[A] 0.18		[A] < 0.10	[A] < 0.10		[A] < 0.10
Pyrene	U	2700	mg/kg	0.10	[A] 0.20		[A] < 0.10	[A] < 0.10		[A] < 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	[A] 0.35		[A] < 0.10	[A] < 0.10		[A] < 0.10
Chrysene	U	2700	mg/kg	0.10	[A] 0.22		[A] < 0.10	[A] < 0.10		[A] < 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	[A] < 0.10		[A] < 0.10	[A] < 0.10		[A] < 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	[A] < 2.0		[A] < 2.0	[A] < 2.0		[A] < 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10		< 0.10	< 0.10		< 0.10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1668800			TP01		A	Amber Glass 250ml
1668800			TP01		A	Plastic Tub 500g
1668801			TP02		A	Amber Glass 250ml
1668801			TP02		A	Plastic Tub 500g
1668802			TP03		A	Amber Glass 250ml
1668802			TP03		A	Plastic Tub 500g
1668803			TP04		A	Amber Glass 250ml
1668803			TP04		A	Plastic Tub 500g
1668804			TP04		A	Amber Glass 250ml
1668804			TP04		A	Plastic Tub 500g
1668805			TP05		A	Amber Glass 250ml
1668805			TP05		A	Plastic Tub 500g
1668806			TP05		A	Amber Glass 250ml
1668806			TP05		A	Plastic Tub 500g
1668807			TP06		A	Amber Glass 250ml
1668807			TP06		A	Plastic Tub 500g
1668808			TP07		A	Amber Glass 250ml
1668808			TP07		A	Plastic Tub 500g
1668809			TP08		A	Amber Glass 250ml
1668809			TP08		A	Plastic Tub 500g
1668810			TP08		A	Amber Glass 250ml
1668810			TP08		A	Plastic Tub 500g

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1668811			TP09		A	Amber Glass 250ml
1668811			TP09		A	Plastic Tub 500g
1668812			TP10		A	Amber Glass 250ml
1668812			TP10		A	Plastic Tub 500g
1668813			TP10		A	Amber Glass 250ml
1668813			TP10		A	Plastic Tub 500g
1668814			HP06		A	Amber Glass 250ml
1668814			HP06		A	Plastic Tub 500g

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
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
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

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

Final Report

Report No.:	23-27646-1		
Initial Date of Issue:	23-Aug-2023		
Re-Issue Details:			
Client	Terra Firma (Wales) Ltd		
Client Address:	5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA		
Contact(s):	jacob@terrafirmawales.co.uk		
Project	17887 Gnoll Park Part 2		
Quotation No.:	Q23-31814	**Date Received:**	17-Aug-2023
Order No.:	GNOLL PARK PART 2	**Date Instructed:**	17-Aug-2023
No. of Samples:	2		
Turnaround (Wkdays):	5	**Results Due:**	23-Aug-2023
Date Approved:	23-Aug-2023		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Soil

Project: 17887 Gnoll Park Part 2

Client: Terra Firma (Wales) Ltd			**Chemtest Job No.:**		23-27646	23-27646
Quotation No.: Q23-31814			**Chemtest Sample ID.:**		1689711	1689712
Order No.: GNOLL PARK PART 2			Client Sample Ref.:		TP11 0.60	HP01 0.50
			Client Sample ID.:		TP11 0.60	HP01 0.50
			Sample Location:		TP11 0.60	HP01 0.50
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.60	0.50
			Date Sampled:		15-Aug-2023	15-Aug-2023
			Time Sampled:		12:00	12:00
			Asbestos Lab:			DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
ACM Type	U	2192		N/A		-
Asbestos Identification	U	2192		N/A		No Asbestos Detected
Moisture	N	2030	%	0.020	23	10
pH	U	2010		4.0	8.2	7.1
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50
Sulphate (Total)	U	2430	%	0.010	0.082	0.050
Arsenic	U	2455	mg/kg	0.5	25	13
Cadmium	U	2455	mg/kg	0.10	0.45	0.13
Chromium	U	2455	mg/kg	0.5	20	18
Copper	U	2455	mg/kg	0.50	54	22
Mercury	U	2455	mg/kg	0.05	0.27	0.06
Nickel	U	2455	mg/kg	0.50	30	27
Lead	U	2455	mg/kg	0.50	310	19
Selenium	U	2455	mg/kg	0.25	1.0	1.0
Zinc	U	2455	mg/kg	0.50	170	77
Chromium (Trivalent)	N	2490	mg/kg	1.0	20	18
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	3.7	< 0.40
Total TPH >C6-C40	U	2670	mg/kg	10		< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10

Results - Soil

Project: 17887 Gnoll Park Part 2

Client: Terra Firma (Wales) Ltd			**Chemtest Job No.:**		23-27646	23-27646
Quotation No.: Q23-31814			**Chemtest Sample ID.:**		1689711	1689712
Order No.: GNOLL PARK PART 2			Client Sample Ref.:		TP11 0.60	HP01 0.50
			Client Sample ID.:		TP11 0.60	HP01 0.50
			Sample Location:		TP11 0.60	HP01 0.50
			Sample Type:		SOIL	SOIL
			Top Depth (m):		0.60	0.50
			Date Sampled:		15-Aug-2023	15-Aug-2023
			Time Sampled:		12:00	12:00
			Asbestos Lab:			DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	< 2.0
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 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
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
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2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
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2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
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.

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customerservices@chemtest.com

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

Final Report

Report No.:	23-29610-1		
Initial Date of Issue:	17-Sep-2023		
Re-Issue Details:			
Client	Terra Firma (Wales) Ltd		
Client Address:	5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA		
Contact(s):	Jacob McAnaney		
Project	GN011 2		
Quotation No.:		**Date Received:**	05-Sep-2023
Order No.:		**Date Instructed:**	05-Sep-2023
No. of Samples:	1		
Turnaround (Wkdays):	5	**Results Due:**	11-Sep-2023
Date Approved:	16-Sep-2023		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Soil

Project: GN011 2

Client: Terra Firma (Wales) Ltd			**Chemtest Job No.:**		23-29610
Quotation No.:			**Chemtest Sample ID.:**		1697496
			Sample Location:		HP04
			Sample Type:		SOIL
			Top Depth (m):		0.80
			Asbestos Lab:		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
ACM Type	U	2192		N/A	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected
Moisture	N	2030	%	0.020	25
Soil Colour	N	2040		N/A	Brown
Other Material	N	2040		N/A	Roots and Stones
Soil Texture	N	2040		N/A	Sand
pH	M	2010		4.0	[A] 6.5
Cyanide (Total)	M	2300	mg/kg	0.50	[A] < 0.50
Sulphate (Total)	U	2430	%	0.010	[A] 0.064
Arsenic	M	2455	mg/kg	0.5	26
Cadmium	M	2455	mg/kg	0.10	< 0.10
Chromium	M	2455	mg/kg	0.5	35
Copper	M	2455	mg/kg	0.50	18
Mercury	M	2455	mg/kg	0.05	< 0.05
Nickel	M	2455	mg/kg	0.50	33
Lead	M	2455	mg/kg	0.50	25
Selenium	M	2455	mg/kg	0.25	1.1
Zinc	M	2455	mg/kg	0.50	72
Chromium (Trivalent)	N	2490	mg/kg	1.0	35
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50
Organic Matter	M	2625	%	0.40	[A] 9.8
Total TPH >C6-C40	M	2670	mg/kg	10	[A] < 10
Naphthalene	M	2700	mg/kg	0.10	[A] < 0.10
Acenaphthylene	M	2700	mg/kg	0.10	[A] < 0.10
Acenaphthene	M	2700	mg/kg	0.10	[A] < 0.10
Fluorene	M	2700	mg/kg	0.10	[A] < 0.10
Phenanthrene	M	2700	mg/kg	0.10	[A] < 0.10
Anthracene	M	2700	mg/kg	0.10	[A] < 0.10
Fluoranthene	M	2700	mg/kg	0.10	[A] < 0.10
Pyrene	M	2700	mg/kg	0.10	[A] < 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	[A] < 0.10
Chrysene	M	2700	mg/kg	0.10	[A] < 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	[A] < 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	[A] < 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	[A] < 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	[A] < 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	[A] < 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	[A] < 0.10

Results - Soil

Project: GN011 2

Client: Terra Firma (Wales) Ltd				**Chemtest Job No.:**	23-29610
Quotation No.:				**Chemtest Sample ID.:**	1697496
				Sample Location:	HP04
				Sample Type:	SOIL
				Top Depth (m):	0.80
				Asbestos Lab:	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Total Of 16 PAH's	M	2700	mg/kg	2.0	[A] < 2.0
Total Phenols	M	2920	mg/kg	0.10	< 0.10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1697496			HP04		A	Amber Glass 250ml
1697496			HP04		A	Plastic Tub 500g

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
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
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

ANNEX F
Geotechnical Test Results

Results Summary

Apex Testing Solutions Limited
Sturmi Way
Village Farm Industrial Estate
Pyle
Bridgend
CF33 6BZ

Telephone: 01656 746762
E-mail: andrew.grogan@apex-drilling.com
laura.davis@apex-drilling.com

Reporting Details		**Key Information**	
Company Name:	TFW Group Ltd	**Site Name:**	Gnoll Park
Address:	5 Deryn Court Wharfdale Road Cardiff CF23 7HA	**Job Number:**	D23297
		Date Received:	17/08/2023
		Job Coordinator:	L. Davies
Contact Name:	**Jacob**		
Contact Number:			

Item No.	Tests Undertaken	Number of Tests
1	Water Content - ISO 17892 2014+A1:2022	2
2	Atterburg Limits (4 point) - BS1377-2: 1990	2

Results Issued: 22/08/2023

Comments

Results herein relate only to samples received in the laboratory and where not sampled by Apex Testing Solutions personnel relate to the samples as received.
Where tests are UKAS accredited any Opinion and/or Interpretation expressed herein are outside the scope of the UKAS Accreditation. The reports shall not be reproduced in full without the written approval of the laboratory.

Please contact the job coordinator should any further information be required.

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887- Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	34100		

Site Ref / Hole ID:	TP11	**Depth (m):**	1.10
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown gravelly sandy CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	ISO 17892-1
Date Received:	17 August 2023	**Date Tested:**	21 August 2023

Test Results

Moisture Content (%)	9.0

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis	Date 22/08/2023	Fig **MC**
EN ISO 17892-1:2014 A1:2022			L Davis, Quality Manager		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

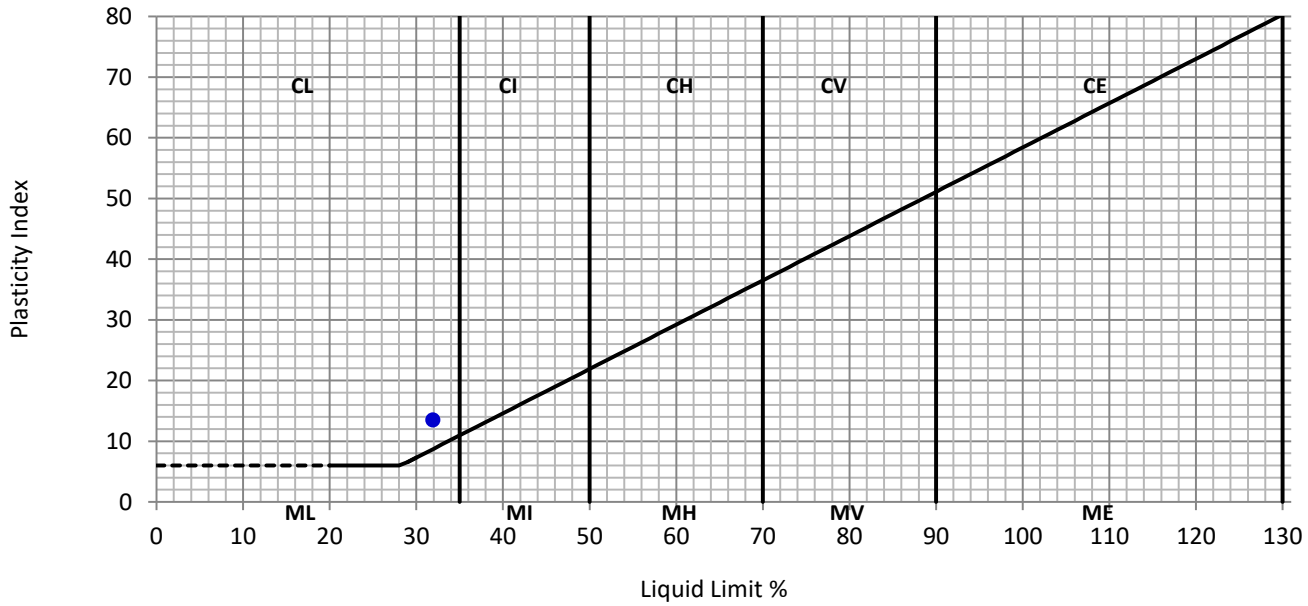
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887- Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	34100		

Site Ref / Hole ID:	TP11	**Depth (m):**	1.10
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown gravelly sandy CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	17 August 2023	**Date Tested:**	18 August 2023

Test Results

Liquid Limit	32	%
Plastic Limit	18	%
Plasticity Index	14	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	39	%



Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig.
BS1377 - 2 Rev. 3.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 UKAS TESTING 7771	L Davis	22/08/2023	**ATT**
		L Davis, Quality Manager		

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887- Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	34101		

Site Ref / Hole ID:	TP12	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Brown gravelly sandy CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	ISO 17892-1
Date Received:	17 August 2023	**Date Tested:**	21 August 2023

Test Results

Moisture Content (%)	18.9

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis	Date 22/08/2023	Fig **MC**
EN ISO 17892-1:2014 A1:2022			L Davis, Quality Manager		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

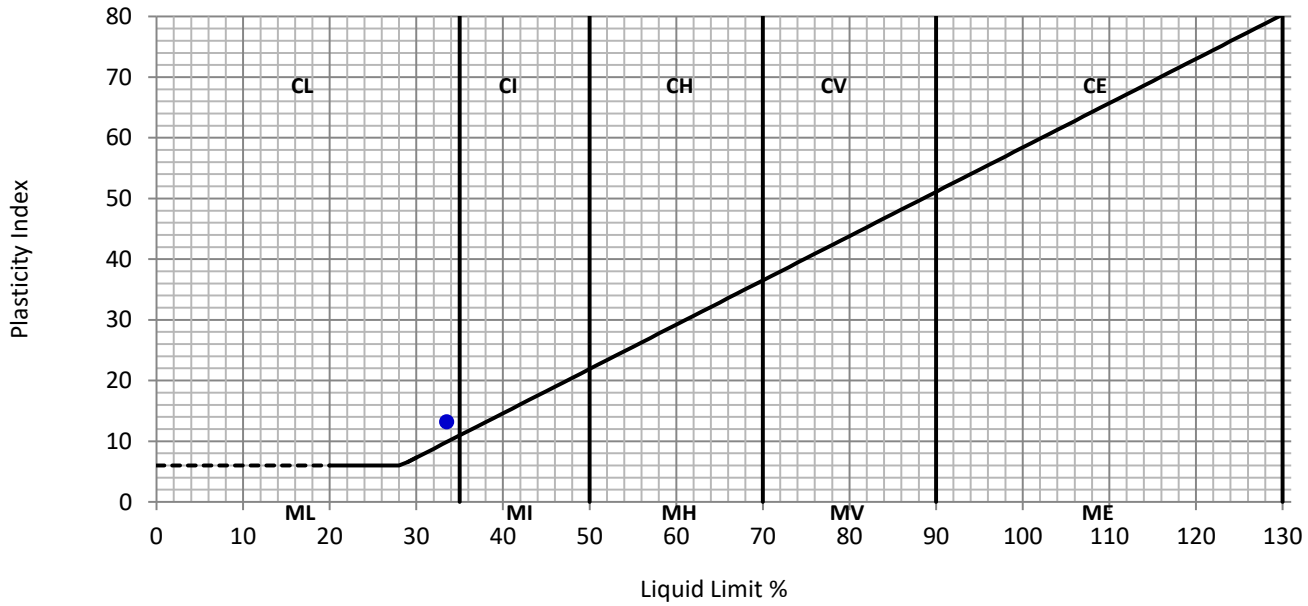
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887- Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	34101		

Site Ref / Hole ID:	TP12	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Brown gravelly sandy CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	17 August 2023	**Date Tested:**	21 August 2023

Test Results

Liquid Limit	33	%
Plastic Limit	20	%
Plasticity Index	13	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	40	%



Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig.
BS1377 - 2 Rev. 3.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 UKAS TESTING 7771	L Davis	22/08/2023	**ATT**
		L Davis, Quality Manager		

Results Summary

Apex Testing Solutions Limited
Sturmi Way
Village Farm Industrial Estate
Pyle
Bridgend
CF33 6BZ

Telephone: 01656 746762
E-mail: andrew.grogan@apex-drilling.com
laura.davis@apex-drilling.com

Reporting Details		**Key Information**	
Company Name:	TFW Group Ltd	**Site Name:**	Gnoll Park
Address:	5 Deryn Court Wharfdale Road Cardiff CF23 7HA	**Job Number:**	D23297
		Date Received:	05/07/2023
		Job Coordinator:	L. Davies
Contact Name:	**Jacob M**		
Contact Number:			

Item No.	Tests Undertaken	Number of Tests
1	Water Content - ISO 17892 2014+A1:2022	6
2	Atterburg Limits (4 point) - BS1377-2: 1990	6
3	Particle Size Distribution - BS1377-2: 1990	6
4	OMC - BS1377-4: 1990 using 2.5kg Rammer in 1L mould	1

Results Issued: 10/07/2023

Comments

Results herein relate only to samples received in the laboratory and where not sampled by Apex Testing Solutions personnel relate to the samples as received.
Where tests are UKAS accredited any Opinion and/or Interpretation expressed herein are outside the scope of the UKAS Accreditation. The reports shall not be reproduced in full without the written approval of the laboratory.

Please contact the job coordinator should any further information be required.

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33482		

Site Ref / Hole ID:	TP01	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown sandy gravelly CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	06 July 2023

Test Results

Moisture Content (%)	8.8

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis	Date 07/07/2023	Fig
EN ISO 17892-1:2014 A1:2022			L Davis, Quality Manager		**MC**

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

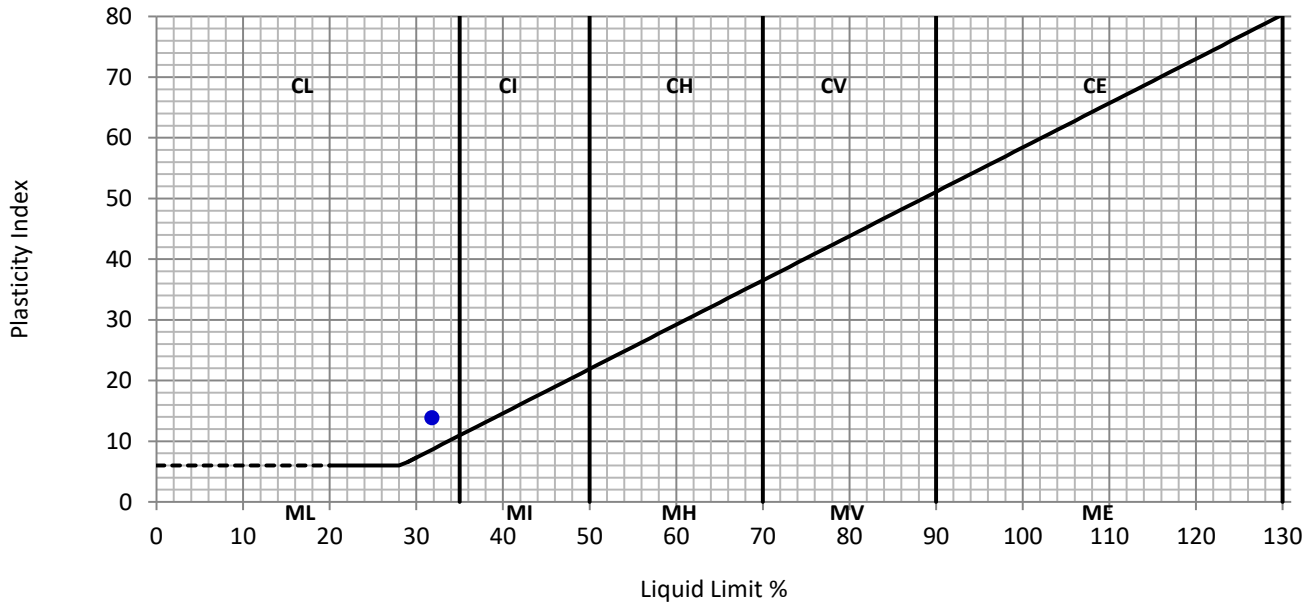
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33482		

Site Ref / Hole ID:	TP01	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown sandy gravelly CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	06 July 2023

Test Results

Liquid Limit	32	%
Plastic Limit	18	%
Plasticity Index	14	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	57	%



Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig.
BS1377 - 2 Rev. 3.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 UKAS TESTING 7771	L Davis	07/07/2023	**ATT**
		L Davis, Quality Manager		

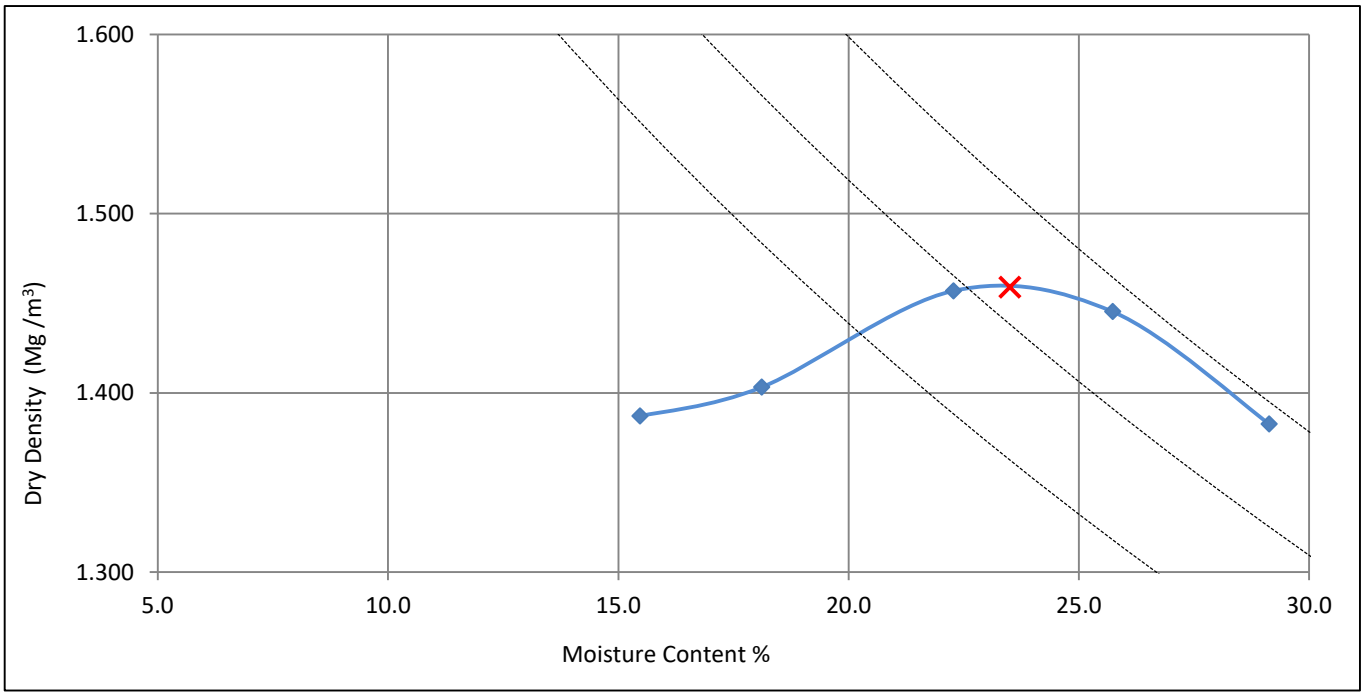
TEST REPORT

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS1377:Part 4:1990

Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33483		

Site Ref / Hole ID:	TP01	**Depth (m):**	1.50
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Greyish brown slightly gravelly sandy CLAY
Location in Works:	N/A	**Material Source:**	Site Generated
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	07 July 2023



Test Method:	BS 1377: part 4: 1990: clause 3.3, 2.5kg rammer in a 1 litre mould
Preparation:	Original sample was oven dried @ 105 oC, separate specimens tested

Particle Density, Mg/m^3	2.35	assumed
Material > 37.5mm	0	%
Material < 37.5mm > 20mm	1	%

Derived Parameters ×	
Maximum Dry Density, Mg/m^3	1.46
Optimum Moisture Content %	24

Remarks: NMC =11 %

QA Ref.					
BS1377 - 4 Rev. 2.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver A Grogan A Grogan, Laboratory Manager	Date 10/07/2023	Fig. **COMP**

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS1377:Part 2:1990

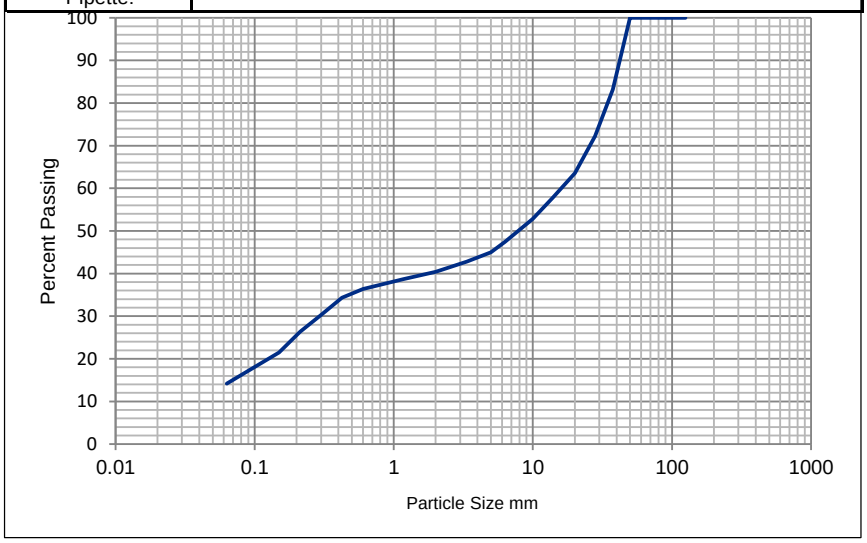
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33484		

Site Ref / Hole ID:	TP02	**Depth (m):**	1.10
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown clayey sandy GRAVEL
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	**BS1377**
Date Received:	05 July 2023	**Date Tested:**	07 July 2023

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	83
28	72
20	64
14	58
10	53
6.3	47
5.0	45
3.35	43
2.00	40
1.18	39
0.600	36
0.425	34
0.300	30
0.212	26
0.150	21
0.063	14

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	0	N/A	D_{60} / D_{10}
Gravel	60		
Sand	26	**Dry mass of sample, kg**	
Silt / Clay	14	3.2	n/a

Remarks:

QA Ref.					
BS1377 - 4 Rev. 2.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver L Davis	Date 07/07/2023	Fig **PSD**
			L Davis, Quality Manager		

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33485		

Site Ref / Hole ID:	TP04	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown silty sandy gravelly CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	07 July 2023

Test Results

Moisture Content (%)	13.3

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis	Date 07/07/2023	Fig **MC**
EN ISO 17892-1:2014 A1:2022			L Davis, Quality Manager		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

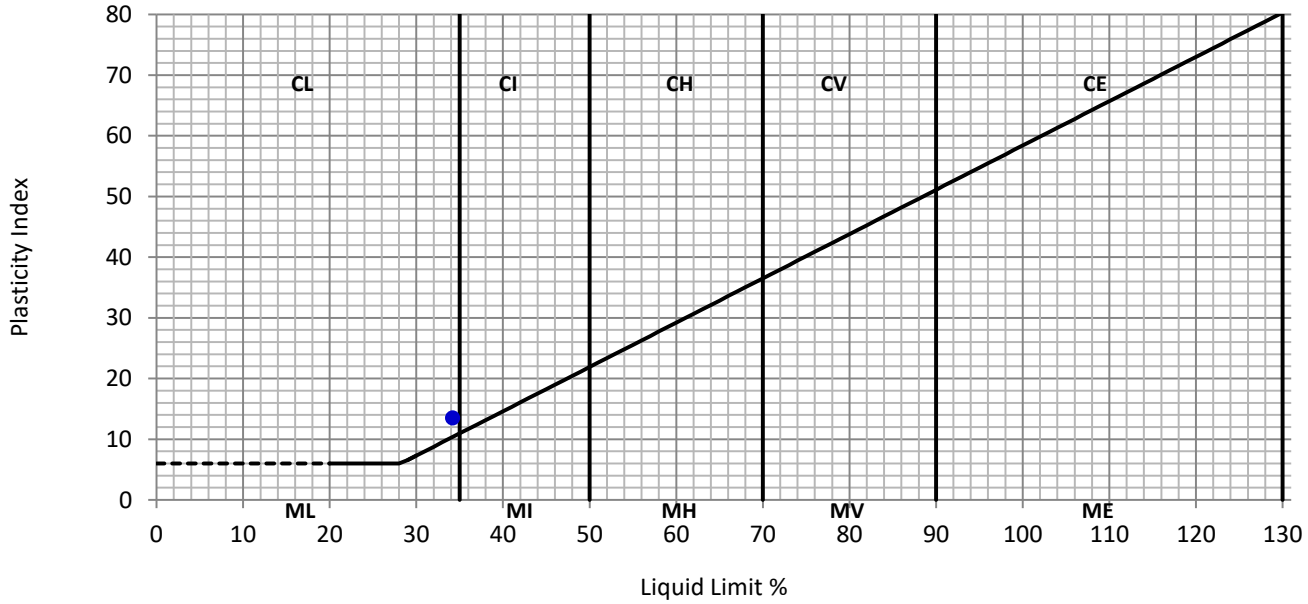
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33485		

Site Ref / Hole ID:	TP04	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown silty sandy gravelly CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	06 July 2023

Test Results

Liquid Limit	34	%
Plastic Limit	21	%
Plasticity Index	13	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	42	%



Remarks:

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS1377:Part 2:1990

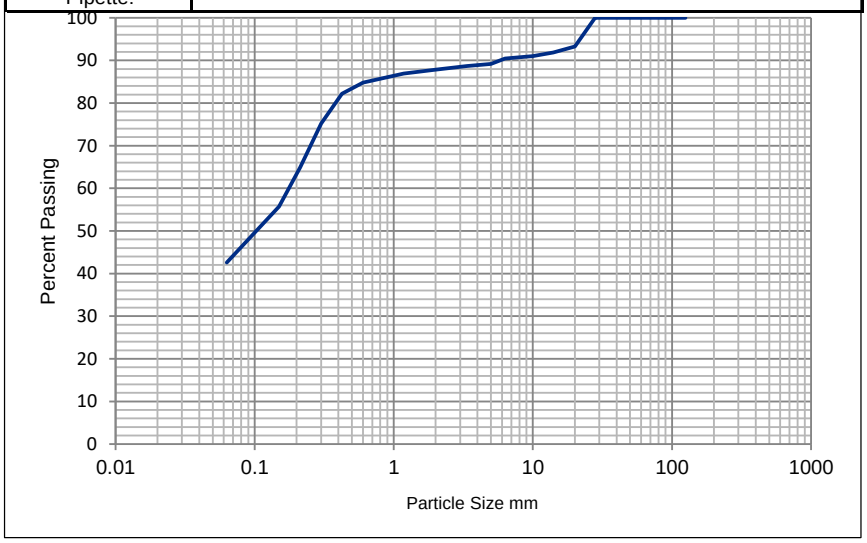
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33486		

Site Ref / Hole ID:	TP04	**Depth (m):**	1.20
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly gravelly sandy CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	**BS1377**
Date Received:	05 July 2023	**Date Tested:**	07 July 2023

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	93
14	92
10	91
6.3	90
5.0	89
3.35	89
2.00	88
1.18	87
0.600	85
0.425	82
0.300	75
0.212	65
0.150	56
0.063	43

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	0	N/A	D_{60} / D_{10}
Gravel	12		
Sand	45	**Dry mass of sample, kg**	
Silt / Clay	43	0.4	n/a

Remarks:

QA Ref.					
BS1377 - 4 Rev. 2.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis	Date 07/07/2023	Fig **PSD**
			L Davis, Quality Manager		

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33487		

Site Ref / Hole ID:	TP05	**Depth (m):**	0.60
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Dark grey sandy gravelly SILT
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	06 July 2023

Test Results

Moisture Content (%)	22.1

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis	Date 07/07/2023	Fig **MC**
EN ISO 17892-1:2014 A1:2022			L Davis, Quality Manager		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

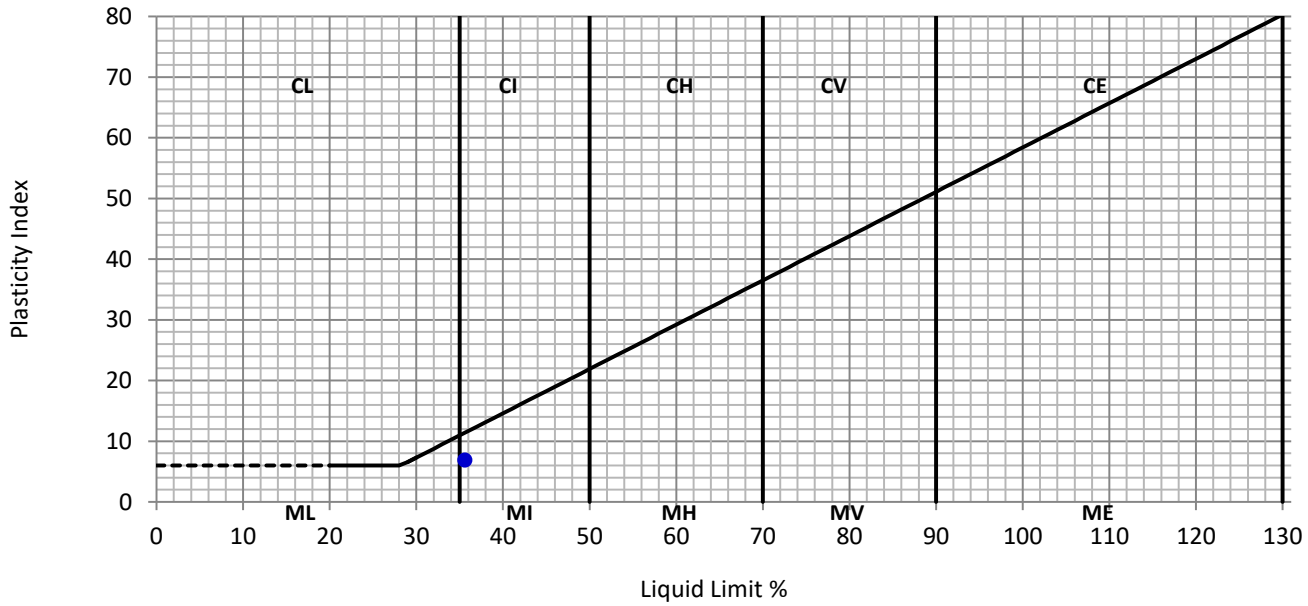
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33487		

Site Ref / Hole ID:	TP05	**Depth (m):**	0.60
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Dark grey sandy gravelly SILT
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	06 July 2023

Test Results

Liquid Limit	36	%
Plastic Limit	29	%
Plasticity Index	7	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	62	%



Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig.
BS1377 - 2 Rev. 3.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 UKAS TESTING 7771	L Davis	07/07/2023	**ATT**
		L Davis, Quality Manager		

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS1377:Part 2:1990

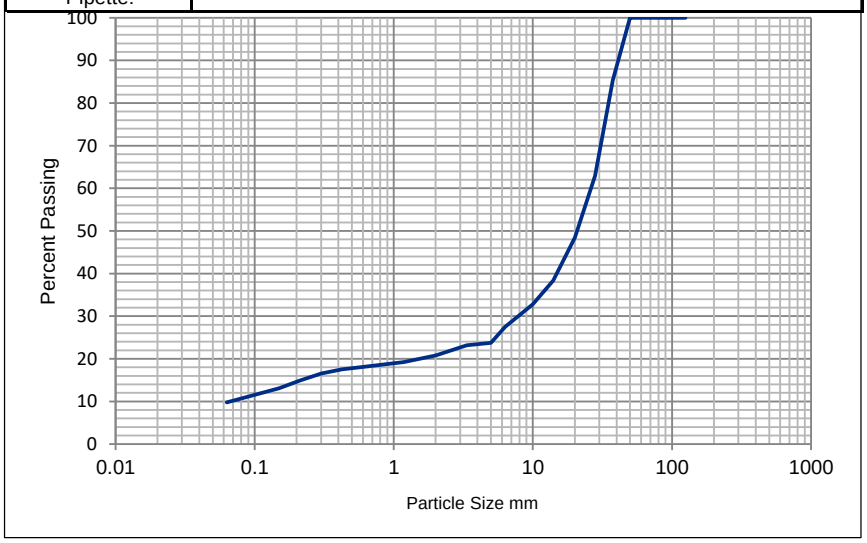
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33488		

Site Ref / Hole ID:	TP06	**Depth (m):**	1.30
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly silty slightly sandy GRAVEL
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	**BS1377**
Date Received:	05 July 2023	**Date Tested:**	10 July 2023

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	85
28	63
20	48
14	38
10	33
6.3	27
5.0	24
3.35	23
2.00	21
1.18	19
0.600	18
0.425	18
0.300	17
0.212	15
0.150	13
0.063	10

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	0	N/A	D_{60} / D_{10}
Gravel	79		
Sand	11	**Dry mass of sample, kg**	
Silt / Clay	10	4.4	n/a

Remarks:

QA Ref.					
BS1377 - 4 Rev. 2.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver A Grogan A Grogan, Laboratory Manager	Date 10/07/2023	Fig **PSD**

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33489		

Site Ref / Hole ID:	TP07	**Depth (m):**	0.30
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown slightly sandy slightly gravelly CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	07 July 2023

Test Results

Moisture Content (%)	18.5

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis	Date 07/07/2023	Fig **MC**
EN ISO 17892-1:2014 A1:2022			L Davis, Quality Manager		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

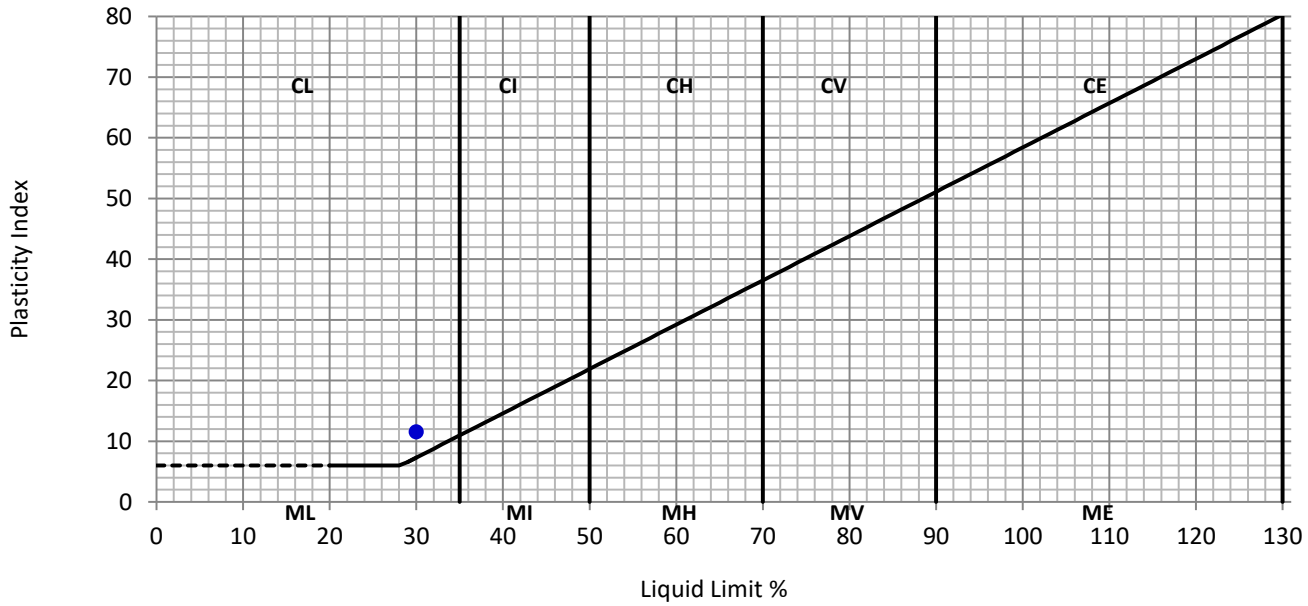
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33489		

Site Ref / Hole ID:	TP07	**Depth (m):**	0.30
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown slightly sandy slightly gravelly CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	06 July 2023

Test Results

Liquid Limit	30	%
Plastic Limit	18	%
Plasticity Index	12	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	11	%



Remarks:

QA Ref.					
BS1377 - 2 Rev. 3.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	UKAS TESTING 7771	Approver L Davis L Davis, Quality Manager	Date 07/07/2023	Fig. **ATT**

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS1377:Part 2:1990

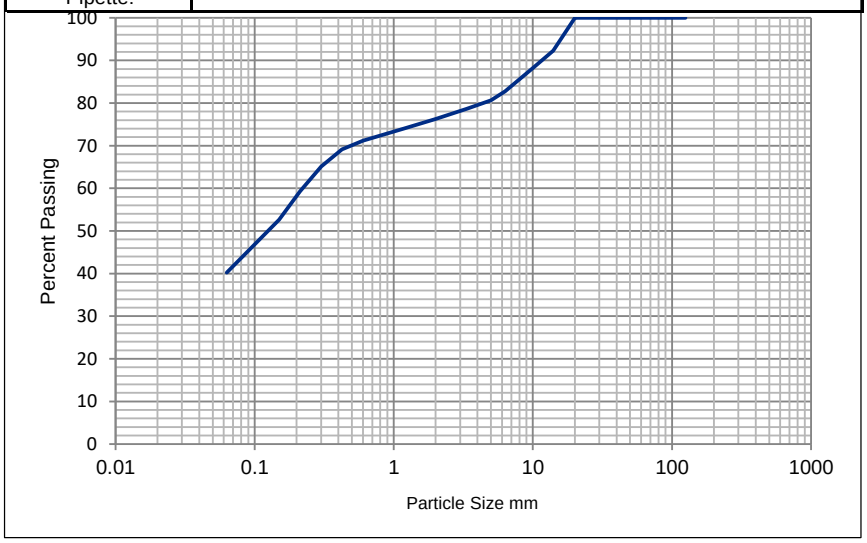
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33490		

Site Ref / Hole ID:	TP07	**Depth (m):**	1.15
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly gravelly sandy CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	**BS1377**
Date Received:	05 July 2023	**Date Tested:**	07 July 2023

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	100
14	92
10	88
6.3	83
5.0	81
3.35	79
2.00	76
1.18	74
0.600	71
0.425	69
0.300	65
0.212	59
0.150	53
0.063	40

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	0	N/A	D_{60} / D_{10}
Gravel	24		
Sand	36	**Dry mass of sample, kg**	
Silt / Clay	40	0.4	n/a

Remarks:

QA Ref.					
BS1377 - 4 Rev. 2.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis	Date 07/07/2023	Fig **PSD**
			L Davis, Quality Manager		

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33491		

Site Ref / Hole ID:	TP09	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown slightly sandy slightly gravelly CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	07 July 2023

Test Results

Moisture Content (%)	9.8

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis	Date 07/07/2023	Fig **MC**
EN ISO 17892-1:2014 A1:2022			L Davis, Quality Manager		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

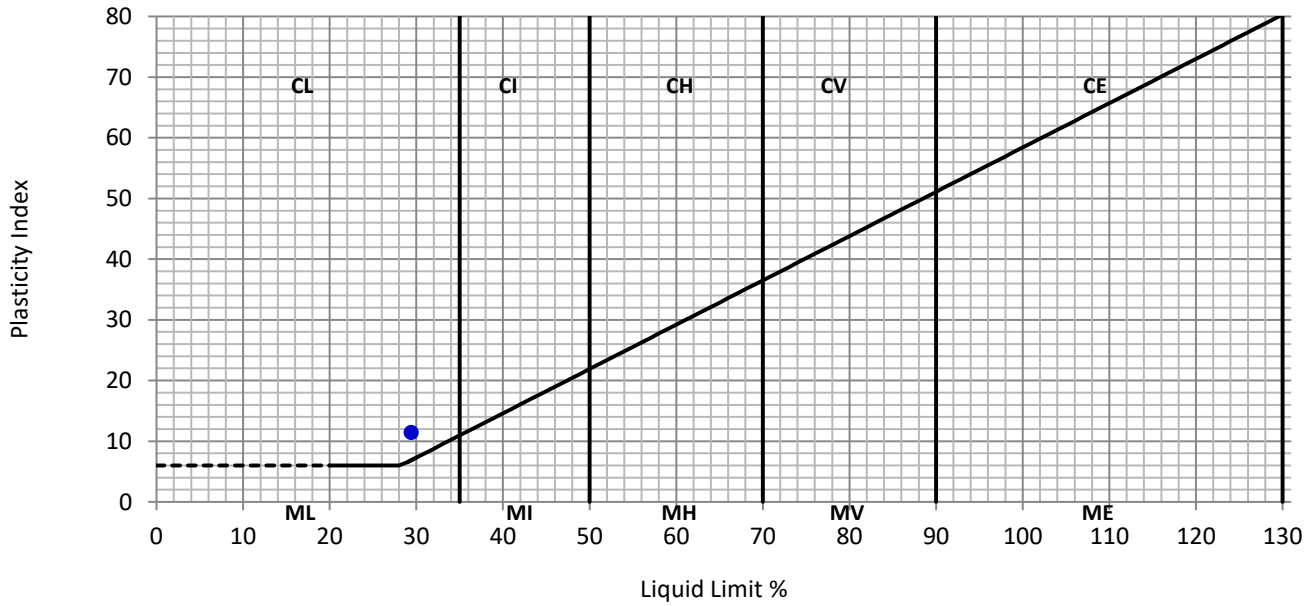
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33491		

Site Ref / Hole ID:	TP09	**Depth (m):**	0.50
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown slightly sandy slightly gravelly CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	06 July 2023

Test Results

Liquid Limit	29	%
Plastic Limit	18	%
Plasticity Index	11	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	25	%



Remarks:

QA Ref.	**Apex Testing Solutions**	Approver	Date	Fig.
BS1377 - 2 Rev. 3.0	Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096 UKAS TESTING 7771	L Davis	07/07/2023	**ATT**
		L Davis, Quality Manager		

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS1377:Part 2:1990

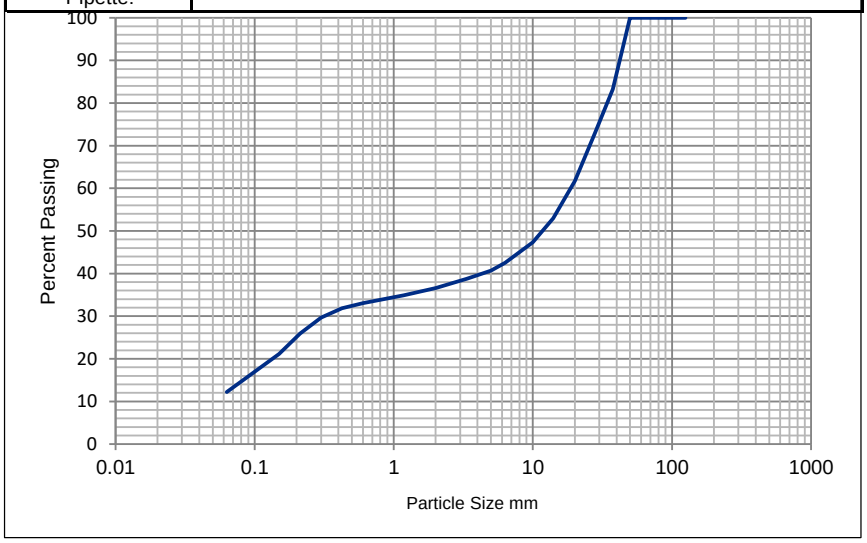
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33492		

Site Ref / Hole ID:	TP09	**Depth (m):**	1.10
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown gravelly clayey very sandy GRAVEL
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	**BS1377**
Date Received:	05 July 2023	**Date Tested:**	07 July 2023

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	83
28	73
20	62
14	53
10	47
6.3	43
5.0	41
3.35	39
2.00	37
1.18	35
0.600	33
0.425	32
0.300	30
0.212	26
0.150	21
0.063	12

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	



Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	0	N/A	D_{60} / D_{10}
Gravel	63		
Sand	24	**Dry mass of sample, kg**	
Silt / Clay	12	4.1	n/a

Remarks:

QA Ref.					
BS1377 - 4 Rev. 2.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis L Davis, Quality Manager	Date 07/07/2023	Fig **PSD**

TEST REPORT

Determination Of Water Content

ISO 17892-1: 2014+A1:2022

Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33493		

Site Ref / Hole ID:	TP10	**Depth (m):**	0.60
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown silty sandy gravelly CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	07 July 2023

Test Results

Moisture Content (%)	9.1

Remarks:

QA Ref.	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis	Date 07/07/2023	Fig **MC**
EN ISO 17892-1:2014 A1:2022			L Davis, Quality Manager		

TEST REPORT

LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX

BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

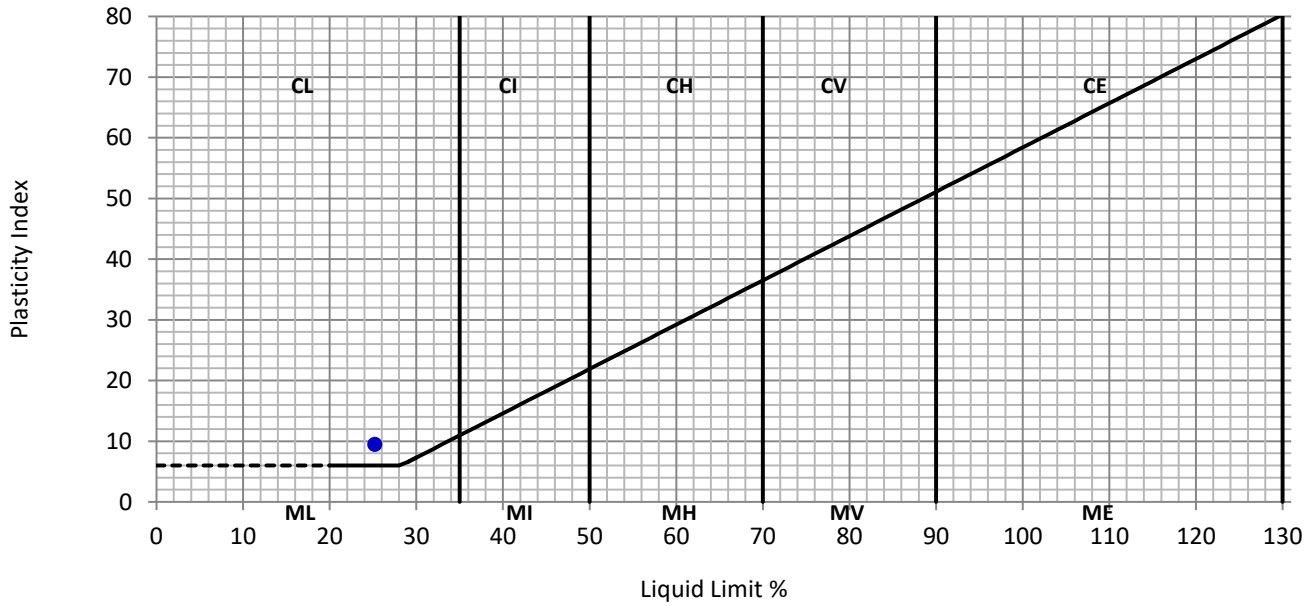
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address:**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33493		

Site Ref / Hole ID:	TP10	**Depth (m):**	0.60
Sample No:		**Sample Type:**	Disturbed
Sampling Certificate Received:	No	**Material Description:**	Greyish brown silty sandy gravelly CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	BS1377
Date Received:	05 July 2023	**Date Tested:**	06 July 2023

Test Results

Liquid Limit	25	%
Plastic Limit	16	%
Plasticity Index	9	%

Preparation:	4.2.4 Sieved Specimen	
Proportion retained on 425µm sieve:	52	%



Remarks:

TEST REPORT
PARTICLE SIZE DISTRIBUTION ANALYSIS
BS1377:Part 2:1990

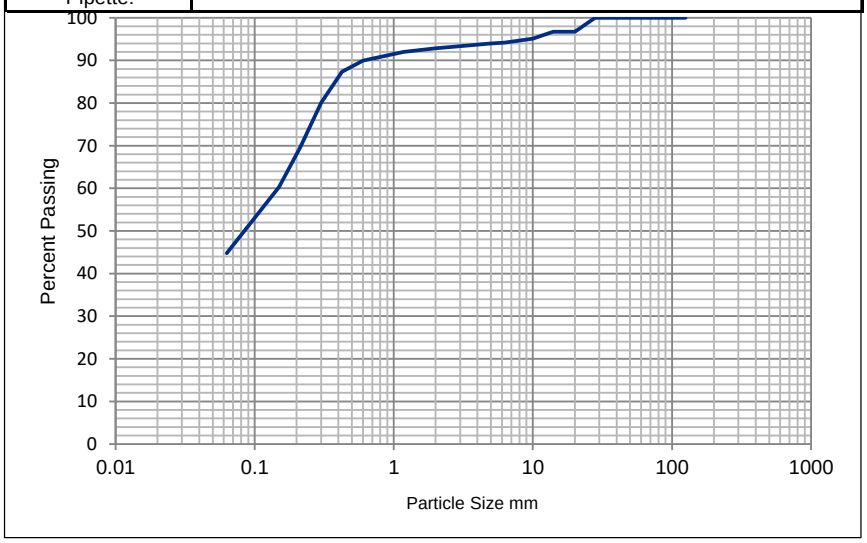
Project No:	D23297	**Client:**	TFW Group Ltd
Project Name:	17887 - Gnoll Park	**Address**	5 Deryn Court Wharfdale Road Cardiff CF23 7HA
ATS Sample No:	33494		

Site Ref / Hole ID:	HP07	**Depth (m):**	0.30
Sample No:		**Sample Type:**	Bulk
Sampling Certificate Received:	No	**Material Description:**	Brown slightly gravelly sandy CLAY
Location in Works:	N/a	**Material Source:**	Ex-Site
Date Sampled:	Unknown	**Material Supplier:**	Ex-Site
Sampled By:	Client	**Specification:**	**BS1377**
Date Received:	05 July 2023	**Date Tested:**	07 July 2023

Test Results

Sieving	
Particle Size mm	% Passing
125	100
90	100
75	100
63	100
50	100
37.5	100
28	100
20	97
14	97
10	95
6.3	94
5.0	94
3.35	93
2.00	93
1.18	92
0.600	90
0.425	87
0.300	80
0.212	70
0.150	60
0.063	45

Preparation / Pretreatment	
Sieve:	Pre dried
Pipette:	

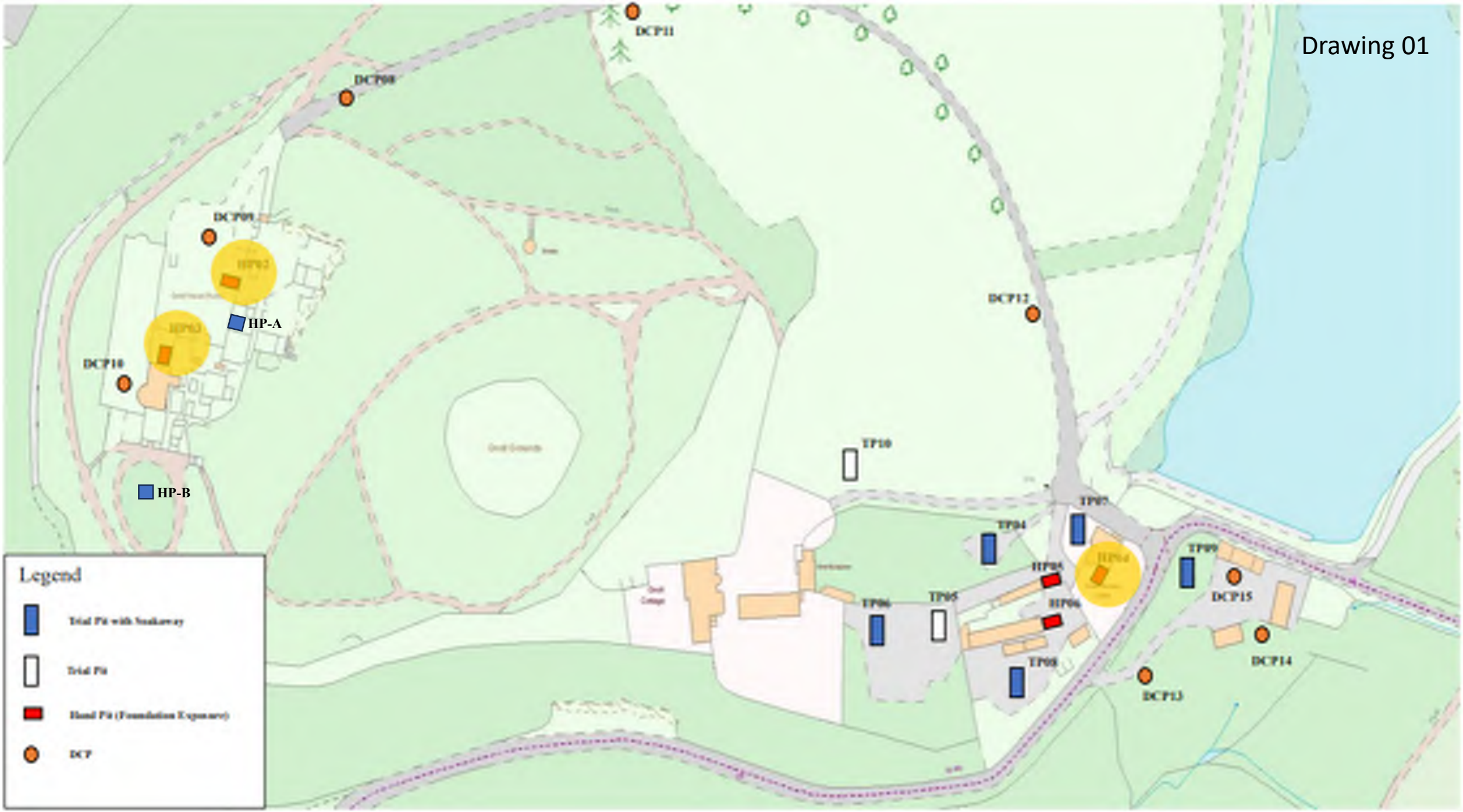


Sample Portions		Particle Density Mg/m3	Uniformity Coefficient
Cobbles / Boulders	0	N/A	D_{60} / D_{10}
Gravel	7		
Sand	48	**Dry mass of sample, kg**	
Silt / Clay	45	0.6	n/a

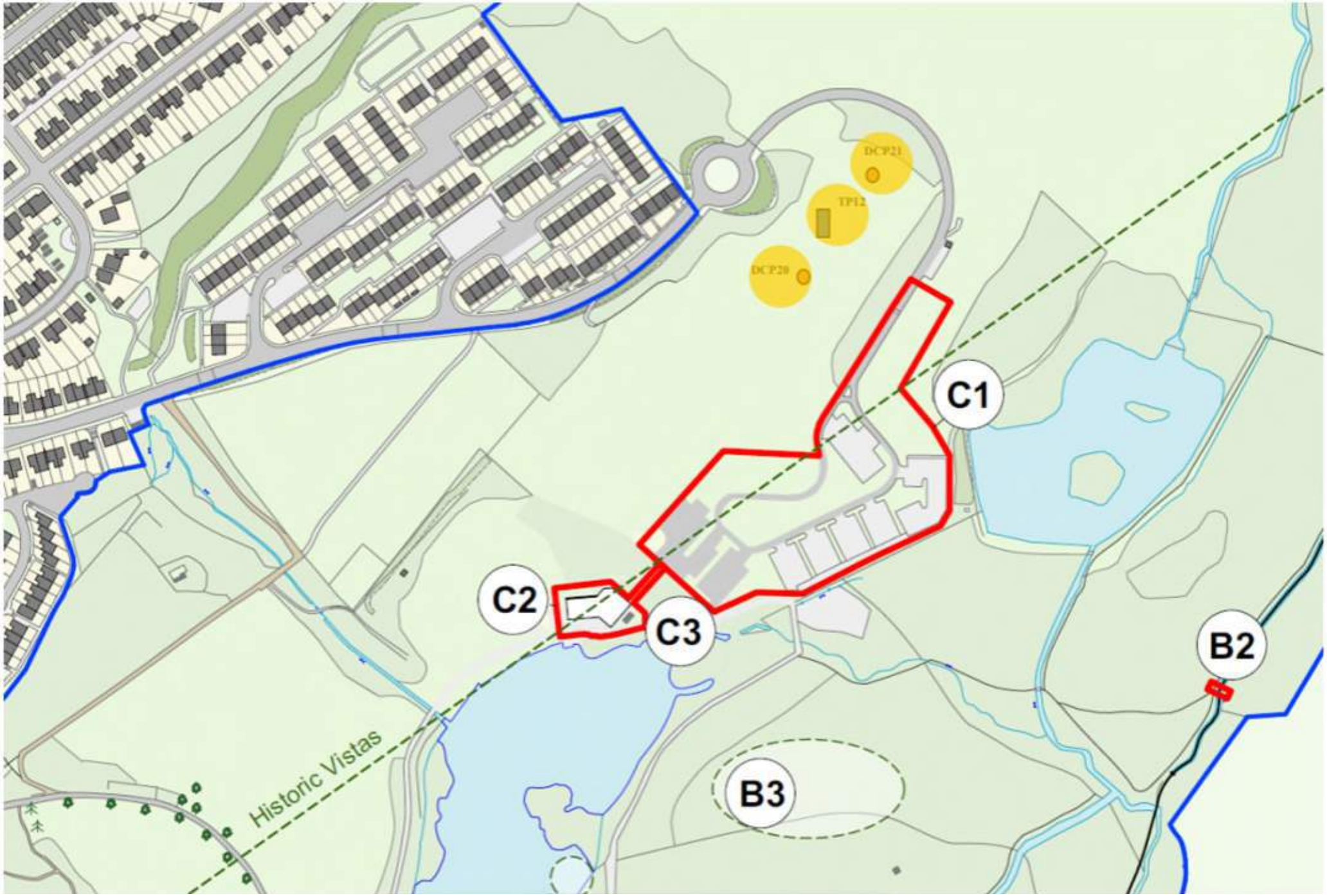
Remarks:

QA Ref.					
BS1377 - 4 Rev. 2.0	**Apex Testing Solutions** Sturmi Way, Village Farm Industrial Est, Pyle, Bridgend, CF33 6BZ Tel: 01656 746762 Fax: 01656 749096	7771	Approver L Davis L Davis, Quality Manager	Date 07/07/2023	Fig **PSD**

Drawings


Drawing 01
DCP11
DCP08
DCP09
HP-A
DCP10
HP-B
DCP12
TP10
TP07
TP04
HP05
HP06
TP06
TP05
TP08
TP09
DCP15
DCP14
DCP13
Legend
Trial Pit with Soakaway
Trial Pit
Hand Pit (Foundation Exposure)
DCP

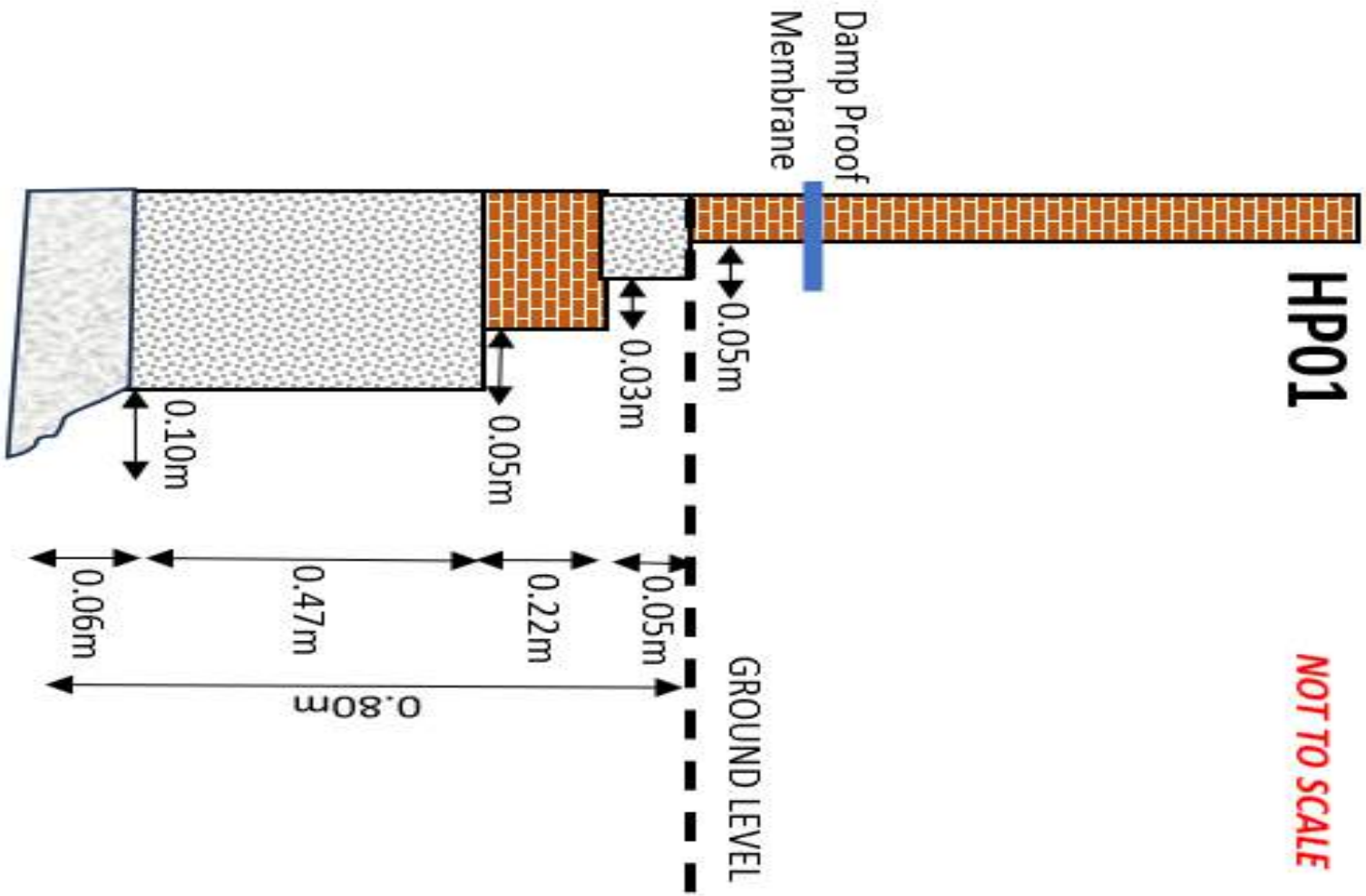
Drawing 02



Drawing 03

TP11
DCP16
DCP01
DCP02
TP01
DCP03
TP02
DCP04
TP03
Play Area
DCP05
DCP06
DCP07
Legend
Trial Pit with Soakaway
Trial Pit
Hand Pit (Foundation Exposure)
DCP

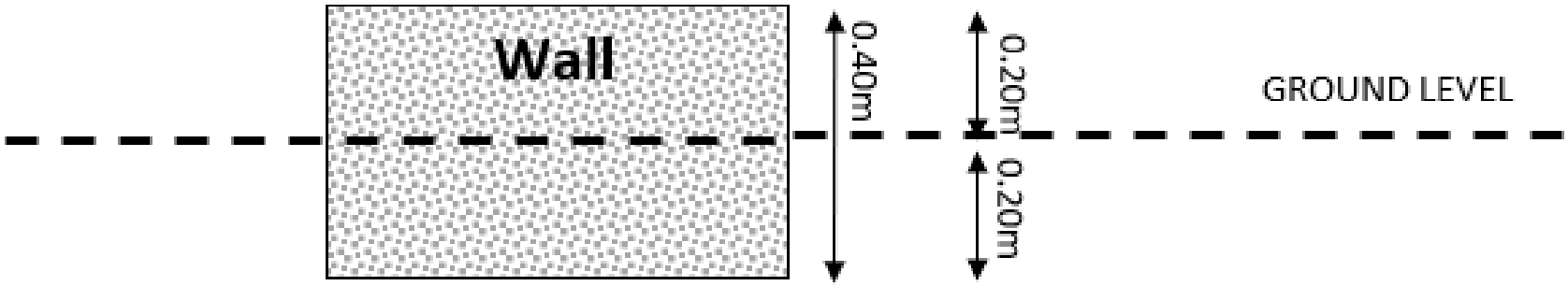
Drawing 04



Site Name: Gnoll Park	
Project Number: 17887	
Drawing Title: HP01 Foundation Sketch	
Drawing Number:	
Scale: Not to scale	

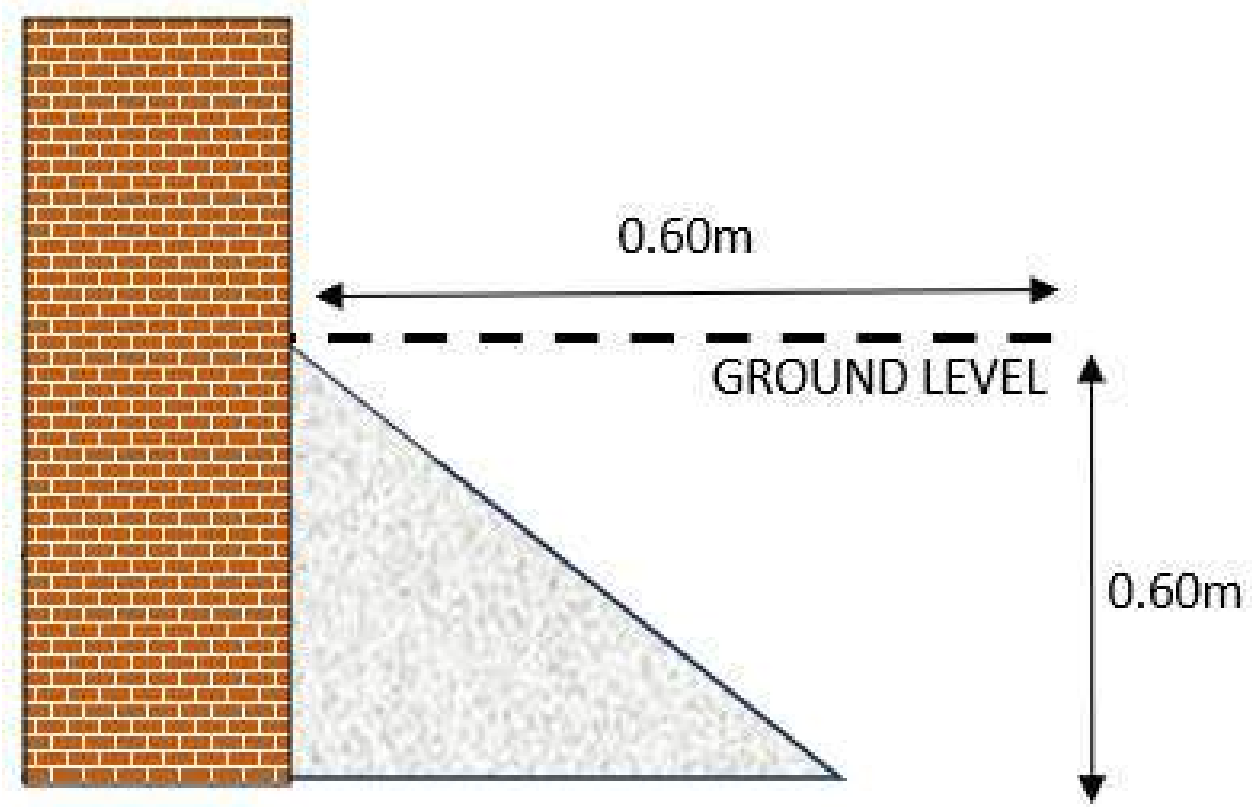
HP02

NOT TO SCALE



Site Name:	Gnoll Park
Project Number:	17887
Drawing Title:	HP02 Foundation Sketch
Drawing Number:	
Scale:	Not to scale

HP03 NOT TO SCALE



Site Name: Gnoll Park	
Project Number: 17887	
Drawing Title: HP03 Foundation Sketch	
Drawing Number:	
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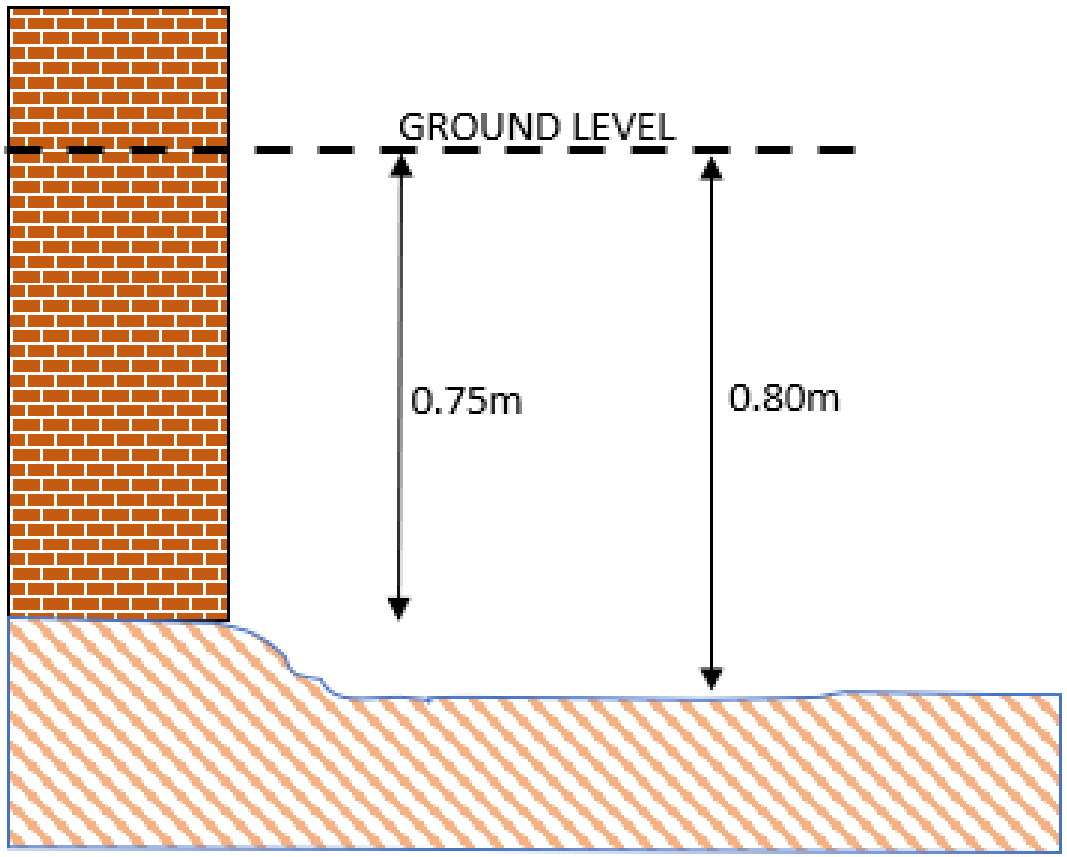
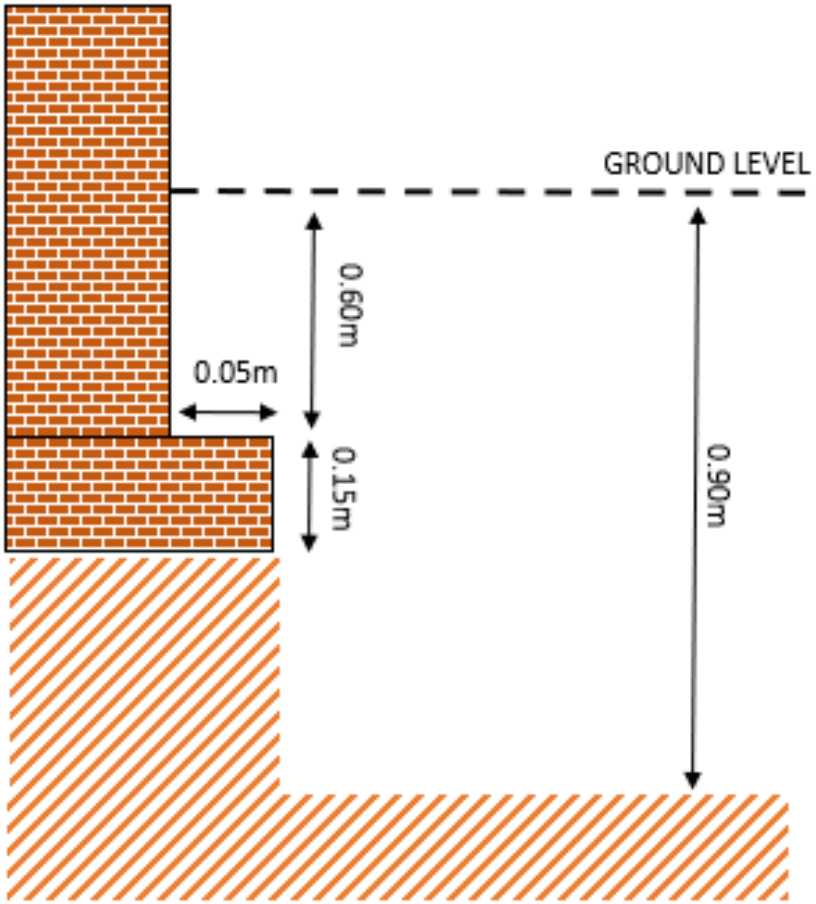


Site Name:	Gnoll Park
Project Number:	17887
Drawing Title:	HP04 Foundation Sketch
Drawing Number:	
Scale:	Not to scale

HP05

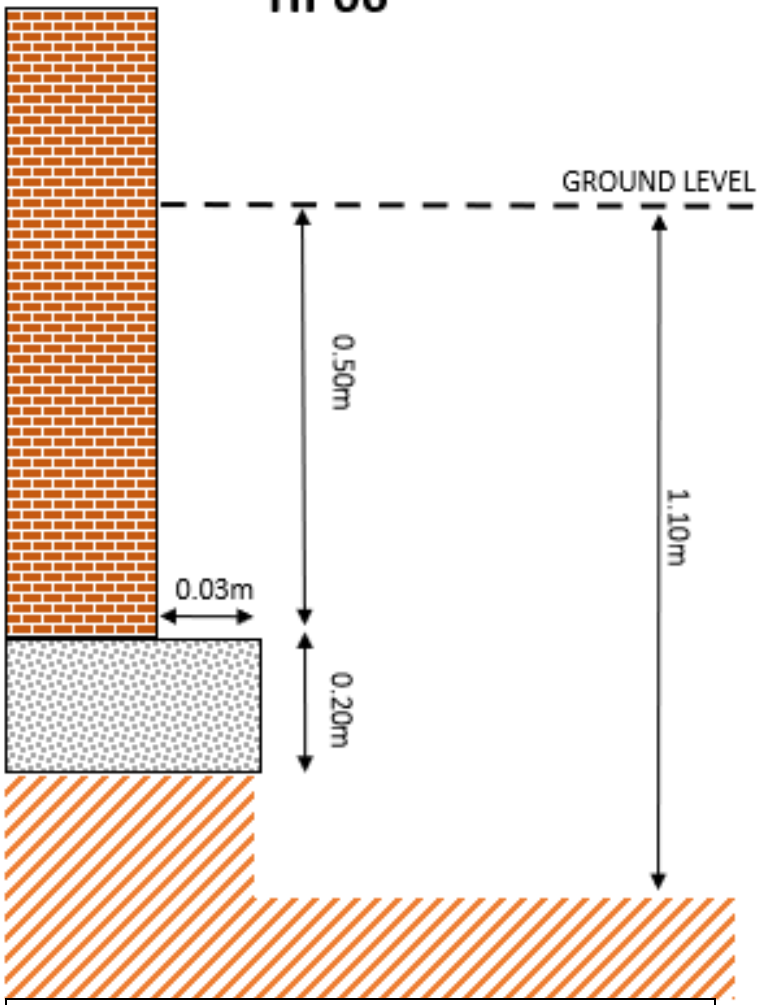
NOT TO SCALE



Site Name: Gnoll Park	
Project Number: 17887	
Drawing Title: HP05 Foundation Sketch	
Drawing Number:	
Scale: Not to scale	

HP06

NOT TO SCALE



Site Name: Gnoll Park

Project Number: 17887

Drawing Title: HP05 Foundation Sketch

Drawing Number:

Scale: Not to scale

terra firma

Geotechnical & Geoenvironmental Specialists

Terra Firma (Wales) Ltd. 5 Deryn Court, Wharfedale Road, Pentwyn, Cardiff CF23 7HA
Tel: 029 2073 5354 **Fax:** 029 2073 5433 **Email:** info@terrafirmawales.co.uk **www.terrafirmawales.co.uk**

APPENDIX H: LIMITATIONS AND EXCEPTIONS

Limitations and Exceptions

1. The advice given in this report is based on the guidelines available at the time of writing.

2. This investigation was conducted so as to generally comply with the relevant principles and requirements of BS10175: 2011 "Investigation of potentially contaminated sites - Code of Practice" and BS 5930:2015 “Code of Practice for Site Investigations”.

3. The Client is advised that the conditions observed on site by Jubb Consulting Engineers Ltd (JCE) at the time of the investigation or assessment are subject to change. Certain indicators of the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance or investigation and they may subsequently have become observable. Ground conditions, including geotechnical properties may vary between points of observation, sampling and testing.

4. Certain areas of site had restricted access or were inaccessible due to the presence of in-use buildings, facilities and live services, as identified in this report. These may require further investigation outside the scope of this present investigation.

5. Comments made relating to land gas or groundwater conditions are based on observations made at the time of an investigation unless otherwise stated. Land gas and groundwater conditions may vary as a result of seasonal or other effects.

6. Ground contamination often exists as small discrete areas of contamination and there can be no certainty that any or all such areas have been located, sampled and/or identified.

7. The findings and opinions conveyed in this report are based on information obtained from a variety of sources, including that from previous site investigations and chemical and geotechnical testing laboratories, and which JCE has assumed are correct. Nevertheless, JCE cannot and does not guarantee the authenticity or reliability of the information it has used or cited. JCE can accept no responsibility for inaccuracies within the data supplied by other parties.

8. This report is written in the context of an agreed scope of work between JCE and the Client and should not be used in a different context. In the light of additional information becoming available, improved practices and changes in legislation, amendment or re-interpretation of the assessment or report in whole or part may be necessary after its original submission.

9. This report is provided for sole use by the Client and is confidential to them. No responsibility whatsoever for the contents of the report will be accepted to anyone other than the Client.

10. This report is not a specification for works.

11. JCE believes that providing information about limitations is essential to help the Client identify and thereby manage risks.

12. JCE does not provide legal advice and the advice of the Clients’ legal advisors may also be required.

13. JCE retain the copyright in this report and all drawings reproduced in it.